The Nature of Goal Orientations and their Relationships with Performance, Mental Effort and Self-Efficacy

by

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Abstract

The concept of Goal Orientations (GOs), which was initially developed in the area of educational psychology, is becoming more and more popular in organisational psychology. Although research on GOs has come a long way since the 1970s there are still a number of conceptual and operational issues which have yet to be addressed. These include issues with the definition, dimensionality, stability and specificity of GOs. It is considered essential to address these concerns because they greatly influence the reliability, validity and accuracy of GO research. Consequently, one aim of this study was to examine the dimensionality, stability and specificity of GOs. It is believed that once enough evidence regarding these issues is gathered this could be used to develop a comprehensive definition of GOs. This study aims to contribute towards gathering such evidence. GOs have been examined both in terms of profiles as well as in terms of individual GO scales (non-profile perspective) in the past. This study uses both perspectives in order to attempt to provide as much information as possible regarding the issues being investigated. Another aim of this study was to investigate the relationships between GOs and performance, mental effort and self-efficacy. Further knowledge of these relationships is considered to be of benefit to organisations. So as to achieve these aims a longitudinal study, consisting of a survey and an experimental study, was carried out. The survey sample consisted of 641 participants whilst the experimental sample was made up of 73 participants. The participants were mainly Loughborough University students. However, there were also a number of employed and retired individuals participating in the study. Quantitative analysis was deemed to be the most appropriate method of analysis to achieve the aims of this study. Data analyses were carried out using SPSS and Latent Gold software packages. The results point towards GOs not being as general and stable as initially assumed. There is a strong possibility of GOs being domain-specific. Consistent with a number of past studies, the approach GOs were found to be more strongly related to self-efficacy, mental effort and performance on tasks than the avoidance GOs. Moreover, the relationships between GOs and these variables seem to be moderated by task characteristics. The profile analyses results revealed that a number of GO profiles obtained in this study were very similar to those obtained in other studies. A closer look at these common GO profiles indicated that some profiles were consistently more strongly related to self-efficacy, mental effort and performance than others. This study provides a foundation for future research studies to build on in order to better understand the nature of GOs and their relationships with self-efficacy, mental effort and performance.

Key Words: Goal Orientations, Achievement Motivation, Stability, Dimensionality, Specificity, Self-Efficacy, Mental Effort, Performance, Goal Orientation Profiles.

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Chapter 1: Introduction

1.0. Motivation at Work

I decided to do this PhD because I was interested in discovering more about motivation at work. I used to work in a call centre where there was a lot of competition to sell and do better than others. Unfortunately, I did not feel motivated to compete and sell more than others because I am not a competitive person. I was more interested in helping customers as best I could. I actually felt uncomfortable working for this organisation because of the strong competitive environment. I knew that there were other employees in this organisation who were not motivated by the competition. This experience led me to believe that if only organisations could be flexible in the way that they motivate employees, both the employees and the organisation would benefit so much more. As a result I was determined to carry out research on employee motivation.

1.1. Motivation Research

At the start of this PhD I read about various concepts being researched in relation to employee motivation including, intrinsic and extrinsic motivation (e.g. Ryan & Deci, 2000; Eccles & Wigfield, 2002), personality and motivation (e.g. Furnham et al., 1999; Judge & Ilies, 2002; Barrick et al., 2002) and the core self-evaluations (e.g. Judge et al., 1997; Erez & Judge, 2001; Judge et al., 1998). The concept of goal orientations however, was the one that interested me most. This is due to the fact that I could really relate to it because of my previous work experience. According to Elliot and Thrash (2001:144) a goal orientation (GO) is "a cognitive representation of a competence-based possibility that an individual seeks to attain", or more simply, goal orientations (GOs) are aims or goals that people have in situations involving competence. The basic model of GOs, which will be discussed in further detail in Chapter 2, suggests that people may adopt mastery or performance

GOs. The focus of the former is on learning and improving whilst the focus of the latter is on doing better than others. I realised that in the call centre they were promoting a performance GO whilst I had more of a mastery GO and this is probably a major reason why I did not feel comfortable working in that environment.

As I read more about the concept of GOs, a number of gaps in research became apparent. The one that bothered me the most was that many researchers assumed that GOs were general, stable traits. However, very little research, if any, explicitly investigated the stability and generality of GOs. A number of other inconsistencies in research also became evident. These included inconsistencies regarding the relationships between GOs and other variables, the definition of GOs, questions regarding the dimensionality of GOs and whether GOs should be investigated as individual GO scales or in terms of profiles. As a result I decided to focus my research on the concept of GOs and investigate these gaps in knowledge (and inconsistencies in research) in order to take knowledge on GOs a step further. In order to maintain clarity and provide the reader with a clear understanding of the structure of this dissertation a summary of each chapter is presented below.

1.2. Dissertation Structure

1.2.1. Chapter 2

This chapter provides an introduction to the concept of GOs. A description of how the GO concept developed is presented and the different perspectives of early GO researchers are reviewed. This chapter also addresses how the concept of GOs may be useful to organisations as well as the importance of GOs in organisational research.

1.2.2. Chapter 3

Chapter 3 illustrates the inconsistencies in research with respect to the definition and dimensionality of GOs. Over the years researchers proposed a number of definitions of GOs and have also used different terms when referring to the concept of GOs (for example, achievement goals and goal orientations). In this chapter a description of the different definitions and terms used is provided and the ones used in the current study are presented.

The dimensionality of GOs refers to how many types of GOs there are. As will be described in further detail in Chapter 3, the model of GOs developed from a 2-factor model (having 2 types of GOs), to a 3-factor model (having 3 types of GOs), to a 2x2 model (having 4 types of GOs). A description of each of these models is provided and research investigating the utility and accuracy of the three models is reviewed. A discussion regarding which model will be used in the current study (and why) is also provided in this chapter.

The notion of multiple GOs is also discussed in this chapter. It has been argued that people can and do adopt more than one GO simultaneously. Consequently there has been debate in literature as to whether GOs should be investigated as individual scales or in terms of GO profiles. Research using the profile perspective is described and a Research Question indicating how this perspective will be investigated further in this study is presented.

1.2.3. Chapter 4

This chapter focuses on inconsistencies in research regarding the stability and specificity of GOs. Some researchers consider GOs to be stable traits whilst others attempt to induce

GOs or view them as being more changeable. Also, a number of researchers investigate the interaction between trait and state GOs. These research studies are discussed and relevant Research Questions and Hypotheses for the current study are presented.

Another aspect of the 'lack of stability' of GOs is the idea of GOs being task-specific. A limited number of research studies have been carried out in order to investigate whether participants adopt the same or different GOs on different tasks. These studies are reviewed and, since there are still uncertainties regarding the task-specificity of GOs, Research Questions and Hypotheses are presented thus proposing how the current study will further investigate the task-specificity of GOs.

1.2.4. Chapter 5

In Chapter 5 the inconsistencies in research with respect to the relationships between GOs and self-efficacy, effort and performance are described. Since a number of studies reviewed attempt to investigate GOs as antecedents, moderators, mediators, and consequences of these variables, the problem of determining the direction of causality is discussed. Moreover, Research Questions and Hypotheses are put forward with the aim of clarifying current inconsistencies in research with respect to the relationships between GOs and self-efficacy, mental effort and performance.

1.2.5. Chapter 6

This is a short summary chapter which provides an outline of the issues discussed in the previous four chapters as well as a list of the Research Questions and Hypotheses being addressed in the current study.

1.2.6. Chapter 7

This is the methodology chapter. The research methods used in this study are described in detail and the reasons for using these methods are also provided. A longitudinal study, consisting of a survey and experiments, was considered to be the most appropriate means of data collection for testing the Hypotheses and answering the Research Questions proposed in the current study. Survey participants completed a Time 1 and Time 2 questionnaire whilst experimental participants completed the Time 1 and Time 2 questionnaires and attended two experimental sessions. 641 participants took part in the survey and 73 of these took part in the experiment. A detailed description of the data collection procedure is presented in this chapter along with a description of the measures used and the ethical considerations for the current study.

1.2.7. Chapter 8

Chapter 8 is the first of two results chapters. The main focus of this chapter is to provide information regarding the psychometric properties of the measurement scales used. In order to do this descriptive statistics, reliability analyses, exploratory and confirmatory factor analyses results are presented. These were used to decide which model of GOs should be used in the current study. In order to make a decision regarding model choice for GO **profiles**, Latent Class Analyses, which is similar to cluster analysis, were carried out and the results are presented in this chapter. So as to provide a good basis for understanding the relationships between the variables measured in this study two correlation matrices, one for the non-experimental participants and one for the experimental participants, are presented. A number of correlations of interest, that do not directly relate to any of the Research Questions or Hypotheses but which may provide a better understanding of these, are discussed in this Chapter.

Due to the complexity of the study, in order to make the results chapters more reader friendly and understandable, it was thought best to group the Research Questions and Hypotheses according to their common themes. Five main themes were chosen:

a) Types and characteristics of General GO profiles and model choice with respect to GO profiles

b) The relationships between GOs and other variables (self-efficacy, effort and performance)

c) The stability of GOs over time

d) The task-specificity of GOs

e) Interactions between state and trait GOs.

The results relating to the first theme are provided in this chapter. The correlation matrices presented in this chapter provided the answers to a number of Research Questions and Hypotheses regarding the relationships between GOs and other variables (Theme B). Although these were discussed last in the literature review, in order not to have too much repetition and so as to keep the Research Questions and Hypotheses in close proximity to relevant results, these are discussed in Chapter 8 too. Moreover, although some of the Research Questions and Hypotheses relating to Theme B required some further analyses these were still presented in Chapter 8 (along with the additional analyses) in order to maintain thematic consistency.

1.2.8. Chapter 9

The results of Research Questions and Hypotheses relating to the themes of stability over time, task-specificity, and interactions between state and trait GOs (Themes C, D and E) were presented in this Chapter. Statistical techniques used to obtain these results included Repeated Measures Analyses of Variance, Paired Samples t-tests, Fisher z tests, Correlational Analyses and Chi-square tests. The theme of stability over time is addressed first and is followed by the presentation of results relating to the theme of task-specificity. Finally, the results concerning the interactions between state and trait GOs are presented.

1.2.9. Chapter 10

This is the discussion chapter. In this chapter the results obtained from the current study are discussed and compared with those of previous research studies. The same order of themes as that in Chapters 8 and 9 is maintained in this Chapter. Therefore, the types and characteristics of GO profiles are discussed first. Subsequently, the relationships between GOs and self-efficacy, mental effort and performance are discussed. Next, the theme of stability of GOs over time is reviewed. This is followed by a discussion of the theme of task-specificity. The findings regarding the effects of the interactions between state and trait GOs on performance are then examined. In conclusion, a summary of the main findings of this study is presented.

1.2.10. Chapter 11

The conclusion chapter to this dissertation firstly addresses the theoretical and practical implications of the study. Following this, the limitations of the current study are discussed and recommendations for future research are made. This chapter ends with some concluding remarks regarding GO research and some reflective comments about this research project.

Chapter 2: The Development of Goal Orientations

2.0. The Development of the concept of Goal Orientations

The concept of GOs initially emerged in educational research. However, it quickly expanded to other areas of psychology, predominantly, sports and organisational psychology. The first part of this chapter provides a brief overview of the development of the GO concept. This is followed by a description of the development of GOs in organisational psychology. Subsequently, a section outlining the importance of GOs in organisational research is presented.

2.1. How did the concept of Goal Orientations develop?

According to Elliot (2005), the concept of GOs (which the author refers to as 'achievement goals') developed as a result of "independent and collaborative work by Carol Ames, Carol Dweck, Marty Maehr, and John Nicholls" (Elliot, 2005:53). Ames, Dweck, Maehr, and Nicholls conducted research on achievement motivation in an educational setting. The most prominent research on GOs was developed by Dweck and Nicholls, who produced a number of influential studies on GOs. Dweck and Nicholls eventually went their different ways and proposed two different conceptualisations of GOs. The following sub-section (2.1.1.) provides a description of the GO conceptualisation developed by Dweck. Subsequently, there is a description of the one developed by Nicholls (Section 2.1.2). Following this, a comparison of the ideas suggested by Dweck and Nicholls is made (Section 2.1.3).

2.1.1. Dweck's Conceptualisation of Goal Orientations

Dweck and Elliott (1983: 644) describe how "Intellectual performance and achievement have long been prized by our society…..However, too often we have assumed that the key to understanding achievement lies in defining intelligence, assessing its level, and charting its course of development."

Dweck and Elliott (1983) discuss how intelligence is not the only factor influencing performance in achievement situations but that ***motivation*** plays an extremely important part in determining the outcomes of such situations. Since they were working in an educational setting, Dweck and Elliott (1983) were specifically interested in a particular type of motivation, that is, 'achievement motivation'. They were predominantly interested in the concept of achievement motivation because they believed that this type of motivation, independent of a child's ability, profoundly influences a child's performance and achievement in the classroom (Dweck & Elliott, 1983).

In 1983, Dweck and Elliott wrote a chapter on Achievement Motivation. In this chapter they reviewed four major theories of achievement motivation and used these to create an integrated model of achievement motivation. The rest of this sub-section will focus on the chapter written by Dweck and Elliott (1983) since it provides an excellent explanation of Dweck's conceptualisation of GOs. The chapter also provides a good basis for understanding the differences and similarities between Dweck's and Nicholls' conceptualisations of GOs (which will be described in further detail in section 2.1.3.). Dweck and Elliott (1983) used the following definitions of motivation and achievement motivation as a guide to their work:

Dweck and Elliott (1983:645) defined motivation as: "referring to the contemporaneous, dynamic psychological factors that influence such phenomena as the choice, initiation, direction, magnitude, persistence, resumption, and quality of goal-directed (including cognitive) activity."

They also proposed that achievement motivation "may be viewed as involving goals relating to competence – increases in competence and judgements of competence." (Dweck & Elliot, 1983:645).

According to Dweck and Elliot (1983), in 1979 Nicholls and Dweck wrote a manuscript which was not published. In this manuscript Nicholls and Dweck (1979) identified three goals relating to competence: a learning goal and two performance goals. The learning goal "involves seeking to acquire knowledge or skills, to master or understand something new" (Dweck & Elliot, 1983: 645) whilst the performance goals involve goals "to obtain favourable judgements of one's competence, and to avoid unfavourable judgements of one's competence" (Dweck & Elliot, 1983: 645).

As will be emphasised in later chapters of this thesis, it is crucial to note that Dweck and Elliott (1983) specifically state that ***it is possible for all three of the above goals to coexist***. However, in order to be considered an 'achievement situation', at least one of the above-mentioned goals must be present. Dweck and Elliott (1983) suggest that the three goals proposed above integrate previous views of achievement motivation. They put forward that the definition of motivation as proposed by Heckhausen (1967) actually represents the learning goal, whilst both performance goals are embodied by the definition proposed by Crandall et al. (1960). In order to provide a foundation stone on which to build their chapter, Dweck and Elliott (1983:646) defined the study of achievement motivation as "the study of psychological factors (other than ability) that affect the adoption and pursuit of these goals – that affect whether an achievement goal is pursued, how vigorously it is pursued, and how long it is pursued."

Keeping the above definition in mind, the rest of their chapter focuses on identifying the 'psychological factors' that affect the adoption and pursuit of achievement goals. Dweck and Elliott (1983) focus on three main factors: cognitive, affective, and value-related factors. In discussing the cognitive factors Dweck and Elliot (1983) included their own work about 'Theories of Intelligence' which is described in further detail below.

Prior to suggesting the 'Theory of Intelligence', Dweck and Reppucci (1973), Dweck (1975), and Diener and Dweck (1978) carried out research in order to determine children's behavioural responses to failure. They discovered that although children had the same levels of ability some children did not persist in the face of failure whilst others did. According to Dweck and colleagues (Dweck & Reppucci, 1973; Dweck, 1975; & Diener & Dweck, 1978) some children responded to failure on achievement tasks with a 'mastery-oriented' pattern of behaviour. They attributed failure to insufficient effort. On the other hand, some children responded to failure with a maladaptive 'helpless' response in which they attributed failure to lack of ability. According to Dweck and Elliott (1983) these studies led Dweck and Elliott (1981) and Dweck and Bandura (1981) to propose the Theory of Intelligence. However, the work of both Dweck and Elliott (1981) and Dweck and Bandura (1981) were unpublished manuscripts and the first publication on the Theory of Intelligence seems to be that by Dweck and Elliott (1983).

According to the 'Theory of Intelligence' (Dweck & Elliott, 1981; Dweck & Bandura, 1981) individuals may hold two different perceptions of competence. Individuals may either view intelligence as "a fixed, general, judgable entity" or they may view intelligence as "an ever-growing repertoire of skills and knowledge" (Dweck & Elliott, 1983:654). The former view of intelligence is referred to as the 'entity' theory of intelligence, whilst the latter is referred to as the 'incremental' theory of intelligence.

Dweck and Elliott (1983) describe how different individuals seem to favour different theories of intelligence and how individuals who favour different intelligence theories also seem to favour different achievement goals. It was found that individuals making use of an entity theory of intelligence seem to adopt performance goals in achievement situations. Conversely, individuals holding an incremental theory of intelligence seem to adopt learning goals in achievement situations. Beliefs about theories of intelligence as well as the types of achievement goals adopted were found to influence consequences such as quality of performance, task choice, effort, and persistence on tasks. Thus, Dweck (1986) proposed that these achievement goals interacted with perceived ability in order to create certain behavioural patterns in achievement situations.

In 1986, Dweck used the ‘Theory of Intelligence’ to create a model of achievement motivation (please refer to Figure 2.1.). In this model Dweck (1986) proposed that the theory of intelligence adopted by an individual influences the type of achievement goal, which Dweck (1986) refers to as a ‘goal orientation’, adopted. In turn, the GO adopted, along with the person’s perception of ability elicit a particular behavioural response pattern.

Figure 2.1. Dweck’s Model of Achievement Motivation

Theory of Intelligence		Goal Orientation	Confidence in present ability		Behaviour Pattern
Entity Theory	→	Performance Goal	If High	→	Mastery-oriented
			But		
			If Low	→	Helpless
Incremental Theory	→	Learning Goal	If High	→	Mastery-oriented
			or		
			Low	→	Mastery-oriented

(Dweck, 1986:1041)

The review of literature carried out for the purposes of this study indicated that the term ‘Goal Orientation’ was used for the first time in the figure above drawn up by Dweck (1986). As shown in Figure 2.1., the term ‘Goal Orientation’ was used in order to refer to the competence-related goals that individuals adopted in achievement contexts, that is, when referring to achievement goals. The term 'Goal Orientation' was used more and more often in literature from this point on (that is, from 1986 onwards). A more detailed discussion regarding the term 'goal orientation' will be provided in Chapter 3.

2.1.2. Nicholls' Conceptualisation of Goal Orientations

Nicholls (1984) also carried out work relating to GOs in an educational setting. In his research, Nicholls (1984) assumes (what he refers to as) an "intentional view of behaviour". This view of behaviour maintains that "individuals' actions serve to achieve purposes efficiently or economically" (Nicholls, 1984: 328).

According to Nicholls (1984), in order to be able to predict behaviour, one must first determine an individual's goals and then discover whether this goal will influence behaviour. Nicholls (1984) was interested in achievement behaviour, which he defines as "that behaviour in which the goal is to develop or demonstrate – to self or to others – high ability, or to avoid demonstrating low ability." (Nicholls, 1984:328). Thus, according to Nicholls (1984) achievement behaviour is characterised by the goal of competence (or at least perception of competence). Nicholls (1984) suggests that competence (or ability) may be interpreted in different ways by individuals. When he carried out developmental research on conceptions of ability he found that young children judge their ability with reference to their own previous level of performance (self-referenced). Therefore, higher performance than their previous performance would indicate higher ability. According to Nicholls (1984:909) "Ability and effort are imperfectly differentiated by young children." This is because mastery of a task using high effort signifies more gains in mastery and higher ability than mastery of a task using low effort. On the other hand, for adolescents (and adults) evidence of learning/mastery alone does not provide sufficient evidence to justify high ability. They believe that to be judged as having high ability they must learn more than others with equivalent effort or achieve the same level of performance as others with less effort. Therefore, adolescents use an ‘other-referenced’ conception of ability which is less subjective than that of young children.

Since Nicholls (1984) suggests that young children are not yet able to differentiate between self-referenced and other-referenced conceptions of ability, he refers to young children’s conceptions of ability as the ***‘less differentiated’*** and adolescents’ and adults conceptions of ability as the ***‘more differentiated’***.

Nicholls and Jagacinski (1984) proposed that although adults are able to use the ‘more differentiated’ conception of ability, they may use either the more or the less differentiated conceptions of ability in different achievement settings (depending on their goals). When people use the less differentiated conception of ability, they compare their learning and performance to their own previous learning and performance (that is, perceptions of ability and performance are *self-referenced*). On the other hand, when people use the more differentiated conception of ability, they compare their ability and performance to the ability and performance of a reference group (Nicholls, 1984). Therefore, the two conceptions of ability create different frameworks for evaluating one’s ability and performance. In the case of a less differentiated conception of ability, individuals consider tasks to be difficult if they expect to fail on them. In this case, increased mastery of the task indicates higher ability. In addition, since effort leads to more learning (which is an indication of high ability in this case) then effort is associated with high ability. On the other hand, in the case of the more differentiated conception of ability, both ability and task difficulty are specified by the performance of others. In this case a task is considered difficult if other people fail on it. High ability is evident if one uses less effort than others in completing a task (and vice versa for low ability).

Nicholls (1984) makes use of the term 'task-involvement' to indicate the state when an individual uses the less differentiated conception of ability in evaluating ability and performance. The term 'ego-involvement' refers to the state when an individual uses the more differentiated conception of ability for evaluating ability and performance.

2.1.3. Comparison of Dweck's and Nicholls' conceptualisations of Goal Orientations

From the above descriptions of Dweck's and Nicholls' work on achievement motivation it is evident that they agree that individuals adopt particular goals (which they refer to as 'achievement goals' or 'goal orientations') in an achievement situation. In addition, both Dweck and Nicholls agreed that in order to predict behaviour in an achievement situation one must look at an individual's achievement goals. Although initially they seemed to have suggested that there are one learning and two performance achievement goals in their early work (unpublished manuscript 1979), each seems to have later used different terms for achievement goals: Dweck used the terms 'learning' and 'performance' GOs whilst Nicholls used the terms' 'task' and 'ego' orientations. A discussion regarding whether the previously mentioned terms actually refer to the same constructs (or not) is provided in Chapter 3 (Section 3.1.1.).

The main difference between Dweck's and Nicholls' conceptualisations is that each developed a different theory about predicting individuals' adoption of the different achievement goals. Dweck proposed the Theory of Intelligence (Dweck & Elliott, 1981; Dweck & Bandura, 1981) whereas Nicholls proposed the 'conceptions of ability' theory (1984).

As a result of their different theories of ability, Nicholls (1984) and Dweck (1986) differ in terms of their understanding about effort and ability. Dweck (1986) seems to assume that beliefs about effort and ability are quite stable individual characteristics. Conversely, Jagacinski and Nicholls (1984) proposed that individuals have different perceptions about ability and effort depending on the situation. According to Jagacinski and Nicholls (1984: 910), “In previous work on attributions and affects it has been implicitly assumed that the meanings of effort and ability are fixed.” Jagacinski and Nicholls (1984) challenged this belief by proposing that the understanding of effort and ability may change according to the situation. The results of their research indicate that in competitive situations, individuals tend to adopt an ego-orientation and judge their ability as being high only when effort was low in comparison to others. On the contrary, when individuals adopt a task-orientation (in a non-competitive environment), they judge their ability as being high when effort is high. The results of this study indicate that conceptions of ability and effort are not as stable as previous researchers imagined them to be. In the 1990s, the model of GOs was further developed. However, the various models of GOs shall be described in further detail in Chapter 3.

2.2. When was the concept of Goal Orientations introduced into the Organisational setting?

In 1989, Wood and Bandura conducted a research study “governing performance in a simulated organisation” (Wood & Bandura, 1989). They made use of the concepts of effort and ability proposed by Dweck and Elliott (1983). It was suggested that people who adopt an incremental perspective of ability tend to take on a learning GO whereas individuals who adopt an entity perspective of ability are more likely to take on a performance GO. However, in their research, Wood and Bandura (1989) propose that these perceptions of ability are changeable and may be induced by situational characteristics (e.g. if an instructor emphasises that a certain task is improvable with practice, then it is more likely that individuals will adopt an incremental perspective of ability). They found that when individuals assumed an entity conception of ability they showed decreased perceived self-efficacy, set low organisational goals and used less efficient analytic strategies than they did at the beginning of the experiment. In contrast, participants who assumed an incremental perspective of ability maintained the same level of perceived self-efficacy (as they did at the start of the experiment), set challenging organisational goals and used effective analytic strategies.

Wood and Bandura (1989) attempted to induce mastery and performance GOs in their organisational research. Consequently, they seem to have been two of the first researchers to make use of the concept of GOs in the organisational setting.

In 1993, Farr et al. (p.194) stated that the GO approach is "not well integrated at present into the I/O literature". During the 1990s studies on GOs in the organisational setting became more frequent. Initially, studies focused on how GOs relate to sales performance (e.g. Sujan et al., 1994; Kohli et al., 1998; VandeWalle et al., 1999). Eventually studies began to focus on GOs with respect to other areas of organisational behaviour such as training (e.g. Ford et al., 1998; Hertenstein, 2001; Kozlowski et al., 2001; Rogers & Spitzmueller, 2009), performance other than sales performance (e.g. Seijts et al., 2004; Dragoni, 2005; Mehta et al., 2009; Steele-Johnson et al., 2000) and feedback-seeking behaviour (e.g. Janssen & Prins, 2007) amongst others.

In general, the studies carried out in an organisational setting focused on determining the relationships between GOs and performance (e.g. sales performance, extent of learning and transfer resulting from training courses, team performance, and feedback-seeking behaviour leading to improvements in performance). Additionally, most of these studies used a two-factor model of GOs (consisting of mastery and performance GOs). In the next Chapter it will become evident how a two-factor model is considered to be inadequate for measuring GOs since there are more differentiated models available which were found to provide a better understanding of GOs. Therefore, although GO research has been carried out within an organisational setting, the majority of GO research is still carried out in the educational sector. Further research examining GOs in the organisational setting is definitely required since it has been quite limited so far and, as described next, there are numerous benefits of carrying out such research.

2.3. Why is Goal Orientation research in organisations so important?

DeShon and Gillespie (2005) provide an important argument which offers a suitable answer to the question posed above. They describe how GO research has been able to provide "at least a partial answer" (DeShon and Gillespie, 2005:1096) to important questions that managers within organisations quite often pose. One such question is why certain individuals are continuously attempting to strive for self-improvement whilst others are happy to experience life using the same set of skills and knowledge. Another question relates to why some individuals are happy to take on challenges whilst others avoid challenges or make use of self-handicapping behaviour in order to avoid challenging tasks. GO research has been somewhat successful in providing answers to such questions. Research on GOs has also provided answers as to why some people are interested in performing better than others whilst other people are not as concerned about their performance relative to others (Nicholls et al., 1989).

The utilisation of GOs in organisational research has enabled researchers to better understand, as well as make predictions about, learning and behaviour in a wide array of organisational contexts. These include training, sales performance, feedback seeking, performance adaptability (DeShon and Gillespie, 2005) as well as cross-cultural adjustment (Gong, 2003). These organisational contexts are, beyond doubt, important for businesses in order to be able to maintain a competitive edge.

Thus, not only has GO research proved to be beneficial in enhancing knowledge by promoting a better understanding of human behaviour but it has also been successful in providing recommendations to businesses in order for them to be able to increase their productivity. For example, as a result of their research regarding the relationship between GOs and performance, Lee et al. (2006:495) recommend that "when a performance goal orientation is dominant, managers should structure employee tasks so that they are specific, quantifiable and easy to master". They also recommend that managers should delegate tasks that promote or require a future orientation (e.g. strategic planning) to employees having a dominant mastery GO.

In addition to the use of GOs in the previously mentioned organisational contexts, it is possible that GOs may also be used in recruitment and selection. If one attempts to determine which GOs are valued by an organisation then it is possible to find suitable employees by matching these GOs with those adopted by prospective employees. This might also benefit prospective employees because they may feel more comfortable working in an organisation with a culture that matches their personal GOs. However, this would only be possible if GOs are stable dispositional traits. As will become evident in Chapter 4 (Section 4.1.) there is currently not enough evidence to make any claims regarding the stability of GOs. Therefore, the viability of using GOs in recruitment and selection is currently an unexplored issue. Consequently, as argued by Farr et al. (1993: 194) "We believe that I/O psychology theory and research would be well served by consideration of these constructs."

2.4. Synopsis

In this chapter a summary of the development of the concept of GOs and the importance of researching and further understanding this concept in organisational settings was provided. The next chapter (Chapter 3) focuses on the issues present in GO literature. It is crucial to understand these issues since this will provide a basis for understanding the aims and objectives of this research study.

Chapter 3: Conceptual Inconsistencies in Goal Orientation Research: Definition and Dimensionality of Goal Orientations

3.0. Research Issues with regards to Goal Orientations

Although research on GOs has come a long way since the 1970s, there are still many conceptual and operational issues which have not been addressed. These ambiguities in GO research have resulted in a large number of inconsistent research results which are extremely hard to reconcile (DeShon & Gillespie, 2005).

According to DeShon and Gillespie (2005) there are three main conceptual inconsistencies in GO research. These include issues with definition, dimensionality, and stability. There are also questions regarding the specificity of GOs, that is, whether GOs are general or more task-specific. This chapter will focus on the definition and dimensionality issues. The stability and specificity issues will be discussed in the next chapter.

3.1. Definition

The review of literature (carried out for the purposes of this study) indicated that there is a lot of confusion over the definition of GOs. This confusion is compounded by the fact that different researchers use different terms when referring to GOs. In this section the concerns surrounding the use of different terms in GO literature are first described. Following this, the problems with regards to the definition of GO are discussed.

3.1.1. Different terms, same concepts?

GO literature has been rather confusing from the start since even the earliest studies on GOs have been laced with different terms and definitions of the concept. This is evident in

Dweck's (1986) study when she uses the terms 'achievement goals' and 'goal orientations' interchangeably. When Dweck (1986) first suggested the terms 'learning' and 'performance', she classified these as *achievement goals*. In the same article she uses the term 'goal orientation' to refer to the type of achievement goals that individuals are oriented towards (Dweck, 1986: 1041). This issue of different terms extends to the ***types*** of achievement goals too. As discussed in Chapter 2 (Section 2.1.1.), initially Dweck and Nicholls seem to have proposed three achievement goals: one learning and two performance goals. However, as seen in later articles both researchers seem to have abandoned the idea of three achievement goals and focused on two. As a result of their different theories about predicting the adoption of GOs they also used different terms for the GOs. Dweck seems to have stuck with the original 'learning goal orientation' and 'performance goal orientation' whilst Nicholls (1984) suggested the terms 'task-involvement' and 'ego-involvement'.

An additional problem creating confusion in GO literature results from the fact that many researchers make use of the term 'mastery orientation' when referring to a 'learning' GO (e.g. Meece & Holt, 1993; Harackiewicz & Elliot, 1993, and Senko & Harackiewicz, 2005, amongst others). The term 'mastery' seems to have been proposed by Diener and Dweck (1978). However, contrary to its use in many GO articles, Dweck uses the term 'mastery-oriented' when referring to a behavioural response NOT a GO. As mentioned in Chapter 2 (Section 2.1.1.) Dweck makes use of the term 'learning goal' when referring to the GO. A *mastery-oriented response* refers to the positive behaviours exhibited by an individual who adopts a learning GO (e.g. persistence on tasks). The *learning GO* refers to the goal that the individual is pursuing in that achievement situation, that is, the goal of seeking to increase competence. The use of the terms 'mastery-oriented' and 'learning goal' as used by Dweck (1986) are evident in her article (Dweck, 1986:1041).

As will be discussed later on in this chapter, researchers eventually proposed that there are three types of GOs. The 'performance' GO was bifurcated into two GOs which are generally referred to as 'performance-approach' and performance-avoidance' GOs. However, they are also referred to as 'proving' and 'avoiding' GOs respectively, (e.g. in VandeWalle et al., 2001) or as 'self-enhancing ego orientation' and 'self-defeating ego orientation' respectively (Skaalvik, 1997).

Pintrich and Schunk (2002) discuss how there is still some debate between researchers as to whether these different terms actually refer to the same constructs. Pintrich (2000a:96) suggests that it is important for researchers to

maintain distinctions in terms or labels when they reflect important and real differences in the terms, theories, and supporting empirical data, but not to let terms proliferate when they signify distinctions without any real theoretical or empirical differences.

The problem with this solution is that although there seem to be slight differences between the different terms used, there is also a great deal of overlap. In addition, it seems as though many researchers acknowledge that the terms refer to slightly different conceptualisations of GOs but have still used them interchangeably in literature. This has resulted in a great deal of confusion and misunderstanding. At this point, I believe that the solution proposed by Wigfield and Cumbria (2010) is by far the most appealing due to its simplicity in solving the matter. They suggest that although they acknowledge that the different terms do in fact reflect some distinctions in the conceptualisations of these GOs, they also "believe that the similarities are stronger than the distinctions between them" (Wigfield & Cumbria, 2010: 7). They decided to use the terms 'mastery' and 'performance' goals in their study. The terms 'mastery' and 'performance' will also be used in this study. These terms were chosen due to the fact that the measure of GOs used in this study makes use of them and, in addition, according to Pintrich et al. (2003) they are the most commonly used terms in GO literature.

3.1.2. What is the definition of Goal Orientations?

Elliot and Thrash (2001) describe how there is no single widely accepted definition of GOs. They explain how theorists generally make use of one of two basic approaches in defining achievement goals. The first approach describes achievement goals "in terms of the *purpose* for which a person engages in achievement behaviour" (Elliot & Thrash, 2001:140) whilst the second approach involves characterising "achievement goals as a network or integrated pattern of variables that together create an *orientation* toward achievement tasks" (Elliot & Thrash, 2001: 140).

Elliot and Thrash (2001) explain how theorists using the first definitional approach understand achievement goals as being a combination of a) the reason for behaviour and b) the outcome an individual would like to attain in an achievement setting. Conversely, theorists using the second definitional approach view GOs as the general orientations adopted on tasks which result from numerous beliefs about success and ability, effort, and standards for evaluation. These beliefs, effort, and standards of evaluation are thought to be interrelated and thus provide a framework for approaching achievement settings.

Elliot and Thrash (2001) offer a number of limitations for the two definitional approaches described above. For example, they argue that the definitions above view achievement goals as being a combination of variables which make it difficult to determine which of the variables should be considered to be responsible for any hypothesised or observed effects. In addition, they state that there are no guidelines available for determining how many characteristics of the achievement goal must be present before a person may be described as having adopted that achievement goal.

In light of these limitations, Elliot and Thrash (2001) proposed that achievement goals could be defined as “a cognitive representation of a competence-based possibility that an individual seeks to attain” (Elliot and Thrash, 2001:144). This definition is different from the first definitional approach (described above) in that the reason for achievement behaviour and the aim of achievement behaviour are kept separate. Additionally, it is different from the second definitional approach since the processes associated with the aim are kept separate from the aim itself.

Another study which paid significant attention to the concern of defining GOs was carried out by DeShon and Gillespie (2005). They reviewed 88 GO studies, and came up with five categories of definitions: goals, traits, quasi-traits, mental frameworks, and beliefs. According to DeShon and Gillespie (2005:1097) the ‘goals’ definition of GOs is the most commonly used (29 studies). Researchers using this approach view “goal orientation as the adoption and pursuit of specific goals in achievement contexts”. The second category proposed is that of ‘traits’; 26 studies fit into this category. Researchers using this definition “view goal orientation as a trait or disposition that is responsible for individual differences in behavior” (DeShon & Gillespie, 2005:1097). The third definitional category proposed is that of ‘quasi-traits’ (9 studies in this category). In this definitional approach, GOs are viewed “as a somewhat stable trait that can be modified by the appropriate situational characteristics” (DeShon & Gillespie, 2005:1101). The fourth category proposed is the ‘mental framework’ category (9 studies in this category). Researchers with studies in this category view GOs as “a mental framework consisting of a wide variety of beliefs, affects, goals, and cognitions that covary in achievement contexts and result in achievement related behaviour” (DeShon & Gillespie, 2005:1101). This category is somewhat similar to the second definitional approach described by Elliot and Thrash

(2001). The final category proposed is that of 'beliefs' (9 studies in this category). Researchers having studies in this category view GOs as "following from an individual's beliefs or implicit theories concerning the malleability of ability" (DeShon & Gillespie, 2005:1101). There were three studies which DeShon and Gillespie (2005) could not classify due to insufficient detail. In addition, they had a category which they referred to as 'other' in which they placed two studies that did not clearly fit into any of their five categories.

Although DeShon and Gillespie (2005) seem to have clear-cut categories of the different understandings of GOs it is not necessarily as easy as it seems to determine which definition of GOs researchers adopt in their studies. As DeShon and Gillespie (2005) mention themselves, a significant amount of judgement was required when classifying the studies. Some of the categories are questionable. For example, it is debatable whether the 'trait' and 'quasi-trait' categories are significantly different from each other. Nowadays, many researchers using the trait approach tend to accept that situational factors may influence dispositional traits and the resulting behaviour (e.g. Button et al., 1996). Moreover, there is the difficulty of the three studies having insufficient detail as well as the 'other' category. Additionally, as DeShon and Gillespie (2005) mention, a number of researchers tend to use different definitions of GOs in the same study (e.g. Brett & Atwater, 2001; Yeo & Neal, 2004).

After their review of GO studies, DeShon and Gillespie (2005) propose a model of goal-oriented behaviour which they refer to as the 'Motivated Action Theory'. According to their model, "*Goal orientation* is a label used to describe the pattern of cognition and action that results from pursuing a mastery-approach, performance-approach, or performance-avoid goal at a particular point in time in a specific achievement situation." (DeShon & Gillespie, 2005:1114). Since this definition states that GO is *the result of* mastery-approach, performance-approach, and performance-avoidance it is not consistent with what is meant by GOs in the current study (or most of GO literature!). Consequently, this definition will not be used for the present study. After careful consideration, it was decided that the definition proposed by Elliot and Thrash (2001) will be used as a guide for this study.

Therefore, in this study GOs are viewed as cognitive representations of competence-based possibilities that individuals want to achieve. This definition was chosen since it is the most comprehensive and well-researched definition of GOs found in literature. It is the result of an in-depth investigation into the various definitions of GOs and an assessment of their strengths and limitations. The authors who proposed this definition clearly indicate an in-depth understanding of the history and development of GOs. Moreover, this definition was used as a guide for developing the GO questionnaire used in this study, that is, the Achievement Goal Questionnaire-Revised (please refer to Section 3.2.3. for an explanation of the choice of questionnaire). Consequently, it was considered appropriate to use this definition in order to maintain definitional consistency throughout this study.

3.2. The Dimensionality of Goal Orientations

As described in the introduction to this chapter the problem of dimensionality of GOs is another area of great debate within GO literature. Researchers have used different models of GOs in order to guide their research and to date there is still disagreement regarding which model of GOs is best. The development of the different models of GOs as well as the reasoning behind their use is described in this section.

3.2.1. The Two-Factor Model of Goal Orientations

As discussed in Chapter 2 (Section 2.1.1.), initially, Dweck and Nicholls (1979) proposed that there are three types of achievement goals: one learning goal and two performance goals. However, eventually they both focused on two main achievement goals: a learning/task GO and a performance/ego GO. This understanding of GOs is referred to as the 'two-factor model of goal orientations'. A substantial amount of research on GOs makes use of a two-factor model of GOs (e.g. Ames, 1992; VandeWalle et al., 1999; Anderman & Midgley, 1997; and Phillips & Gully, 1997, amongst others).

Although Dweck and Nicholls initially suggested two types of performance GOs "the concept of independent approach and avoidance goal orientations received very little theoretical and empirical attention and was soon overlooked by researchers" (Smith et al., 2002: 156). However, a number of years later, the idea of the presence of three types of GOs was rediscovered and developed further by Elliot and colleagues (Elliot & Harackiewicz, 1996; Elliot et al., 1999) as described in Section 3.2.2. Due to the fact that three GOs were proposed, the model developed by Elliot and Harackiewicz (1996) is referred to as the three-factor model of GOs.

3.2.2. The Three-Factor Model of Goal Orientations

Throughout their research Elliot and colleagues (e.g. Elliot & Harackiewicz, 1996; Elliot, 1999; Elliot & Thrash, 2001; and Elliot & Covington, 2001) describe how studies on achievement motivation have always incorporated an approach-avoidance distinction. For example, according to Elliot and Harackiewicz (1996), Lewin et al. (1944) as well as McClelland et al. (1953) suggested that there are two types of motivational orientations, one focusing on achieving success and the other on avoiding failure. Thus, the idea of approach and avoidance motivations seems to have been present quite early on in motivation research.

As a consequence of early motivation theorists (e.g. McClelland et al., 1953) emphasising the importance of the approach-avoidance distinction, Elliot and Harackiewicz (1996: 462) suggested "that the conventional achievement goal dichotomy be expanded in order to incorporate independent approach and avoidance components within the performance goal orientation". Thus, they proposed a three-factor model of GOs. This three-factor model consisted of a 'mastery' GO [which retained the same meaning as the learning GO described by Dweck (1986) in earlier research], and the performance GO was divided into what they refer to as a 'performance-approach' GO and a 'performance-avoidance' GO. The performance-approaqch GO consists of "attaining favourable judgements of competence" (Elliot & Harackiewicz, 1996:461), whilst the performance-avoidance GO entails "avoiding unfavourable judgements of competence" (Elliot & Harackiewicz, 1996: 461).

Apart from the fact that early motivation theorists emphasised the importance of the approach-avoidance distinction, it was evident from research that the performance GO was not being measured accurately enough. Research studies investigating the consequences of GOs produced very different results with regards to the performance GO and quite consistent results with respect to the mastery GO. Many studies using the two-factor model found that a mastery GO was found to be consistently positively related to persistence on difficult tasks, use of deep cognitive strategies, and attributing failure to lack of effort rather than lack of ability (e.g. Ames & Archer, 1988; Dweck & Leggett, 1988; Meece & Holt, 1993; Pintrich & Garcia, 1991; Wolters et al., 1996). On the other hand, the results of studies investigating the relationships between a performance GO and other variables were rather inconsistent. Some studies found significant positive relationships between a performance GO and positive outcomes such as self-efficacy (Bandalos et al., 2003) and task performance (Harackiewicz et al., 1997). Other studies found no significant relationships between a performance GO and task performance (e.g. Schraw et al., 1995) and yet other studies found a performance GO to be negatively correlated with task performance (e.g. Bell & Kozlowski, 2002). These inconsistencies in research regarding the performance GO provided Elliot and colleagues with another reason to include the approach-avoidance distinction in GO literature.

In order to test the utility of distinguishing between a performance-approach GO and a performance-avoidance GO, Elliot and Harackiewicz (1996) conducted a study investigating the effects of the two types of performance GOs on intrinsic motivation. By using sequential simultaneous regression they found that a performance-approach GO did not undermine intrinsic motivation but a performance-avoidance GO did. Elliot et al. (2005) carried out an experimental study to investigate the effects of mastery, performance-approach, and performance-avoidance GOs on performance. They used planned comparisons in order to analyse their data. The results of their study indicate that performance-approach and performance-avoidance GOs have different effects on performance. The performance-avoidance GO was found to undermine performance relative to performance-approach and mastery GOs.

Further support for the utility of the approach-avoidance distinction was obtained by Church et al. (2001) who indicated how performance-approach, performance-avoidance, and mastery GOs have different antecedents. By using hierarchical linear modelling they found that lecture engagement seems to positively predict a mastery GO (.34, $p < .05$); evaluation focus was found to positively predict performance-approach (.50, $p < .05$) as well as performance-avoidance GOs (.44, $p < .05$) and negatively predict a mastery GO (-.13, $p < .05$); and harsh evaluation (which refers to work being marked strictly) was found to positively predict a performance-avoidance GO (.35, $p < .05$) and negatively predict a mastery GO (-.23, $p < .01$). Thus, it seems as though the two types of performance GOs proposed have somewhat different antecedents.

A number of studies assessing GO measures provide further support for the three-factor model of GOs. For example, Elliot and Church (1997) developed and tested scales measuring performance-approach and performance-avoidance GOs. Factor analysis indicated that the performance-approach and performance-avoidance scales were different and the results indicated the presence of three separate factors (i.e. mastery, performance-approach, and performance-avoidance GOs).

Research carried out by Day et al. (2003) provides additional evidence for the use of a three-factor model. They found that a two-factor model "does not adequately explain the nature of the goal orientation instruments." (Day et al., 2003:448). They also found that measures of general performance GO are correlated with measures of both performance-approach and performance-avoidance GOs. Thus, they suggest that one should be cautious in making use of results of studies based on a two-factor model as opposed to a three-factor model of GOs.

Midgley et al. (1998) carried out research in order to validate scales measuring the three types of GOs proposed by Elliot and Harackiewicz (1996). The scales developed were found to have good convergent and discriminant validity and the confirmatory factor analysis provided additional support for a three-factor model of GOs. In another study on the three-factor model, Skaalvik (1997) attempted to create a measure for the three types of GOs as well as a measure for work avoidance. The results of his exploratory factor analysis revealed good factor loadings for items on each of the predicted four factors and low factor loadings for items on factors other than the predicted ones. These results indicated that the performance-approach and performance-avoidance GOs were found to be different factors. They were also found to be weakly correlated with each other.

It is interesting to note that although researchers show how the two-factor model is not accurate enough and provide reasonable support for using a 3-factor model (e.g. Elliot &

Harackiewicz, 1996; Midgley et al., 1998; Skaalvik, 1997; Elliot et al., 2005; Church et al., 2001; Day et al., 2003), a number of studies still make use of the 2-factor model of GOs in their research (e.g. Yeo & Neal, 2004; Kozlowski et al., 2001; Bereby-Meyer et al., 2010; Hanrahan & Cerin, 2009). There may be a number of possible explanations for this. For example, the two-factor model is the original model proposed by early GO theorists. However, a closer look at literature reveals that early GO theorists actually proposed three types of achievement goals initially (as mentioned in Section 3.2.1.). This provides further support for the use of a three-factor model as opposed to a two-factor model. Another possible explanation for the popular use of the two-factor model is that many researchers coming from an educational psychology background believed that a mastery GO is adaptive and a performance GO is non-adaptive (e.g. Meece & Holt, 1993; Schraw et al., 1995). Consequently, they were not really interested in the performance GO. These researchers were more focused on the mastery GO and finding ways in which to encourage students to adopt a mastery GO.

The prevailing belief of the mastery GO being adaptive and the performance GO being negative might have biased and stalled the development of GO literature. This belief was held by the majority of GO theorists until the late 1990s (e.g. Phillips & Gully, 1997; VandeWalle et al., 1999). As was made evident in this section, bifurcating the performance GO led researchers to discover that a performance-approach GO has quite positive outcomes whilst a performance-avoidance GO has rather negative outcomes. Therefore, promoting a performance-approach GO may be as important as promoting a mastery GO.

3.2.3. The Four-Factor Model of Goal Orientations (2x2 approach)

After proposing and testing the three-factor model of GOs, Elliot continued to investigate the dimensionality of GOs and, as a result, he further developed the model of GOs. In

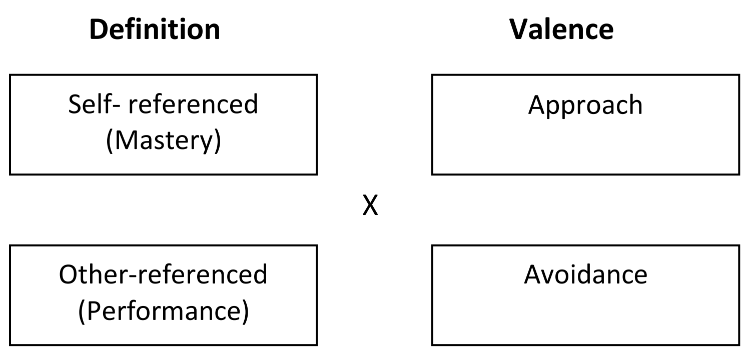
1999, Elliot proposed that even the mastery GO should be bifurcated into approach and avoidance components because “a full 2x2 crossing of the performance-mastery and approach-avoidance distinctions seems necessary to account for the broad spectrum of competence-based strivings.” (Elliot, 1999:181). Pintrich (2000b) also discussed the idea of having a 2x2 model of GOs. He stated that although (at the time) there was no empirical evidence supporting the presence of a mastery-avoidance GO, research should be carried out in order to investigate this concept further. The research proposed by Pintrich (2000b) was carried out by Elliot and McGregor (2001) who described how competence is “at the conceptual core of the achievement goal construct” (Elliot & McGregor, 2001:501). They suggest that achievement goals (and competence) may be distinguished along to two basic dimensions: **definition** and **valence**.

Definition: According to Elliot and McGregor (2001) achievement goals may be defined in terms of the standards used in performance evaluation. They propose that three types of standards are used in performance evaluation: absolute, intrapersonal, and normative standards. Absolute standards refer to the requirements of the task itself; intrapersonal standards refer to evaluation compared with an individual’s past performance or maximum potential; whilst normative standards refer to comparing one’s performance to that of others. Elliot and McGregor (2001) describe how absolute and intrapersonal standards are very similar and often hard to distinguish, therefore they collapsed these into one category. Consequently, they explain how achievement goals can be distinguished depending on whether performance is defined as self-referenced (mastery GO) or other-referenced (performance GO).

Valence: According to Elliot and McGregor (2001: 502) “Competence is valenced in that it is either construed in terms of a positive, desirable possibility (i.e. success) or a negative, undesirable possibility (i.e. failure).” It seems as though people tend to process most stimuli in terms of valence and this seems to be done unconsciously. This processing is, in turn, alleged to induce approach and avoidance behavioural predispositions. Thus, they suggest that GOs should also be distinguished according to whether they have approach or avoidance valences.

The result of distinguishing GOs along definition and valence is a four-factor model, or as it is better known, a 2x2 factor model. Achievement goals are distinguished along two basic dimensions (definition and valence) both of which have two ends of a continuum (***definition*****:** self-referenced vs. other-referenced; and ***valence*****:** approach vs. avoidance) as illustrated in Figure 3.1.

Figure 3.1.The 2x2 model of Goal Orientations



As indicated in the model above, Elliot and McGregor (2001) proposed that there are four main types of GOs: mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance GOs. Pintrich and Schunk (2002) provide an extremely clear understanding of what is meant by these terms as presented in the table below.

Table 3.1. An Explanation of the Four Types of Goal Orientations

	Approach Focus	Avoidance Focus
Mastery orientation	• Focus on mastering task, learning, and understanding. • Use of standards of self-improvement, progress, deep understanding of task.	• Focus on avoiding misunderstanding, avoiding not learning or not mastering task. • Use of standards of not being wrong, not doing task incorrectly.
Performance orientation	• Focus on being superior, being the smartest, best at task in comparison to others. • Use of normative standards such as getting best or highest grades, being top or best performer in class.	• Focus on avoiding inferiority, not looking stupid or dumb in comparison to others. • Use of normative standards of not getting the worst grades, being lowest performer in class.

Adapted from Pintrich & Schunk (2002: 219).

As illustrated in Section 3.2.2., Elliot and Harackiewicz (1996) already provided support for the performance GO being divided into performance-approach and performance-avoidance GOs. In a research study carried out in 2001, in which they proposed the 2x2 model, Elliot and McGregor provided support for this model by designing a measure (the Achievement Goal Questionnaire [AGQ]) assessing the four types of GOs and determining its validity and reliability. They provide evidence for the existence of four GOs by the use of factor analysis. Their results indicate how each of the four factors were found to be empirically distinct from one other and were therefore not measuring the same construct. In addition, Elliot and McGregor (2001) offered further support for the 2x2 model of GOs by indicating how the four GOs each have different antecedents and different consequences. Their regression analyses indicated that need for achievement was an antecedent of a mastery-approach GO whilst fear of failure was an antecedent of a mastery-avoidance GO. Need for achievement was found to be a predictor of a performance-approach GO whilst fear of failure was found to predict both performance-approach and performance-avoidance GOs. In addition, self-determination was found to positively predict a mastery-approach GO; negatively predict mastery-avoidance and performance-avoidance GOs; and not relate to a performance-approach GO. The antecedents and consequences of GOs will be discussed in further detail in Chapter 4.

With regards to the consequences of the four types of GOs, Elliot and McGregor (2001) examined the relationships between GOs and the type of cognitive strategies used. Cognitive strategies are generally categorised into surface strategies and deep strategies. Surface strategies refer to cognitive processes in which information is remembered as a result of repetition and rehearsal whilst deep strategies refer to cognitive processes such as elaboration and organisation of new information with previous information (Lyke & Kelaher, 2006).

Elliot and McGregor (2001) found that a mastery-approach GO significantly predicted deep processing; a performance-avoidance GO marginally negatively predicted deep processing; whilst mastery-avoidance and performance-approach GOs were not significantly related to deep processing. Furthermore, a performance-avoidance GO was found to positively predict surface processing whilst a performance-approach GO was found to marginally predict surface processing. Mastery-approach and mastery-avoidance GOs were found *not* to be significantly related to surface processing. The results presented above provide further evidence indicating that the four GOs are significantly different from each other since they are clearly related differently to various variables.

Finney et al. (2004) conducted a study to test the AGQ. They describe how the AGQ is very course-oriented and therefore adapted it slightly in order to test it at a domain-level of specificity (a discussion regarding levels of specificity of GOs is provided in Chapter 4 Section 4.1.3.). They aimed to assess the AGQ in terms of model structure, reliability and discriminant validity in a domain-specific context (academic) as opposed to a course-specific context. They conducted a confirmatory factor analysis (CFA) and found that the four-factor model fit significantly better than the alternative (three- and two-factor) models tested (CFI=0.95; RMSEA= 0.066; SRMR= 0.048). Moreover, the results of the CFA indicated that all the scales had high reliabilities (greater than 0.70) except the performance-avoidance scale which had a reliability of 0.68. This lower reliability was the result of a problem item (please refer to Chapter 7 Section 7.1.5.1.) for a more detailed description of the properties of the AGQ and its revision). The results of their analyses also provided evidence of discriminant validity since the intercorrelations between the four GOs were low to moderate (intercorrelations ranged between 0.11 and 0.51 with four out of the six intercorrelations being lower than 0.30). Since Finney et al. (2004) used a much larger sample size (2,111 participants) than Elliot and McGregor (2001), who used three different samples of 180, 148, and 182, the results obtained by the former are an important addition to the evidence providing support for the 2x2 model of GOs.

Additional support for the presence of four GOs was provided by Janssen and Prins (2007). Prior to examining the differences in feedback-seeking behaviour depending on the type of GO adopted they conducted a principal component analysis. This indicated the presence of four factors, with items loading highly on the predicted factors. Furthermore, the scales had high reliability levels (Cronbach's alpha between 0.71 and 0.91). Their results indicate that each of the four GOs is related to different types of feedback-seeking behaviour. With respect to the seeking of self-improvement information, mastery-approach and performance-avoidance GOs were found to be significantly positively correlated whilst a performance-approach GO was found to be negatively related. No significant relationship was found between a mastery-avoidance GO and seeking of self-improvement information. With regards to the relationships between GOs and seeking of self-validation information, a performance-avoidance GO was found to be positively related whilst a mastery-approach GO was found to be negatively related. No significant relationships were found between seeking of self-validation information and performance-approach and mastery-avoidance GOs. The different relationships between the four types of GOs and feedback-seeking behaviour provide further support for the four-factor model.

In a later study, Elliot and Murayama (2008) further developed the 2x2 measure of GOs. They also assessed the utility of 2x2 model in greater detail. They discovered that each of the four GOs had a high degree of internal consistency (mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance had Cronbach's α of: 0.84, 0.88, 0.92, and 0.94, respectively). The 2x2 model was also found to provide the best fit compared with the two- and three-factor models of GOs. Elliot and Murayama (2008) applied a multiple-indicator correlated trait-correlated method model (MI CT-CM model) to their data (using maximum likelihood estimation) in order to test the theory that GOs may be distinguished along two basic dimensions (i.e. competence and valence). This model provided a good fit to the data: $X^2(49, N=229) = 78.54$, $\rho<0.01$, $X^2/df = 1.60$, CFI= 0.99, IFI= 0.99, RMSEA= 0.051, and all path coefficients were significant. Additionally, when compared to alternative models (e.g. 3-factor model consisting of mastery-approach, mastery-avoidance and performance GOs and a 3-factor model consisting of mastery, performance-approach and performance-avoidance GOs) the MI CT-CM model still provided the best fit thus supporting the theory that GOs may be distinguished along two basic dimensions.

Further support for the 2x2 model of GOs is provided by Conroy et al. (2003) who carried out a research study in order to create an adapted version of the AGQ for the sports context (AGQ-S). Confirmatory factor analyses were conducted in order to test the 2x2 model and six other models. The results of the analyses indicate that the 2x2 model provided an acceptable fit to the data with goodness-of-fit indices (NFI, NNFI, CFI) of 0.92 to 0.94. These indices exceeded the minimum conventional criteria of 0.90 for acceptable fit. Moreover, the 2x2 model was found to have a superior fit to the data than the other six models tested. Each item was also found to significantly load onto its hypothesised latent variable.

Radosevich et al. (2007) carried out a research study to investigate whether a three- or four-factor model provides a better conceptualisation of GOs. They used structural equation modelling in order to determine model fit. Their research results indicate that the four-factor model seems to provide a better conceptualisation of GOs over the three factor model (3-factor model goodness of fit statistics: CFI=0.75, SRMR=0.09, Chi Square=118.68 with df=16; 4-factor model goodness of fit statistics: CFI=0.83, SRMR=0.07, Chi Square=92.10 with df=16). However, as indicated by the goodness of fit statistics, *the four-factor model still does not provide an excellent fit*. In addition, there is no evidence that the four-factor model fit is *significantly* better than the three-factor model fit.

A study published in 2007 by Pastor et al. focused on determining which model of GOs helps to provide the best understanding of GOs from a multiple goal perspective (this perspective will be discussed in further detail in the next section). They used Latent Class Analysis (which is a similar to cluster analysis) to analyse their data. Their results indicate that, *to a certain extent*, the four-factor model of GOs is better than the two- and three-factor models since it included a cluster of participants that would not have been identified by the two- and three-factor models. Although this cluster is quite small (2% of their sample) the authors describe how the more complex model of GOs (i.e. the four-factor model) could help to better differentiate among students (since their study was based in educational psychology). This cluster was different from the other clusters obtained since it was characterised by individuals having high performance-avoidance and mastery-avoidance GOs in addition to a high mastery-approach GO and somewhat lower performance-approach GO. Therefore, it was different from the other clusters since it is high on all four GOs. However, what is especially notable about this cluster is that both avoidance GOs are high. Therefore, it may be that the cluster is so small because people adopting high avoidance GOs might not be willing to indicate that they adopt avoidance GOs due to the negative connotations that this may imply. Another reason for the cluster being so small is that people adopting avoidance GOs may be less likely to participate in such studies for a number of reasons. For example, it was found that a performance-avoidance GO is predicted by fear of failure. This may cause individuals to be less likely to participate in research studies because of the stress that this fear of failure might cause. Therefore, although the additional cluster is a small cluster, it might be a very important one.

The 2x2 model of GOs is becoming more widely accepted in research on GOs and more and more researchers are beginning to make use of it in their studies (e.g. Narayan, & Steele Johnson, 2007; Van Yperen & Renkema, 2008; Karabenick, 2004; Van Yperen, 2006; Liu et al., 2009; Schantz & Conroy, 2009; Warburton & Spray, 2009; Putwain & Daniels, 2010, amongst others) since as Van Yperen and Renkema (2008: 260) stated "Elliot…introduced the most sophisticated contemporary achievement goal model." Although there has been an increase in research studies using the 2x2 model of GOs there are still many research studies which acknowledge the existence of the 2x2 model but proceed to use the three-factor model (e.g. Wolters, 2004) and even the two-factor model in their research (e.g. Diefendorff, 2004; Anderson & Dixon, 2009; Beckmann, et al., 2009; Hanrahan & Cerin, 2009; Bereby-Meyer et al., 2010; amongst others). Van Yperen et al. (2009) suggest that some researchers are reluctant to use the 2x2 model of GOs as a result of the fact that firstly, the concept of a mastery-avoidance GO is a relatively recent concept and secondly because

an avoidance component of mastery-based goals is more difficult to envision than an avoidance component of performance-based goals and empirical evidence to date has provided no evidence of a link between mastery-avoidance goals and indicators of actual performance. (Van Yperen et al., 2009:941).

Since there is still debate regarding whether the 3-factor or 2x2 model of GOs is the more comprehensive, a final decision regarding which model of GOs will be used in the current study will be made after the initial data analyses are carried out. As described earlier, the main difference between the 3-factor model and the 2x2 model of GOs is the mastery GO. In the 2x2 model it is divided into mastery-approach and mastery-avoidance GOs whilst in the 3-factor model there is a combined mastery GO. An examination of measures of the 3-factor model of GOs indicated that, in measuring a mastery GO, these questionnaires tend to use items measuring a mastery-approach GO only rather than mastery-approach and mastery-avoidance GOs (e.g. Liem et al., 2008; Alkharusi, 2008). Consequently, the inclusion of the mastery-avoidance GO (to create the 2x2 model) does not change the structure of the 3-factor model, but rather, it simply adds a new dimension to it. Therefore, in essence, the 2x2 model is the 3-factor model plus 1 (the mastery-avoidance GO). As a result, in order to be able to decide whether to use the 3-factor or 2x2 model of GOs in the current study it was thought best to use a measure of the 2x2 model of GOs. Therefore, if the 3-factor model is thought to be more appropriate the mastery-avoidance scale will be omitted from the analyses. However, if the 2x2 model is found to be better, the mastery-avoidance scale will be included in the analyses.

An adapted version of the AGQ-R developed by Elliot and Murayama (2008) will be used in this study since this is the most recently developed measure using the 2x2 model of GOs and there seems to be sufficient validity and reliability information for use (refer to Chapter 7 Sections 7.1.5.1. and 7.2.5.1. for a description of the GO questionnaire used in this study). Moreover, the AGQ-R makes it possible to be flexible regarding model choice since it allows individuals to score high or low on one or more of the GOs. Therefore, if an individual scores highly on the mastery-avoidance GO items, this will not influence his/her scores on the other three GOs thus making it possible to omit the mastery-avoidance GO scale without having any influence on the other three GOs.

3.3. Multiple Goal Perspective

Some researchers (e.g. VandeWalle, 1997; Darnon et al., 2010) seem to assume that early GO researchers viewed mastery and performance GO as being at opposite ends of the same continuum. However, Dweck and Elliott (1983:645) explain how GOs are not mutually exclusive and, in fact, they explicitly stated that "all three goals can coexist, but the presence of one is sufficient (also necessary) to define a situation as an achievement situation." Hence, although in their early studies on GOs Dweck and Elliott (1983) did not explicitly make use of multiple goal measures they certainly did not assume that learning and performance goals are mutually exclusive.

As described in Chapter 2 (Section 2.1.2.) Nicholls (1984) made use of the terms 'task-orientation' and 'ego-orientation'. He too did not assume that these two orientations are mutually exclusive. In fact, Nicholls et al. (1989:69) state that "There is not, as some imply, a bipolar dimension of task- versus ego-orientation. Students are approximately as likely to be high or low on both dimensions as they are to be high on one and low on the other." In another study Nicholls et al. (1990:110) describe how a number of research studies (e.g. Maehr & Braskamp, 1986; Nicholls et al., 1985; Nolen, 1988; and Thorkildsen, 1988) found task- and ego-orientations to be "virtually independent of one another". According to Urdan and Maehr (1995:215) as a result of the fact that a number of researchers found goal orientations "to be weakly related or even orthogonal (Nicholls, 1992), recent research has begun to examine the effects of pursuing multiple goals". Both the terms 'profile perspective' (e.g. DeShon & Gillespie, 2005) and 'multiple goal perspective' (e.g. Barron & Harackiewicz, 2001; Pastor et al., 2007; and Midgley et al., 2001) refer to the view of those researchers who accept that individuals may be high or low on one or more GOs.

Several researchers (e.g. Van Yperen, 2006) acknowledge the multiple goal perspective. For example Janssen and Prins (2007:237) state that “several achievement goal orientations can coexist in a person, so that, for example, trying to develop competency is not necessarily inconsistent with striving to demonstrate competency.” Although the multiple goal perspective seems to be more accepted by researchers in recent years (since, as will be discussed below, a number of research studies have been carried out in order to investigate it) DeShon and Gillespie (2005:1102) describe how “goal orientation researchers are not commonly using this more complex goal orientation perspective.” This may be because use of the multiple goal perspective may complicate matters in attempting to understand the causes and consequences of GOs. Since most researchers are interested in determining the causes and consequences of GOs they may decide NOT to adopt the multiple goal perspective in order to be able to understand the causes and consequences of each GO more clearly.

However, if individuals do in fact adopt multiple GOs, choosing to examine the relationships between each GO and other variables separately may provide an incorrect picture of how GOs relate to different variables. Barron and Harackiewicz (2001: 707) emphasise this in their research when they state that “Given the possibility that individuals can and do pursue multiple goals, it is critical to test the simultaneous effects of mastery and performance goals, as well as test whether mastery and performance goals interact.” They describe how many GO studies do not test for these interaction effects. Thus, in their research they attempted to determine whether adopting multiple GOs influences performance. More specifically, they wanted to determine whether adopting a high mastery and a high performance GO simultaneously would result in better performance than adopting only a high mastery GO.

Barron and Harackiewicz (2001) suggested four different ways in which adopting multiple GOs may enhance performance as opposed to adopting a single GO.

In the *additive goal hypothesis*, they propose that both mastery and performance GOs will have positive and independent effects on a particular achievement outcome. Thus, the two GOs together will have a greater positive effect on achievement as opposed to either of the GOs alone.

As the name suggests, in the *interactive goal hypothesis*, the mastery and performance GOs are expected to interact so that individuals adopting both goal orientations are at an advantage over those adopting a single GO.

In the *specialised goal hypothesis*, they suggest that mastery and performance GOs have positive effects on different outcomes (e.g. mastery GO increases interest whilst performance GO increases performance), thus adopting both GOs simultaneously will be of benefit overall.

Finally, in the *selective goal hypothesis*, individuals are assumed to be able to choose between pursuing different GOs and are thus able to adopt the GO that best suits the situation at hand.

As a result of their research, Barron and Harackiewicz (2001) found support for the specialised goal hypothesis. They used the two-factor model of GOs and found that mastery and performance GOs each had a positive influence on different achievement outcomes. The mastery GO was found to be a predictor of interest (but not performance), whilst the performance GO was found to positively influence performance (but have no effect on interest). Wolters (2004) also investigated the influence of multiple goals on behaviour, and found partial support for the specialised goal hypothesis in that adopting a performance-avoidance GO along with other GOs was found to have a negative influence on task-involvement. In another research study, Harackiewicz et al. (2002) found further support for the specialised hypothesis. Their results indicate the positive consequences of adopting both mastery and performance-approach GOs in college courses. Their data provide evidence that mastery and performance-approach GOs “have positive and complementary consequences for motivation and performance in college courses over the course of students’ academic careers” (Harackiewicz et al., 2002: 574). Harackiewicz et al. (2000) also provided evidence for the specialised hypothesis when they found that a mastery GO positively predicted course interest (but not performance) whilst a performance GO positively predicted performance (but not interest).

However, the results of a study conducted by Pintrich (2000b) do not seem to support the specialised goal hypothesis. He found that adopting high mastery and high performance GOs simultaneously did not result in better performance than adopting high mastery and low performance GOs. The contradictory research results obtained may be a consequence of the two-factor model of GOs being used in the study by Pintrich (2000b) as opposed to the more differentiated model which was used in all the other research studies mentioned (that investigated the multiple goal perspective). As was discussed in the previous section (Section 3.2.) studies that did not differentiate between performance-approach and performance-avoidance GOs (i.e. studies that used a 2-factor model of GOs) obtained inconsistent results. This provides a possible explanation for the inconsistent results obtained across studies using different GO models.

So far, it seems as though only two studies adopting the multiple goal perspective use the 2x2 model of GOs. These are the study by Pastor et al. (2007) and that by Cano and Berben (2009). These studies examined the types of GO profiles that participants adopt. Two of the studies reviewed, those by Pastor et al. (2007) and Fortunato and Goldblatt (2006), used the 3-factor model to investigate the types of GO profiles that participants adopt. Pastor et al. (2007) used both the 3-factor and the 2x2 models of GOs in their research since they were interested in examining which model provides the best understanding of GOs in terms of the multiple goal perspective. Since a decision regarding model choice will be made following preliminary analyses of data, it was thought useful to provide an overview of the GO profiles obtained by studies using the 3-factor model as well as the 2x2 model of GOs. Please refer to Table 3.2. and Table 3.3. for an overview of the results of studies using the 3-factor and 2x2 models of GOs, respectively. The percentages shown in brackets refer to the percentages of participants who were found to adopt this GO profile.

Table 3.2. Goal Orientation Profile Results of Studies Using the 2x2 Model

	Cano & Berben (2009)	**Pastor et al. (2007)**
Cluster 1	(27.21%) MAP : Low MAV : Low PAP : Moderately Low PAV : Moderately High	(13%) MAP : High MAV : Moderately Low PAP : High PAV : Moderately High
Cluster 2	(20.44%) MAP : Moderately High MAV : Moderately Low PAP : Moderately Low PAV : Low	(11%) MAP : High MAV : Moderately Low PAP : High PAV : Moderately Low
Cluster 3	(28.09%) MAP : Moderately High MAV : High PAP : Low PAV : Moderately High	(30%) MAP : Moderately High MAV : Moderately Low PAP : Moderately High PAV : Moderately High
Cluster 4	(24.26%) MAP : Moderately High MAV : High PAP : High PAV : High	(24%) MAP : Moderately High MAV : Low PAP : Moderately High PAV : Moderately Low
Cluster 5		(20%) MAP : Moderately High MAV : Moderately Low PAP : Moderately Low PAV : Moderately Low
Cluster 6		(2%) MAP : High MAV : High PAP : High PAV : High

Key: MAP = Mastery-Approach Goal Orientation; MAV = Mastery-Avoidance Goal Orientation; PAP = Performance-Approach Goal Orientation; PAV = Performance-Avoidance Goal Orientation. Cano & Berben (2009) N=680; Pastor et al. (2007) N=1868

Table 3.3. Goal Orientation Profile Results of Studies Using the 3-factor Model

	Pastor et al. (2007) **N=1868**	**Fortunato & Goldblatt (2006)** **N=311**
Cluster 1	(12%) MAP: High PAP: High PAV: Moderate	(32%) MGO : Low PAP : Moderate PAV : Moderate
Cluster 2	(9%) MAP: High PAP: High PAV: Mod Low	(18%) MGO : Moderate PAP : Low PAV : Low
Cluster 3	(25%) MAP: Mod High PAP: Mod High PAV: Moderate	(28%) MGO : Moderate PAP : High PAV : High
Cluster 4	(44%) MAP: Mod High PAP: Moderate PAV: Mod Low	(22%) MGO : High PAP : Moderate PAV : Low
Cluster 5	(10%) MAP: Moderate PAP: Low PAV: Mod Low	

Key: MAP = Mastery-Approach Goal Orientation; MAV = Mastery-Avoidance Goal Orientation; PAP = Performance-Approach Goal Orientation; PAV = Performance-Avoidance Goal Orientation.

Cano and Berben (2009) and Fortunato and Goldblatt (2006) used cluster analysis in order to examine GO profiles whilst Pastor et al. (2007) used Latent Class Analysis (LCA). LCA is similar to cluster analysis but it is model-based unlike cluster-analysis (Pastor et al., 2007). An advantage of LCA over other types of cluster analysis is that there are more rigorous criteria available in order to decide on the final model (Pastor et al., 2007). Yeo et al. (2008:298) argue that it has been difficult to interpret findings with regards to the multiple goal perspective “because most past research has used analytic techniques such as median splits or cluster analysis which prevent a powerful test of interactions”. As a result, it seems necessary to use more advanced statistical tools such as LCA in order to advance knowledge on GO profiles. A more detailed description of LCA will be provided in the results chapter (Chapter 8 Section 8.5).

A comparison of the GO profiles of the two studies presented in Table 3.2. revealed that Cluster 2 and Cluster 4 of Cano and Berben (2009) are quite similar to Cluster 5 and Cluster 4, respectively, of Pastor et al. (2007). A comparison of the GO profiles presented in Table 3.3. indicates that Cluster 5 in the study by Pastor et al. (2007) and Cluster 2 obtained by Fortunato and Goldblatt (2006) are very similar in that participants seem to be adopting a higher mastery-approach GO than performance-approach and performance-avoidance GOs. A second notable commonality is that Cluster 3 from the study by Pastor et al. (2007) and Cluster 3 from the study by Fortunato and Goldblatt (2006) seem to have moderate to high GOs for all three GOs in the profiles. Moreover, Clusters 2 and 4 from the studies by Pastor et al (2007), Fortunato and Goldblatt (2006), respectively, may be argued to be similar since the PAV GO in these profiles is lower than the MAP and PAP GOs. Consequently, participants adopting this particular GO profile seem to have high approach and low avoidance GOs.

As a result of their study, Pastor et al. (2007) encouraged researchers to carry out further analyses of GOs using the multiple goal perspective in order to determine whether GO profiles are replicated or not. This is necessary in order to provide evidence of the consistency and validity of the GO profiles. The similarities across studies indicate that further research into GO profiles might result in the determination of patterns of GO profiles. Therefore, the recommendation by Pastor et al. (2007) seems to be a very sensible one. The latter also recommended that research should be carried out in order to attempt to better understand the relationships between the different GO profiles and outcomes of GOs.

The present study takes up these recommendations made by Pastor et al. (2007) and aims to help to provide a better understanding of the GO profiles that people adopt. This study will improve on the study by Pastor et al. (2007) by using a more recent and better developed questionnaire in order to assess GOs using the multiple goal perspective (based on the 2x2 model of GOs). The questionnaire used by Pastor et al. (2007) was the AGQ developed by Elliot & McGregor (2001). As described in Section 3.2.3. Elliot and Murayama (2008) developed the questionnaire by Elliot and McGregor (2001) further by making some amendments to the items in order for the questionnaire to better allow for the measurement of GOs using the multiple goal perspective. Similarly to the study of Pastor et al. (2007) this study will use Latent Class Analysis (LCA) to determine the number, size, and type of GO profiles that individuals may adopt.

Although there is support for the 2x2 model of GOs, there is still debate regarding whether the 3- or 2x2 factor models of GOs is more comprehensive. Pastor et. al (2007) compared the 3- versus the 2x2 models of GOs in terms of GO profiles in their study. However, their results do not provide a clear-cut conclusion as to which model should be used in future research. Consequently, in the current study, the multiple goal perspective will also be used to assess the utility of the 3- versus the 2x2 factor models of GOs. Therefore, the first Research Question for this study is:

Research Question 1: Using LCA as a method of clustering goal orientations, how many different types of goal orientation profiles are there and what are the characteristics of each goal orientation profile? Does the 2x2 model significantly improve on the 3-factor model in terms of identifying goal orientation profiles?

Once the second part of the Research Question 1 has been answered, a decision will be made regarding whether to use the 3- or the 2x2 factor model of GOs in the rest of the analyses using the multiple goal perspective in the current study.

Following one of the recommendations made by Pastor et al. (2007) and as a result of the contradictory evidence found in research so far (e.g. Barron & Harackiewicz, 2001 and Pintrich, 2000b) this study will also investigate the relationships between GO profiles and variables such as self-efficacy, performance, and mental effort. However, this will be discussed in further detail in Chapter 5 which focuses on the causes, consequences, and correlates of GOs.

3.4. Synopsis

The focus of this chapter was on the definitional concerns, dimensionality issues and utility of the multiple goal perspective. As mentioned in the introduction to this chapter there are also concerns regarding the stability and specificity of GOs. These will be discussed in depth in the next chapter.

Chapter 4: Conceptual Inconsistencies in Goal Orientation Research: Stability and Specificity of Goal Orientations

4.0. Further Concerns in Goal Orientation Research

The previous chapter focused on concerns regarding the definition and dimensionality of GOs as well as the utility of the multiple goal perspective. However, these are not the only concerns in GO literature. Additional issues include the stability and specificity of GOs. These are discussed in this chapter.

Although GO ***profiles*** are being investigated in the current study (as discussed in Chapter 3), the nature of individual GO scales will also be examined since this may provide further insight into the results obtained for GO profiles. From here onwards, so as to avoid confusion, investigation using individual GO scales (as opposed to GO profiles) will be referred to as the 'non-profile perspective'.

4.1. The Stability of Goal Orientations

Over the years, running in parallel to the concern of the dimensionality of GOs was the concern regarding the stability of GOs; that is, whether GOs are stable personality traits or whether they are state-like. Button et al. (1996:27) maintain that "past research has been inconsistent on this issue; some researchers treat it as an individual trait, whilst others have manipulated it as if it were a characteristic of the setting or situation". Another dilemma in GO research is whether GOs are general, domain-specific, task-specific, or situation-specific. The issues of stability and generality are likely to be deeply intertwined: if GOs are found to be stable personality traits then they are more likely to be general and adopted across a wide range of situations. However, if GOs are found to be state-like, they are more likely to be domain/task/situation-specific.

Although the two issues are closely related first the problem of stability of GOs will be addressed. Following this (Section 4.1.3.) the issues concerning the generality (or specificity) of GOs will be discussed. This decision to separate the two issues was made because they are in fact separate concerns and do not *necessarily* influence each other. For example, although it would be very likely that if GOs were found to be stable then they would also be general, there is a possibility that GOs are stable over time on particular tasks. Since it is still currently debatable whether GOs are stable and/or general, it was thought best to focus on these aspects of GOs separately.

4.1.1. Goal Orientations: Traits or States?

DeShon and Gillespie (2005:1115) describe how the problem of stability in GO literature "has been one of the most vexing problems". They describe how "Rather than face the issue head on, researchers appear to operationalize the construct in whatever manner is convenient for the adopted research methodology and then provide a passing acknowledgement that other perspectives exist." (DeShon & Gillespie, 2005: 1115). Payne et al. (2007) also highlight the problem of the stability of GOs in their research and state that the stability of GOs still needs to be determined.

There was always a great deal of confusion with regards to the nature of GOs. When the concept of GOs was first introduced, Dweck (1978) suggested that children respond to achievement situations according to their beliefs about ability and effort. These beliefs were assumed to be relatively stable over time (Dweck, 1978) thus implying that the resulting GOs should also be relatively stable. Nevertheless, in later research, Dweck and Leggett (1988:6) "induced experimentally" performance and learning GOs, thus implying that GOs are not as stable as initially thought to be. However, even though different GOs may be induced according to the situation this does not necessarily imply that they may not be defined as traits. In fact, trait theorists do not rule out that people's behaviour may be influenced by situations and acknowledge the interaction between person and situation (Pervin, 1989). Dweck and Leggett (1988:269) clearly describe this idea regarding dispositions and situational influences as follows:

dispositions are seen as individual difference variables that determine the a priori probability of adopting a particular goal and displaying a particular behaviour pattern, and situational factors are seen as potentially altering these probabilities.

In addition, they argue that different GOs may be present in different situations. For example, in achievement situations achievement goals are not the sole predictors of behaviour. There may be other goals present such as social goals. Therefore, for example, a person might not adopt a performance-approach GO (which might indicate competitiveness) with a new group of friends owing to the fact that he/she may wish to appear agreeable since this may seem to be more socially acceptable in that particular situation.

As discussed in Chapter 2 (Section 2.1.2.) Nicholls (1984) proposed that the GOs adopted by individuals depend on whether they adopt a more or less differentiated conception of ability. Nicholls and Jagacinski (1984) describe how adults are able to adopt either conception of ability. They also suggest that certain situations induce people to adopt either the more or the less differentiated conception of ability. For example playing basketball in a sports competition would probably induce people to adopt a more differentiated conception of ability whilst playing basketball in training session would be more likely to induce a less differentiated conception of ability. Consequently, it seems as though Nicholls (1984) and Nicholls and Jagacinski (1984) believe that GOs are situation-specific and therefore, more state-like rather than trait-like. As a result of the fact that early researchers did not directly address the matter of GOs being trait-like or state-like many GO researchers seem to have assumed the views adopted by the early GO researchers unquestioningly. Nicholls' (1984) research seems to be used more in the area of sports psychology whilst Dweck's (1984) research is more prominent in the area of educational psychology. Since a lot more GO research was carried out in educational psychology than in sports psychology, the idea that GOs are stable traits has become a very prominent view in GO research. With regards to organisational psychology, there seem to be mixed views regarding the nature of GOs. A number of studies in the organisational setting draw on Dweck's early theories of achievement goals e.g. Rogers and Spitzmueller (2009), Hertenstein (2001) and Ford et al. (1998). Some organisational psychology researchers carrying out research on GOs view them as individual differences which may be influenced by situational factors (e.g. Kozlowski et al., 2001; Sujan et al., 1994; Kohli et al., 1998). There are also some researchers (in organisational psychology) who distinguish between trait and state GOs (e.g. Dragoni, 2005; VandeWalle, 1999; Steele-Johnson et al., 2008).

The review of GO literature carried out for the purposes of this study indicated that a number of researchers simply assume that GOs are stable dispositional traits (e.g. Cunningham & Xiang, 2008; Colquitt & Simmering, 1998; Kozlowski et al., 2001; Chen et al., 2000; Phillips & Gully, 1997). Other researchers acknowledge that there is an ongoing debate regarding the stability of GOs but nonetheless assume that GOs are traits that can be influenced by situational cues (e.g. Bettencourt, 2004; van Hooft & Noordzij, 2009; VandeWalle, 2003; Roberson & Alsua, 2002; VandeWalle & Cummings, 1997; Harris et al., 2008; Horvath et al., 2006). However, some researchers attempted to assess the stability of GOs. A description of these studies is provided below. This is followed by a discussion outlining why further research is required in order to arrive at an adequate conclusion regarding the stability of GOs.

Anderman & Midgley (1997) carried out a study in order to investigate the stability of children's GOs over a one year time period. The results of their study indicate quite low stability over time with correlation coefficients ranging between 0.28 and 0.47 ($\rho<0.001$). Elliot and McGregor (2001) used simultaneous regression analyses to assess the stability of GOs. They found evidence of stability for all the four GOs which were found to predict subsequent GOs.

In 2007, Fryer and Elliot assessed changes in the GOs of individuals (for academic courses) at three points in time (approximately 5 weeks apart). They found evidence for both stability and change over time. When assessing change (based on the 2x2 model) using differential continuity (that is, correlations over time) they found GOs to be quite stable over time with correlations between 0.57 and 0.78 ($\rho<0.001$). When assessing stability using mean-level change (that is, the average amount of change in a construct over time) they found mastery-approach and performance-avoidance GOs to significantly increase and decrease, respectively, from Time 1 to Time 2. No significant changes were found for mastery-avoidance and performance-approach GOs for this time period. None of the GOs changed significantly from Time 2 to Time 3 whilst from Time 1 to Time 3 only the mastery-approach GO changed significantly (increased). They also assessed individual-level change of GOs over time. This "represents the magnitude of increase or decrease in a construct over time exhibited by an individual...individual-level change examines stability and change at the level of the single person within the sample." (Fryer & Elliot, 2007:702). This was assessed by means of the reliable change index (RCI) and the results indicated changes in all four GOs over time. Finally, they assessed stability of GOs in terms of ipsative continuity. This "represents the level of stability and change exhibited in an individual's configuration of constructs over time" (Fryer & Elliot, 2007:702). In order to do this, they correlated each participant's scores on all four GOs over the three time points in order to estimate profile consistency coefficients. Their results indicated within-person stability over time.

Muis and Edwards (2009) carried out a study to investigate the stability of GOs over time and the task-specificity of GOs. They examined the GOs of students for the same academic subject over four time points (using a three-factor model of GOs). At two time points participants were required to complete an exam for the course whilst at the other two time points participants were required to complete an assignment for the course. The table below provides a brief description of the tasks undertaken at each time point.

Table 4.1. Tasks carried out at each time point

Time Point at which GOs were measured	Task being carried out at this time point
Time 1	Assignment 1
Time 2	Exam 1
Time 3	Assignment 2
Time 4	Exam 2

The GOs were measured across a semester. However, it was not evident how long the gaps between the time points were. The different assessment types were considered to constitute different tasks. Consequently, stability of GOs over time was assessed by examining changes from Time 1 to Time 3 and from Time 2 to Time 4. On the other hand task-specificity (stability across tasks) was assessed by examining changes from Time 1 to Time 2, Time 2 to Time 3, Time 3 to Time 4 and Time 1 to Time 4. The task-specificity of GOs will be discussed in further detail in Section 4.2.

Stability and task-specificity were assessed by means of differential continuity, mean-level change, and individual-level change. In addition, Muis and Edwards (2009) examined individuals profile consistency with regards to the GOs adopted. In order to do this, they used the dominant GOs of participants to examine whether participants switched GOs across tasks (to assess task-specificity) or over time to assess stability (e.g. if they scored highest on a mastery-approach GO on Exam 1 did they also score highest on Exam 2 or did they switch to a high performance-approach GO?). Thus, although they refer to it as 'profile consistency' they did not use the multiple goal perspective.

Their differential continuity results indicated a moderate to high level of stability for the three GOs with correlations ranging from 0.32 to 0.78 (significance level not provided). When assessing stability in terms of mean-level change they found some evidence of stability and some evidence of change (refer to Table 4.2.). RCIs were used to examine individual-level change. RCI values less than -1.96 or more than 1.96 are considered to be evidence of reliable change (refer to Table 4.3. for the percentages of individuals who showed reliable change over time).

Table 4.2. Comparisons of Goal Orientations over time

	Comparison Between Assignment 1 and Assignment 2	**Comparison Between Exam 1 and Exam 2**
MAP	No change	Increased ($\rho<0.001$)
PAP	No change	No change
PAV	No change	Decreased ($\rho<0.002$)

Key: MAP = Mastery-Approach Goal Orientation; PAP = Performance-Approach Goal Orientation; PAV = Performance-Avoidance Goal Orientation.

Table 4.3. Percentages of Individuals who showed reliable change (increases/decreases) over time

	A1 to A2	**E1 to E2**
MAP	50%	72.4%
PAP	70%	78.5%
PAV	80.6%	78.5%

Key: A1= Assignment 1; A2 = Assignment 2; E1 = Exam 1; E2 = Exam 2; MAP = Mastery-Approach Goal Orientation; PAP = Performance-Approach Goal Orientation; PAV = Performance-Avoidance Goal Orientation.

Finally, when they assessed profile consistency, it was found that 76.7% of participants did not engage in goal switching on the assignments. However, only 37% of participants did not switch goals from Exam 1 to Exam 2. Goal switching was found to be predominantly from a mastery-approach to a performance-avoidance GO or vice versa. Overall, the results obtained indicate evidence of both stability and change over time.

Payne et al. (2007) conducted a meta-analysis of GO studies. One of their aims in this study was to assess the stability of trait GOs. Their results indicate that trait GOs

were quite stable over the short term.....However, the longer the time interval, the weaker the coefficient of stability, undermining the stability of trait GOs. That said, few studies have examined the stability of trait GOs beyond the length of one college semester, so the long-term stability of trait GOs remains unclear (Payne et al., 2007, pp139).

Their meta-analysis included 178 independent samples from 141 studies examining trait GOs. One outlier was found for the test of temporal stability, that is, the study by Amabile et al. (1994) which was removed from the analysis. In order to assess temporal stability Payne et al. (2007) examined the sample-weighted mean correlations for each dimension. Their results indicated moderate stability over time from 1 to 14 weeks (M=7.01, SD=3.89). The sample weighted mean, r, was 0.66 (total number of effect sizes included in the analysis, k, =20) for a mastery GO; r=0.70 (k=16) for a performance-approach GO; r=0.73 (k=4) for a performance-avoidance GO. Since this meta-analysis was based on the three-factor model of GOs, those studies which were conducted using a two-factor model had the performance GO results included with the performance-approach GO dimension for the analyses. This decision was made since Payne et al. (2007) thought that the performance GO items on the two-dimensional measure were more reflective of the performance-approach GO than the performance-avoidance GO.

In addition, Payne et al. (2007) examined the length of time between administrations as a continuous moderator of the test-retest relationships. The results indicated that the relationships between the time interval and the coefficients of stability were negative for all three GOs (for a mastery GO $r=-0.20$, for a performance-approach GO $r=-0.29$, and for a performance-avoidance GO $r=-0.74$). This led them to the conclusion that the longer the time frames between the administrations, the smaller the coefficients of stability. Thus, the stability of GOs seems to decrease over time. Although the results of this meta-analysis offer a good indication of the stability of GOs there are a number of limitations. Firstly, as suggested by the authors themselves, the administrations of GO measures might have coincided with the beginning and end of a semester. Therefore, changes in GOs may have been due to changes in situation e.g. exams or assignments due in at the end of a semester may have led to a stronger performance-approach GO. Secondly, as mentioned earlier, although the three-factor model of GOs was used in this study some of the studies included in the analyses used a two-factor model (and their performance GO being classified as a performance-approach GO) which may limit the accuracy of the results. Thirdly, the studies used in this meta-analysis did not use the multiple goal perspective. Different results may be obtained if GO profiles are assessed as opposed to GOs from the non-profile perspective. Finally, the use of meta-analysis for testing the stability of GOs is questionable due to all the inconsistencies in GO research. The major concern in this case would be that the studies included in the meta-analysis used different measures of GOs. As a result of GO researchers using different definitions of GOs in order to guide their research, the GO scales used in the different studies are not necessarily measuring the same concepts. Consequently, the results of the meta-analysis should be interpreted with caution.

Although a few research studies have investigated the stability of GOs there is still a lot more evidence required in order to be able to draw sound conclusions based on empirical evidence regarding the stability of GOs. Results from the research studies described above indicate evidence of both stability and change of GOs. However, the results are inconclusive for a number of reasons. The study by Anderman and Midgley (1997) was carried out using children as participants. It is very likely that traits are not yet stable in children. For example, personality traits are thought to become stable after thirty years of age (Costa & McCrae, 1988). Therefore, the changes in GOs found in the study by Anderman and Midgley (1997) may be a consequence of age rather than GOs having low stability. Elliot and McGregor (2001) used correlational analyses in order to assess stability over time. Although they found a high degree of consistency for all four GOs over time, correlational analysis alone is not sufficient to assess the stability of GOs.

As described above, Fryer and Elliot (2007) assessed stability and change of GOs by means of differential continuity, mean-level change, individual-level change, and ipsative continuity. Since they closely examine the stability of GOs using the 2x2 model of GOs, their study provides a good understanding of the stability and change of GOs. Muis and Edwards (2009) also closely examined the stability of GOs over time by assessing differential continuity, mean-level change and individual-level change. However, both studies do not provide evidence regarding the stability of general GOs since task-specific measures of GOs were used in their study. (The problem of generality versus task-specificity will be described in further detail in Section 4.1.3. below). With respect to assessing the stability of GOs it might be useful to assess the stability of general GOs before assessing the stability of task-specific GOs.

Muis and Edwards (2009) assessed what they refer to as 'profile consistency'. However, they only measured changes in participants' dominant GOs. Consequently, this does not provide much information regarding the stability of multiple GOs. On the other hand, Fryer and Elliot (2007) assessed the stability of GO profiles by means of ipsative continuity. This provides within-person correlations for the participants' GO profiles over time thus showing whether each participant's profile changes over time. In order to assess the stability of GO profiles from a broader perspective (that is, at the sample level as opposed to the individual level) it was thought to be appropriate to use LCA in the current study. LCA provides clusters/classes indicating the types of GO profiles that participants adopt. It therefore allows us to investigate whether, **overall,** participants' tend to change their GO profiles over time or not.

As a result of the limitations of the research studies discussed above and the limited research on the stability of GO profiles, it is still inconclusive whether general GOs (and GO profiles) are stable over time or not. Therefore, the current study aims to further develop knowledge on the stability of GOs by using LCA to assess the stability of general GO ***profiles*** of an adult sample over time as well as further investigate the stability of GOs from the non-profile perspective. The following Research Questions were therefore proposed.

Research Question 2a: Do individuals' General goal orientation profiles change over time?
Research Question 2b: Do individuals' General goal orientations change significantly over time?

4.1.2. Goal Orientations: Traits *and* States?

As a result of the debate regarding the stability of GOs some researchers have discussed the possibility of GOs existing as both traits and states. For example, Pintrich and Schunk (2002:237) maintain that

It may be that the solution to this matter regarding the stability of goal orientations will involve the adoption of a strategy used in social and personality psychology that assumes that both situational and personal conceptualizations are important and the issue is to specify how they interact

Harwood and Swain (1998) conducted a study using both dispositional (trait) and situational (state) GO measures. This study was conducted in a sports psychology context using a two-factor model of GOs. They found that trait GOs did not predict the state GOs. Therefore, they suggest that both trait and state GO measures should be used in GO research. These findings may be due to different measures being used to measure trait and state GOs. Results might have differed had an adapted version of the trait measure been used to assess state GOs.

In another study, Button et al. (1996) attempted to investigate whether GOs are dispositional traits which may be influenced by situational characteristics or not. They concluded that a GO may be described as "a somewhat stable individual difference that may be influenced by situational characteristics" (Button et al., 1996: 28). Therefore, individuals are predisposed to have particular response patterns. However, their response patterns may vary considerably as a result of situational influences (Button et al., 1996). It seems as though they found that GOs may be both traits and states. This is evident from their correlational analyses in which dispositional and situational GOs were found to be related but distinguishable. Button et al. (1996:40) themselves state that "dispositional and situational goal orientations were distinguishable." However, as with Harwood and Swain (1998), this distinction may have resulted from the fact that they used two different questionnaires to measure trait and state GOs. It is debatable whether it is best to use adapted or different measures to examine whether GOs exist as both traits and states. 'Adapted measures' refers to using questionnaires which have only very slight differences in wording to assess trait and state GOs (e.g. by keeping the item wording as similar as possible but for the trait measure to ask about participants' GOs in general and for the state measure to ask about participants' GOs for that particular point in time). 'Different measures' refers to questionnaires developed specifically for assessing trait or state GOs which have items with very different wording from each other (e.g. Harwood & Swain, 1998, used the 'Task and Ego Orientation in Sport Questionnaire' to measure dispositional GOs and the 'Match Context Questionnaire' to measure state GOs).

On the one hand, if different measures are used it may be argued that any differences found may be a result of different constructs being measured. On the other hand, if an adapted measure is used and no differences are found, it may be argued that this is a result of common method variance. However, if an adapted measure is used and significant differences are found, this would clearly indicate that there are differences between trait and state GOs. Since studies have already found significant differences when assessing GOs using different measures for trait and state GOs, adapted measures will be used in the current study. If significant differences are found, then this will provide additional support for the existence of trait (general) and state (specific) GOs.

This research into trait and state GOs led other researchers to examine these concepts. For the purposes of this review studies assessing state GOs have been placed into three categories. The first category consists of studies attempting to prove that trait GOs influence state GOs. The second category consists of studies that only examine state GOs and their consequences. Studies in the third category focus on assessing the interactions between trait and state GOs. The studies shall be discussed in the order mentioned above. For the purpose of this review 'induced' (e.g. Steele-Johnson et al., 2008), 'manipulated' (e.g. Barker et al., 2002), or 'assigned' GOs (e.g. Van Yperen, 2003) are considered to be state GOs.

Category 1: Breland and Donovan (2005) suggest that dispositional GOs influence state GOs which in turn influence self-efficacy and performance. Their research study focused on attempting to prove the relationships between trait GOs, state GOs and self-efficacy using structural equation modelling. From their study, it was evident that dispositional GOs do in fact influence the corresponding state GOs.

Apart from assessing the stability of GOs (as described earlier) in their meta-analysis Payne et al. (2007) also investigated the antecedents and proximal consequences of GOs.

They suggest that state GOs are proximal consequences of trait GOs. 178 independent samples from 141 studies were used for the analyses of trait GOs whilst 19 independent samples derived from 16 studies were used for the analyses of state GOs. A three-factor model of GOs was used for the analyses. Trait and state GOs were found to be positively correlated with one another (estimated true mean correlations = 0.55, 0.58, and 0.55). However, since this was a meta-analysis, it cannot be determined whether the trait GOs were actually **antecedents** of state GOs or not.

Category 2: Six studies were found that examined the consequences of state GOs. These were, the studies by Steele-Johnson et al. (2008), Steele-Johnson et al. (2000), Loraas and Diaz (2009), Barker et al. (2002), Van Yperen (2003) and Elliot et al. (2005). Steele-Johnson et al. (2008) found that inducing a state mastery GO is related to participants reporting higher levels of perceived challenge than when no state mastery GO is induced. They also hypothesised that individuals with an induced state mastery GO will initially demonstrate higher levels of task performance than those without an induced state mastery GO. However, they failed to find support for this hypothesis. They found support for the hypothesis that for individuals having high cognitive ability, inducing a mastery GO demonstrates greater improvement in task performance over time than when no mastery GO is induced. However, they did not find support for the hypothesis that a state mastery GO relates to higher satisfaction. Finally, they found that those individuals with an induced performance GO reported higher levels of perceived effort required. The results obtained by Steele-Johnson et al. (2008) should be interpreted with caution. This is mainly due to the way in which the mastery GO was induced. In order to induce the mastery GO Steele-Johnson et al. (2008) informed participants that performance could be increased by developing strategies for learning. However, participants having a mastery GO would not necessarily want to improve performance but rather their focus would be on increasing learning. This reference to performance in the GO induction is not consistent with inducing a mastery GO but rather it is consistent with inducing a performance GO. As a result, the conclusions derived from this study might not be accurate in describing the effects of inducing a mastery GO.

Steele-Johnson et al. (2000) also conducted a study (using the two-factor model of GOs) in order to investigate the influence of state GOs on performance. They assessed the influence of state GOs on performance for two tasks: a simple task and a difficult task. Their results indicate that for the simple task, participants having an induced performance GO performed better than participants having an induced mastery GO. On the other hand, for the difficult task there were no differences in performance between participants having an induced mastery or performance GO. Performance on the difficult task was lower than performance on the simple task for both groups of participants.

Loraas and Diaz (2009) found that participants with a state mastery GO indicated intent to learn how to use new technology regardless of perceived difficulty whilst participants with a state performance GO indicated intent to learn how to use new technology depending on how easy it was to learn.

Barker et al. (2002) carried out a study in which they induced mastery, performance-approach and performance-avoidance GOs in order to assess the recall of verbal information. Their results indicate that participants in the performance-approach and performance-avoidance induction conditions had higher levels of recall than participants in the mastery induction and control conditions. The manipulations in this study are also questionable. The mastery GO inductions refer to improving performance which, as mentioned earlier is not entirely accurate since individuals with a mastery GO would want to improve their learning and not necessarily their performance. In addition, the performance-avoidance GO induction was not entirely accurate and seemed quite unethical, especially since the experiments were conducted with kindergarten and primary school students! In the performance-avoidance manipulation the emphasis was on not appearing silly in front of the class as opposed to trying not to be one of the worst performers: "Answer the following questions to this test with the correct answers so your class don't think you are silly or stupid." (Barker et al., 2002: 578). Consequently, the results of this study should also be interpreted with caution.

Van Yperen (2003) induced mastery-approach, mastery-avoidance, performance-approach and performance-avoidance GOs in his study. His study focused on determining whether GOs that are incongruent with task interest (which he considers to be all the GOs except for mastery-approach) undermine the positive effect of task interest on performance. The results of his study support his hypotheses in that individuals were found to have higher performance when they showed high task interest. Moreover, he found that assigned mastery-avoidance, performance-approach and performance-avoidance GOs undermined the positive effect of task interest on performance.

Elliot et al. (2005) induced mastery, performance-approach and performance-avoidance GOs. They found that a performance-avoidance GO was found to undermine performance relative MGOs or PAP GOs. According to Elliot et al. (2005) the performance-avoidance manipulations in the studies by Barker et al. (2002) and Van Yperen (2003) were not entirely accurate since participants in this condition (in both studies) were asked to focus on getting answer right as opposed to not getting answers wrong. GO manipulations have not been consistent across studies and, as mentioned above, not all manipulations are entirely accurate. Consequently, it is advisable to keep the way in which GOs were manipulated in mind when interpreting research results.

Although some of the manipulations are questionable, the results described above indicate how examining state GOs might provide valuable information regarding their consequences. However, the studies described above do not take trait GOs into account.

If trait GOs do in fact exist, it may be wise to investigate the interactions between trait and state GOs. This is what researchers in Category 3 did.

Category 3: Three studies of GOs, those by Chen and Mathieu (2008); Gerhardt and Luzadis (2009) and Jagacinski, Madden, and Reider (2001), focused on investigating the interactions between trait and state GOs and the influence of these interactions on performance. In these studies participants' trait GOs were measured and state GOs were induced, the effects on performance were then measured. All three studies used a two-factor model of GOs. The study by Chen and Mathieu (2008) indicated that a mastery GO predicted a more positive performance trajectory when combined with an induced performance GO than when combined with an induced mastery GO. There were no significant interaction effects between trait performance and state (mastery and performance) GOs. The study carried out by Gerhardt and Luzadis (2009) only measured a mastery GO. This study was focused on determining whether a trait mastery GO coupled with an assigned mastery GO would result in a higher level of performance than if a trait mastery GO is coupled with an assigned performance GO. The authors did not find any support for their hypothesis.

In their study, Jagacinski et al. (2001) attempted to determine whether inducing mastery and performance GOs influenced the performance of individuals having either mastery or performance trait GOs. It was found that inducing a mastery GO had a ***nearly*** significant positive effect on performance for participants having a trait mastery GO. They did not find support for their hypothesis that inducing a performance GO would have more positive effects on the performance of those individuals having a performance trait GO than those individuals having a mastery trait GO.

Although it seems as though there is evidence for the presence of trait and state GOs, further research is definitely required. Additional assessment of the interaction between trait and state GOs is also necessary. The studies carried out by Chen and Mathieu (2008) and by Gerhardt and Luzadis (2009) have a number of limitations. With respect to the study by Chen and Mathieu (2008), the trait GOs and state GOs were measured in very close proximity. Therefore, the measurement of trait GOs might have had a carryover effect on the measurement of state GOs. The study by Gerhardt and Luzadis (2009) only measured a trait mastery GO. Therefore, it does not provide sufficient information regarding the interactions of assigned GOs with trait GOs. Finally, Jagacinski et al. (2001) themselves state that the observed effects of their study were not strong and that future investigation into the effects of the interactions between trait and state GOs is necessary. The current study aims to improve knowledge on trait and state GOs by investigating the interactions between dispositional (trait) and induced (state) GOs from the profile and non-profile perspectives.

The state GOs in the current study were limited to mastery-approach and performance-approach GOs since it was thought to be rather unethical to induce avoidance GOs as a result of the negative implications that these inductions might have. I do not think it is appropriate to ask participants to focus on not having the worst performance (performance-avoidance induction) or to make sure that they do not misunderstand the task (mastery-avoidance induction) since this might make some individuals feel uncomfortable or insulted. Consequently, the following Research Questions and Hypothesis were proposed:

Research Question 3a: How do trait goal orientation profiles interact with induced mastery-approach and performance-approach goal orientations in order to influence task performance of participants?

Hypothesis 1. Individuals holding a trait mastery-approach goal orientation are expected to perform significantly better when a performance-approach goal orientation is induced as opposed to when a mastery-approach goal orientation is induced.

The Hypothesis above was proposed since the results of the study by Chen and Mathieu (2008) indicate that there is a significant positive effect on performance of individuals having a mastery trait GO when a performance GO is induced. A possible explanation for this result is the ‘specialised goal hypothesis’ (described earlier) proposed by Barron and Harackiewicz (2001) in which mastery and performance GOs have beneficial effects on different outcomes. Consequently, the adoption of both GOs would have an overall more beneficial effect than the adoption of just one of the GOs. Barron and Harackiewicz (2001) suggested this hypothesis (and found support for it) in the context of multiple goal adoption (as opposed to that of the trait-state GO interactions being discussed here). However, since the results of Chen and Mathieu (2008) are remarkably similar to those obtained by Barron and Harackiewicz (2001) it is possible that, regardless of whether the GOs being measures are traits or states, the presence of both mastery and performance GOs may be more beneficial than the presence of one GO alone.

Since there is not sufficient evidence for the interaction effects of trait mastery-avoidance, performance-approach and performance-avoidance GOs with state mastery-approach and performance-approach GOs on performance these relationships will not be hypothesised but investigated as Research Questions.

Research Question 3b. What effects will the relationships between a trait mastery-avoidance goal orientation and induced mastery-approach and induced performance-approach goal orientations have on the performance of participants? This Research Question will only be answered if a 2x2 model of goal orientations is chosen as an appropriate model.

Research Question 3c. What effects will the relationships between a trait performance-approach goal orientation and induced mastery-approach and induced performance-approach goal orientations have on the performance of participants?

Research Question 3d. What effects will the relationships between a trait performance-avoidance goal orientation and induced mastery-approach and induced performance-approach goal orientations have on the performance of participants?

4.2. Generality vs. Specificity of Goal Orientations

In addition to the problem concerning GOs being traits or states, another concern raised in recent literature focuses on the specificity of GOs. Besides the assumption that GOs are stable, many researchers also assume that GOs are general (e.g. Rheinberg et al., 2000). Although they are assumed to be general, some studies investigating 'general' GOs use task-specific measures (e.g. Fan et al., 2008; Lin et al., 2009). This is a great cause for concern due to the fact that if GOs are truly general dispositions then task-specific measures should not be required. Researchers using trait measures do not usually adapt their questionnaires to the task/situation at hand. The fact that researchers have been using task-specific GO questionnaires might be an indication of the concern regarding the generality of GOs.

DeShon and Gillespie (2005) brought up the matter of generality vs. specificity of GOs in their review of GO literature. They indicate how studies have been inconsistent with regards to whether they conceptualise GOs as general, domain-specific, or situation-specific (these different terms are described below). From their review of GO studies, they found that 46.6% of the studies viewed GOs as being stable, general characteristics of the person. 26.1% of the studies viewed GOs as a combination of personal and situational factors whilst 4.5% had a view of GOs being highly unstable and situationally induced.

Finally, 12.5% of the studies reviewed conceptualised GOs as being domain-specific. As mentioned earlier, the issue of generality is deeply intertwined with the issue of stability of GOs. The categories discussed by DeShon and Gillespie (2005) seem to address both issues simultaneously. However, in order to clarify each and every concern regarding the nature of GOs it is necessary to distinguish between the issues of generality vs. specificity and stability (trait vs. state) of GOs. With respect to the problem of generality, in order to maintain conceptual clarity, it is important to distinguish between: a) domain-specificity, b) task-specificity, and c) situational-specificity. A description of each term is provided below.

The dictionary definition of the word ‘domain’ is “a sphere of activity or knowledge” (Oxford English Dictionary, 2010). Examples may include: academic domain, sports domain, or social domain. However, it is not clear how specific domains are *or* what constitutes a domain. A task is defined as “A piece of work imposed, exacted, or undertaken as a duty or the like” (Oxford English Dictionary, 2010). Therefore, a ‘task’ refers to a specific piece of work e.g. a verbal aptitude test. ‘Situation’ refers to the context in which a task is carried out. Therefore, a person may be working on an essay with no time limit and another time under exam conditions. In such a case the task is the same but the situation (context) is different, thus it is situation-specific.

In 1997 Allan Wigfield wrote a paper highlighting the need to examine the domain-specificity of motivational constructs. The concept of GOs is one of the motivational constructs discussed. Wigfield (1997) describes how most research on GOs has used general measures. He states how research concerning competence and self-efficacy beliefs have provided strong evidence regarding the domain-specificity of these constructs but not much is known about the domain-specificity of GOs. Van Yperen (2006) also discusses the stability of GOs across time and across contexts. He suggests that future research should be carried out in order to investigate whether individuals have certain GOs anytime and anywhere or whether these differ as a function of time and domain.

Some studies (e.g. VandeWalle et al., 2001; Dweck, 1999; Yeo et al., 2009) assume that GOs are domain-specific, whilst other studies have tested this (e.g. Anderman & Midgley, 1997; Green et al., 2007; Magson et al., 2008; Bong, 2001; Nicholls et al., 1990). A description of the studies assessing the domain-specificity of GOs is provided below along with an outline of the results obtained. Following this there is a discussion regarding why further investigation into the generality vs. specificity of GOs is required and how this will be addressed in the current study.

Duda and Nicholls (1992) examined whether GOs were generalisable across academic and sport domains. They found that there was considerable generality across domains for GOs. The results of a study carried out by Anderman and Midgley (1997) contradict the results obtained by Duda and Nicholls (1992). The former found that overall participants reported higher performance goals in Maths than in English. This difference across the two studies may be a result of the domains assessed in the two studies being very different from each other. Duda and Nicholls (1992) used very broad domains (academic and sports) whilst Anderman and Midgley (1997) used two different academic subjects as different domains. Therefore, the domains used by the latter were much more specific than those used by the former. Bong (2001) highlights the broadness of the domains used by Duda and Nicholls (1992), and argues that they are too broad to understand much about the associations of GOs across domains. Therefore, she assessed GOs across four academic subjects: Korean, English, Science and Mathematics using the three-factor model of GOs. The results of her study indicate that performance-approach and performance-avoidance GOs were significantly consistent across academic subjects but the mastery GO was found to be subject- specific.

Green et al. (2007) also evaluated the domain-specificity of motivation. Unfortunately, the study is not focused solely on the domain-specificity of GOs and only a mastery GO was assessed. The results of this study indicate that students' mastery GOs were not identical across subjects therefore, there seems to be some evidence for domain-specificity. However, since only a mastery GO was assessed the usefulness of this study in supporting the domain-specificity of GOs is rather limited. In another study assessing the domain-specificity of GOs, Magson et al. (2008) address the need to discover whether GOs are general or domain-specific. They focus on testing the domain-specificity of mastery and performance GOs. Their results are very similar to those obtained by Bong (2001), in that, the performance GO appears to be generalised across subjects whereas the mastery GO appeared to be more subject-specific. One possible reason for a mastery GO being subject-specific is interest in the subject at hand. If a person is interested in the subject being studied, they are possibly more likely to adopt a mastery GO in which they are focused on learning as much as possible about the subject as opposed to simply trying to perform better than others in class (performance GO). However, this possibility would need to be investigated further. Since motivation and performance (which are of primary interest to organisations) are the main variables included in this study (as will be described in the next Chapter), interest will not be measured in the current study.

It is evident from the results of the studies described above that evidence regarding the domain-specificity of GOs is inconclusive. Some studies provide support for the generality of GOs whilst others provide support for the generality of some GOs but not others. There are a number of reasons which may explain the inconsistencies in the results of the above studies. First of all, all the studies described above used a two-factor model of GOs with the exception of Green et al. (2007) who only assessed a mastery GO. As described in Chapter 3 (Section 3.2.) the two-factor model of GOs is not differentiated enough. This may account for differences in the results across studies. Moreover, although all of the above studies assessing the specificity of GOs are said to be measuring 'domain-specificity' it is arguable that all the studies assessing different academic subjects are in fact assessing 'task-specificity' within the academic domain. For the purposes of the current study, the studies assessing differences in GOs across **academic subjects** will be grouped together as studies assessing the task-specificity of GOs.

As mentioned earlier Muis and Edwards (2009) examined the task-specificity of GOs. When assessing this in terms of differential continuity they found moderate to high levels of stability in GOs across tasks (correlation coefficients ranged from 0.27 to 0.92, significance level not provided). Table 4.4. shows the results obtained when assessing task-specificity in terms of mean-level change.

Table 4.4. Comparisons of Goal Orientations across Tasks

Comparison Between:	**Assignment 1 and Exam 1**	**Assignment 1 and Exam 2**	**Assignment 2 and Exam 1**	**Assignment 2 and Exam 1**
MAP	Decreased ($\rho<0.001$)	No change	Increased ($\rho<0.001$)	No change
PAP	No change	No change	Decreased ($\rho<0.002$)	No change
PAV	Increased ($\rho<0.001$)	No change	Decreased ($\rho<0.001$)	No change

Key: MAP = Mastery-Approach Goal Orientation; PAP = Performance-Approach Goal Orientation; PAV = Performance-Avoidance Goal Orientation.

Table 4.4. indicates both stability and change in GOs across tasks. When GOs were assessed in terms of individual-level change (refer to results in Table 4.5.) the percentages of participants showing reliable change seem to be quite high. Moreover, when the individual-level change results were aggregated to the group level each GO showed changes across tasks.

Table 4.5. Percentages of Individuals who showed reliable change (increases/decreases) across tasks

	A1 to E1	A1 to E2	E1 to A2	A2 to E2
MAP	77.4%	79.3%	73.3%	76.7%
PAP	76.7%	72.4%	72.4%	58.6%
PAV	80.6%	67.9%	76.7%	60.7%

Key: A1= Assignment 1; A2 = Assignment 2; E1 = Exam 1; E2 = Exam 2; MAP = Mastery-Approach Goal Orientation; PAP = Performance-Approach Goal Orientation; PAV = Performance-Avoidance Goal Orientation.

When assessing stability of GOs in terms of what Muis and Edwards (2009) refer to as 'profile consistency' (refer to Section 4.1. for an explanation of this) they found that the majority of participants did not switch goals from assignment 1 to exam 2 and from assignment 2 to exam 2. However, the majority of participants did seem to engage in goal switching from assignment 2 to exam 1 and assignment 1 to exam 1.

The results of the study described above indicate that as yet, no definite conclusions can be drawn with respect to the task-specificity of GOs because there seems to be evidence of both stability and change in GOs across tasks. Some results provide support for GOs not changing across tasks. For example some of the correlation coefficients obtained for GOs across tasks were quite high (e.g. 0.91 and 0.92). Additionally, there were no mean-level changes in GOs across assignment 1 and exam 2 and across assignment 2 and exam 1. Moreover, the majority of participants did not engage in goal switching across assignment 1 and exam 2 and across assignment 2 and exam 2. However, a number of other results obtained in this study provide support for GOs being task-specific. For example, some of the correlation coefficients obtained when assessing differential continuity were found to be as low as 0.27. Moreover, as indicated in Table 4.4. some of the mean-level change results show significant changes in GOs across tasks and the percentages of participants who showed reliable increases or decreases in GOs across tasks were quite high (refer to Table 4.5.). In addition, the majority of participants seemed to engage in goal switching across assignment 1 and exam 1 as well as across exam 1 and assignment 2. Since the results obtained do not provide consistent evidence regarding the task-specificity of GOs further investigation is necessary.

As described in Section 4.1., Muis and Edwards (2009) used the same academic subject with different assessment types (exams and assignments). These different assessment types were considered to constitute different tasks. Although different skills are required for the different types of assessment, the academic subject is the same. Consequently, it is debatable whether different assessment types could be said to constitute different tasks. Nevertheless, Muis and Edwards (2009) found some evidence for GOs changing significantly across tasks. The results of their study indicate the importance of investigating the task-specificity of GOs. Since they used the same academic subject without adopting the multiple goal perspective, this study will improve on the study conducted by Muis and Edwards (2009) by using different tasks to assess the task-specificity of GOs from the profile and the non-profile perspectives. Since evidence regarding the stability and change of GOs is inconclusive, it was not possible to develop Hypotheses for the current study. Instead, a number of Research Questions were raised:

Research Question 4a: Do participants adopt different goal orientation profiles across tasks?

Research Question 4b: Are participants' task-specific goal orientation profiles different from their General GO profiles?

Research Question 4c: Do participants' adopt different goal orientations across tasks?

Research Question 4d: Are participants' task-specific goal orientations significantly different from their General goal orientations?

Research Question 5a: Are task-specific goal orientation **profiles** stable over time?

Research Question 5b: Are task-specific goal orientations stable over time?

A number of studies mention the idea of GOs being situation-specific rather than domain-specific or task-specific. In a review of GOs, Elliot and Dweck (2005:66) address the matter of generality vs. situational-specificity when they state that "although the achievement goal construct can be utilized at both dispositional and situation-specific level of analysis, conceptual and empirical considerations seem to suggest that it may be best suited for the situation-specific level." Although it is plausible that GOs are influenced by situations (e.g. time limit vs. no time limit), since not much is known about the task-specificity of GOs, it is thought to be ideal to first determine whether GOs vary according to task AND whether task-specific GOs are stable over time prior to investigating situational-specificity of GOs. This study focuses on investigating the former two.

4.3. Synopsis

In Chapter 3 (Section 3.1.) it was discussed how there is currently no widely accepted definition of GOs. As a result, GO researchers have been using different models, measures and perspectives of GOs. All this diversity in research has caused a great amount of confusion in literature on GOs. The concept of GOs cannot be researched properly if there is no consensus about what GOs are and how they should be measured and assessed. Button et al. (1996) stress the importance of discovering the true nature of goal orientations in order for future research regarding GOs in organisations to be more accurate and reliable than past research has been. This suggestion should be taken into serious consideration. It is hoped that the current study will improve knowledge on the nature of GOs in order for future research to come a step closer towards being able to provide organisations with accurate information regarding GOs. The next chapter focuses on the causes, consequences, and correlates of GOs.

Chapter 5: Variables related to Goal Orientations

5.0. Introduction

This chapter focuses on the variables related to GOs. Past GO studies have examined the relationships between GOs and a number of variables (e.g. culture, gender, personality, cognitive strategies). However, since the current study is being carried out from an organisational psychology perspective only those variables which are considered to be especially relevant to organisations will be discussed. These include perceptions of ability and self-efficacy (since these have been associated with a number of positive outcomes such as increased performance e.g. Pajares, 1997; Bouffard-Bouchard, 1990), motivation, and performance. Past studies investigating the relationships between GOs and perceptions of ability, self-efficacy, motivation, and performance are discussed below. Each section of this chapter includes a description regarding how the current study will further develop knowledge on the relationships between GOs (and GO profiles) and each of these variables.

5.1. Goal Orientations and Perceptions of Ability

Early GO theorists included perceptions of ability in their research on GOs. Dweck (1986) proposed that GO adoption resulted from the type of 'theory of intelligence' adopted by individuals. Individuals holding an incremental theory of intelligence adopted a mastery GO whilst individuals holding an entity theory of ability adopted a performance GO. However, according to Dweck (1986) the type of behavioural response resulting from the two GOs depended on the perceptions of ability held by the individual. She proposed that if an individual adopted a mastery GO he/she would exhibit mastery-oriented behavioural responses. However, the behavioural responses exhibited by individuals adopting a performance GO depended on the perceptions of ability of the individual. According to Dweck (1986) if a person having a performance GO had high perceptions of ability they would still exhibit mastery-oriented behavioural responses. In contrast, if a person having a performance GO had low perceptions of ability they would exhibit a helpless behaviour pattern. Nicholls (1984) also suggested that when individuals are ego-involved (performance GO), low perceptions of ability produce lower levels of performance whilst high perceptions of ability produce higher levels of performance. In addition, he too (like Dweck, 1986) maintained that perceptions of ability do not influence the performance of individuals who are task-involved (mastery GO).

The GO research described above positions perceptions of ability as moderating the relationship between GOs and performance. A number of studies on GOs adopted this perspective and tested for moderation effects (e.g. Kaplan & Midgley, 1997; Miller, et al., 1993) of perceptions of ability between GOs and performance. These studies found little or no support for this moderation effect.

A number of researchers (e.g. Greene & Miller, 1996) noted that in literature on GOs the terms ‘perceptions of ability/competence’, ‘self-concept of ability’ and ‘self-efficacy’ were used interchangeably. In fact, Anderman and Midgley (1997:271) state that “Expectancy beliefs have been conceptualized in different ways, including expectancies for success, self-efficacy, and self-perceptions of competence.” Since studies have used the terms ‘perceptions of ability/competence’ and ‘self-efficacy’ interchangeably it was decided that GO studies focusing on perceptions of competence and self-efficacy should be considered together. The next section focuses on studies investigating the relationship between GOs and self-efficacy/perceptions of competence.

5.2. Goal Orientations and Self-Efficacy

Albert Bandura (1986) is well-known for his theory of personality referred to as the ‘Social-Cognitive Theory’. According to this theory individuals are active beings and not just passive respondents to their environment. Bandura (1986) describes how individuals actively monitor their behaviour, assess their progress, and learn by means of observation (Larsen & Buss, 2006). One of Bandura's (1986) key concepts in the Social Cognitive Theory is that of self-efficacy. Self-efficacy may be defined as "an individuals' beliefs about their capabilities to produce designated levels of performance" (Judge et al., 2007:107). Thus, according to Bandura's Social Cognitive Theory, if a person believes that he/she can perform a certain task, then he/she has high self-efficacy beliefs on that task.

Some studies have examined self-efficacy as being an antecedent, consequence, correlate or mediator of GOs. Studies investigating self-efficacy as antecedents of GOs will be described first. Subsequently, an outline of studies examining self-efficacy as a mediator between GOs and performance will be provided. Following this, a description of studies assessing self-efficacy as a consequence of GOs will be presented. Prior to discussing the studies examining the correlations between GOs and self-efficacy, a subsection will be devoted to discussing the research designs and analytical techniques used in the studies inferring causality between GOs and self-efficacy. Following this a description of the studies examining the correlations between GOs and self-efficacy will be provided. Finally, a discussion regarding how this study aims to advance knowledge with respect to the relationship between self-efficacy and GOs will be presented.

5.2.1. Self-efficacy as an Antecedent of Goal Orientations

A number of studies have focused on determining whether self-efficacy is an antecedent of GOs (e.g. Payne et al., 2007; Liem et al., 2008; Lau et al., 2008,). The results of these research studies are consistent with respect to mastery GOs but not completely so with respect to performance GOs.

Elliot and Church (1997), Liem et al. (2008), and Payne et al. (2007) used two- or three-factor models of GOs. They found self-efficacy to positively predict a mastery GO. The study by Lau et al. (2008) used a four-factor model of GOs. They found self-efficacy to significantly positively predict a mastery-approach GO but not a mastery-avoidance GO. As discussed in Chapter 3 Section 3.2. measures of the three-factor model of GOs tend to use mastery-approach GO items rather than mastery-avoidance GO items (e.g. Liem et al., 2008; Alkharusi, 2008) for the mastery GO scale. Therefore, the results of the studies described are consistent in suggesting that self-efficacy positively predicts a mastery-approach GO. Since only one study (that by Lau et al., 2008) used a four-factor model of GOs, further investigation regarding whether self-efficacy is a predictor of a mastery-avoidance GO is required.

With regards to self-efficacy and performance GOs, the studies by Lau et al. (2008), Morris and Kavussanu (2008), Liem et al. (2008) and Elliot and Church (1997) found self-efficacy to positively predict a performance-approach GO. However, Payne et al. (2007) did not find a significant relationship between task-specific self-efficacy and a performance-approach GO in their meta-analysis. Payne et al. (2007), Liem et al. (2008), Elliot and Church (1997), and Lau et al. (2008) found self-efficacy to negatively predict a performance-avoidance GO. However, Morris and Kavussanu (2008) did not find a significant relationship. Since the results for the relationships between self-efficacy and performance-approach and performance-avoidance GOs are inconsistent, further research is required in order to better understand these relationships. Moreover, since only one study investigated the relationships between self-efficacy and a mastery-avoidance GO further investigation of this is also required.

5.2.2. Self-efficacy as a Mediator of Goal Orientations and Performance

Studies examining self-efficacy as a mediator between GOs and performance may be divided into two main categories. These are:

Category 1:

Goal Orientations → Self-efficacy → Performance

Category 2:

Goal Orientations → Self-efficacy → Self-set Goals → Performance

Seven studies falling into Category 1 were found from the review of literature carried out for this study. Please refer to Table 5.1. for the results of these studies.

Table 5.1. Results of studies in Category 1

Authors of Study	Goal Orientation model used	Effect of Goal Orientations on Self-efficacy	Effect of Self-Efficacy on Performance
Ford et al. (1998)	Two-factor	MGO: Positive PGO: Negative	Positive
Bandalos et al. (2003)	Two-factor	MGO: Positive PGO: Positive	Positive
Kozlowski et al. (2001)	Two-factor	MGO: Positive PGO: Not Tested	Positive
Seijts et al. (2004)*	Two-factor	MGO: Positive PGO: Not Tested	Positive
VandeWalle et al. (2001)	Three-factor	MGO: Positive PAP: Not Significant PAV: Negative	Positive
Tanaka (2007)	Three-factor	MGO: Positive PAP: Positive PAV: Negative	Positive
Crippen et al. (2009)	Four-factor	MAP: Not Significant MAV: Not Significant PAP: Not Tested PAV: Not Tested	Not Significant

Key: *Effect of state GOs assessed in this study; MGO=Mastery Goal Orientation; PGO=Performance Goal Orientation; MAP=Mastery-Approach Goal Orientation; MAV=Mastery-Avoidance Goal Orientation; PAP=Performance-Approach Goal Orientation; PAV=Performance-Avoidance Goal Orientation.

In all the studies using a two- or three-factor model summarised in the table above, a mastery GO was found to positively influence self-efficacy. Similarly, self-efficacy was found to positively influence performance. As mentioned previously, studies using the two- and three-factor models tend to use mastery-approach items in their measures as opposed to mastery-avoidance items. Consequently, the mastery GO results of the studies using two- and three-factor models would be expected to be similar to the mastery-approach GO results for studies using a 2x2 model of GOs. However, as indicated in the table above, the study by Crippen et al. (2009) did not find a significant relationship between self-efficacy and a mastery-approach GO. The only study using a 2x2 model of GOs (that by Crippen et al., 2009), found a non-significant relationship between a MAV GO and self-efficacy.

With respect to performance GOs, only two studies investigated the relationship between a performance-approach GO and self-efficacy and they obtained very inconsistent results. Vandewalle et al. (2001) found a non-significant relationship whilst Tanaka (2007) found a significant positive relationship between a performance-approach GO and self-efficacy. With respect to the performance-avoidance GO, it seems as though this negatively influences self-efficacy.

Four of the studies reviewed fall into Category 2. All four studies used a two-factor model of GOs. Please refer to Table 5.2. for the results of studies in Category 2.

Table 5.2. Results of studies in Category 2

Authors of Study	Effect of Goal Orientations on Self-efficacy	Effect of Self-efficacy on Self-set Goals	Effect of Self-Set goals on Performance
Phillips & Gully (1997)	MGO: Positive PGO: Negative	Positive	Positive
Diefendorff (2004)	MGO: Positive PGO: Negative[1]	Positive	Positive[1]
Vrugt et al. (2002)	MGO: Positive[2] PGO: Not Tested	Positive	Positive
Breland & Donovan (2005)*	MGO: Positive PGO: Negative[1]	Positive	Positive[3]

Key: * Effect of state GOs assessed; [1] For 1 out of 3 data sets; [2] For 1 out of 2 data sets; [3] For 2 out of 3 data sets; MGO=Mastery Goal Orientation; PGO=Performance Goal Orientation

In addition to the results presented in the table above, Phillips and Gully (1997) and Breland and Donovan (2005) also found a direct significant positive relationship between self-efficacy and performance. The results from Table 5.2. clearly indicate that a mastery GO positively influences self-efficacy. Additionally, self-efficacy was found to positively influence self-set goals which, in turn, positively influenced performance.

If the two categories of studies are combined, it becomes evident that a mastery GO positively influences self-efficacy. The results are not entirely consistent for performance-approach and performance-avoidance GOs across studies. Most of the studies using a two-factor model of GOs, found the performance GO to negatively influence self-efficacy. However, when a more differentiated model was used, the performance-approach GO was found to positively influence or not relate to self-efficacy and the performance-avoidance GO was found to negatively influence self-efficacy. Since only one of the studies used the 2x2 model of GOs and because the results for the performance-approach GO are not entirely consistent further investigation of the relationships between GOs and self-efficacy is required. As mentioned in the introduction to this section, a discussion regarding the causality inferred in the studies described above will be provided in Section

5.2.4. However, first the results of studies investigating self-efficacy as a consequence of GOs are discussed.

5.2.3. Self-efficacy as a Consequence of Goal Orientations

Three of the studies reviewed (Elliot & Sheldon, 1997; Wolters et al., 1996; Linnenbrink, 2005) investigated self-efficacy as a consequence of GOs. Wolters et al. (1996) and Linnenbrink (2005) found self-efficacy to be a consequence of a mastery GO. Elliot & Sheldon (1997) did not examine the relationship between a mastery-approach GO and self-efficacy. However, they found a significant negative relationship between a mastery-avoidance GO and self-efficacy. The study by Wolters et al. (1996) only measured a mastery GO whilst Linnenbrink (2005) measured mastery and performance-approach GOs. Linnenbrink (2005) did not find any significant relationship between a performance-approach GO and self-efficacy. Elliot & Sheldon (1997) did not examine the relationship between a performance-approach GO and self-efficacy but they found a significant negative relationship between a performance-avoidance GO and self-efficacy. The correctness of inferring causality in these three studies (as well as in the studies described in sub-sections 5.2.1. and 5.2.2.) is discussed in the next sub-section.

5.2.4. Are the designs and data analytical techniques used in the studies above enough to infer causality between Self-Efficacy and Goal Orientations?

In order to infer causality, multivariate data analytical techniques such as structural equation modelling are used. These are normally combined with the use of experimental designs in order to provide support for the hypothesised direction of causality being inferred. Experimental designs are necessary in order to infer causality due to the fact that the statistical techniques alone cannot establish the direction of causality (Tabachnik & Fidell, 1996:715).

Referring to self-efficacy as an ‘antecedent’, ‘mediator’, or ‘consequence’ of GOs means inferring causality. However, most of the studies described above that infer causality did not use experimental designs (e.g. Liem et al., 2008; Lau et al., 2008; VandeWalle et al., 2001; Bandalos et al, 2003; Crippen et al., 2009; Vrugt et al., 2002). As a result, their inferences about the direction of causality are still quite subjective. Although some of the studies described above measured self-efficacy on multiple occasions, it is still uncertain whether the GOs influence self-efficacy or vice versa. This matter is compounded by the fact that it is still not certain whether GOs are stable or not. If GOs are found to be stable, then it would be highly unlikely that self-efficacy is an antecedent of GOs since self-efficacy is known to be changeable (Bandura, 1982). If on the other hand, GOs are found to change over time (or across tasks) then there is a greater possibility of GOs being influenced by self-efficacy. Since the stability and task-specificity of GOs are being tested in this study, the causality of the relationship between GOs and self-efficacy will not be addressed. However, the direction and magnitude of ***correlation*** between self-efficacy and GOs (and GO profiles) will be examined.

The studies described above that used experimental designs (e.g. Breland & Donovan, 2005 and Seijts et al., 2004) used the two-factor model of GOs. As mentioned a number of times throughout this review of literature, a two-factor model is not ideal for examining GOs since it is not differentiated enough. This is especially the case for the performance GO which was found to produce very inconsistent results when it was not divided into approach and avoidance orientations. Moreover, both Breland and Donovan (2005) and Seijts et al. (2004) examined the relationships between **state** GOs and self-efficacy in their studies. These difficulties make it extremely tricky to combine the results of studies carried out so far in order to determine the direction of causality for the relationships between GOs and self-efficacy. Although an experimental design is being used in this study it was thought best to examine the correlations between GOs and self-efficacy for the reasons described in the previous paragraph (regarding the stability and task-specificity of GOs).

Before providing an overall summary of the results of all the studies described in the sub-sections above, a short description of the studies that examined the correlations between GOs and self-efficacy is provided next.

5.2.5. Self-efficacy as a Correlate of Goal Orientations

A number of studies did not attempt to infer causality with regards to the relationships between self-efficacy and GOs but rather they assessed the correlations between them. The results of these studies are presented in Table 5.3. As discussed in the previous section, the majority of studies attempting to infer causality did so by using statistical techniques such as structural equation modelling but not experimental designs. Consequently, the main difference between studies investigating the direction of causality and those that do not are the types of statistical techniques used. A number of studies (e.g. Liem et al., 2008; and Lau et al., 2008) examined self-efficacy as an antecedent, mediator or consequence of GOs (hence attempting to determine the direction of causality) by using statistical techniques such as structural equation modelling but they also provided correlational analyses results as part of their descriptive statistics. Consequently, the correlational analyses results of these studies will also be included in Table 5.3.

Table 5.3. Results of studies examining the correlations between self-efficacy and Goal Orientations

Authors of Study	Goal Orientation Model Used	Correlations between GOs and Self-Efficacy
Ford et al. (1998)	Two-factor	MGO: Positive PGO: Negative
Diefendorff (2004)	Two-factor	MGO: Positive PGO: Non-significant
Breland & Donovan (2005)	Two-factor	MGO: Non-significant for Trait, Positive for State PGO: Non-significant
Chen et al. (2000)	Two-factor	MGO: Positive PGO: Positive[6]; Non-significant[7]
Sins et al. (2008)	Four-factor (but only 2 factors measured)	MAP: Positive PAV: Non-significant
Wolters et al. (1996)	Only MGO measured	MAP: Positive
Liem et al. (2008)	Three-factor	MAP: Positive PAP: Positive PAV: Negative
Bong (2001)	Three-factor	MGO: Positive PAP: Positive PAV: Positive[8] ; Non-significant[9]
VandeWalle et al. (2001)	Three-factor	MGO: Positive PAP: Non-significant PAV: Negative
Elliot & Church (1997)	Three-factor	MAP: Positive PAP: Positive PAV: Negative
Tanaka (2007)	Three-factor	MAP: Positive PAP: Positive PAV: Non-significant
Linnenbrink (2005)	Three-factor	MAP: Positive PAP: Positive PAV: Not tested

Table 5.3. continued on next page.

Table 5.3. continued

Bong (2009)	Four-factor	MAP: Positive MAV: Positive[1],Non-significant[2], Negative[3] PAP: Positive PAV: Positive[1], Non-significant[4], Negative[5]
Radosevich et al. (2007)	Four-Factor	MAP: Positive MAV: Negative PAP: Positive PAV: Negative
Lau et al. (2008)	Four-factor	MAP: Positive MAV: Negative PAP: Positive PAV: Negative
Morris & Kavussanu (2008)	Four-factor	MAP: Positive MAV: Non-significant PAP: Positive PAV: Non-significant

Key: [1] For lower elementary; [2] For Middle Elementary and Middle School; [3] For Upper Elementary; [4] For Middle and Upper Elementary; [5] For Middle School; [6] Prior to initial performance; [7] Following initial performance; [8] For English, Maths and Science in Middle school and for Science in High School; [9] For Korean, English & Maths in High School and Korean & Science in Middle School; MGO=Mastery Goal Orientation; PGO=Performance Goal Orientation; MAP=Mastery-Approach Goal Orientation; MAV=Mastery-Avoidance Goal Orientation; PAP=Performance-Approach Goal Orientation; PAV=Performance-Avoidance Goal Orientation.

The results presented in Table 5.3. indicate that a mastery GO (for those studies using a two-factor model) and a mastery-approach GO (for those studies using the three- or four-factor model) are significantly positively related to self-efficacy with the exception of Breland and Donovan (2005) for the trait mastery GO. The results for a mastery-avoidance GO are not clear since two studies (Radosevich et al., 2007; and Lau et al., 2008) found significant negative correlations between a mastery-avoidance GO and self-efficacy whilst Bong (2009) found positive, negative and non-significant relationships depending on the age of participants. Morris and Kavussanu (2008) found a non-significant relationship between a mastery-avoidance GO and self-efficacy.

Some of the studies using the two-factor model of GOs found significant negative relationships between a performance GO and self-efficacy whilst others found non-significant relationships. Moreover, Chen et al. (2001) found a significant positive relationship between a performance GO and self-efficacy prior to initial performance and a non-significant relationship following initial performance. All the studies using the three- or four-factor models found significant positive relationships between a performance-approach GO and self-efficacy with the exception of VandeWalle et al. (2001). The results were not so consistent for a performance-avoidance GO since some studies found non-significant (e.g. Sins et al., 2008; Morris & Kavussanu, 2008), significant negative (e.g. Radosevich et al., 2007; VandeWalle et al., 2001) and significant positive (e.g. Bong, 2001, for English, Maths and Science in Middle school and Science in High School) relationships between a performance-avoidance GO and self-efficacy. The inconsistent results obtained for the avoidance GOs (for the studies presented in Table 5.3.) reflect the inconsistencies found in studies in the other sub-sections.

Since the studies examining the relationships between GOs and self-efficacy were discussed in different sub-sections (according to their hypothesised relationships) an overview of the results of all the studies is provided below. This is followed by the Research Questions and Hypotheses proposed for the current study with regards to the relationships between GOs and self-efficacy.

5.2.6. Self-efficacy, Perceptions of Ability and Goal Orientations

After summing up the results of the studies described above, it seems as though the majority of studies found significant positive relationships between a mastery-approach (or mastery) GO and self-efficacy. However, two studies (those by Crippen et al, 2009, and Breland & Donovan, 2005) found non-significant relationships. Therefore, although there is a strong indication that a mastery/mastery-approach GO is significantly positively related to self-efficacy, further investigation into why two of the studies did not obtain this result would be useful. Possible explanations for the differences in results include different measures of self-efficacy being used (e.g. Crippen et al., 2009, developed their own self-efficacy scale which seems to be quite different from the self-efficacy measures used in other studies) or general GOs being used to measure self-efficacy on tasks. With respect to a mastery-avoidance GO, the results of the studies described above are not entirely consistent since negative, non-significant and positive relationships were found between a mastery-avoidance GO and self-efficacy.

Studies using a two-factor model of GOs found self-efficacy to be predominantly negatively related to a performance GO. However, two studies found a significant positive relationship (Bandalos et al., 2003; and Chen et al., 2001, prior to initial performance) and some other studies (e.g. Breland & Donovan, 2005; Diefendorff, 2004) found no significant relationship between self-efficacy and a performance GO. When the three- and four-factor models were used, a performance-approach GO tended to be significantly positively related to self-efficacy. However, in a few cases no significant relationship was found. The results for a performance-avoidance GO with self-efficacy tended to be quite inconsistent with studies finding significant negative, positive and non-significant relationships with self-efficacy. After taking into consideration all the results of studies described in Section 5.2. the following Hypotheses and Research Questions were proposed for the current study:

Research Question 6a: Do the different task-specific GO profiles score significantly differently on self-efficacy?

Research Question 6b: How do task-specific mastery-avoidance goal orientations correlate with self-efficacy? This Research Question will only be answered if a 2x2 model of goal orientations is chosen as an appropriate model.

Research Question 6c: How do task-specific performance-avoidance goal orientations correlate with self-efficacy?

Hypothesis 2a: Task-specific mastery-approach goal orientations are expected to be significantly positively correlated with self-efficacy.

Hypothesis 2b: Task-specific performance-approach goal orientations are expected to be significantly positively correlated with self-efficacy.

In the current study, it was decided that self-efficacy should be assessed rather than perceived competence since "A perceived competency could be defined as generalized self-efficacy" (Gist, 1987: 479). Since task-specificity is important in the current study (as described in Chapter 4) it was thought to be more appropriate to measure self-efficacy of participants rather than perceived competence.

5.3. Goal Orientations and Motivation

Motivation may be seen as made up of three major components: direction, effort, and persistence (Arnold et al., 2005). ***Direction*** refers to what the person is trying to achieve. ***Effort*** refers to the amount of energy an individual is putting into achieving what he/she wants to achieve. ***Persistence*** may be defined as the length of time that a person continues trying to achieve what they want to achieve (Arnold, et al., 2005).

A number of studies have examined the relationships between GOs, effort and persistence. Early GO research carried out by Dweck and her colleagues (e.g. Dweck & Reppucci, 1973; Diener & Dweck, 1978) focused on determining why some children persist in the face of failure whilst others do not (even though they have the same level of ability). Their research indicated that the type of GO that children adopted led them to adopt one of two behavioural responses: a mastery-oriented response or a helpless response. According to Dweck and Reppucci (1973), children exhibiting a mastery-oriented response persisted in the face of failure and attributed failure to lack of effort. On the other hand, children who exhibited a helpless response pattern did not persist in the face of failure and attributed failure to lack of ability. From their research, it became evident that children adopting a mastery GO tended to exhibit a mastery-oriented behavioural response whilst children adopting a performance GO tended to exhibit a helpless behavioural response. However, they found that it was only those children with low perceived ability who exhibited a helpless response when adopting a performance GO. Children with high perceived ability who adopted a performance GO still tended to exhibit a mastery-oriented behavioural response.

As GO research evolved a few authors revisited the ideas suggested by Dweck and Reppucci (1973) in order to investigate whether the GOs that individuals adopt are related to their effort and persistence on tasks. Out of the studies reviewed, three investigated the relationships between both effort and persistence with GOs (Wolters, 2004; Agbuga & Xiang, 2008; and Elliot et al., 1999) whilst a fourth study investigated the relationship between effort and GOs (Phan, 2009). As a result of his analyses, Wolters (2004) found that a mastery GO was positively related to effort and persistence whilst a performance-avoidance GO was negatively related. A performance-approach GO was found to be significantly positively related to effort but not significantly related to persistence. Agbuga and Xiang (2008) found positive correlations between all three GOs investigated (mastery, performance-approach, and performance-avoidance GOs) and effort and persistence. The results of their regression analysis indicated positive relationships between a mastery GO and persistence and effort. There was also a positive relationship between a performance-approach GO and persistence and effort. However, no relationship was found between a performance-avoidance GO and persistence and effort. Elliot et al. (1999), found significant positive correlations between mastery as well as performance-approach GOs with effort and persistence. However, no significant relationships were found between a performance-avoidance GO and effort and persistence. The results of their study also indicated that persistence and effort mediated the relationships between a mastery GO and exam performance as well as between a performance-approach GO and exam performance. However, no mediation effects were found for the relationships between a performance-avoidance GO and exam performance.

Phan (2009) used structural equation modelling in his analysis. His results indicated that all three GOs were positive predictors of effort. Although the four studies described above have rather large sample sizes (N= 525, 229, 275 and 179 for the studies by Wolters, 2004; Agbuga & Xiang, 2008; Phan, 2009; and Elliot et al., 1999, respectively), and used multilevel modelling and multiple regression analysis in order to conduct their data analysis, they did not use experimental designs. All four studies conducted surveys. Therefore, again, one cannot be certain about the direction of causality.

The results of the studies discussed above are quite consistent with respect to mastery-approach and performance-approach GOs. However, this is not the case for the relationships between a performance-avoidance GO and effort. Since these are quite inconsistent and because there is not enough research examining the relationship between a mastery-avoidance GO and effort it is necessary to further investigate the relationships between GOs and motivational factors. Due to the nature of the tasks which will be used to assess GOs in this study it is not possible to examine the relationship between GOs and persistence or direction. However, the relationships between GOs and effort will be investigated in the current study. Since the tasks used in this study are aptitude tests (described in further detail in Chapter 7) the mental effort of participants on these tasks will be measured. Once again, since the multiple goal perspective is being used in this study, the relationship between GOs and effort will be assessed from both the profile and non-profile perspectives.

Although this study makes use of an experimental design no attempts to make inferences regarding the direction of causality (for the relationships between GOs and effort) will be made. This was thought to be appropriate because in order to design an experiment to test the direction of causality one should have a reasonable theory regarding the direction of causality. For example if one wanted to test whether the sun rising causes roosters to crow they would have a good theory supporting this direction of causality (based on what is known about the sun rising and roosters crowing) since it is extremely unlikely that the direction of causality is in reverse. With respect to mental effort and GOs the direction of causality may be hypothesised to go in either direction (mental effort being an antecedent OR consequence of GOs). Since little is known about the relationships between GOs and mental effort (and the direction of causality may be hypothesised to go either way) it was thought best to assess the correlations between these variables before attempting to make inferences regarding the direction of causality. The following Research Questions were therefore proposed:

Research Question 7a: Do the different task-specific GO profiles score significantly differently on mental effort?

Research Question 7b: How do the different task-specific goal orientations correlate with mental effort (if at all)?

5.4. Goal Orientations and Performance

Beyond doubt the relationships between GOs and performance has been one of the most researched relationships in GO literature. From an educational, sports, as well as organisational perspective, performance is an outcome of extreme interest. If one or more GOs are found to influence performance positively, then it might be possible to induce these beneficial GOs (in all three settings) in order to increase performance. Research on the relationships between GOs has been carried out in various ways. In order to summarise the results of past research in this area, studies investigating the relationship between GOs and performance will be discussed in three subsections. The first subsection will describe the results of research investigating GOs as direct predictors of performance as well as studies investigating the direct correlations between GOs and performance. In the second subsection, the results of studies investigating the indirect relationship between GOs and performance will be described. The third subsection will focus on those studies investigating the relationships between GOs and performance from a multiple goals perspective.

5.4.1. Goal Orientations as direct predictors of Performance

Since a large number of studies have investigated GOs as direct predictors of performance as well as the direct correlations between GOs and performance it was thought best to present the results in table form. The former will be presented first followed by the latter.

Different studies assessing GOs as direct predictors of performance used the two-, three-, and four-factor models of GOs. Consequently, three summary tables are presented below, one each for studies using the two-, three-, and four-factor models, respectively. Following this, the results of studies which provided the correlational analyses results for the relationships between GOs and performance are provided.

Table 5.4. Summary of Results obtained by studies investigating the relationships between the 2-factor model of Goal Orientations and performance.

Authors of Study	Relationship between MGO and Performance	Relationship between PGO and Performance
Schraw et al. (1995)	Positive	Non-significant
Bell & Kozlowski (2002)	Positive	Negative
Harackiewicz et al. (1997)	Non-significant	Positive
Harackiewicz et al. (2002)	Non-significant[1]; Negative[2]	Positive
Harackiewicz et al. (2000)	Non-significant	Positive

Key: MGO = Mastery Goal Orientation; PGO = Performance Goal Orientation; [1]For Final Grade; [2]For Semester GPA.

The studies by Harackiewicz et al. conducted in 2000 and 2002 focused on assessing the relationships between multiple GOs and their outcomes. However, since they assessed the outcomes of each GO separately rather than as GO profiles they have been included in the table above as opposed to the section on multiple GOs.

Table 5.5. Summary of Results obtained by studies investigating the relationships between the 3-factor model of Goal Orientations and Performance.

Authors of Study	MGO	PAP	PAV
Payne et al. (2007)	Non-significant[1]; Positive[2]	Non-significant[3]	Non-significant[4]; Negative[5]; Not Tested[6]
Elliot & Church (1997)	Non-significant	Positive	Negative
Elliot et al. (1999)	Non-significant	Positive	Direct relationship not tested
Church et al. (2001)	Positive	Positive	Negative
Elliot et al. (2005)	Positive[7]	Positive[7]	Negative[7]
Durik et al. (2009)	Non-significant	Positive	Negative

Key: MGO = Mastery Goal Orientation; PAP = Performance-approach Goal Orientation; PAV = Performance-avoidance Goal Orientation; [1] For Task Performance and Job Performance; [2]For academic performance; [3]For academic, task and job performance; [4]For academic performance; [5]For task performance; [6]For job performance.

Table 5.6. Summary of Results obtained by studies investigating the relationships between the 4-factor model of Goal Orientations and Performance.

Authors of Study	MAP	MAV	PAP	PAV
Elliot & McGregor (2001)	Non-significant	Non-significant	Positive	Negative
Elliot & Murayama (2008)	Not Tested	Not Tested	Positive	Negative

Key: MAP = Mastery Approach Goal Orientation; MAV = Mastery Avoidance Goal Orientation; PAP = Performance-approach Goal Orientation; PAV = Performance-avoidance Goal Orientation.

The studies presented in Tables 5.4. to 5.6. assess whether GOs are predictors of performance by measuring GOs prior to measuring performance (e.g. Elliot & McGregor, 2001, and Elliot & Murayama, 2008, measure GOs 1 week prior to task performance) and using statistical techniques such as regression analyses and structural equation modelling. In some studies a mastery/mastery-approach GO was found to significantly positively predict performance whilst in others it did not significantly predict performance.

Moreover, one study (that by Harackiewicz et al., 2002) found a mastery GO to negatively predict performance for Semester GPA. These results indicate that further investigation into the relationship between a mastery-approach GO and performance is definitely required. The relationship between a mastery-avoidance GO and performance was only tested in one study, that by Elliot and McGregor (2001), who found a non-significant relationship.

Three out of the five studies reviewed that used the 2-factor model of GOs found a performance GO to positively predict performance. However one study (Bell & Kozlowski, 2002) found a performance GO to negatively predict performance and the other (Schraw et al., 1995) found no significant relationship. When the three- and four-factor models were used a performance-approach GO was found to positively predict performance in all studies except one (the meta-analysis by Payne et al., 2007). On the other hand, a performance-avoidance GO was found to negatively predict performance in all studies except that by Payne et al. (2007) for academic performance where a non-significant relationship was found.

Although the studies above state that GOs are predictors of performance it is difficult to determine the direction of causality. If GOs were stable, it would seem plausible to conclude that GOs influence performance rather than vice versa. However, since the stability of GOs is still being questioned, determining the causality of the relationships between GOs and performance is quite tricky. A number of studies investigated the correlations between GOs and performance. The results of these studies are presented in Table 5.7. Some of the studies investigating GOs as direct predictors of performance (presented in Tables 5.4. to 5.6.) examined the correlations between GOs and performance too. The results of these are also presented in Table 5.7.

Table 5.7. Summary of Results obtained by studies investigating the correlations between Goal Orientations and Performance.

Authors of Study	Goal Orientation Model Used	Correlations between GOs and Performance
Bell & Kozlowski (2002)	Two-factor	MGO: Non-significant PGO: Non-significant
Harackiewicz et al. (1997)	Two -factor	MGO: Non-significant PGO: Positive
Harackiewicz et al. (2000)	Two -factor	MGO: Non-significant PGO: Positive
Harackiewicz et al. (2002)	Two -factor	MGO: Non-significant PGO: Positive[1]; Non-significant[2]
Jagacinski et al. (2001)	Two-factor	MGO: Non-significant PGO: Non-significant
Elliot et al. (1999)	Three-factor	MGO: Positive[3]; Non-significant[4] PAP: Positive[3]; Non-significant[4] PAV: Negative
Church et al. (2001)	Three-factor	MGO: Non-significant[5]; Positive[6] PAP: Non-significant[5]; Positive[6] PAV: Negative
Elliot & McGregor (2001)	Four-factor	MAP: Non-significant MAV: Non-significant PAP: Non-significant[7]; Positive[8] PAV: Non-significant[8]; Negative[7]
Yeo et al. (2009)	Four-factor	MAP: Positive[9], Non-significant[10] MAV:Non-significant[10] PAP: Positive[9]; Non-significant[10] PAV:Non-significant[9]; Negative[10]
Bong (2009)	Four-factor	MAP: Positive[11], Non-significant[12] MAV: Negative[13], Non-significant[14] PAP: Positive[15], Non-significant[16] PAV: Negative[17], Non-significant[18]

Key: MGO = Mastery Goal Orientation; PGO = Performance Goal Orientation; MAP = Mastery Approach Goal Orientation; MAV = Mastery Avoidance Goal Orientation; PAP = Performance-approach Goal Orientation; PAV = Performance-avoidance Goal Orientation; [1]For final grade; [2]For semester GPA, Psychology GPA and Subsequent GPA; [3]In study 1; [4]In study 2; [5]For SAT Scores; [6]For Graded Performance; [7]For Study 3; [8]For Study 2; [9]On Air Traffic Control Task; [10]On Exam; [11]For Middle Elementary, Upper Elementary and Middle School students; [12]For Lower Elementary; [13]For Middle Elementary; [14]For Lower Elementary, Middle School and Upper Elementary; [15]For Upper Elementary and Middle School; [16]For Lower and Middle Elementary; [17]For Middle and Upper Elementary and Middle School; [18]For Lower Elementary.

Table 5.7. indicates that the majority of studies found a mastery/mastery-approach GO not to be related to performance. However, a number of studies (e.g. Yeo et al., 2009 and Bong, 2009) found a significant positive relationship between a mastery/mastery-approach GO and performance. There were no consistent distinguishing differences between those studies that found significant positive and non-significant relationships. For example Elliot and McGregor (2001) found a *non-significant* relationship between a mastery-approach GO and exam performance on an introductory psychology course. On the other hand Elliot et al. (1999) found a *significant positive* relationship between a mastery GO and exam performance on an introductory psychology course. Consequently, it is unclear why these differences were found. Two out of the three studies using the four-factor model of GOs found non-significant relationships between a mastery-avoidance GO and performance. However, Bong (2009) also found a significant negative relationship for participants in Middle Elementary School.

With respect to the relationships between performance GOs and performance, those studies using a 2-factor model found significant positive and non-significant relationships. Studies using the three- and four-factor models of GOs found both positive and non-significant correlations between a performance-approach GO and performance. The relationships between a performance-avoidance GO and performance were also quite inconsistent with some studies finding significant negative relationships and others finding non-significant relationships.

Overall, the results for the relationships between GOs and performance are quite inconsistent with different studies obtaining different results. Moreover, a number of studies (e.g. Elliot et al., 1999; Church et al., 2001) found inconsistent results for the relationships between GOs and performance across tasks, studies (e.g. Study 1 and Study 2), or for participants of different ages. These inconsistencies in research indicate that further investigation of the relationships between GOs and performance is definitely required.

As was mentioned earlier (Section 5.3.), in order to determine the direction of causality for the relationships between GOs and performance one should have a sufficiently sound theory to test. At this point in time it is quite difficult to form a theory regarding whether GOs predict performance or vice versa. Although it is more likely that GOs predict performance there is no evidence to show that the opposite is not true. For example, it is possible that past performance on a task influences the types of GOs adopted on that task. Consequently, it was thought that testing the direction of causality in this study would not be appropriate. Therefore, in the current study, the strength and direction of the *correlations* between GOs and performance will be assessed. Based on the results obtained from the studies described above, the following Research Questions were proposed for the current study:

Research Question 8a: How do task-specific mastery-approach goal orientations correlate with performance on tasks (if at all)?

Research Question 8b: How do task-specific mastery-avoidance goal orientations correlate with performance on tasks (if at all)? This Research Question will only be answered if a 2x2 model of goal orientations is chosen as an appropriate model.

Research Question 8c: How do task-specific performance-approach goal orientations correlate with performance on tasks (if at all)?

Research Question 8d: How do task-specific performance- avoidance goal orientations correlate with performance on tasks (if at all)?

5.4.2. Goal Orientations as Indirect Predictors of Performance

As mentioned earlier some researchers focused on examining the direct relationships between GOs and performance whilst others (e.g. Bandalos et al., 2003; VandeWalle et al., 2001; Elliot & Sheldon, 1997) examined how GOs influence performance indirectly e.g. with self-efficacy, effort, and cognitive strategies as mediators. It was decided that the indirect relationships between GOs and performance will not be discussed in the current study. This decision was made as a result of the fact that there are still inconsistencies in research with respect to the direct relationships between GOs and performance and (as will become evident in the next section) not much is known about the relationships between ***GO profiles*** and performance. Therefore, it was thought necessary to focus on further investigating the direct relationships between GOs and performance as well as examining whether different GO profiles have different relationships with performance prior to investigating the processes by which GOs influence performance (or vice versa).

5.4.3. Multiple Goal Orientations as direct predictors of Performance

Studies using the multiple goals perspective have obtained varied results with respect to the types of GO profiles and their effects on performance. A number of studies investigated the relationships between GO profiles and performance. These are described briefly below. Following this, the necessity to investigate these relationships further is discussed.

Ng (2009) assessed GO profiles by measuring the mastery, performance-approach, and work-avoidance orientations of participants. He obtained three GO profiles from his cluster analysis. **Cluster 1** was named ‘performance-focused learners’. This cluster included participants having high a performance-approach GO and low mastery and work avoidance orientations. **Cluster 2**, which was referred to as ‘work-avoidant learners’, was characterised by participants having moderate mastery and performance-approach GOs and slightly higher work avoidance orientations. In contrast, **Cluster 3**, referred to as ‘multiple-goal learners’ was characterised by participants having high mastery and performance GOs and low work avoidance GOs. His sample consisted of 441 adult learners in distance learning programs at a university in Hong Kong. Their performance on a compulsory academic essay was used as an indicator as performance. As a result of his analysis he found that multiple-goal learners performed significantly better than work-avoidant learners. However, there were no significant differences in performance between multiple-goal learners and performance-focused learners. One concern regarding the design of this study is that different essays were used as indicators of performance since students from different courses were recruited for the study. This difference might introduce bias into the study since different essays may have had different levels of difficulty and slightly different requirements. In addition, grading of the essays may have been quite subjective as these are not marked on an all-or-none basis. These factors do not seem to have been taken into account during the study since no mention of them was made. Consequently, these concerns should be taken into consideration when evaluating the results of this study.

Meece and Holt (1993) also carried out a study investigating the relationships between multiple GOs and performance. They used a two-factor model of GOs and their cluster analyses revealed three GO profiles. **Cluster 1**, labelled ‘high mastery’ was characterised by participants having high mastery and low performance GOs. **Cluster 2**, which was referred to as ‘combined mastery-ego’, was characterised by participants who had high mastery and high performance GOs. Finally, **Cluster 3**, which was labelled ‘low mastery-ego’ consisted of those participants who endorsed low mastery and low performance GOs. Their sample consisted of 257 5th and 6th graders whose performance in science was assessed by means of their grade at the end of the year and a self-report measure of strategy use. The results of the analyses indicated that participants in the high mastery cluster (Cluster 1) performed significantly better than participants in the other two clusters. There were no differences in performance for participants in Clusters 2 and 3. Participants in Clusters 1 and 2 reported greater use of active learning strategies than those in Cluster 3. Moreover, participants in Clusters 2 and 3 reported greater use of superficial engagement (effort minimising strategies) than those in Cluster 1. Consequently, it seems as though the greater use of active learning strategies and lower use of superficial engagement may be contributing to the higher performance of participants in Cluster 1.

Pintrich (2000) used the multiple goals perspective in order to assess the relationships between multiple GO adoption and performance in Maths. A sample of 150 8th and 9th graders participated in his study. Maths grades were used as an indicator of performance. He investigated four categories of GO profiles: High mastery/Low performance; High mastery/High performance; Low mastery/High performance; Low mastery/Low performance. The results of his study indicated no significant relationships between GO profiles and performance.

Daniels et al. (2008) found four types of GO profiles as a result of their cluster analyses. The four clusters characterised individuals with high mastery/high performance GOs (referred to as multiple goals); dominant mastery GO; dominant performance GO; and low mastery/low performance GOs (referred to as low motivation). Their sample consisted of 1002 undergraduates enrolled in an Introductory Psychology course. Their final grade on this course was used as an indicator of performance. The analyses revealed that there were no significant differences in the performance of individuals in the multiple goals, dominant mastery, and dominant performance clusters. However, participants in the low motivation cluster performed significantly worse than participants in the other three clusters.

Out of the four studies described above, three of them (those by Meece & Holt, 1993; Pintrich, 2000; and Daniels et al., 2008) used a two–factor model of GOs. The other study (by Ng, 2009) only measured a performance-approach GO. The studies described in Chapter 3 (Section 3.3.) used the 3-factor model (Table 3.2.) and the 2x2 model (Table 3.3.) of GOs in examining GO profiles. These studies also investigated the relationships between GO profiles and performance. A comparison of these studies indicated that for the studies investigating the 3-factor model (that is, the studies by Pastor et al., 2007, and Fortunato & Goldblatt, 2006), participants adopting a 'High Approach, Low Avoidance' profile performed better than participants adopting a 'High Mastery, Low Performance' profile or a 'High Performance-Avoidance' profile (the latter profile was only found in the study by Fortunato & Goldblatt, 2006). Pastor et al. (2007) and Cano and Berben (2009) used the 2x2 model of GOs. The results obtained when using a 2x2 model are not as consistent as those obtained when using the 3-factor model. For example, Cano and Berben (2009) found that participants who scored highly on all four GOs had higher performance than participants in other clusters with the exception of participants in the 'High Mastery-Approach' cluster (participants who adopted high mastery-approach and low mastery-avoidance, performance-approach and performance-avoidance GOs) who obtained similar mean performance scores. On the other hand, Pastor et al. (2007) found that the performance of participants who scored high on all four GOs was average whilst that of participants in the 'High Mastery-Approach' cluster was low. Since further research is definitely required before any conclusions may be drawn regarding the relationships between GO profiles and performance the current study aims to investigate these relationships further. Therefore, the following Research Question was proposed for the current study:

Research Question 9: Do the different task-specific GO profiles score significantly differently on task performance?

5.5. Synopsis

The focus of this chapter was on variables related to GOs that are considered to be important to organisations, namely, self-efficacy, motivation, and performance. As described in the introduction chapter, the next chapter provides an overview of the literature review and a list of the Hypotheses and Research Questions for the current study.

Chapter 6: Summary of Literature and Research Questions

6.0. Introduction

The aim of this chapter is to provide an outline of the previous four chapters (the literature review chapters) and a summary of the Research Questions and Hypotheses which will be addressed in the current study. This will facilitate the understanding of the next chapter in which the research methods used in the current study are described.

6.1. Summary of Literature Review

In Chapter 2 it was described how the concept of GOs, which initially developed in educational psychology, is being applied to organisational research. Throughout this chapter it became evident how the use of this concept in organisational research may benefit organisations.

In Chapter 3 it became clear how there is currently no widely accepted definition of GOs and researchers are using different definitions to guide their research. Different terms (when referring to GOs) are also being used and it is not entirely clear whether these different terms refer to the same concepts or not. The definition and terms to be used in the current study and the reasons for this choice were presented in this Chapter. The problem of dimensionality was also discussed in this Chapter. Following a description of the different models of GOs it was discussed how the 2-factor model was not differentiated enough. There is still not enough evidence indicating whether the 3- or 4-factor model provides the best understanding of GOs. Consequently, a decision was made to investigate this further in the current study and choose the model to be used in this study following the initial analyses. Finally, the multiple goals perspective was discussed. Following a description of the studies investigating this perspective it was described how the current study will further investigate this in order to promote knowledge on the multiple goals perspective.

In Chapter 4 a discussion of the concerns regarding the stability of GOs led to the conclusion that further research is required in order to establish whether GOs are stable traits or not. A number of studies investigated state GOs. These studies were grouped into three categories according to whether (a) they assessed if trait GOs predict state GOs, (b) they examined the consequences of state GOs or (c) they investigated the interactions between trait and state GOs.

After describing these studies it was concluded that since GOs may exist as traits and states, the interaction effects between trait and state GOs on performance would be examined in this study. Since the existence of trait GOs is also being investigated (by assessing the stability of GOs) the results of the latter will provide a better understanding of the interaction effects. Following this, the issue of task-specificity was discussed. Researchers have used both general and task-specific measures of GOs. However, little research has been carried out in order to investigate whether GOs are general or task-specific. Therefore, the current study will investigate this. The conclusion to this chapter described the importance of investigating the stability and task-specificity of GOs since these greatly influence research designs and the accuracy of research outcomes.

Finally, in Chapter 5 studies investigating the relationships between GOs and self-efficacy, effort, and performance were described. This description made it clear that there is still a lot of inconsistency in research with respect to these relationships. Since it is not entirely clear how these variables relate to GOs the current study will examine these relationships (both in terms of the profile and non-profile perspective).

A number of Research Questions and Hypotheses were proposed for the current study throughout the literature review. These are presented Section 6.2.

6.2. Summary of Hypotheses and Research Questions for the current study

6.2.1. Hypotheses proposed for the current study

Hypothesis 1. Individuals holding a trait mastery-approach goal orientation are expected to perform significantly better when a performance-approach goal orientation is induced as opposed to when a mastery-approach goal orientation is induced.

Hypothesis 2a: Task-specific mastery-approach goal orientations are expected to be significantly positively correlated with self-efficacy.

Hypothesis 2b: Task-specific performance-approach goal orientations are expected to be significantly positively correlated with self-efficacy.

6.2.2. Research Questions proposed for the current study

Research Question 1: Using LCA as a method of clustering goal orientations, how many different types of goal orientation profiles are there and what are the characteristics of each goal orientation profile? Does the 2x2 model significantly improve on the 3-factor model in terms of identifying goal orientation profiles?

Research Question 2a: Do individuals' General goal orientation profiles change over time?

Research Question 2b: Do individuals' General goal orientations change significantly over time?

Research Question 3a: How do trait goal orientation profiles interact with induced mastery-approach and performance-approach goal orientations in order to influence task performance of participants?

Research Question 3b. What effects will the relationships between a trait mastery-avoidance goal orientation and induced mastery-approach and induced performance-approach goal orientations have on the performance of participants? This Research Question will only be answered if a 2x2 model of goal orientations is chosen as an appropriate model.

Research Question 3c. What effects will the relationships between a trait performance-approach goal orientation and induced mastery-approach and induced performance-approach goal orientations have on the performance of participants?

Research Question 3d. What effects will the relationships between a trait performance-avoidance goal orientation and induced mastery-approach and induced performance-approach goal orientations have on the performance of participants?

Research Question 4a: Do participants adopt different goal orientation profiles across tasks?

Research Question 4b: Are participants' task-specific goal orientation profiles different from their General GO profiles?

Research Question 4c: Do participants' adopt different goal orientations across tasks?

Research Question 4d: Are participants' task-specific goal orientations significantly different from their General goal orientations?

Research Question 5a: Are task-specific goal orientation **profiles** stable over time?

Research Question 5b: Are task-specific goal orientations stable over time?

Research Question 6a: Do the different task-specific GO profiles score significantly differently on self-efficacy?

Research Question 6b: How do task-specific mastery-avoidance goal orientations correlate with self-efficacy? This Research Question will only be answered if a 2x2 model of goal orientations is chosen as an appropriate model.

Research Question 6c: How do task-specific performance-avoidance goal orientations correlate with self-efficacy?

Research Question 7a: Do the different task-specific GO profiles score significantly differently on mental effort?

Research Question 7b: How do the different task-specific goal orientations correlate with mental effort (if at all)?

Research Question 8a: How do task-specific mastery-approach goal orientations correlate with performance on tasks (if at all)?

Research Question 8b: How do task-specific mastery-avoidance goal orientations correlate with performance on tasks (if at all)?This Research Question will only be answered if a 2x2 model of goal orientations is chosen as an appropriate model.

Research Question 8c: How do task-specific performance-approach goal orientations correlate with performance on tasks (if at all)?

Research Question 8d: How do task-specific performance- avoidance goal orientations correlate with performance on tasks (if at all)?

Research Question 9: Do the different task-specific GO profiles score significantly differently on task performance?

A careful review of literature on GOs led to the proposal of the Research Questions and Hypotheses presented above. A description of the research methods used in the current study to address these Research Questions and Hypotheses is provided in the next chapter.

Chapter 7: Methodology

7.0. Introduction

This chapter focuses on the research methods used in this study. This study was a longitudinal one which was carried out over a period of one year. It was carried out using two main research designs: a panel survey and an experimental study. Consequently, the large part of this chapter is split into two main sections: one describing the survey (Section 7.1.) and the other describing the experiments (Section 7.2.). In each of the two sections, firstly, there is an overall description of the research design and the reasoning behind the use of such a design. This is followed by descriptions of the sample and survey (in Section 7.1.) or experiment (in Section 7.2.) characteristics. Next, the data collection procedure is presented and details of the pilot study are provided. Finally, a description of each of the measures used as well as support for the use of these measures is provided.

Following the two main sections on the survey and experiments, an overall explanation of the rationale for using these data collection methods is provided. This is followed by a description of the ethical issues relating to this study and the ways in which these were addressed. In conclusion, two summary tables providing information on the demographics and data collection times for the overall study are presented along with a diagram indicating which aspects of the research relate to each of the research questions and hypotheses.

7.1. Panel Survey

7.1.1. Sample Characteristics

The panel survey data were required in order to provide answers to a number of the Research Questions and Hypotheses (e.g. Hypothesis 1 and Research Questions 1, 2, 3 and 4). Participants were asked to complete questionnaires at two points in time (Time Q1 and Time Q2). At Time Q1 participants were asked to indicate whether they would be interested in participating in the experimental study. Therefore, a sub-sample of the panel survey participants also participated in the experimental study. Further details of this are provided in Section 7.2.

The majority of participants consisted of Loughborough University School of Business and Economics students. However, there were also a number of employed and retired individuals. Participant numbers were assigned to individuals so as to be able to match their responses at different Time points (e.g Time Q1 and Time Q2). The sample size at Time Q1 consisted of 641 participants whilst the sample size at Time Q2 consisted of 202 participants.

7.1.2. Survey Characteristics

At Time Q1, participants were asked to complete a measure of General GOs, and a short demographics questionnaire[1]. The questionnaire at Time Q1 also contained a Hypothetical Task GO measure. For this, participants were provided with one of two task scenarios (refer to Appendix A for copies of the Time Q1 questionnaires) and asked to complete the Hypothetical Task GO measure keeping in mind the way they would approach the task provided in the task scenario. Participants were randomly assigned to task scenarios. Two task scenarios were provided in order to ensure that any differences between General and Hypothetical Task GOs (as well as between Hypothetical Task and Verbal and Numerical Test GOs) would be the result of task-specificity per se and not some unknown bias resulting from the nature of the hypothetical task chosen.

[1] Participants were also asked to complete a personality measure at Time Q1 (refer to Appendix A). However, it was later decided that the relationships between GOs and personality would not be included in this thesis.

At Time Q2 the questionnaire consisted of a General GO measure and a Hypothetical Task GO measure (refer to Appendix B for copies of the Time Q2 questionnaires). At Time Q2 participants completed the Hypothetical Task GO measure with the same task scenario that they had at Time Q1.

The time interval between Time Q1 and Time Q2 needed to be long enough to reduce familiarity with the questionnaire but not too long due to the time constraints of the study. Since a number of participants were also taking part in the experimental study it was decided that there should be two different time intervals (one for survey only participants and one for survey participants who also took part in the experiments). In this way the stability of General and Hypothetical Task GOs over shorter and longer time intervals could be compared. The plan was to have a four week gap between Time Q1 and Time Q2 for survey only participants and a twelve week gap (with the experimental sessions in between) for survey participants who also took part in the experiments. Unfortunately, things did not always go according to plan and the interval between Time Q1 and Time Q2 ranged between 5 and 51 weeks for different participants (refer to Section 7.1.3. for further details).

The questionnaires were handed out personally in order to obtain as high a response rate as possible (refer to Section 7.1.3. for further details of the data collection procedure). The response rate for postal surveys is not very high (Frankfort-Nachmias & Nachmias, 1996). The same can be said for e-mail surveys. Therefore, by personally asking participants to complete the questionnaire a higher response rate was hoped for. Since some participants were not present when the Time 2 questionnaires were handed out in person, an e-mail (with the Questionnaire attached) was sent out to the participants who did not respond at Time Q2 (refer to Appendix C for a copy of the e-mail).

7.1.3. Description of the Survey Data Collection Procedure

This section provides a brief description of how the survey data collection was carried out including the original timeline for data collection and the reasons for deviating from this timeline. As described in Section 7.1.2. it was decided that there should be two different time intervals between the administration of Time Q1 and Time Q2 questionnaires for the survey only participants and for the survey participants who also took part in the experiments.

Survey Only Participants. The participants who only took part in the survey (and not the experiment) mainly consisted of full-time Loughborough University students and a group of employed individuals (most of whom were attending a part-time management course at Loughborough University). The plan was to have a four week time interval between Time Q1 and Time Q2 for these participants.

In order to increase the survey response rate it was decided that the questionnaires should be handed out personally. A number of lecturers at the School of Business and Economics at Loughborough University provided the opportunity for questionnaires to be handed out during their lectures. Each lecturer allocated ten to fifteen minutes of two of their lectures (once for the Time Q1 questionnaire and approximately 4 weeks later for the Time Q2 questionnaire) for data collection purposes. During this time students were provided with a brief summary of the study and of the questionnaire. Moreover, the questionnaires were handed out and the completed ones were collected. When the Time Q2 questionnaires were handed out it was made clear that *only participants who were not participating in the experiment* were being asked to complete the questionnaires being handed out. The survey participants who also took part in the experiments were informed that they would be asked to complete the questionnaire at a later stage.

The part-time students were all employed by the same company and were attending a part-time course at Loughborough University. These participants had two lectures based at Loughborough University (during the data collection phase of this study). Consequently, the timings of the Time Q1 and Time Q2 questionnaires needed to coincide with the dates of these two lectures. Again, ten minutes were provided during each of these two lectures to provide a brief summary of the study, hand out the questionnaires and collect the completed ones. The MSc students and employed participants were people the researcher knew and personally invited to participate in the study. These people were invited to participate in order to increase the sample size as much as possible (especially for the experimental study).

At Time Q1 participants were invited to take part in the experimental study by providing them with a brief explanation of what this consisted of and asking them to indicate on their questionnaires (which at Time Q1 had a short section inviting participants to take part in the experimental study) whether they were interested in participating or not (refer to Appendix A for a copy of the Time Q1 questionnaire). Participants who did not indicate whether or not they were interested in participating in the experimental study were assumed not to be interested and were asked to complete the Time Q2 questionnaire 4 weeks after completing the Time Q1 questionnaire.

It was assumed that, for various reasons (e.g. illness) a number of participants might not have been present when the Time Q2 questionnaire was handed out. Consequently, an e-mail with the Time Q2 questionnaire attached was sent out to those participants who had completed the Time Q1 questionnaire but not the Time Q2 questionnaire (refer to Appendix C for a copy of this e-mail).

The variations in the time interval for the survey only participants came about for three main reasons:

1. It was not always possible to attend lectures exactly 4 weeks apart.
2. Some participants who were contacted by e-mail took much longer to respond than others (and than the participants who completed the Time Q2 questionnaire during the lectures).
3. Only two of the part-time student lectures were being carried out at Loughborough University. Therefore, the Time Q1 and Time Q2 questionnaires were handed out during these two lectures. Unfortunately, there was a change in their timetable and the second lecture was postponed to a much later date. Consequently, completion of the Time Q2 questionnaires by these participants was delayed by a few months.

Survey participants who also took part in the experiment. These consisted of Loughborough University students, a group of employed individuals from Malta, and a group of retired and employed individuals from the UK. As mentioned in Section 7.1.2. a 12 week interval between the Time 1 and Time 2 questionnaires of these participants was planned.

The Time Q1 questionnaire was handed out personally to all participants. The Time Q1 questionnaires were handed out during lectures, as described above, for the Loughborough University students. The employed participants from Malta as well as the retired and employed participants in the UK consisted of family, friends, and friends of friends and family. The Time Q1 questionnaires were also handed out personally to these participants. All participants taking part in the experimental study (apart from the retired participants) received an e-mail with the Time Q2 questionnaire attached a few weeks after their second (Time E2) experimental session (refer to Appendix J for a copy of the e-mail). The retired participants expressed during their experimental sessions that they preferred to receive their second questionnaire by post. Subsequently, their Time Q2 questionnaire was posted to them four weeks after their second experimental session.

The variations in the time interval (between Time Q1 and Time Q2) for these participants came about for two main reasons:

1. There were a number of delays in carrying out the experimental sessions (described in further detail in Section 7.2.3.) and the Time Q2 questionnaires were sent out after the Time E2 experiments.
2. Some participants took longer than others to send back the Time Q2 questionnaires by e-mail and post.

7.1.4. Survey Pilot Study

A pilot study was conducted prior to the main data collection in order to ensure that there were no problem items in the questionnaires. Participants in the survey pilot study were asked to complete and provide feedback on the Time Q1 Questionnaire. The survey pilot study consisted of 6 participants. These were all Loughborough University School of Business and Economics PhD students.

The feedback provided indicated that there were a few problems with the mastery-avoidance items. Some of the pilot study participants either did not understand these items properly or assumed that the mastery-avoidance GO items were measuring a mastery-approach GO in different terms. This became evident when one participant asked for one of the mastery-avoidance items to be clarified and another participant provided an explanation which showed that he understood the mastery-avoidance item to have the same meaning as the mastery-approach items but to be simply worded differently. This prompted some other participants to point out that they found the mastery-avoidance items difficult to understand. The problem items were modified and pilot study participants were asked to evaluate the changes. Once it was agreed that the items were understandable the survey data collection for the study commenced.

7.1.5. Description of Measures used in the Survey

In this section the measures used in the survey are described. The choice of measures is justified and relevant reliability and validity statistics (from previous studies using these measures) are provided for each of the measures used. The reliability results for the measures in the current study are presented in the next chapter. A summary of the measures completed by survey participants at each time point are presented in Table 7.1.

Table 7.1. Measures completed at each point in time

Time	Measures completed
Time Q1	• Demographics Measure • General GOs Measure • Hypothetical Task GOs Measure
Time Q2	• General GOs Measure • Hypothetical Task GOs Measure

7.1.5.1. General and Hypothetical Task Goal Orientations

The measures of General and Hypothetical Task GOs were adapted from the Achievement Goal Questionnaire–Revised (AGQ-R) developed by Elliot and Murayama (2008). As described in Chapter 3 (Section 3.2.3.) the AGQ-R (Elliot & Murayama, 2008) is a revised version of the AGQ developed by Elliot and McGregor (2001). On careful examination of the AGQ, Elliot & Murayama (2008) found a number of issues with it, including pitting one goal against another, thus not allowing for the multiple goal perspective (Elliot & Murayama, p615). As a result they revised it and developed the AGQ-R. This was found to have reliability coefficients for the four scales ranging between .84 and .94 (including the performance avoidance scale which had a lower reliability in the AGQ). Moreover, the intercorrelational analyses results ranged from non-significant to .68 (ρ<.01) with higher correlations for GOs sharing the same competence dimension (mastery vs. performance) than those that did not.

Elliot and Murayama (2008) also conducted a confirmatory factor analysis in order to test whether the AGQ-R items loaded onto the respective GO scales. Their results indicated that all the items loaded onto the scales they were meant to be measuring (the factor loadings ranged from 0.73 to 0.93). Moreover, they found good model fit for the four-factor model ($\chi^2(48, N=229)= 78.32$; $p <.01$, $\chi^2/df =1.63$, CFI=0.99, IF=0.99, RMSEA=0.053). They also tested six alternative models (including a 3-factor model with the MAP and MAV items loading onto one scale and a 3-factor model with the PAP and PAV items loading onto one scale). The fit indexes for these alternative models indicated that none of the alternative models provided a good fit to the data (Elliot & Murayama, 2008, pp619).

Since this study makes use of the multiple goal perspective, and because the AGQ-R improved upon the AGQ in a number of ways, the GO measures in the current study were adapted from the AGQ-R. The GO measures needed to be adapted because the AGQ-R was originally developed for measuring students' GOs on university courses e.g. "I am striving to understand the content of this course as thoroughly as possible" (Elliot & Murayama, 2008). For the purposes of the survey, the AGQ-R was adapted in order to make the items relevant to the General and Hypothetical Task GOs. Items were presented in the present and future tense for the General and Hypothetical Task GOs measures, respectively. Further adaptations to the questionnaires were made as a result of the feedback obtained from the pilot study regarding the unclarity of the mastery-avoidance items. The mastery-avoidance items were modified in order to try and make them as clear as possible. However, overall, the adaptations were kept as minor as possible. Since the confirmatory factor analysis results indicated that all the items in the AGQ-R loaded onto the appropriate scales and had good reliabilities, all the AGQ-R items were included in the questionnaires and the same order of items was maintained.

Table 7.2. indicates the items in the original AGQ-R and the adapted items in the General GO questionnaire. Tables 7.3. and 7.4. indicate the items in the original AGQ-R and the adapted items in the Hypothetical Task GO questionnaires for Task 1 and Task 2, respectively.

Table 7.2. Comparison of AGQ-R questionnaire items with adapted General Goal Orientation items.

Item number	AGQ-R Item	General GO Questionnaire Item
1	My aim is to completely master the material presented in this class.	My aim is to completely master everything I do.
2	I am striving to do well compared to other students.	I strive to do well compared with others in everything I do.
3	My goal is to learn as much as possible.	My goal is to learn as much as possible about the things I do.
4	My aim is to perform well relative to other students.	My aim is to perform well relative to others in everything I do.
5	My aim is to avoid learning less than I possibly could.	My aim is to ensure I do not miss out on new learning opportunities.
6	My goal is to avoid performing poorly compared to others.	My goal is to avoid performing poorly compared to others in everything that I do.
7	I am striving to understand the content of this course as thoroughly as possible.	I strive to understand the content of the things I do as much as possible.
8	My goal is to perform better than the other students	My goal is to perform better than others in everything I do.
9	My goal is to avoid learning less than it is possible to learn.	My goal is to avoid missing opportunities to fully understand an activity.
10	I am striving to avoid performing worse than others.	I strive to avoid performing worse than others in everything that I do.
11	I am striving to avoid an incomplete understanding of the course material.	I strive to avoid an incomplete understanding of the things I do.
12	My aim is to avoid doing worse than other students.	My aim is to avoid doing worse than others in everything that I do.

Key: Items measuring MAP GO: 1, 3 and 7; Items measuring MAV GO: 5, 9 and 11; Items measuring PAP GO: 4, 2 and 8; Items measuring PAV GO: 6, 10 and 12.

Table 7.3. Comparison of AGQ-R questionnaire items with adapted Hypothetical Task Goal Orientation items for Task 1

Item number	AGQ-R Item	Hypothetical Task GO Questionnaire Item (for Task 1)
1	My aim is to completely master the material presented in this class.	I will aim to completely master selling the new carpets.
2	I am striving to do well compared to other students.	I will strive to do better at selling the new carpets compared to my colleagues.
3	My goal is to learn as much as possible.	My goal will be to learn as much as possible regarding how to sell these new carpets.
4	My aim is to perform well relative to other students.	My aim will be to sell more new carpets relative to my colleagues.
5	My aim is to avoid learning less than I possibly could.	My aim will be to avoid learning less than I possibly could about selling these new carpets.
6	My goal is to avoid performing poorly compared to others.	My goal will be to avoid selling fewer new carpets compared to my colleagues.
7	I am striving to understand the content of this course as thoroughly as possible.	I will be striving to understand how to sell these new carpets as thoroughly as possible.
8	My goal is to perform better than the other students	My goal will be to perform better than my colleagues at selling these new carpets.
9	My goal is to avoid learning less than it is possible to learn.	My goal will be to avoid learning less than it is possible to learn about selling new carpets.
10	I am striving to avoid performing worse than others.	My goal will be to avoid missing opportunities to fully understand how to sell the new carpets.
11	I am striving to avoid an incomplete understanding of the course material.	I will be striving to avoid an incomplete understanding about how to sell the new carpets.
12	My aim is to avoid doing worse than other students.	My aim will be to avoid doing worse than my colleagues when selling the new carpets.

Key: Items measuring MAP GO: 1, 3 and 7; Items measuring MAV GO: 5, 9 and 11; Items measuring PAP GO: 4, 2 and 8; Items measuring PAV GO: 6, 10 and 12.

Table 7.4.Comparison of AGQ-R questionnaire items with adapted Hypothetical Task Goal Orientation items for Task 2

Item number	AGQ-R Item	Hypothetical Task GO Questionnaire Item (for Task 2)
1	My aim is to completely master the material presented in this class.	My aim will be to completely master the new computer program.
2	I am striving to do well compared to other students.	I will strive to do better in training compared to my colleagues.
3	My goal is to learn as much as possible.	My goal will be to learn as much as possible about this new computer program.
4	My aim is to perform well relative to other students.	My aim will be to perform better during training relative to my colleagues.
5	My aim is to avoid learning less than I possibly could.	My aim will be to avoid learning less than I possibly could about this new computer program.
6	My goal is to avoid performing poorly compared to others.	My goal will be to avoid performing poorly during training compared to my colleagues.
7	I am striving to understand the content of this course as thoroughly as possible.	I will be striving to understand the content of this computer program as thoroughly as possible.
8	My goal is to perform better than the other students	My goal will be to perform better than my colleagues during training.
9	My goal is to avoid learning less than it is possible to learn.	My goal will be to avoid learning less than it is possible to learn about this new computer program.
10	I am striving to avoid performing worse than others.	My goal will be to avoid missing opportunities to fully understand the new computer program.
11	I am striving to avoid an incomplete understanding of the course material.	I will be striving to avoid an incomplete understanding of this new computer program.
12	My aim is to avoid doing worse than other students.	My aim will be to avoid doing worse than my colleagues during training.

Key: Items measuring MAP GO: 1, 3 and 7; Items measuring MAV GO: 5, 9 and 11; Items measuring PAP GO: 4, 2 and 8; Items measuring PAV GO: 6, 10 and 12.

7.1.5.2. Demographics Questionnaire

At Time Q1 and Time Q2 participants were asked to complete a short demographics questionnaire. This included items asking about age and current occupation amongst others. The demographics questionnaire was included in the panel survey for two main reasons. Firstly, due to the fact that the study was longitudinal (and the stability of a number of variables over time was being examined) it was essential to be able to match participants' questionnaires at Time Q1 and Q2. Participants' full name, age, and occupation were requested for matching purposes. Secondly, it was considered important to be able to assess the presence of any significant differences in GOs as a result of differences in age and occupation, if necessary. Therefore, it was essential to ask for this information in order to be able to perform the necessary analyses if required. Additionally, participants' e-mail addresses were requested as part of this questionnaire. This was required in order to be able to contact them at a later date regarding the experiment (in the case of participants who were interested in participating in the experimental study), or (in the case of all other participants) to send them the follow-up questionnaire if required (refer to Appendix A and Appendix B for copies of the demographics questionnaires at Time Q1 and Time Q2, respectively).

7.2. Experimental Study

One purpose of the experiments was to examine the interaction effects of General and Induced GOs on performance. An additional purpose was to examine whether task-specific GOs adopted on different tasks are different from each other and from General GOs. The experiments were also carried out in order to examine the relationships between task-specific GOs and mental effort, self-efficacy and performance on tasks.

7.2.1. Sample Characteristics

A sub-sample from the panel survey was used for the experiments (rather than an independent sample) due to the fact that data concerning the General GOs of participants taking part in the experimental study were required in order to answer some of the Research Questions and Hypotheses. Rather than measure the General GOs of an independent sample (as well as of the survey participants), it was thought to be more practical to ask participants taking part in the panel survey to participate in the experimental study since they had already completed the General GOs and demographics questionnaires. Experimental study participants were asked to attend two experimental sessions (Time E1 and Time E2; further details of the data collection procedure are provided in Section 7.2.3.). The sample size at Time E1 was 73 participants, of whom 71 attended the experimental session at Time E2.

7.2.2. Experiment Characteristics

The experimental study consisted of two 1 hour sessions. Participants were asked to attend the experimental sessions in groups (mainly due to time constraints). The fact that participants attended in groups as opposed to individually was not thought to have any influence on their performance since participants could not see what other participants were doing and complete confidentiality was maintained with regards to questionnaire and test results. Moreover, it is not uncommon to ask participants to attend GO experimental sessions in groups. This was done in a number of other GO studies such as those by Chen and Mathieu (2008), Loraas and Diaz (2009), and Jagacinski et al. (2001), amongst others. Participants were randomly assigned to groups according to their availabilities.

During the experimental sessions participants were asked to complete a verbal and a numerical aptitude test as well as a number of questionnaires. The exact content of each session is provided Sections 7.2.2.3. and 7.2.2.4.

7.2.2.1. Use of Aptitude Tests

Since this study is aimed at developing knowledge of GOs in organisations it was thought appropriate to use aptitude tests as the experimental tasks. Aptitude tests were chosen due to the fact that they are used in employment and selection (and therefore relevant to organisations). Moreover, although they are both components of General Mental Ability, they are quite different tasks. Verbal and Numerical skills are considered to be quite different from each other and participants having one set of skills do not necessarily have the other.

Furthermore, aptitude tests are NOT all-or-none tasks in which individuals either win or lose. On the contrary, it is possible for participants to obtain different levels of performance on the two tasks. This was considered to be important so that even small differences in performance (as a result of different GOs) could be determined. Aptitude tests also provide a link between university and work. Since the majority of the sample consisted of university students and because this research was carried out in order to provide insight into the use of the concept of GOs in organisations, aptitude tests were considered to be ideal since they are work-related but can be administered to university students.

An additional benefit of the use of aptitude tests was for the participants themselves. By participating in the experiments students had the opportunity to practise aptitude tests which are widely used in employee selection. I was able to give these students feedback on their performance as well as tips on how to improve on aptitude tests. The fact that students were given an opportunity to practise aptitude tests also helped me obtain a larger sample size. Thus, the use of aptitude tests provided a win-win situation. Finally, aptitude tests may easily be administered in a classroom. Consequently, they were chosen for practical reasons too.

A decision was made to use aptitude tests developed by test publishers rather than develop aptitude tests for the purposes of this study. This decision was based on the fact that published aptitude tests have been tried and tested and they have good levels of reliability and validity as well as norm groups for comparison (details of the reliability and validity of the aptitude tests are provided in Section 7.2.5.6.).

7.2.2.2. Incentives

Participants were offered the opportunity to take part in a £50 cash prize draw (three £50 prizes were offered) as an incentive to participate in the experimental study. This prize draw took place on the 10th May 2010 once all the experiments were completed. However, the main incentive for participation in the experimental study was the opportunity to practise Verbal and Numerical aptitude tests and obtain feedback as well as hints and tips regarding how to improve on these tests. This was thought to be useful for participants since nowadays a large number of employers make use of aptitude tests in their selection process. In fact, one of the many reasons for choosing aptitude tests as the experimental tasks was that it would provide participants with a good opportunity to practise these tests in order to increase their chances of success in the selection process when applying for jobs or placements. The feedback was sent out to participants approximately 2 months after their Time E2 session (and, for those who completed the Time Q2 questionnaires, approximately 1 month after completing these). Please refer to Appendix M for a copy of the feedback form template.

7.2.2.3. Experimental Session 1

Prior to attending the first experimental session all the necessary information was sent out to participants by e-mail (Refer to Appendix D for a copy of the e-mail sent out to participants).

On arrival at the first experimental session, participants were given a description of what the session would entail and were provided with an information sheet and consent form to sign (Refer to Appendix E for a copy of the information sheet and consent form). Following this, participants were provided with an example question of the first test which they were asked to complete. The answer to this example question was provided and subsequently, participants were asked to complete a self-efficacy questionnaire in order to rate their perceived self-efficacy on the test they were about to complete (refer to Section 7.2.5.4. for details on the self-efficacy questionnaire and Appendix F for a copy of the self-efficacy questionnaire). On completion of the self-efficacy questionnaire, participants were provided with task instructions and the first aptitude test was handed out (refer to Appendix G for a copy of the instructions provided throughout the experiment at Time E1).

The order of the tests was randomised for the different participant groups so that any carryover effects would be distributed evenly through the sample. Therefore, some participants were asked to complete the verbal test first followed by the numerical test whilst others were asked to complete the numerical test first.

On completion of the first aptitude test, participants were asked to complete a questionnaire (referred to as the post-test questionnaire, Appendix H) consisting of measures of their GOs on the Verbal/Numerical test (depending on which test they had just completed), as well as measures of mental effort and task-experience for the Verbal/Numerical test.

The only two GO studies which assessed state GOs (Harwood & Swain, 2001, and Breland & Donovan, 2005) did not manipulate GOs. In these studies the state GO questionnaire was handed out to participants prior to the task. In other studies (e.g. Loraas and Diaz, 2009; Kozlowski et al., 2001; Steele-Johnson et al.,2008; Jagacinski et al., 2001) goal commitment was measured to check whether the manipulations worked. However, state GOs were not specifically assessed. In this study it was thought best to assess the GOs being adopted on the Verbal and Numerical Tests rather than goal commitment. These Verbal and Numerical Test GOs were not 'state' GOs since at Time E1 no manipulations occurred. However, they were considered to be 'task-specific' GOs. The Verbal and Numerical test GOs were measured on completion of the test rather than before. It was thought that participants might be able to understand the questionnaire better and provide more accurate answers, after completing the test since the thoughts they had during test completion, as well as the approach that they adopted, would still be fresh in their minds.

The same process (questionnaire – experiment - questionnaire) was repeated for the second test. In order to minimise external factors influencing GOs, self-efficacy, mental effort and performance on tests, the test instructions were strictly adhered to and the experimental sessions were kept as consistent as possible.

7.2.2.4. Experimental Session 2

Prior to the second experiment, participants were divided into three groups: Group A, Group B, and Group C. All three groups completed the same measures and the same tests as they did during the first experimental session. However, the three groups were given *different test instructions* during the second experimental session. Group A were the control group. Group B were given instructions intended to induce a performance-approach GO whilst Group C were given instructions intended to induce a mastery-approach GO (please refer to Appendix I for the Time 2 test instructions).

Although it would have been ideal to assign participants randomly to these groups this was not entirely possible because of the different participant backgrounds. The mastery-approach GO induction relied on participants benefitting from improving their understanding of the aptitude tests. Consequently, this induction was not relevant to the employed and retired participants. As a result, the majority of these were assigned to the control group (Group A) and a few were assigned to the performance-approach induction group (Group B). All other experimental participants were randomly assigned to the three groups. An overview of the Verbal and Numerical test instructions given to the different experimental groups at Time E1 and Time E2 is provided in Table 7.5.

Table 7.5. Verbal and Numerical Test Instructions given to the Different Experimental Groups at Time E1 and Time E2

Group	Time 1	Time 2
A	Neutral Instructions	Neutral Instructions
B	Neutral Instructions	Instructions inducing a PAP GO
C	Neutral Instructions	Instructions inducing a MAP GO

Key: PAP GO = Performance-approach goal orientation; MAP GO = Mastery-approach goal orientation.

In order to maximise the probability that the GO manipulations would be successful, other GO studies which successfully manipulated GOs were examined. These included the studies by Loraas and Diaz (2009), Chen and Mathieu (2008), Jagacinski et al. (2001), Gerhardt and Luzadis (2009), Kozlowski et al. (2001), and Steele-Johnson et al. (2008). It was noted that in these studies the mastery-approach manipulation emphasised the importance of learning and stressed that the purpose of the session was to learn. Moreover, there were no references to comparison with others, but rather, the emphasis was on oneself. In contrast, for the performance-approach manipulations the emphasis was on performance and the comparison of participants' performance with that of others was stressed. Manipulation checks performed in a number these studies indicated that the GO manipulations were successful. Therefore, the GO manipulations for the current study were based on the GO manipulations of the previously mentioned studies. The following instructions were provided for the mastery-approach GO induction:

“It is important that you keep in mind that this session is a chance for you to practise aptitude tests for when you apply for employment. So it is important that you use this opportunity to learn more about what it is like to take a verbal/numerical aptitude test. The results on these tests are not as important as the opportunity to learn more about aptitude tests.”

As in the other studies, the focus was on learning and on emphasising that the purpose of the experimental session was for them to learn more about aptitude tests. The instructions provided for inducing a performance-approach GO consisted of the following:

“This time I shall be comparing your performance on the test to the test norms and I shall also be comparing your performance on this test with the performance of other participants of my research. I would like to remind you that the results of this test will ONLY be used for the purpose of this research and will not have any influence whatsoever on your course since the results will be kept in very strict confidentiality.”

Similarly to the other studies in which performance-approach GOs were manipulated the emphasis was on performance and on comparing participants’ performance to that of other individuals (other-referenced).

7.2.3. Description of the Experiment Data Collection Procedure

This section provides a brief description of how the experimental data collection was carried out including the original timeline for data collection and the reasons for deviating from this timeline.

Experimental participants were contacted by e-mail prior to each experimental session in order to remind them what the study consisted of and how the experimental sessions would be conducted (refer to Appendix D for a copy of the e-mail sent out to participants). This e-mail was only sent out to those participants who indicated (on the Time Q1 questionnaire) that they were interested in participating in the experiments.

Participants were provided with a list of possible dates and times for the experimental sessions which they could sign up for. However, they were also informed that extra sessions could be arranged if they could not make any of the proposed dates and times. At the end of the first experimental session participants were informed that they would be contacted by e-mail regarding the second experimental session. Once again, an e-mail was sent out to experimental participants prior to the second experimental sessions (Time E2) in order to make arrangements (refer to Appendix K for a copy of the e-mail inviting participants to attend the Time E2 experimental session).

The initial plan was to allow a four week time interval between each questionnaire and experimental session and between the two experimental sessions. Therefore, 4 weeks between Q1 and E1; between E1 and E2; and between E2 and Q2. These time intervals were required in order to diminish the possibility of participants becoming too familiar with the tasks and measures which might in turn influence their performance, responses to the questionnaires, and/or GOs that they adopted. These time intervals were chosen because they were thought to be an optimal compromise between allowing sufficient time between measures to reduce familiarity and not spending too much time collecting data due to the time constraints of the study. Unfortunately, the data collection did not proceed perfectly according to plan. There were three main reasons for the deviations from the planned timeline:

1. There were problems gaining access to the aptitude tests. This delayed the experimental sessions by 2 months.

2. Summer holidays, Christmas holidays, and time periods during which there were exams made it difficult to stick to a 4 week time interval (for students).
3. It was not always possible to go to Malta and other places in the UK at exact 4 week intervals to carry out the experimental sessions for the Maltese, employed, and retired participants.

7.2.4. Pilot Study for Experiment

Similarly to the survey, the pilot study was carried out purely to ensure that there were no problem items in any of the questionnaires and that participants would not have any problems understanding the test instructions. Participants in the pilot study were asked to attend an experimental session having the same content and instructions as the Time E1 experimental session. Four participants attended the experiment pilot study; three of these had participated in the survey pilot study. All four participants were Loughborough University School of Business and Economics PhD students. The mastery-avoidance GO items on the questionnaires had been modified following feedback from the survey pilot study. Participants in the experiment pilot study seemed to fully understand the questionnaire items and test instructions. Consequently, experimental data collection commenced.

7.2.5. Description of Measures used in the Experiments

In this section the measures used in the experiments are described. The choice of measures is justified and relevant reliability and validity statistics (from previous studies using these measures) are provided for each of the measures used. The reliability results for the measures in the current study are presented in the next chapter. A summary of the measures completed by experimental participants during each of the experimental sessions is presented in Table 7.6.

Table 7.6. Measures completed at each point in time

Time	Measures completed by Experimental participants
Time E1	• Verbal and Numerical Tests • Verbal and Numerical Test GOs Measures • Verbal and Numerical Test measures of task experience • Verbal and Numerical Test measures of perceived self-efficacy • Verbal and Numerical Test measures of mental effort
Time E2	• Verbal and Numerical Tests • Verbal and Numerical Test GOs Measures • Verbal and Numerical Test measures of task experience • Verbal and Numerical Test measures of perceived self-efficacy • Verbal and Numerical Test measures of mental effort

7.2.5.1. Verbal and Numerical Test Goal Orientations

For the reasons described in Section 7.1.5.1. the AGQ-R was adapted in order to measure participants' GOs in this study. This time adaptations were required to make the questionnaires relevant to the Verbal and Numerical Tests. Moreover, the survey pilot study feedback was kept in mind when adapting the questionnaires for the Verbal and Numerical tests in order to make the MAV items as clear and understandable as possible. However, as with the General and Hypothetical Task GO questionnaires, the adaptations were kept as minor as possible. Table 7.7. provides a comparison of the original AGQ-R questionnaire items and the Verbal and Numerical Test GO questionnaire items.

Table 7.7. Comparison of AGQ-R questionnaire items with adapted Verbal and Numerical Test Goal Orientation items

Item number	AGQ-R Item	Verbal/Numerical Test GO Questionnaire Item
1	My aim is to completely master the material presented in this class.	My aim was to completely master this task.
2	I am striving to do well compared to other students.	I was striving to do well on this task compared to the other participants.
3	My goal is to learn as much as possible.	My goal was to learn as much as possible.
4	My aim is to perform well relative to other students.	My aim was to perform well on this task relative to the other participants.
5	My aim is to avoid learning less than I possibly could.	My aim was to avoid learning less than the maximum possible about this task.
6	My goal is to avoid performing poorly compared to others.	My goal was to avoid performing poorly compared to others on this task.
7	I am striving to understand the content of this course as thoroughly as possible.	I was striving to understand the content of this task as thoroughly as possible.
8	My goal is to perform better than the other students	My goal was to perform better on this task than other participants.
9	My goal is to avoid learning less than it is possible to learn.	My goal was to avoid learning less than it was possible to learn about this task.
10	I am striving to avoid performing worse than others.	I was striving to avoid performing worse than others on this task.
11	I am striving to avoid an incomplete understanding of the course material.	I was striving to avoid an incomplete understanding of this task.
12	My aim is to avoid doing worse than other students.	My aim was to avoid doing worse than the other participants on this task.

Key: Items measuring MAP GO: 1, 3 and 7; Items measuring MAV GO: 5, 9 and 11; Items measuring PAP GO: 4, 2 and 8; Items measuring PAV GO: 6, 10 and 12.

7.2.5.2. Task Experience

It was thought that experience of Verbal and Numerical aptitude tests or regular practice of the skills required to do well on these tests might influence the types of GOs adopted. For example, if a participant was very familiar with Numerical tests or regularly practised the skills required to do well on a numerical test they might be more likely to adopt a performance-approach GO than a participant who is not familiar with the test or who did not usually practise numerical tasks. A measure of task experience was therefore drawn up in order to be able to control for familiarity with the tests and regular practice of the associated skills (refer to Appendix H for a copy of the Task Experience measure).

7.2.5.3. Practice

Some participants may have chosen to practise Verbal and Numerical tests between Time E1 and Time E2. There were two main reasons for choosing to ask participants whether they practised Verbal and Numerical tests between Time E1 and Time E2. Firstly, there was a possibility that participants who chose to practise between Time E1 and Time E2 had certain GOs in common. For example, if a participant with a performance-avoidance GO felt that he/she might have performed the worst on one of the tests at Time E1, he/she might decide to practise so as not perform the worst on that particular test at Time E2. Therefore, the first reason for choosing to measure practice was to be able to test whether having a particular GO motivated participants to practise between Time 1 and Time 2. Secondly, it was thought necessary to be able to control for practice in the data analyses in order to ensure that any of the observed effects were not a result of practice. Consequently, an item measuring whether participants practised the aptitude tests before the Time E2 experiment was introduced into the task experience measure at Time 2 (refer to Appendix L for a copy of the task experience measure at Time E2). This item replaced item 1 (of the Time E1 task experience measure) since this was no longer relevant at Time E2. Thus, the item, ‘Have you ever completed a verbal (or numerical) aptitude test?’ was replaced by the item, ‘Have you completed any other verbal (or numerical) aptitude test (other than that in the first part of this experiment)?' Participants who answered 'No' to Item 1 on the Time E1 Task Experience Questionnaire and 'Yes' to Item 1 on the Time E2 Task Experience Questionnaire were assumed to have practised the aptitude tests between Time E1 and Time E2. Although the new item 1 formed part of the task experience measure at Time E2, it was used as a measure of practice on its own in the data analyses (e.g. numerical test practice consisted of the answer to item 1 of the Task Experience measure at Time E2).

7.2.5.4. Self-efficacy

The self-efficacy subscale of the Motivated Strategies for Learning Questionnaire (MSLQ, Pintrich, 1993) was used as a measure of self-efficacy. This subscale was chosen due to its psychometric properties as well as the fact that it has been frequently used in GO research. The fact that a subscale of the MSLQ was used as opposed to the whole questionnaire did not compromise the psychometric properties of the measure. Duncan and McKeachie (2005:119) state that "The 15 scales on the MSLQ can be used together or singly. The scales are designed to be modular and can be used to fit the needs of the researcher." Pintrich et al. (1993) carried out a study in order to test the reliability and predictive validity of the MSLQ. Their factor analysis results indicated 6 latent variables, each one of which consisted of the items associated with the subscale it was meant to be measuring (that is, Intrinsic GO, Extrinsic GO, Task Value, Control beliefs about Learning, Self-Efficacy, and Test Anxiety). The self-efficacy subscale of the MSLQ was found to have a Coefficient Alpha of 0.93 indicating good reliability and internal consistency. The MSLQ self-efficacy subscale was also found to have good predictive validity with respect to academic performance ($r=.41$, $\rho=.05$).

As mentioned previously, a number of studies assessing the relationship between self-efficacy and GOs used the self-efficacy subscale of the MSLQ. These include Bandalos et al. (2003), Bong (2001), Green (2001), Lau et al. (2008), and Karabenick (2004), amongst others. The MSLQ self-efficacy subscale was adapted for use in the experiments. This was necessary because the original version was aimed for assessing students' self-efficacy on university courses. The adaptations, which were kept to a bare minimum, were made to allow the measure to be relevant to the experimental tasks. Therefore, for example the original item "I'm certain that I can understand the most difficult material presented in the readings for my courses" was changed to "I'm certain that I can understand the most difficult items presented on this task." Refer to Appendix F for a copy of the self-efficacy measure on the verbal and numerical tests at Time E1 and Time E2 (the same questionnaire was used in all cases).

7.2.5.5. Mental Effort

The measure of mental effort used in the current study is one developed by Paas (1992), which was a modification of the perceived task difficulty scale developed by Bratfisch et al. (1972). In a study conducted by Paas et al. (1994) this scale was found to have good reliability (Cronbach's alpha=.90) and sensitivity (mental effort was found to change significantly in different training conditions). Moreover, the scale has been used in a number of other studies including Paas (1992), Pas and van Merrienboer (1994), De Crook et al. (1998), and De Crook and van Merrienboer (2007) and was found to have reliability coefficients of 0.90, 0.82, 0.98, and 0.88, respectively (refer to Appendices H and L for copies of the measures of Mental Effort at Time 1 and Time 2, respectively).

7.2.5.6. Verbal and Numerical Test Reliability and Validity

As mentioned earlier (Section 7.2.2.1.) the Verbal and Numerical aptitude tests were obtained from test publishers. A number of decisions regarding the type of aptitude tests required for this study were made. Firstly, the aptitude tests needed to have a constant level of difficulty as opposed to tests that increased in difficulty as the test progressed. This was necessary because it was necessary to split each test in half for participants to complete the first half at Time E1 and the second half at Time E2. The alternative to splitting the tests would have been to obtain two versions of the same test. However, this would have been far too costly and was decided against. Secondly, paper and pencil tests were required since it would have been problematic to book computer labs for the experimental sessions. Moreover, it would have been problematic to use online tests for the employed and retired participants since the experimental sessions for these participants were not carried out at the university and there would not have been enough computers for the sessions to be carried out in groups. Thirdly, the tests were required not to be too easy or too technical for the experimental purposes but rather aptitude tests which were developed for use at a University level standard of education were required. Finally, tests that were long enough to be able to split into half and still have a good number of items in each half were needed. These criteria drastically limited the number of appropriate aptitude tests for use in the experimental study. In the end access to Verbal and Numerical Tests from ERAS test publishers was gained. The tests used were the Managerial and Professional Series Verbal and Numerical Reasoning Tests. These tests were designed to test people having "at least some significant attainments in secondary or possibly tertiary education" (etm103, 2007).

The Verbal test was designed to be 30 minutes long and consisted of 13 stems having 4 items each (52 items in all). Participants were asked to complete 6 stems (24 items) at Time E1 and another 6 stems at Time E2. At Time E1 the example question provided on the test booklet was used as an example question whilst at Time E2 the extra stem was used as the example question. Participants were given 14 minutes to complete the Verbal Test at Time E1 and Time E2. The Numerical Test was designed to be 35 minutes long and consisted of 5 stems having 6 items each (30 items in all). Participants were asked to complete the first 2 stems (12 items) at Time E1 and the last 2 stems at Time E2. Similarly to the Verbal test, the example question provided on the booklet was used as an example question at Time E1 whilst 3 items of the third stem were used as the Time E2 example question. Participants were given 15 minutes to complete the Numerical Test at Time E1 and Time E2.

The psychometric properties of these tests were established and tested during the test development phase by the test publishers. The Verbal and Numerical tests had good levels of reliability (Alpha=.89 on Verbal test and .88 on Numerical test). The tests also had good content validity since they were reviewed by chartered occupational psychologists in order to assess whether they met a number of criteria (e.g. they were related to/drawn from the world of work). Any items that were thought to be problematic were amended or removed. With respect to criterion-related validity, the verbal and numerical tests were significantly correlated to a number of competencies such as leadership, teamwork, and planning and organisation, amongst others. The test publishers also obtained a correlation of 0.53 when correlating the Verbal and Numerical tests. This indicates good construct validity and shows that the tests are measuring a similar underlying construct (probably general reasoning ability).

7.3. Support for the research methods used in this study

As described previously, this study entails the use of questionnaires and experiments. In addition, it is a longitudinal study. In this section the rationale for choosing quantitative methods over qualitative ones is provided. Furthermore, the advantages of using questionnaires and experiments in the current study as opposed to other data collection methods are described.

7.3.1. Quantitative versus Qualitative Methods

The main reason for choosing to use quantitative methods over qualitative ones was due to the nature of the Research Questions and Hypotheses of the current study. Examining the stability of GOs, determining the different types of GO profiles, as well as assessing the relationships between GOs and other variables such as self-efficacy, performance, and mental effort all require the use of quantitative methods. Most GO studies have made use of quantitative methods of data collection and analyses in the past. Although it is possible to use qualitative methods in order to discover more about the concept of GOs this was not thought to be appropriate for the purposes of the current study.

7.3.2. Questionnaires

In this study questionnaires are used a number of times. At Time Q1 and Time Q2, the only other option available for collecting the data required would be to use interviews. The preference of questionnaires over interviews at Time Q1 and Time Q2 was the result of a number of reasons. Firstly, questionnaires are much less time consuming than interviews and participants are able to complete them at their own leisure. Since a sub-sample from the survey study were asked to attend two experimental sessions it would have been rather excessive to ask them to attend two interviews too (one before and one after the experimental sessions). A second reason for using questionnaires rather than interviews is that these allow the participants to take as long as they need to answer them and there is much less pressure to answer in socially desirable ways in comparison with interviews (where one is face to face with the interviewer). Since the mastery-avoidance and performance-avoidance GOs may have negative connotations it was thought that participants may answer more truthfully if they completed a questionnaire rather than if they attended an interview. Thirdly, questionnaires are much less costly than interviews and much easier to record. Finally, questionnaires are more objective than interviews as they are not subjected to interviewer bias. Thus, they tend to have greater reliability and validity than interviews. For these reasons it was thought that the use of questionnaires would be more advantageous in order to achieve the aims of this study.

7.3.3. Experiments

Rather than carrying out an experimental study, it would have been possible to send out a survey asking participants to think back to different tasks and state whether they adopted different GOs according to the task at hand. This would have enabled the use of a much larger sample and would have been much less time consuming and less costly than carrying out an experiment. Interviewing people would have been another alternative. Participants could have been asked how they would approach particular tasks in certain settings. However, experiments were carried out for three main reasons. Firstly, they made it possible to measure performance, mental effort and self-efficacy under controlled conditions. Secondly, they allowed for the manipulation of GOs on tasks and, thirdly, they reduced the possibility of memory biases. These would not have been easy to achieve had a survey or interviews been used.

7.3.4. Longitudinal Study

In order to assess the stability of a number of variables over time (including General GOs, Hypothetical Task GOs, and Verbal and Numerical test GOs) a longitudinal study was necessary. By measuring these variables a number of times and at different time periods it was possible to examine their stability over time.

A second important reason for using a longitudinal design was to reduce practice effects on the experimental task. If participants were asked to perform the tasks after a very short interval there would have been an increased chance of performance improvement as a result of recent practice. Therefore, it was essential to have as long a time interval as possible between the experimental sessions so as to reduce any practice effects. Since participants may have practised in between the two experimental sessions in order to improve their tests scores, the task experience questionnaire at Time E2 included a measure of practice. Practice on tests was taken into account when carrying out the data analyses. Finally, it was considered essential to measure the variables over a period of time rather than in quick succession so as to prevent (as much as possible) one measure influencing participants' answers (and performance) on the other measures (and tests).

7.4. Ethical Considerations

Ethical clearance was obtained from the Loughborough University Ethical Advisory Committee. In order to comply with the ethical advisory committee codes of practice a number of ethical considerations were made for the current study. With respect to the survey, participants were informed that participation in the study was completely voluntary, and they had the right to withdraw from the study at any point in time without any negative consequences whatsoever. Moreover, participants were given a brief description of the study and informed that the information provided in their questionnaires would be kept in very strict confidentiality at all times. Finally, participants were given the researcher's e-mail address in order to be able to contact the researcher if they had any questions regarding the study (refer to Appendices A and B for copies of the information provided to participants at Time Q1 and Time Q2, respectively).

With regards to the experiments, at Time E1, participants were provided with an information sheet (which was for them to keep) which contained details regarding what the experimental sessions would entail, the length of the experimental sessions, and that they would be asked to attend a second experimental session. The information sheet also provided information regarding their eligibility to participate in the prize draw, their right to withdraw from the study, the fact that participation in the study was completely voluntary, and that the information provided by them throughout the experimental sessions would be kept in very strict confidentiality. Participants were also provided with the researcher's e-mail address so as to be able to contact the researcher if they had any queries or if they wanted to ask for further information regarding the study (refer to Appendix E for a copy of the Information Sheet given to participants of the experimental study). Participants were given time to read the Information Sheet at the beginning of the Time E1 experimental session. Following this they were asked to complete an Informed Consent Form (as advised by the Loughborough University ethical advisory committee, refer to Appendix E for a copy of the consent form).

7.5. Overview of Study

This section aims to summarise the information provided throughout the chapter by providing information regarding the data collection times and the sample characteristics for the survey and experiments. Table 7.8. provides a summary of the characteristics of the survey only participants as well as the median time intervals between the Time Q1 and Time Q2 questionnaires. Table 7.9. provides a summary of the demographic characteristics of the participant who took part in the survey and experimental study, as well as the median time intervals between the questionnaires and experiments. Following this, in order to provide an overview of how the questionnaire survey and experiment are related to each of the research questions and hypotheses (presented in Chapter 6 Section 6.2.) a diagram of research (Figure 7.1.) is presented.

Table 7.8. Survey only Participant Demographics and Data Collection Times

Category	Number of participants at Time 1	Gender (Time 1 participants)	Number of participants at Time 2	Gender (Time 2 participants)	Median Time between Q1 and Q2 (in weeks)	Age Range
Full-Time 1st Year	131	60 male 69 female 2 missing	14	4 male 10 female	6	17-40
Full-Time 2nd Year*	50	25 male 24 female 1 missing	8	2 male 6 female	36	19-22
Full-Time 3rd Year	354	195 male 123 female 36 missing	108	61 male 47 female	7	20-32
MSc	2	2 male	1	1 male	19	24
Employed	31	24 male 7 female	18	17 male 1 female	38	19-45
Total	568	306 male 223 female 39 missing	149			17-45

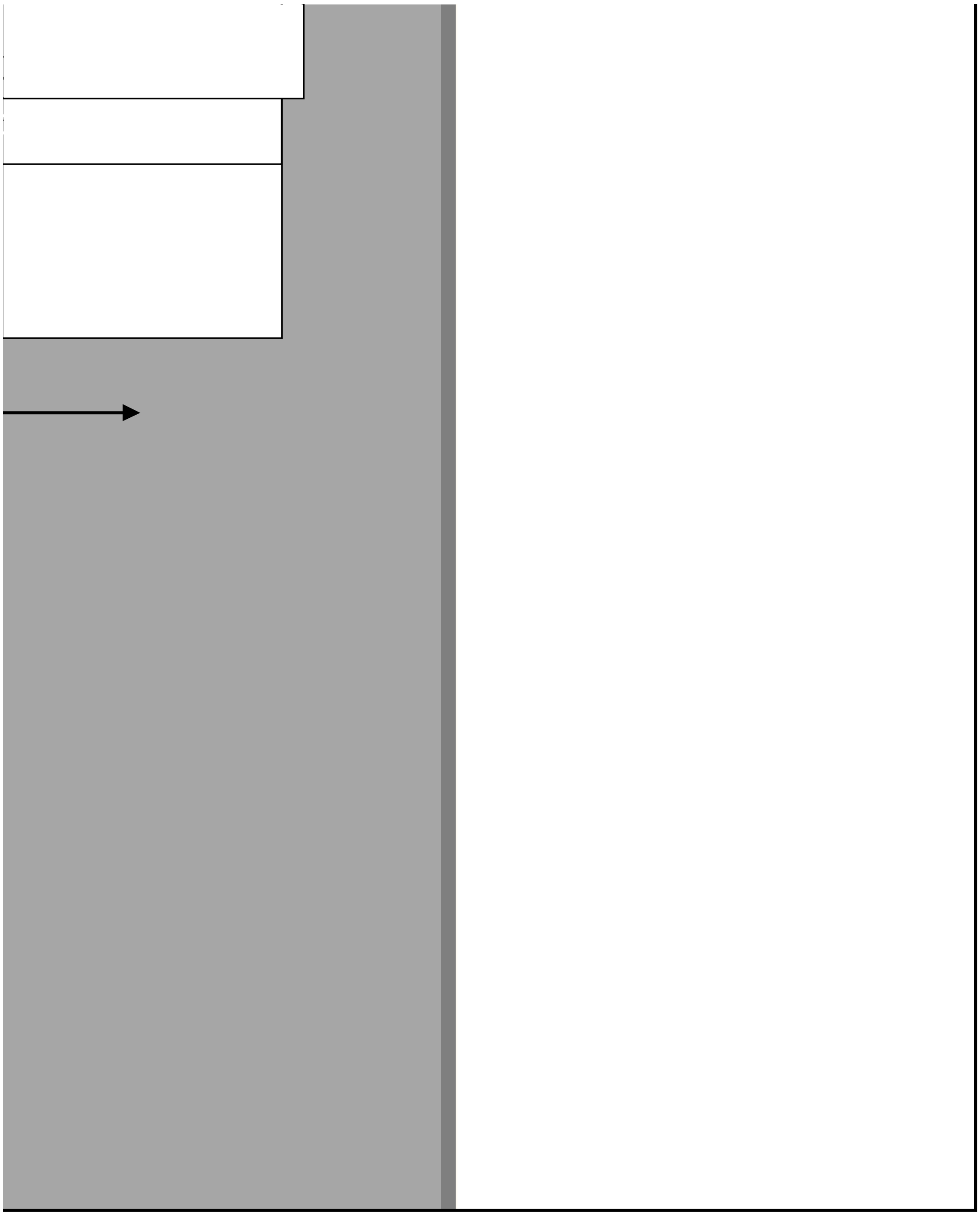
* These participants were going on placement the following academic year. Those participants who consented to me having their placement e-mail address were sent the Time Q2 questionnaire approximately 36 weeks later (when they were on placement). I sent the Time Q2 questionnaire to all other participants approximately 8 weeks after they completed the Time Q1 questionnaire.

Table 7.9. Demographics and Data Collection Times of Participants who took part in the Survey and Experimental Study

Category	Number of participants at Time Q1 (Gender)	Number of participants at Time Q2 (Gender)	Number of participants at Time E1 (Gender)	Number of participants at Time E2 (Gender)	Median Time between Q1 and Q2*	Median Time between Q1 and E2*	Median Time between E1 and E2*	Median Time between E2 and Q2*	Age Range	Experimental Group
Full-Time 1st Year	21 (9 male 12 female)	15 (5 male 10 female)	21 (9 male 12 female)	21 (9 male 12 female)	10	3	3	4	18-21	MAP: 10 PAP: 10 1 did not attend at Time E2
Full-Time 3rd Year	18 (8 male 8 female 2 missing)	12 (4 male 8 female)	18 (8 male 8 female 2 missing)	17 (8 male 8 female 1 missing)	10	2	2	6	20 - 22	Control: 6 MAP: 7 PAP: 5
MSc	9 (6 male 3 female)	9 (6 male 3 female)	9 (6 male 3 female)	9 (6 male 3 female)	19	5	5	7	22 -29	Control: 4 MAP: 5
Employed	19 (8 male 10 female 1 missing)	14 (5 male 9 female)	19 (8 male 10 female 1 missing)	18 (8 male 10 female)	17	6	4	5	18 – 57	Control: 9 MAP: 3 PAP: 6 1 did not attend at Time E2
Retired	6 (2 male 4 female)	3 (1 male 2 female)	6 (2 male 4 female)	6 (2 male 4 female)	32	5	30	12	59-64	Control: 6
Total	73 (33 male 37 female 3 missing)	53 (21 male 32 female)	73 (33 male 37 female 3 missing)	71 (33 male 37 female 1 missing)					18-64	Control: 25 MAP: 25 PAP: 21 2 did not attend at Time E2

Note: The year of study of participants was based on when they completed the Time Q1 questionnaire e.g. those participants who completed the Time Q1 questionnaire in their 1st year and Time E1 experiment in their 2nd year were placed in the '1st year' category. * In weeks
Key: MAP = mastery-approach induction condition; PAP = performance-approach induction condition.

Figure 7.1. Diagram indicating which aspects of the research relate to each of the research questions and hypotheses



As will be discussed in the introduction to the next chapter, the results and discussion chapters are presented according to theme. Five main themes were chosen for this study (refer to Chapter 8 Section 8.0. for further details). Each box on the right-hand-side represents a theme and includes all the research questions and hypotheses associated with that theme. The two boxes on the left-hand-side indicate the two research designs used in the study and the arrows indicate which data were used in order to answer the research questions and hypotheses for each of the themes.

7.6. Synopsis

Data collection methods and procedures for the current study were presented in this chapter. Furthermore, a description regarding how the ethical considerations were addressed in the current study was provided. In the next chapter the results of the exploratory analyses of the data are presented. Moreover, a number of Research Questions are answered and Hypotheses tested.

Chapter 8: Exploratory Analyses

8.0. Introduction

The literature review was structured in a way to make it "reader friendly" by first introducing the concept of GOs and how this developed, then creating an awareness of the problems with its conceptualisation and finally discussing how these problems have created inconsistencies with respect to the relationships between GOs and other variables (relevant to organisations). Although this structure was considered to be the most suitable for the literature review, the order in which these themes are discussed in the results chapters has been modified in line with the order in which the analyses are most sensibly reported. These modifications were made so that the results chapters would be more reader friendly and understandable.

The aim of this chapter is to provide information regarding the psychometric properties of the measurement scales used in this study. Descriptive statistics, reliability analyses, and factor analyses results are presented. Moreover, the results of the LCAs are provided. These analyses will provide the reader with a good understanding of the nature of the scales used as well as the reasoning behind the choice of GO model used in the current study.

In conducting these exploratory analyses a number of Hypotheses and Research Questions were answered. These are therefore addressed in this chapter so as not to have unnecessary repetition of these results in the next chapter. Therefore, although the Hypotheses and Research Questions regarding the relationships between GOs and other variables were discussed last in the literature review, these Hypotheses and Research Questions will be discussed first in the results chapters.

Since a number of Research Questions and Hypotheses are closely related, in order for the results to be described in a meaningful way, the Research Questions and Hypotheses that are closely related were grouped together according to their common themes. The themes chosen for this study included:

a) Types and characteristics of General GO profiles and model choice with respect to GO profiles
b) The relationships between GOs and other variables
c) The stability of GOs over time
d) The task-specificity of GOs
e) Interactions between state and trait GOs.

A consequence of this thematic grouping is that some Research Questions were included in this chapter even though their results were not directly answered by the exploratory analyses. For example Hypotheses 2a and 2b and Research Questions 6b and 6c address the relationships between GOs and self-efficacy. These were all tested or answered by means of the exploratory analyses and were therefore included in the present chapter. Research Question 6a also addresses the relationships between GOs and self-efficacy. However, the exploratory analyses do not provide an answer to it. Nevertheless, this Research Question was included in the present chapter along with the other Research Questions and Hypotheses addressing the relationships between GOs and self-efficacy. Although a number of Research Questions and Hypotheses that are not answered or tested by the exploratory analyses are included in this chapter, the majority of these will be dealt with in Chapter 9. The themes addressed in this chapter include Theme A and Theme B. Themes C, D and E will be addressed in Chapter 9. Preceding the first section of the results is a brief outline of this chapter.

First the reliability analyses and descriptive statistics for all the scales used in the current study are presented (Sections 8.1., 8.2. and 8.3.). Next, there is a description of the results of the exploratory and confirmatory factor analyses (Section 8.4.). Following this, the results of the LCAs are presented along with the answer to the Research Question 1 (Section 8.5.). Subsequently, the correlation matrices for all the variables included in the analyses are provided and a few correlations of interest are discussed (Section 8.6.). Subsequently, the results of the Research Questions and Hypotheses addressed by the correlational analyses (and any Research Questions and

Hypotheses having the same themes as the latter Research Questions and Hypotheses) are then focused on (Section 8.7.).

8.1. Descriptive Statistics and Reliability Analyses of General Goal Orientations and Hypothetical Task Goal Orientations at Time 1 and Time 2

Tables 8.1. through to 8.4. show the descriptive statistics and reliability analyses for the General and Hypothetical Task GOs. These data were collected at Time Q1 and Time Q2 of the General Survey. The descriptive statistics obtained here and in Section 8.2. will be compared with those of other studies using the 2x2 model of GOs in Section 8.2. in order to examine any variation in the GOs adopted by participants across studies.

Table 8.1. General GOs at Time 1

	Mean	SD	N	Highest Possible Score	Lowest Possible Score	Number of Items	Cronbach's Alpha
MAP	3.88	0.56	636	5	1	3	0.59
MAV	3.75	0.64	634	5	1	3	0.70
PAP	3.95	0.67	636	5	1	3	0.78
PAV	3.96	0.76	635	5	1	3	0.83

Key: MAP=Mastery Approach Goal Orientation; MAV=Mastery Avoidance Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation

Table 8.2. General GOs at Time 2

	Mean	SD	N	Highest Possible Score	Lowest Possible Score	Number of Items	Cronbach's Alpha
MAP	3.90	0.60	189	5	1	3	0.67
MAV	3.72	0.63	187	5	1	3	0.74
PAP	3.81	0.72	188	5	1	3	0.85
PAV	3.82	0.76	190	5	1	3	0.86

Key: MAP=Mastery Approach Goal Orientation; MAV=Mastery Avoidance Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation.

The means and standard deviations of all four GOs at Time Q1 and Time Q2 seem to indicate that participants tend to adopt moderate to high GOs (on all four GOs). This will be picked up on later in the Chapter when describing the GO profiles adopted by participants (Section 8.5.). There was quite a substantial decrease in sample size from Time 1 to Time 2. However, as this is nearly always the case in longitudinal studies, this attrition was expected.

The General GO scales at Time 1 and Time 2 seem to be quite reliable with mastery-avoidance (MAV), performance-approach (PAP), and performance-avoidance (PAV) GOs all having a Cronbach's Alpha of 0.7 or more. However, the reliabilities of the mastery-approach (MAP) GO scales (both at Time 1 and at Time 2) are not as high as those of the other scales. When Item 1 was deleted the reliabilities increased slightly (Cronbach's Alpha = 0.64 at Time 1 and 0.69 at Time 2). However, this increase in reliability was not large enough to justify removal of Item 1 in either case. Moreover, when assessing a MAP GO on Verbal and Numerical tests, removal of item 1 caused a substantial decrease in reliability (e.g. Crobach's alpha decreased from .56 to .37 on the Verbal test MAP scale at Time 2 when item 1 was deleted). Therefore, it was decided that Item 1 should be kept on the MAP scale.

The mean scores presented in Table 8.1. and 8.2. show that participants' PAP and PAV General GOs seem to be decreasing from Time 1 to Time 2 whilst the MAP and MAV GOs seem to be stable for respondents as a whole. The differences in mean scores from Time 1 to Time 2 will be investigated further in Chapter 9 Section 9.1.1.

Table 8.3. Hypothetical Task GOs at Time 1

	Mean	SD	N	Highest Possible Score	Lowest Possible Score	Number of Items	Cronbach's Alpha
MAP	3.95	.66	631	1	5	3	.76
MAV	3.70	.70	630	1	5	3	.75
PAP	3.80	.76	633	1	5	3	.89
PAV	3.86	.63	629	1	5	3	.65

Key: MAP=Mastery Approach Goal Orientation; MAV=Mastery Avoidance Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation

Table 8.4. Hypothetical Task GOs at Time 2

	Mean	SD	N	Highest Possible Score	Lowest Possible Score	Number of Items	Cronbach's Alpha
MAP	3.93	.70	193	1	5	3	.81
MAV	3.62	.77	191	1	5	3	.85
PAP	3.71	.85	194	1	5	3	.93
PAV	3.73	.75	194	1	5	3	.77

Key: MAP=Mastery Approach Goal Orientation; MAV=Mastery Avoidance Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation

Similarly to the General GOs, participants seem to adopt moderate to high Hypothetical Task GOs on all four GOs. The mean scores indicate that participants' MAV, PAP and PAV GOs seem to be decreasing from Time 1 to Time 2 whilst the MAP GO seems to be rather stable for respondents as a whole. These changes over time will be investigated further in Chapter 9 Section 9.1.2.

With respect to reliability, the Cronbach's alpha of the Hypothetical Task GOs were all greater than 0.7 (indicating good levels of reliability) except for the PAV GO at Time 1 which had a Cronbach's Alpha of 0.65. One of the items on the PAV scale at Time 1 seemed to be a problem item. Cronbach's alpha increases to .74 if this item is deleted. However, since this item does not seem to be a problem in any of the other PAV scales it was not thought wise to delete it.

8.2. Descriptive Statistics and Reliability Analyses of Verbal and Numerical Test Goal Orientations at Time 1 and Time 2

Verbal and Numerical test GOs were assessed by means of a questionnaire following completion of the Verbal and Numerical Tests during the experimental sessions (Time E1 and Time E2). The descriptive statistics and reliability analyses of the Verbal and Numerical Test GOs are presented in Tables 8.5. through to 8.8.

Table 8.5. Verbal Test GOs at Time 1

	Mean	SD	N	Highest Possible Score	Lowest Possible Score	Number of Items	Cronbach's Alpha
MAP	3.85	0.66	71	5	1	3	0.42
MAV	3.55	0.72	71	5	1	3	0.72
PAP	3.51	0.86	71	5	1	3	0.93
PAV	3.59	0.92	71	5	1	3	0.91

Key: MAP=Mastery Approach Goal Orientation; MAV=Mastery Avoidance Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation

Table 8.6. Verbal Test GOs at Time 2

	Mean	SD	N	Highest Possible Score	Lowest Possible Score	Number of Items	Cronbach's Alpha
MAP	3.71	0.66	71	5	1	3	0.56
MAV	3.46	0.80	71	5	1	3	0.80
PAP	3.42	0.94	71	5	1	3	0.93
PAV	3.61	0.95	71	5	1	3	0.94

Key: MAP=Mastery Approach Goal Orientation; MAV=Mastery Avoidance Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation

Although participants seem to be adopting moderate to high GOs (on all four GOs) on the Verbal tests, these means are a little lower than the mean GO scores for General GOs. The statistical significance of differences in the mean scores of General and task-specific GOs will be addressed in Chapter 9 Sections 9.2.3. and 9.2.4. With respect to the reliability analyses, there seems to be a problem with the MAP GO scale both at Time 1 and at Time 2. Unfortunately, deletion of any of the items on this scale does not seem to increase the reliability of the scale. Cronbach's alpha was greater than 0.7 for all the other scales, indicating good levels of reliability.

Table 8.7. Numerical Test GOs at Time 1

	Mean	SD	N	Highest Possible Score	Lowest Possible Score	Number of Items	Cronbach's Alpha
MAP	3.69	0.79	71	5	1	3	0.63
MAV	3.34	0.74	70	5	1	3	0.69
PAP	3.40	0.99	71	5	1	3	0.91
PAV	3.57	1.02	71	5	1	3	0.95

Key: MAP=Mastery Approach Goal Orientation; MAV=Mastery Avoidance Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation

Table 8.8. Numerical Test GOs at Time 2

	Mean	SD	N	Highest Possible Score	Lowest Possible Score	Number of Items	Cronbach's Alpha
MAP	3.72	0.76	71	5	1	3	0.70
MAV	3.54	0.78	70	5	1	3	0.77
PAP	3.47	0.92	71	5	1	3	0.94
PAV	3.58	0.88	71	5	1	3	0.95

Key: MAP=Mastery Approach Goal Orientation; MAV=Mastery Avoidance Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation

The means and standard deviations once again indicate that participants seem to be adopting moderate to high GOs on all four GOs for the Numerical tests at Time 1 and Time 2 (but again these seem to be lower than the mean General GO scores). The MAP GO scale on the Numerical tests seems to have much better reliability than that on the Verbal test. In fact, at Time 2, the MAP GO scale had a Cronbach's alpha of 0.7. The MAP and MAV GO scales on the Numerical test at Time 1 do not have particularly good reliabilities. They are however, reasonable (and much better than the Verbal test MAP GO scale).

The studies reviewed which investigated GOs using the 2x2 model used different measures and scale types. For example Janssen and Prins (2007) used a measure of GOs developed by Biemond and Van Yperen (2001) and a 7-point scale. Elliot and McGregor (2001) used the AGQ with a 7-point scale whilst Elliot and Murayama (2008) used the AGQ-R with a 5-point scale. Since an adaptation of the AGQ-R was used in this study (with a 5-point scale) a decision was made to compare the means and reliabilities obtained in this study to those obtained by Elliot and Murayama (2008). This comparison is made in Table 8.9. For the purpose of this comparison the mean scores and reliabilities obtained for General, Hypothetical Task, Verbal Test and Numerical Test GOs at Time 1 are used.

Table 8.9. Comparison of Descriptive Statistics obtained in this study with those obtained in the study by Elliot and Murayama (2008)

Research Study	Mean GO Score				Scale Reliability			
	MAP	MAV	PAP	PAV	MAP	MAV	PAP	PAV
Elliot & Murayama (2008) N=229	4.23	3.61	4.05	3.83	0.84	0.88	0.92	0.94
Present Study – General GOs	3.88	3.75	3.95	3.96	0.59	0.70	0.78	0.83
Present Study – Hypothetical Task GOs	3.95	3.70	3.80	3.86	0.76	0.75	0.89	0.65
Present Study – Verbal Test GOs	3.85	3.55	3.51	3.59	0.42	0.72	0.93	0.91
Present Study – Numerical Test GOs	3.69	3.34	3.40	3.57	0.63	0.69	0.91	0.95

A comparison of the mean scores indicates that the mean MAP and PAP GO scores obtained in the study by Elliot and Murayama (2008) are higher than those obtained in this study, particularly for the Numerical Test. The mean MAV and PAV General and Hypothetical Task scores obtained are higher than those of Elliot and Murayama (2008). However, the mean Verbal and Numerical Test scores are lower than those of the Elliot and Murayama (2008). From the table, it is clear that the mean General and Hypothetical Task GO scores are higher than the mean Verbal and Numerical Test scores. Since there are variations in the mean scores across tasks within this study it was thought best to focus on these differences for the purposes of this study and not examine the differences in mean scores obtained in this study with those obtained in other studies. These differences in mean GO scores obtained in this study will be investigated in further detail in Chapter 9 Sections 9.2.3. and 9.2.4.

The reliability analyses comparison in Table 8.9. indicates that the MAP and MAV GO scale reliabilities obtained in this study are lower than those of Elliot and Murayama (2008). The PAP and PAV General GO scales and the PAV Hypothetical Task GO scale in this study also have lower reliabilities than those of Elliot and Murayama (2008). However, the PAP and PAV Verbal and Numerical Test GO scales and the PAP

Hypothetical Task GO scale have similar (and sometimes higher) reliabilities to those of Elliot and Murayama (2008).

The scale reliabilities obtained in this study were all good with the exception of the MAP General GO at Time 1 and the MAP Verbal Test GOs at Time 1 and Time 2. Moreover, the MAP General GO at Time 2, MAP Numerical Test GO at Time 1 and PAV Hypothetical Task GO at Time 1 were a little low. It is not entirely clear why the MAP and PAV GO scales had low reliabilities at times especially since these were found to be very good in some cases e.g. when measuring Numerical Test GOs at Time 2. Since the scale reliabilities were only a little low in a few instances and were very good in all other cases it was decided that, for the purpose of the current study, all the items should be kept on all the four GO scales. This decision will be discussed further in Section 8.4. (where the results of the exploratory and confirmatory factor analyses are presented).

With respect to model choice, as discussed in the literature review, the main difference between the 3-factor model and the 2x2 model of GOs is the mastery GO. In the 2x2 model it is divided into MAP and MAV GOs whilst in the 3-factor model there is a combined mastery GO (MGO) scale. However, on careful inspection of scales measuring a MGO it was found that these only include MAP GO items (e.g. Liem et al., 2008; Alkharusi, 2008) as opposed to items measuring both MAP and MAV GOs. Consequently, the 2x2 model of GOs may be considered to be the same as the 3-factor model plus the MAV GO. As a result, the usefulness and scale properties of the MAV GO will be examined in order to determine which GO model should be used in this research study.

With respect to the reliability of the MAV scales in this study, there was a high level of reliability in all cases except for Numerical Test GOs at Time 1. However, even in the latter case, Cronbach's alpha was found to be 0.69, which is an acceptable level of scale reliability. Consequently, in terms of reliability, the 2x2 factor model seems to be an appropriate model for assessing GOs. The results of the exploratory and confirmatory factor analyses presented in Section 8.4. of the current chapter will provide further evidence as to whether the 3-factor or 2x2 model of GOs should be used in the current study.

8.3. Descriptive Statistics and Reliability Analyses of Self-efficacy, Mental Effort, Task-experience, Practice, and Performance, for Verbal and Numerical Tests at Time 1 and Time 2

The self-efficacy, practice, mental effort, task experience, and performance of participants on Verbal and Numerical tests were all measured during the experimental sessions at Time E1 and Time E2. The descriptive statistics and reliability analyses for these variables are presented in Table 8.10. through to Table 8.17.

Table 8.10. Self-efficacy on Verbal and Numerical Tests at Time 1 and Time 2

	Mean	SD	N	Highest Possible Score	Lowest Possible Score	Number of Items	Cronbach's Alpha
VT S.E. T1	3.67	0.61	71	5	1	7	0.88
VT S.E. T2	3.44	0.73	70	5	1	7	0.92
NT S.E. T1	3.54	0.88	71	5	1	7	0.95
NT S.E. T2	3.29	0.95	71	5	1	7	0.95

Key: VT = Verbal Test; NT = Numerical Test; S.E. = Self-efficacy; T1= Time 1; T2 = Time 2;

Self-efficacy seems to be moderate to high on both Verbal and Numerical tests at Time 1 and Time 2. Moreover, the mean self-efficacy scores seem to decrease slightly from Time 1 to Time 2 on both the Verbal and the Numerical Tests. Paired Samples T-Tests were carried out in order to determine whether these decreases in self-efficacy from Time 1 to Time 2 were significant. The results are presented in Table 8.11.

Table 8.11. Paired Samples T-Test to Test for Significant Differences in Self-Efficacy from Time 1 to Time 2 on Verbal and Numerical Tests (N≈70)

Variables	Time 1 Mean	Time 1 SD	Time 2 Mean	Time 2 SD	Df	T-value	Sig.
VT S.E.	3.67	0.61	3.44	0.73	69	3.27	<.01
NT S.E.	3.54	0.88	3.29	0.95	70	3.16	<.01

Key: VT S.E. = Verbal Test Self-Efficacy; NT S.E. = Numerical Test Self-Efficacy

Table 8.11. shows that there is a significant decrease in participants' self-efficacy scores from Time 1 to Time 2 on both the Verbal and Numerical Tests. A possible reason for this may be that participants thought they could do well on the tests at Time 1 but found the tests difficult. Consequently their confidence regarding their performance on the tests decreased at Time 2. Although participants answered an example question before completing their self-efficacy questionnaire a number of participants disclosed that they found the example questions much easier to complete than the actual tests. This provides some support for the explanation above.

It was thought useful to compare the mean self-efficacy scores obtained in this study to those obtained in other studies in order to be able to evaluate better whether the mean scores obtained in this study were in fact moderate to high. The mean scores obtained in other studies using the MSLQ to measure self-efficacy are presented in Table 8.12.

Table 8.12. Mean Self-Efficacy Scores in Studies using the MSLQ Self-Efficacy Subscale

Research Study	Mean Self-Efficacy Score
Lau et al. (2008) N=1476	3.77
Bong (2009) N=500	3.36 (for Middle School students)
Bong & Hocevar (2002) N=358	Scores ranging between 4.17 and 5.51 on 6 different academic subjects

All studies used a 5-point scale with the same labels ranging from Strongly Disagree to Strongly Agree.

The mean scores obtained in this study are very similar to the mean scores obtained in the studies by Lau et al. (2008) and Bong (2009). However, they are low compared to the mean scores obtained in the study by Bong and Hocevar (2002). Since the former two studies have the largest sample sizes it was considered reasonable to compare the mean scores obtained in this study with them. Consequently, it may be said that the mean self-efficacy scores obtained in this study are similar to those obtained in other studies.

With respect to scale reliability, the self-efficacy scale indicates high levels of reliability with Cronbach's alpha being greater than 0.88 in all cases. Pintrich et al. (1993) carried out a study in order to test the reliability and predictive validity of the MSLQ. The self-efficacy subscale of the MSLQ was found to have a Coefficient Alpha of 0.93 indicating good reliability and internal consistency. The reliability coefficients indicated in Table 8.10. are very similar to that obtained by Pintrich et al. (1993).

Table 8.13. Mental Effort on Verbal and Numerical Tests at Time 1 and Time 2

	Mean	SD	N	Highest Possible Score	Lowest Possible Score	Number of Items
VT M.E. T1	6.34	1.23	71	9	1	1
VT M.E. T2	6.31	1.25	71	9	1	1
NT M.E. T1	6.62	1.38	71	9	1	1
NT M.E. T2	6.72	1.28	71	9	1	1

Key: VT = Verbal Test; NT = Numerical Test; M.E.=Mental Effort; T1= Time 1; T2 = Time 2;

Since mental effort was a single item measure it was not possible to assess its internal reliability. However, the psychometric properties of this measure were assessed in a number of studies as described in Chapter 7 Section 7.2.5.5. The mean scores on this measure indicate that participants seem to adopt rather high mental effort on Verbal and Numerical tests. Moreover, it seems as though participants tended to adopt slightly higher mental effort on Numerical tests than they did on Verbal tests. Paired samples t-tests were carried out in order to assess whether these differences in mental effort were significant. The results are presented in Table 8.14. below.

Table 8.14. Paired Samples T-Test to Test for Significant Differences in Mental Effort on Verbal and Numerical Tests at Time 1 and Time 2 (N=71)

Variables	VT Mental Effort Mean	VT Mental Effort SD	NT Mental Effort Mean	NT Mental Effort SD	Df	T-value	Sig.
Time 1	6.34	1.23	6.62	1.38	70	0.22	.07
Time 2	6.31	1.25	6.72	1.28	70	-0.63	<.01

Key: VT Mental Effort = Verbal Test Mental Effort; NT Mental Effort = Numerical Test Mental Effort

Table 8.14. indicates that at Time 1 there was a nearly significant difference and at Time 2 there was a significant difference in the mental effort of participants on the

Verbal and Numerical Tests. Therefore, it seems as though participants did in fact adopt higher levels of mental effort on the Numerical Tests than on the Verbal Tests. This is possibly because people tend to find Numerical tasks more challenging than Verbal tasks.

The task experience scales (please refer to Table 8.15. below) consisted of 3 items. In each case the Cronbach's alpha increases (to .76, .61, .73, and .61 for VT T1, VT T2, NT T1 and NT T2, respectively) if item 1 is deleted. This was probably due to the fact that item 1 was somewhat different from items 2 and 3. Items 2 and 3 focused on understanding how often participants practised Verbal and Numerical tasks whilst item 1 focused on determining whether they had completed similar aptitude tests before. Although item 1 had a slightly different emphasis to items 2 and 3 all three items were considered to be important for understanding how much task experience participants had on the Verbal and Numerical Tests.

When measuring a broad construct with relatively few items, the items should not necessarily be very highly correlated with each other because they should be tapping somewhat different parts of the broad construct. Therefore, item 1 was kept. With respect to the means, it seems as though participants had a moderate level of task experience on both the Verbal and Numerical aptitude tests at Time 1 and Time 2.

Table 8.15. Task Experience on Verbal and Numerical Tests at Time 1 and Time 2

	Mean	**SD**	**N**	**Highest Possible Score**	**Lowest Possible Score**	**Number of Items**	**Cronbach's Alpha**
VT T.E. T1	2.25	0.83	71	4	1	3	.58
VT T.E. T2	2.23	0.83	71	4	1	3	.53
NT T.E. T1	2.16	0.75	71	4	1	3	.55
NT T.E. T2	2.06	0.80	71	4	1	3	.55

Key: VT = Verbal Test; NT = Numerical Test; T1= Time 1; T2 = Time 2; T.E. = Task Experience

Table 8.16. Practice on Verbal and Numerical Tests between Time 1 and Time 2

	Mean	SD	N	% Yes	% No	Number of Items
Practice on VT	1.53	1.59	70	47	53	1
Practice on NT	0.50	0.50	71	41	59	1

Key: VT = Verbal Test; NT = Numerical Test.

As described in the Methodology Chapter (Chapter 7 Section 7.2.5.3.) the practice measure at Time 2 consisted of item 1 of the task experience scale. It was thought that the type of General or task-specific GOs adopted by individuals may have influenced participants' motivation to practise aptitude tests between Time E1 and Time E2. Moreover, practising tests may have an influence on the type of GOs adopted on the Verbal and Numerical Tests at Time E2. Therefore, practice was measured in order for it to be included as a covariate when examining changes in GOs over time as well as changes in mental effort, self-efficacy, and performance. Since this was a 1-item measure with a yes or no response, it was thought that the percentage of responses in each category might provide more useful information than the mean scores. Therefore, although the mean scores are provided, the percentages of participants who answered 'yes' and 'no' to the item "Have you completed any other verbal/numerical aptitude test (other than that in the first part of this experiment)?" are also provided in Table 8.16.

Table 8.16. indicates that just over half the experimental participants (53%) did **not** practise Verbal Tests between Time E1 and Time E2. With respect to the Numerical Test it seems as though a slightly larger percentage of participants (than that on the Verbal test) did not practise between Time E1 and Time E2 (59%).

Table 8.17. Verbal and Numerical Test Performance at Time 1 and Time 2

	Mean	SD	N	Highest Possible Score	Lowest Possible Score
VT Performance T1	15.31	3.47	71	24	0
VT Performance T2	13.58	3.80	71	24	0
NT Performance T1	6.08	2.27	71	12	0
NT Performance T2	6.92	2.41	71	12	0

Key: VT = Verbal Test; NT = Numerical Test.

Since the aptitude tests were purchased from a test publisher, the reliabilities of the Verbal and Numerical aptitude tests were provided in Chapter 7 Section 7.2.5.1. The descriptive statistics in Table 8.17. indicate the mean performance scores of participants on the Verbal and Numerical tests and Time 1 and Time 2. The data presented in Table 8.17. were gathered during the experimental sessions (Time E1 and Time E2).

The mean scores indicate a decrease in Verbal Test performance from Time 1 to Time 2 and a slight increase in Numerical Test performance from Time 1 to Time 2. In addition, there seems to be more variation in performance on the Verbal tests than on the Numerical tests (as indicated by the standard deviations of the two tests at Time 1 and Time 2). Paired samples t-tests were carried out in order to test whether these observed differences were significant. The results are presented in Table 8.18.

Table 8.18. Paired Samples t-test to Test for Significant Differences in Verbal and Numerical Test Performance over time (N=71)

Variables	Time 1 Mean	Time 1 SD	Time 2 Mean	Time 2 SD	Df	T-value	Sig.
VT Perf.	15.31	3.47	13.58	3.80	70	4.10	<.01
NT Perf.	6.08	2.27	6.92	2.41	70	-2.80	<.01

Key: VT Perf. = Verbal Test Performance; NT Perf. = Numerical Test Perf.

The table above indicates that Verbal Test performance decreases significantly from Time 1 to Time 2 whilst Numerical Test performance increases significantly over time. It is not entirely clear why these changes in performance occurred especially since more participants practised Verbal tests than Numerical Tests between Time 1 and Time 2. It may be the case that participants who practised the Numerical Tests did so to a much higher degree. Since the practice scale did not assess the number of hours or the extent to which participants practised it is not possible to be certain whether this might be the case. However, it is also possible that (although the test difficulty was meant to be constant throughout the test) there were slight differences in item difficulty between the items used at Time E1 and Time E2. Unfortunately, it is not possible to determine whether this was the case.

8.4. Exploratory and Confirmatory Factor Analyses of General and Hypothetical Task Goal Orientations

In order to assess the extent to which the scale items are actually measuring the same variable, exploratory factor analyses (EFAs) were carried out. General and Hypothetical Task GOs at Time 1 were chosen for the factor analyses since these had the largest sample sizes. The data for these factor analyses were collected during the survey at Time Q1.

EFAs were carried out using Principal Axis Factoring as a method for extraction and Direct Oblimin rotation. Maximum iterations for conversion were set to 999 and coefficients smaller than 0.30 were suppressed. The results of the factor analyses are presented in Tables 8.19. and 8.20. below.

Table 8.19. Factor Loadings for General GO Items at Time 1 (N=628)

General GO Item Number	GO Scale Item is assessing	Factor 1	Factor 2	Factor 3
1	MAP			.38
2	PAP			.73
3	MAP		.54	
4	PAP			.62
5	MAV		.64	
6	PAV	.59		
7	MAP		.68	
8	PAP	.43		.49
9	MAV		.71	
10	PAV	.80		
11	MAV		.58	
12	PAV	.81		

Key: Minimum loading of 0.30 required.

The results presented in Table 8.19. indicate the presence of three factors. The items loading onto Factor 1 and Factor 3 correspond with the items on the PAV scale and the PAP scale, respectively. However, Item 1 is an exception. This is meant to be measuring a MAP GO and therefore seems to be loading onto the wrong factor. Moreover, Item 8 seems to be a problem too since it is cross-loading onto Factor 1 and Factor 3. Most of the MAP and MAV items (with the exception of Item 1 which seems to be loading onto the wrong factor) loaded onto one factor (Factor 2). Overall, these results support the 3-factor model of GOs with a mastery scale and PAP and PAV scales.

With respect to the two problem items, Item 1 seems to be a problem item since it is loading onto the wrong factor. In the reliability analyses of General GOs at Time 1 it also seemed to be a problem item and removing it would have increased the reliability of this scale somewhat. However, removal of this item would have greatly decreased the reliability of the MAP scale for the Verbal Test at Time 2. Since it is not appropriate to use different scales for measuring General and Verbal Test MAP GOs a decision was made to keep item 1. Moreover, as shown in Table 8.20. item 1 loads onto Factor 1 for the Hypothetical Task GOs at Time 1. Consequently, it was not thought to be reasonable to remove this item from the MAP GO scale. Item 8 also seems to be a problem item with respect to the EFA of General GOs at Time 1. However, removing this item would reduce the reliability of the MAP scale. Similarly to item 1, item 8 also loads onto the expected factor for Hypothetical Task GOs at Time 1 (as shown in Table 8.20.). Consequently, it was decided that this item should not be removed from the MAP GO scale.

Table 8.20. Factor Loadings for Hypothetical Task GO Items at Time 1 (N=612)

General GO Item Number	GO Scale Item is assessing	Factor 1	Factor 2	Factor 3
1	MAP	.59		
2	PAP		-.79	
3	MAP	.76		
4	PAP		-.88	
5	MAV			.74
6	PAV		-.57	
7	MAP	.74		
8	PAP		-.84	
9	MAV			.73
10	PAV	.31		.42
11	MAV	.48		.33
12	PAV		-.71	

Key: Minimum loading of 0.30 required.

Similarly to the EFA of General GO items at Time 1, three factors emerged from the EFA of the Hypothetical Task GO items. This time items 10 and 11 were found to be problem items since they were cross-loading onto factors 1 and 3. Item 10 was the cause of the reliability of the PAV Hypothetical Task GO being on the low side (Table 8.3.). In fact, if item 10 is removed, the reliability of the PAV Hypothetical Task GO increases from .65 to .74. However, item 10 did not negatively affect the reliability of the other PAV GO scales. Unfortunately, it is not possible to use different scales to measure PAV GOs on different tasks, because unwanted variation would be introduced when comparing the PAV GOs. Therefore, it was decided that item 10 should be kept. Item 11 also cross-loaded. However, since this item did not seem to be a problem in the General GO factor analysis and because the reliability analysis (Table 8.3.) indicated a good level of reliability with Item 11 included in the MAV scales it was decided that this item should be kept.

In contrast to the EFA of General GOs at Time 1, the Hypothetical Task GOs EFA at Time 1 shows that the items loading onto Factors 1 and 3 correspond to the items on the scales measuring a MAP and a MAV GO respectively, whilst the items loading onto factor 2 correspond to items on the PAP and PAV scales. In other words the PAP and PAV items combined to form one factor instead of the MAP and MAV items combining.

The fact that the EFA results for General and Hypothetical Task GOs indicate different 3-factor models (one having mastery, PAP, and PAV GOs and the other having performance, MAP, and MAV GOs) is quite puzzling. It is extremely unlikely that these differences are a result of the measures being adapted because item adaptations were kept to a bare minimum.

Since it is difficult to draw conclusions regarding the model structure from the EFA results Confirmatory Factor Analyses (CFA) were carried out in order to further test the measurement model and determine which model provides the best fit to the data. CFAs were also carried out using the General and Hypothetical Task GO data at Time 1. Since the EFAs indicated two different 3-factor models (one having mastery, PAP, and

PAV GOs and the other having performance, MAP, and MAV GOs) these two models were tested by means of a CFA and compared in order to assess which model provides the best fit. Moreover, since the EFAs indicated that for the different GOs (General and Hypothetical Task GOs) four factors emerged overall (MAP, MAV, PAP and PAV) the four-factor model was also tested and its model fit compared with that of the 3-factor models. The CFAs were carried out using LISREL 8.80. The analyses were carried out on covariance matrices using maximum-likelihood estimation. The results are presented in Tables 8.21 and 8.22 for General GOs and Hypothetical Task GOs, respectively.

In order to test the overall model fit a number of goodness-of-fit indices were used. These include the chi-square statistic (χ^2), Root Mean Square Error of Approximation (RMSEA), comparative fit index (CFI), non-normed fit index (NNFI), and the standardised root mean square residual (SRMR). The χ^2 statistic was included since it is a "traditional measure for evaluating overall model fit in covariance structure models" (Diamantopoulos & Siguaw, 2000:83) and it is convention to report this statistic. In order to show good model fit, the χ^2 probability value should be greater than or equal to 0.05. However, since the χ^2 tests *perfect* fit (Diamantopoulos & Siguaw, 2000) and is sensitive to sample size (Jöreskog, 1969), it is highly unlikely to obtain a significant result with sample sizes greater than 200 (Reinard, 2006). The sample sizes in the CFAs presented below are both over 600. Consequently, it is extremely unlikely for the χ^2 to indicate good model fit. Therefore in interpreting the results presented below, not much weight will be put on the χ^2 value but rather the other goodness-of-fit statistics will be relied on more heavily in assessing model fit. Hu and Bentler (1999) recommended the following cut-off values for the goodness-of-fit indices when carrying out CFA: RMSEA value lower than 0.06, CFI and NNFI values greater than 0.95 and SRMR value lower than 0.09. These cut-off values will be used when interpreting the CFA results below.

When all the scale items were used in the General GOs CFA, the results did not show good model fit. Since the exploratory factor analyses results indicated that Items 1 and 8 seemed to be problematic, these were removed and the CFAs were repeated without these two problem items. The results indicated a slightly better model fit when Items 1 and 8 were removed. Out of the three models tested, the 2x2 model showed the best fit to the data (RMSEA=0.07, CFI=0.97, NNFI=0.95, SRMR=0.04). However, due to the RMSEA value being slightly higher than the recommended cut-off value, this was still not an excellent fit.

With respect to the Hypothetical Task GOs, when all the scale items were included in the CFA none of the models fit the data adequately (refer to Table 8.22). Similarly to the General GOs, the problem items identified from the exploratory factor analyses (Items 10 and 11) were removed and the analyses were repeated. The results of the CFA with Items 10 and 11 excluded from the analyses indicated a much better fit to the data. Again, out of the three models tested, the 2x2 model showed the best fit to the data (RMSEA=0.07, CFI=0.98, NNFI=0.96, SRMR=0.05). However, similarly to the CFA for General GOs the fit was not excellent (again due to the RMSEA value being slightly higher than the recommended cut-off value). The CFA validity results for the 2x2 models of General and Hypothetical Task GOs (with the problem items removed) are provided in Tables 8.23 and 8.25, respectively, whilst the reliability results (R^2) are provided in Tables 8.24 and 8.26, respectively.

Table 8.21. Confirmatory Factor Analyses Results for General Goal Orientations at Time 1 (N=621)

Items in Scales	Model	χ^2	df	RMSEA	CFI	NNFI	Standardised RMR
Scales including all items	4-factor model	251.67**	48	0.00	0.95	0.93	0.06
	3-factor model (Mastery, PAP, PAV)	319.56**	51	0.10	0.94	0.92	0.07
	3-factor model (MAP, MAV, Performance)	425.35**	51	0.12	0.91	0.88	0.08
Scales excluding problem items (i.e. items 1 and 8)	4-factor model	115.26**	29	0.07	0.97	0.95	0.04
	3-factor model (Mastery, PAP, PAV)	184.61**	32	0.09	0.95	0.93	0.06
	3-factor model (MAP, MAV, Performance)	256.93**	32	0.11	0.92	0.89	0.06

Key: ** $p<0.01$

Table 8.22. Confirmatory Factor Analyses Results for Hypothetical Task Goal Orientations at Time 1 (N=612)

Items in Scales	Model	χ^2	df	RMSEA	CFI	NNFI	Standardised RMR
Scales including all items	4-factor model	454.48**	48	0.12	0.93	0.90	0.11
	3-factor model (Mastery, PAP, PAV)	597.59**	51	0.13	0.90	0.87	0.11
	3-factor model (MAP, MAV, Performance)	563.72**	51	0.13	0.91	0.88	0.12
Scales excluding problem items (i.e. items 10 and 11)	4-factor model	121.90**	29	0.07	0.98	0.96	0.05
	3-factor model (Mastery, PAP, PAV)	349.74**	32	0.13	0.92	0.89	0.08
	3-factor model (MAP, MAV, Performance)	204.69**	32	0.10	0.96	0.94	0.06

Key: ** $p<0.01$

Table 8.23. CFA Validity Results for the 4-factor model of General Goal Orientations at Time 1

GO Scale Item is Assessing	Item Number	MAP	MAV	PAP	PAV
PAP	**2**			0.66	
MAP	**3**	0.66			
PAP	**4**			0.87	
MAV	**5**		0.65		
PAV	**6**				0.69
MAP	**7**	0.73			
MAV	**9**		0.75		
PAV	**10**				0.84
MAV	**11**		0.62		
PAV	**12**				0.82

Table 8.24. CFA Reliability Results for the 4-factor model of General Goal Orientations at Time 1

GO Scale item is measuring	Item Number	R^2
PAP	**2**	0.44
MAP	**3**	0.43
PAP	**4**	0.76
MAV	**5**	0.42
PAV	**6**	0.48
MAP	**7**	0.53
MAV	**9**	0.56
PAV	**10**	0.71
MAV	**11**	0.39
PAV	**12**	0.67

Table 8.25. CFA Validity Results for the 4-factor model of Hypothetical Task Goal Orientations at Time 1

GO Scale Item is Assessing	Item Number	MAP	MAV	PAP	PAV
MAP	**1**	0.59			
PAP	**2**			0.82	
MAP	**3**	0.81			
PAP	**4**			0.89	
MAV	**5**		0.83		
PAV	**6**				0.70
MAP	**7**	0.76			
PAP	**8**			0.84	
MAV	**9**		0.80		
PAV	**12**				0.83

Table 8.26. CFA Reliability Results for the 4-factor model of Hypothetical Task Goal Orientations at Time 1

GO Scale item is measuring	Item Number	R^2
MAP	**1**	0.35
PAP	**2**	0.67
MAP	**3**	0.66
PAP	**4**	0.79
MAV	**5**	0.68
PAV	**6**	0.49
MAP	**7**	0.57
PAP	**8**	0.70
MAV	**9**	0.64
PAV	**12**	0.70

The validity of the indicators is assessed in terms of the magnitude and significance of the paths between each latent variable and its indicators (Diamantopoulos & Siguaw, 2000). When using the completely standardised solution, factor loadings of 0.5 and higher show that the indicators are loading significantly onto the latent variable. The CFA validity results for the General GOs at Time 1 (Table 8.23) and for the Hypothetical Task GOs at Time 1 (Table 8.25) show that all the indicator loadings are significant thus indicating their validity.

The squared multiple correlations (R^2) provide an indication of the reliability of the indicators. A high R^2 is an indication of high reliability (Diamantopoulos & Siguaw, 2000). The reliability results for the General GOs at Time 1 (Table 8.24) do not indicate excellent reliabilities, particularly for Item 11. Item 11 was one of the problem items for the Hypothetical Task GO factor analysis. Therefore, there might possibly be an issue with this item. In contrast to the reliability results for the General GOs, those for the Hypothetical Task GOs look much better with the exception of item 1. Since item 1 was one of the problem items for the General GOs this item may also be problematic.

Following the reliability analyses and factor analyses, it was necessary to make a number of decisions regarding which model of GOs to use in the current study and which items to keep on the scales measuring the GOs. Deciding on which items to keep on the GO scales was quite a difficult decision due to the fact that in some instances Items 1, 8, 10 and 11 seemed to be problematic but not in others. As discussed earlier, removal of these items would negatively affect the reliability of the scales measuring other GOs (e.g. Verbal and Numerical Test GOs). Since it is not appropriate to use different scales for measuring the different types of GOs (e.g. General and Verbal Test GOs), based on the results of the reliability analyses, and the principle of keeping as many of the items as possible (without having large negative consequences on the scale reliabilities) a decision was made to keep all the items on the four scales measuring GOs.

With respect to model choice the decision was also not that straightforward. Although both CFAs indicated the best model fit for the four-factor (2x2) model of GOs, the model fit for this was not outstanding. However, since the 2x2 model provided better fit than the 3-factor models, this model was chosen for the current study for the analyses of GOs from the *non-profile* perspective. With respect to the analyses using GO *profiles*, a decision as to whether to use the 3-factor or 2x2 model of GOs will be made in the next section.

8.5. Latent Class Analyses

In the previous section a decision was made regarding which model of GOs to use for the non-profile perspective analyses. Consequently, it is timely now to present the LCA results, indicating which model of GOs should be used in the GO profile analyses, at this point in the chapter. However, before presenting the LCA results a brief description of LCA and its advantages over traditional cluster analyses is presented. A description of the criteria used in choosing the final model is also provided.

"Latent class analysis provides a powerful, flexible approach to the analysis of categorically-scored data." (McCutcheon & Hagenaars, 1997:266). With LCA the investigator can use a number of observed variables, which represent the characteristics of people, in order to organise people into two or more meaningful groups (Collins & Lanza, 2010). LCA is used to organise participants into homogenous groups (referred to as latent classes) depending on the types of latent variables that they adopt (Collins & Lanza, 2010). In this study, LCA will be used to organise participants adopting similar profiles of GOs into groups or clusters (latent classes). Therefore, the goal of LCA is similar to that of cluster analysis. However, unlike traditional cluster analysis, LCA is model-based "This means that a statistical model is postulated for the population from which the sample under study is coming. More precisely, it is assumed that the data is generated by a mixture of underlying probability distributions." (Vermunt & Magidson, 2002:90). Consequently, it is less subjective than traditional cluster analysis. Moreover, with LCA it is relatively easy to deal with variables having different scale types and there are more formal or rigorous criteria one can use in order to make decisions about one's final model (Pastor et al., 2007). As a result of LCA having a number of advantages over standard cluster analysis, the former was used in the current research study. Prior to presenting the

LCA results of General GOs, a description of the criteria used in choosing the final model in the LCAs is presented.

As mentioned earlier there are more formal criteria in place for choosing one's final model when using LCA than traditional cluster analysis. These include the likelihood ratio chi-squared statistic L^2, the Akaike information criterion (AIC) and the Bayesian information criterion (BIC). The model L^2 indicates the amount of association among the variables that remains unexplained after estimating the model. Therefore, the lower the L^2 value, the better the model fit (Vermunt & Magidson, 2005). A model fits the data if the value of L^2 is sufficiently low to be attributable to chance with the normal statistical error limit of 0.05 (Magidson & Vermunt, 2004). Therefore, the model that tends to be chosen is the one with a p-value greater than 0.05. Additionally, it is ideal to choose the most parsimonious model, that is, the model with the fewest number of parameters (Vermunt & Magidson, 2005). The 'number of parameters' refers to (a) the sizes of the latent classes *and* (b) the probability of an individual in a particular latent class scoring high on an item. Consequently, the model with a p-value greater than 0.05 and having the lowest number of parameters is normally the model of choice.

The AIC and BIC are similar to the L^2 in that they compare the expected cell frequency count (which is provided by the estimated model) with the actual (observed) cell frequency count found in the sample data. However, unlike the L^2, the AIC and BIC take the number of parameters into consideration. More parameters yield a greater likelihood ratio. Consequently, the information criteria (AIC and BIC) penalise the likelihood ratio by reducing it as a function of the increased number of estimated parameters. A smaller value of the information criteria indicates a better balance of model fit and parsimony. Consequently, models having the lowest BIC and AIC tend to indicate a good fit of the data.

When the number of observed variables or the number of variable categories is large the data are usually sparse. This means that the total number of cells in the resulting frequency table will be large relative to the sample size which results in many empty cells (Magidson & Vermunt, 2004). In such cases it is not wise to use the chi-square distribution to compute the p-value since L^2 would not be a good approximation (Magidson & Vermunt, 2004). In the case of sparse data it is best to use the bootstrap procedure which provides a more precise estimate of the models by relaxing the assumption that the L^2 statistic follows a chi-square distribution (Vermunt & Magidson, 2005). This is done by means of 'resampling'. "Resampling methods aim at finding the distribution of a statistic by repeatedly drawing a sample, making use of the original sample" (Langeheine, Pannekoek and Van de Pol, 1996:493). Moreover, in such a case the BIC and AIC tend to become extremely useful in comparing models (Magidson & Vermunt, 2004). It is important to note that the AIC and BIC do not always indicate the same model as providing the best fit since they are computed differently (Collins & Lanza, 2010). The BIC is more widely used in LCA than the AIC (Magidson & Vermunt, 2004). However, these criteria are more useful in eliminating models and narrowing down the options rather than for making a final decision regarding model choice (Collins & Lanza, 2010). In the LCAs conducted during this study the BIC was used as an indicator. However, the final decisions regarding model choice were based on the number of parameters and the bootstrap p-value. The latter was used since in most cases the sample size was quite small and consequently the data were sparse.

In order to make a decision regarding model choice with respect to GO profiles, LCAs were carried out using both the 3-factor and 2x2 models of GOs. When the 2x2 model was used none of the resulting LCA models were found to provide adequate fit to the data for the General GOs at Time 1 or for the Numerical Test GOs at Time 1. Consequently, a decision was made to use the 3-factor model of GOs in all analyses involving GO profiles. This decision was made due to the fact that when using the bootstrap procedure, which has been described as "perhaps the best statistical criterion for determining the number of latent classes" (Uebersax, 2000) none of the models provided adequate fit to the data for General and Numerical Test GOs at Time 1 when using the 2x2 model of GOs. On the other hand, adequate model fit was obtained when using the 3-factor model of GOs. Therefore, the LCA results presented are those for the 3-factor model of GOs (consisting of MAP, PAP and PAV GOs).

The LCA results obtained for the General, Hypothetical Task, Verbal Test and Numerical Test GOs at Time 1 and Time 2 are presented in Sections 8.5.1., 8.5.2., 8.5.3., 8.5.4., respectively, below. The criteria described above were used in making decisions regarding LCA model choice.

8.5.1. LCA of General Goal Orientations at Time 1 and Time 2

The LCA results of the General GOs at Time 1 provide the answer to Research Question 1. The focus of this Research Question was on determining the type and number of GO profiles obtained when using LCA as a method of clustering as well as examining whether the 2x2 model significantly improved on the 3-factor model in terms of identifying goal orientation profiles. This Research Question will be addressed following the presentation of the LCA results. Additionally, although the LCAs partially answer a number of other Research Questions (e.g. Research Question 2a and Research Question 4b), a decision was made to address these in the next chapter since a substantial number of additional data analyses are required in order to provide the full answers to these Research Questions. Moreover, these Research Questions (which are partially answered by the LCAs presented in this chapter) have similar themes to a considerable number of other Research Questions which are not answered by the LCAs provided below. Thus, it was thought wise to address these Research Questions in the next chapter.

The LCA results for General GOs at Time 1 are presented first (Tables 8.27., 8.28. and Figure 8.1.) and are followed by the LCA results for the General GOs at Time 2. The data used in these analyses were collected at Time Q1 by means of the General GOs measure. As discussed in Section 8.2. it was assumed that the 3-factor model consisted of a MAP, PAP and PAV GOs since the MGO scale of the 3-factor model consists of MAP GO items only (as opposed to MAP **and** MAV GO items). Consequently, the MAP, PAP and PAV GOs were included in the LCA for the 3-factor model.

Table 8.27. LCA of General GOs at Time 1 (N=632)

Model	Number of Clusters	LL	BIC	Npar	L^2	df	p-value	Bootstrap p-value	Class. Err.
1	1	-1158.89	2356.48	6	172.81	20	<.01	<.01	<.01
2	2	-1102.65	2269.79	10	60.33	16	<.01	<.01	0.08
3	3	-1093.38	2277.04	14	41.78	12	<.01	<.01	0.09
4	4	-1081.57	2279.21	18	18.16	8	.02	.07	0.11
5	5	-1080.02	2301.91	22	15.06	4	<.01	.05	0.22

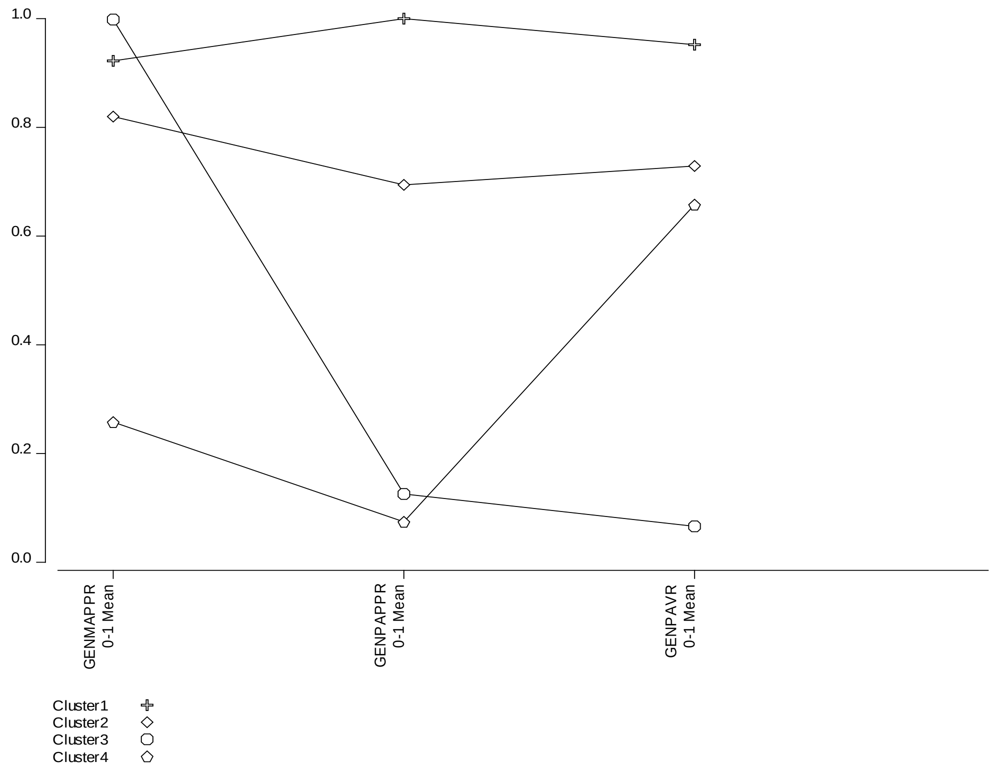
In this case the BIC shows model 2 as providing the best fit to the data. The p-values indicate that none of the models provide an adequate fit since they all have p-values of less than 0.05. However, when the bootstrap procedure was used the bootstrap p-value points towards Model 4 as providing the best fit. This is due to the fact that Model 4 is the model with the lowest number of parameters and a bootstrap p-value of more than 0.05. The results presented in Table 8.28. and Figure 8.1. are those obtained for Model 4.

Table 8.28. Conditional Probabilities of General GOs with Model 4

	Cluster 1	**Cluster 2**	**Cluster 3**	**Cluster 4**
Cluster Size	67% (423)	29% (181)	2% (14)	2% (14)
GENMAP				
Low	<.01	.02	<.01	.53
Moderate	.15	.32	<.01	.42
High	.85	.66	.99	.04
GENPAP				
Low	<.01	<.01	.75	.85
Moderate	<.01	.60	.25	.15
High	1.00	.39	<.01	<.01
GENPAV				
Low	<.01	.08	.87	.13
Moderate	.09	.39	.12	.44
High	.91	.54	<.01	.44

Key: GENMAP = General Mastery-Approach Goal Orientation; GENPAP = General Performance-Approach Goal Orientation; GENPAV = General Performance-Avoidance Goal Orientation; The numbers in brackets indicate the number of participants in each cluster.

Figure 8.1. Profile Plot for Model 4



Key: GENMAPPR = General Mastery-Approach Goal Orientation; GENPAPPR = General Performance-Approach Goal Orientation; GENPAVR = General Performance-Avoidance Goal Orientation; Cluster 1 = High Goal Orientations Cluster; Cluster 2 = High Mastery, Moderate Performance Cluster; Cluster 3 = High Mastery, Low Performance Cluster; Cluster 4 = High Performance-Avoidance Cluster.

Table 8.28. shows the conditional probabilities of individuals in each Cluster being Low, Moderate, or High, on each of the three GOs. For example, the table shows that the probability of a participant in Cluster 1 having a low General MAP GO is less than 1%. However, the probability of them having a high General MAP GO is 85%. Figure 8.1. presents the GO profiles of individuals in each Cluster. Therefore, individuals in Cluster 1 are likely to be high on all three GOs. This cluster will be referred to as 'High GOs' from this point onwards. Individuals within this cluster are likely to have very slightly lower MAP and PAV GOs than PAP GOs. As indicated in Table 8.28., 67% of the participants could be classified as being in Cluster 1. Cluster 2 contained 29% of the participants. Participants in this cluster are also likely to be high on all three GOs. However, their GOs are not as high as those of participants in Cluster 1 and unlike participants in Cluster 1 they are likely to have slightly higher MAP GOs than PAP and PAV GOs. This cluster will be referred to as 'High Mastery, Moderate Performance'

from this point onwards. 2% of the sample were classified as being in Cluster 3. Participants in this cluster are likely to have high MAP and low PAP and PAV GOs. Consequently, this cluster will be referred to as 'High Mastery, Low Performance'. Finally, another 2% of participants were in Cluster 4. Individuals in Cluster 4 are likely to have low MAP and PAP GOs and a high PAV GO. This cluster will be referred to as the 'High Performance-Avoidance' cluster. The LCA results for the General GOs at Time 2 are presented next.

Table 8.29. LCA of General GOs at Time 2 using the 3-factor model of GOs (N=192)

Model	Number of Clusters	LL	BIC	Npar	L^2	df	p-value	Bootstrap p-value	Class. Err.
1	1	-393.59	818.54	6	113.86	20	<.01	<.01	<.01
2	2	-354.87	761.99	10	36.41	16	<.01	<.01	.06
3	3	-341.79	756.75	14	10.27	12	.59	.68	.06
4	4	-340.72	775.51	18	8.13	8	.42	.42	.15
5	5	-340.61	796.18	22	7.89	4	.10	.25	.25

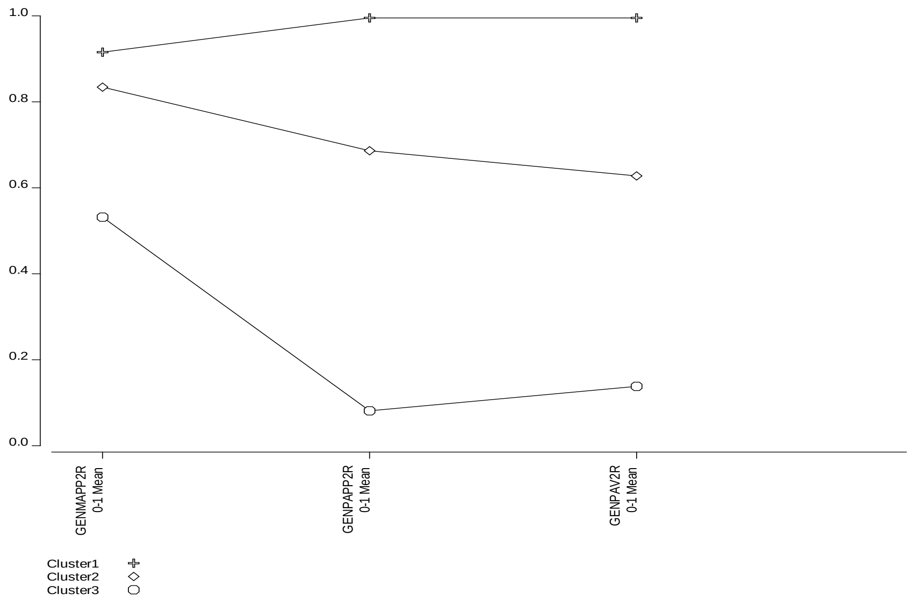
The BIC in Table 8.29. indicates that Model 3 provides the best fit to the data, since this has the lowest value. This time the p-value and the bootstrap p-value also point towards Model 3 as being the best fitting model since it has the lowest number of parameters out of all the models having a p-value (and bootstrap p-value) greater than 0.05. Consequently, the results in Table 8.30. and Figure 8.2. are those obtained for Model 3.

Table 8.30. Conditional Probabilities of General GOs at Time 2 with Model 3

	Cluster 1	Cluster 2	Cluster 3
Cluster Size	60% (115)	35% (67)	5% (10)
GENMAP			
Low	<.01	.02	.20
Moderate	.16	.29	.54
High	.84	.69	.26
GENPAP			
Low	<.01	<.01	.84
Moderate	.01	.62	.16
High	.99	.38	<.01
GENPAV			
Low	<.01	.07	.73
Moderate	.01	.61	.26
High	.99	.32	<.01

Key: GENMAP = General Mastery-Approach Goal Orientation; GENPAP = General Performance-Approach Goal Orientation; GENPAV = General Performance-Avoidance Goal Orientation; The numbers in brackets indicate the number of participants in each cluster.

Figure 8.2. Profile Plot for Model 3



Key: GENMAPP2R = General Mastery-Approach Goal Orientation at Time 2; GENPAPP2R = General Performance-Approach Goal Orientation at Time 2; GENPAV2R = General Performance-Avoidance Goal Orientation at Time 2; Cluster 1= High Goal Orientations cluster; Cluster 2 = High Mastery, Moderate Performance Cluster; Cluster 3 = High Mastery, Low Performance Cluster.

The results presented in Table 8.30. and Figure 8.2. indicate that the three General GO profiles obtained at Time 2 are nearly identical to three of the four General GO profiles obtained at Time 1. It is possible that a fourth GO profile was not identified at Time 2 due to the much smaller sample size. Clusters 1, 2, and 3 presented in Table 8.30. and Figure 8.2. are very similar to the ‘High GOs’; ‘High Mastery, Moderate Performance’; and ‘High Mastery, Low Performance’ clusters, respectively, obtained for General GOs at Time 1.

8.5.2. LCA of Hypothetical Task Goal Orientations at Time 1 and Time 2

Table 8.31. LCA of Hypothetical Task GOs at Time 1 (N=623)

Model	Number of Clusters	LL	BIC	Npar	L^2	df	p-value	Bootstrap p-value	Class. Err.
1	1	-1245.94	2530.48	6	182.42	20	<.01	<.01	<.01
2	2	-1168.89	2402.14	10	28.34	16	.03	.04	.03
3	3	-1165.79	2421.66	14	22.12	12	.04	.04	.08
4	4	-1160.51	2436.84	18	11.57	8	.17	.39	.10
5	5	-1159.43	2460.41	22	9.40	4	.05	.31	.18

The data collected at Time Q1 were used in this LCA. The results presented in Table 8.31. indicate that Model 2 has the lowest BIC value and therefore seems to provide the best fit to the data. However, its p-value is less than 0.05 thus showing inadequate fit. The p-value and bootstrap p-value both indicate that Model 4 shows the best fit to the data since it has a p-value (and bootstrap p-value) greater than 0.05 and the lowest number of parameters. Consequently, Model 4 was chosen as the best-fitting model. Table 8.32. and Figure 8.3. indicate the results obtained for Model 4.

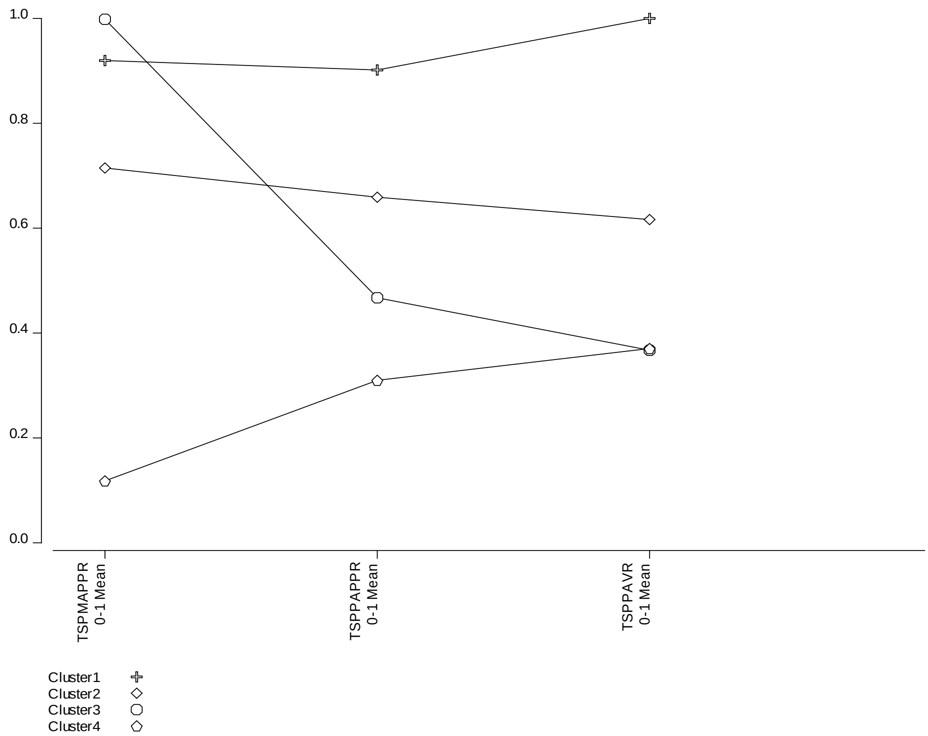
Table 8.32. Conditional Probabilities of Hypothetical Task GOs with Model 4

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Cluster Size	73% (452)	18% (110)	8% (49)	2% (12)
HYPMAP				
Low	<.01	.07	<.01	.78
Moderate	.15	.43	<.01	.21
High	.84	.50	.99	<.01
HYPPAP				
Low	<.01	.10	.27	.46
Moderate	.18	.48	.54	.46
High	.81	.42	.20	.08
HYPPAV				
Low	<.01	<.01	.28	.27
Moderate	<.01	.75	.72	.72
High	1.00	.24	<.01	<.01

Key: HYPMAP = Hypothetical Task Mastery-approach Goal Orientation; HYPPAP= Hypothetical Task Performance-approach Goal Orientation; HYPPAV= Hypothetical Task Performance-avoidance Goal Orientation; The numbers in brackets indicate the number of participants in each cluster.

The results presented in Table 8.32. show that Clusters 1, 2, 3, and 4 made up 73%, 18%, 8% and 2% of the sample respectively. The profiles obtained from the LCA indicate that the four Hypothetical Task GOs clusters at Time 1 are quite similar to the General GO clusters at Time 1 (when using the 3-factor model). Hypothetical Task GO Cluster 1 is very similar to the General GOs 'High GOs' cluster. However, the Hypothetical Task PAV GO is slightly higher in this cluster than in the 'High GOs' General GOs cluster. Moreover, in this case the PAP GO is slightly lower than the PAP GO obtained in the General GOs 'High GOs' cluster. Cluster 2 is extremely similar to the 'High Mastery, Moderate Performance' General GOs Cluster whilst Cluster 3 is similar to the 'High Mastery, Low Performance' General GOs cluster. However, in Cluster 3 the PAP and PAV GOs are slightly higher than those in the corresponding General GOs cluster. Cluster 4 is quite similar to the General GOs 'High Performance-Avoidance' cluster. However, the MAP and PAV GOs of participants in this cluster seem to be lower than those of participants in the corresponding General GOs cluster whilst the PAP GO seems to be higher than that in the corresponding General GOs cluster. On the whole though, the Hypothetical Task GO profiles obtained are quite similar to the General GO profiles at Time 1 obtained using the 3-factor model. This comparison of General and Hypothetical Task GOs will be discussed in further detail in Section 9.2.3.

Figure 8.3. Profile Plot for Model 4



Key: TSPMAPPR = Hypothetical Task Mastery-Approach Goal Orientation; TSPPAPPR = Hypothetical Task Performance-Approach Goal Orientation; TSPPAVR=Hypothetical Task Performance-Avoidance Goal Orientation; Cluster 1=High Goal Orientations Cluster; Cluster 2=High Mastery, Moderate Performance Cluster; Cluster 3=High Mastery, Low Performance Cluster; Cluster 4=High Performance-Avoidance Cluster.

The data collected at Time Q2 were used for the LCA of Hypothetical Task GOs at Time 2. The results are presented in Tables 8.33. and 8.34. as well as Figure 8.4.

Table 8.33. LCA of Hypothetical Task GOs at Time 2 (N=189)

Model	Number of Clusters	LL	BIC	Npar	L^2	df	p-value	Bootstrap p-value	Class. Err.
1	1	-441.74	914.93	6	121.04	20	<.01	<.01	<.01
2	2	-395.56	843.53	10	28.67	16	.03	.02	.04
3	3	-390.36	854.10	14	18.27	12	.11	.12	.04
4	4	-388.02	870.40	18	13.60	8	.09	.09	.09
5	5	-385.71	886.75	22	8.98	4	.06	.15	.12

The BIC points to Model 2 as providing the best fit to the data. However, the p-value shows Model 3 as providing the best fit. When the bootstrap procedure was carried out, Model 3 was again shown to provide the best fit to the data since it had the lowest number of parameters out of the models with bootstrap p-value greater than 0.05. Consequently, Model 3 was chosen as the best-fitting model. The results presented in Table 8.34. and Figure 8.4. are those obtained for Model 3.

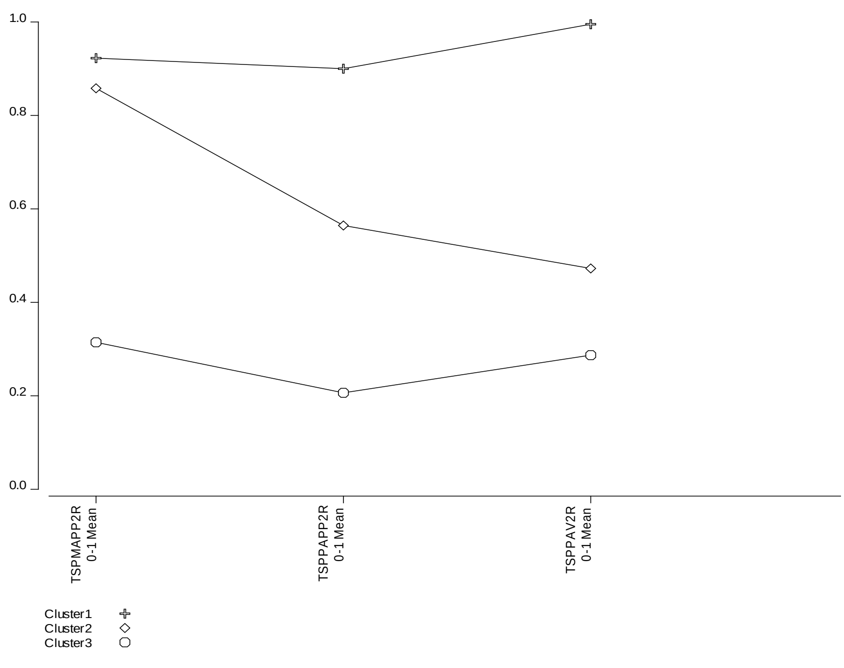
Table 8.34. Conditional Probabilities of Hypothetical Task GOs with Model 3

	Cluster 1	Cluster 2	Cluster 3
Cluster Size	67% (127)	25% (47)	8% (15)
HYPMAP			
Low	<.01	<.01	.42
Moderate	.15	.27	.53
High	.85	.72	.05
HYPPAP			
Low	<.01	.16	.62
Moderate	.19	.55	.35
High	.80	.29	.03
HYPPAV			
Low	<.01	.11	.43
Moderate	<.01	.83	.56
High	.99	.06	<.01

Key: HYPMAP =Hypothetical Task Mastery-approach Goal Orientation; HYPPAP= Hypothetical Task Performance-approach Goal Orientation; HYPPAV= Hypothetical Task Performance-avoidance Goal Orientation; The numbers in brackets indicate the number of participants in each cluster.

The conditional probabilities show that 67%, 25% and 8% of the sample had GO profiles described by Clusters 1, 2, and 3 respectively. Clusters 1 and 2 are very similar to the 'High GOs' and 'High Mastery, Moderate Performance' GO profiles, respectively, obtained for Time 1 Hypothetical Task GOs. Cluster 3 is quite similar to the 'High Performance-Avoidance' cluster for Hypothetical Task GOs at Time 1. However, at Time 2, participants in this cluster seem to have higher MAP GOs than in the corresponding Hypothetical Task GO cluster at Time 1. Moreover, the PAV GO of participants in this cluster is lower at Time 2 than at Time 1. One other difference between the Hypothetical Task GO profiles at Time 1 and Time 2 is that one of the Clusters obtained at Time 1 (Cluster 3) is missing at Time 2. This indicates that participants' GO profiles seem to be changing over time. These changes will be examined more closely in Chapter 9 Section 9.1.2.1. The LCA results for Verbal Test GOs at Time 1 and Time 2 are presented next.

Figure 8.4. Profile Plot for Model 3



Key: TSPMAP2R = Hypothetical Task Mastery-Approach Goal Orientation at Time 2; TSPPAP2R = Hypothetical Task Performance-Approach Goal Orientation at Time 2; TSPPAV2R = Hypothetical Task

Performance-Avoidance Goal Orientation at Time 2; Cluster 1 = High Goal Orientations Cluster; Cluster 2 = High Mastery, Moderate Performance Cluster; Cluster 3 = High Performance-Avoidance Cluster.

8.5.3. LCA of Verbal Test Goal Orientations at Time 1 and Time 2

The data collected at Time E1 and Time E2 were used for the LCAs of Verbal Test GOs at Time 1 and Time 2. The results of these LCAs are presented in Tables 8.35. through to 8.38. and Figures 8.5. and 8.6.

Table 8.35. LCA of Verbal Test GOs at Time 1 (N=71)

Model	Number of Clusters	LL	BIC	Npar	L^2	df	p-value	Bootstrap p-value	Class. Err.
1	1	-188.83	403.24	6	83.46	20	<.01	<.01	<.01
2	2	-159.45	361.53	10	24.70	16	.08	.01	.04
3	3	152.20	364.08	14	10.20	12	.60	.20	.08
4	4	-149.61	375.96	18	5.02	8	.76	.49	.06
5	5	-149.27	392.31	22	4.33	4	.36	.46	.12

The BIC and p-values presented in Table 8.35. show Model 2 as providing the best fit to the data since it has the lowest BIC value and a p-value greater than 0.05 with the least number of parameters. However, when the bootstrap procedure was carried out this indicated Model 3 as providing the best fit to the data (since it is the model with a bootstrap p-value greater than 0.05 and the least number of parameters. The small sample size makes it even more important to use the bootstrap procedure in this case. Consequently, Model 3 was chosen as the best-fitting model. The results presented in Table 8.36. and Figure 8.5. are those obtained for Model 3.

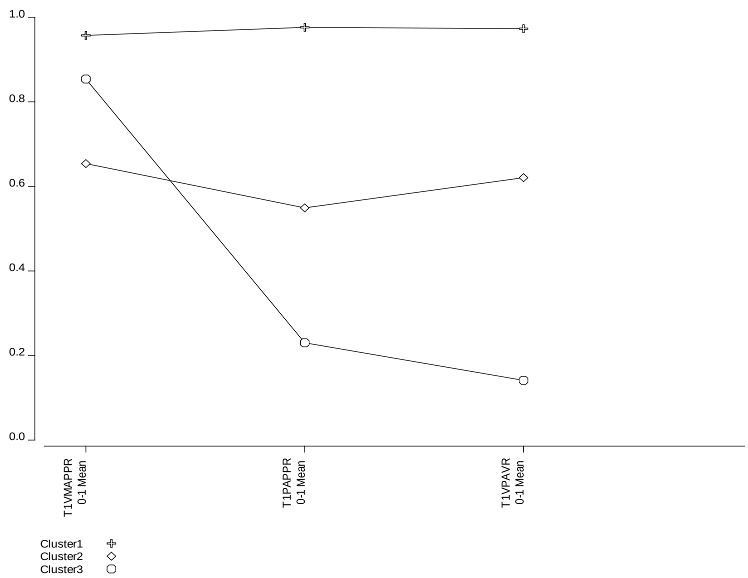
Table 8.36. Conditional Probabilities of Verbal Test GOs with Model 3

	Cluster 1	Cluster 2	Cluster 3
Cluster Size	48% (34)	29% (21)	23% (16)
VTMAP			
Low	<.01	.09	.01
Moderate	.09	.52	.27
High	.91	.39	.72
VTPAP			
Low	<.01	.02	.54
Moderate	.05	.87	.46
High	.95	.11	<.01
VTPAV			
Low	<.01	.02	.72
Moderate	.05	.71	.28
High	.95	.26	<.01

Key: VTMAP = Verbal Test Mastery-approach Goal Orientation; VTPAP= Verbal Test Performance-approach Goal Orientation; VTPAV= Verbal Test Performance-avoidance Goal Orientation; The numbers in brackets indicate the number of participants in each cluster.

The results indicate that Clusters 1, 2 and 3 are made up of 48%, 29% and 23% of the sample, respectively. Clusters 1, 2 and 3 are nearly identical to the 'High GOs', 'High Mastery, Moderate Performance', and 'High Mastery, Low Performance' clusters, respectively, obtained for General GOs at Time 1. The LCA of Verbal Test GOs at Time 2 are presented next.

Figure 8.5. Profile Plot for Model 3



Key: T1VTMAPPR = Time 1 Verbal Test Mastery-Approach Goal Orientation; T1VTPAPPR = Time 1 Verbal Test Performance-Approach Goal Orientation; T1VTPAVR = Time 1 Verbal Test Performance-Avoidance Goal Orientation; Cluster 1 = High Goal Orientations Cluster; Cluster 2 = High Mastery, Moderate Performance Cluster; Cluster 3 = High Mastery, Low Performance Cluster.

Table 8.37. LCA of Verbal Test GOs at Time 2 (N=68)

Model	Number of Clusters	LL	BIC	Npar	L^2	df	p-value	Bootstrap p-value	Class. Err.
1	1	-184.16	393.64	6	88.46	20	<.01	<.01	<.01
2	2	-153.05	348.29	10	26.23	16	.05	.01	.01
3	3	-144.36	347.79	14	8.86	12	.72	.50	.05
4	4	-143.16	362.27	18	6.46	8	.60	.30	.14
5	5	-143.07	378.97	22	6.28	4	.18	.22	.25

The p-value obtained from this analysis shows Model 2 as providing the best fit to the data since it has a p-value of 0.05 and the least number of parameters. However, the BIC and bootstrap p-value indicate otherwise. According to these, Model 3 provides the best fit to the data since it has the lowest BIC value, and a bootstrap p-value greater than 0.05 with the least number of parameters. Similarly to the LCA for Verbal Test GOs at Time 1, the bootstrap procedure was necessary in this case due to the small sample size. As a result, Model 3 was chosen as the best-fitting model and the results presented in Table 8.38. and Figure 8.6. below are those obtained for Model 3.

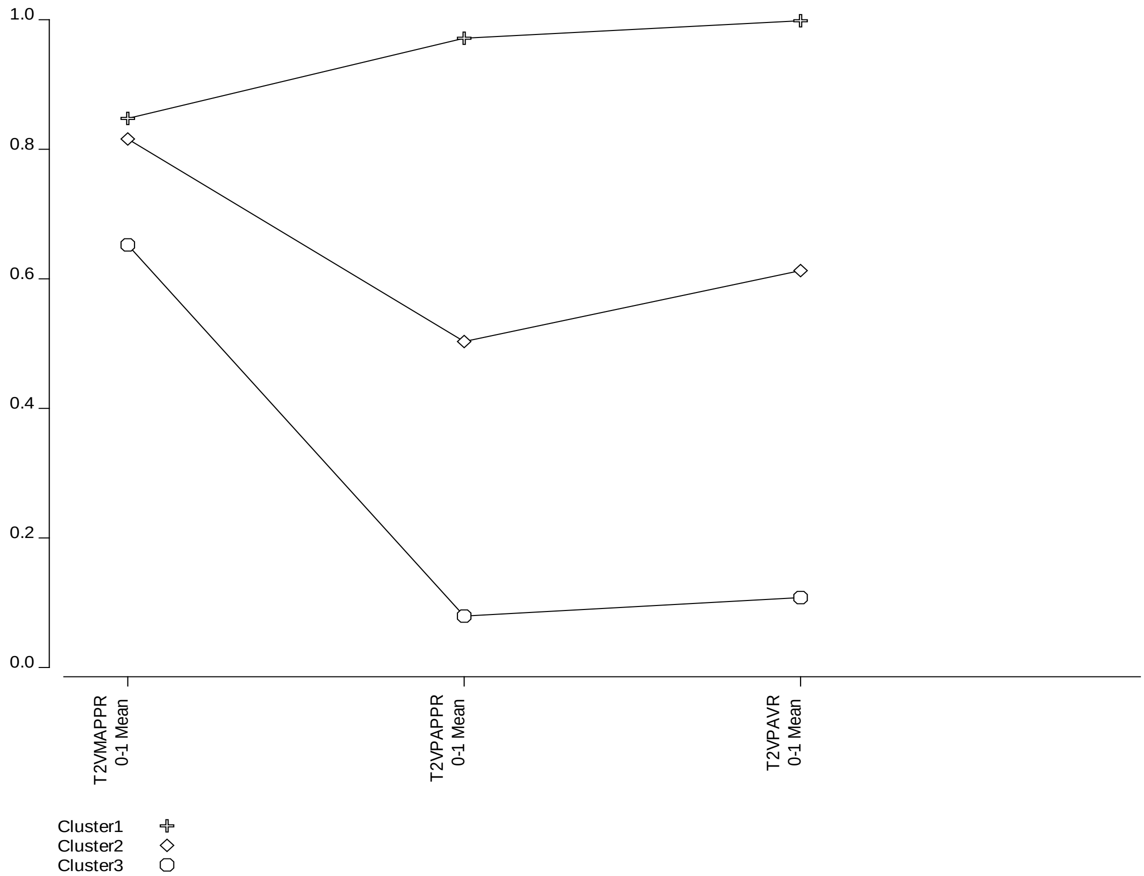
Table 8.38. Conditional Probabilities of Verbal Test GOs with Model 3

	Cluster 1	**Cluster 2**	**Cluster 3**
Cluster Size	52% (35)	29% (21)	18%(12)
VTMAP			
Low	.01	.02	.09
Moderate	.28	.33	.52
High	.71	.65	.39
VTPAP			
Low	<.01	.02	.84
Moderate	.06	.95	.16
High	.94	.03	<.01
VTPAV			
Low	<.01	.06	.79
Moderate	<.01	.66	.21
High	.99	.28	<.01

Key: VTMAP = Verbal Test Mastery-approach Goal Orientation; VTPAP= Verbal Test Performance-approach Goal Orientation; VTPAV= Verbal Test Performance-avoidance Goal Orientation; The numbers in brackets indicate the number of participants in each cluster.

This time Clusters 1, 2 and 3 were made up of 52%, 29% and 18% of the sample respectively. The three GO profiles obtained (Clusters 1, 2 and 3) are very similar to the 'High GOs', 'High Mastery, Moderate Performance', and 'High Mastery, Low Performance' clusters obtained for General GOs at Time 1. They are also very similar to the three clusters obtained for Verbal Test GOs at Time 1. The LCA results for Numerical Test GOs at Time 1 and Time 2 are presented next.

Figure 8.6. Profile Plot for Model 3



Key: T2VTMAPPR = Time 2 Verbal Test Mastery-Approach Goal Orientation; T2VTPAPPR = Time 2 Verbal Test Performance-Approach Goal Orientation; T2VTPAVR = Time 2 Verbal Test Performance-Avoidance Goal Orientation; Cluster 1 = High Goal Orientations Cluster; Cluster 2 = High Mastery, Moderate Performance Cluster; Cluster 3 = High Mastery, Low Performance Cluster.

8.5.4. LCA of Numerical Test Goal Orientations at Time 1 and Time 2

The data collected at Time E1 and Time E2 were used in the following LCAs. These analyses were carried out in order to examine the types of GO profiles adopted by participants on the Numerical Test provided to them at Time 1 and at Time 2.

Table 8.39. LCA of Numerical Test GOs Time 1 (N=71)

Model	Number of Clusters	LL	BIC	Npar	L^2	df	p-value	Bootstrap p-value	Class. Err.
1	1	-198.51	422.60	6	81.80	20	<.01	<.01	<.01
2	2	-172.33	387.28	10	29.44	16	.02	.01	.03
3	3	-167.26	394.19	14	19.30	12	.08	.03	.07
4	4	-163.69	404.11	18	12.16	8	.14	.13	.05
5	5	-160.41	414.59	22	5.59	4	.23	.51	.05

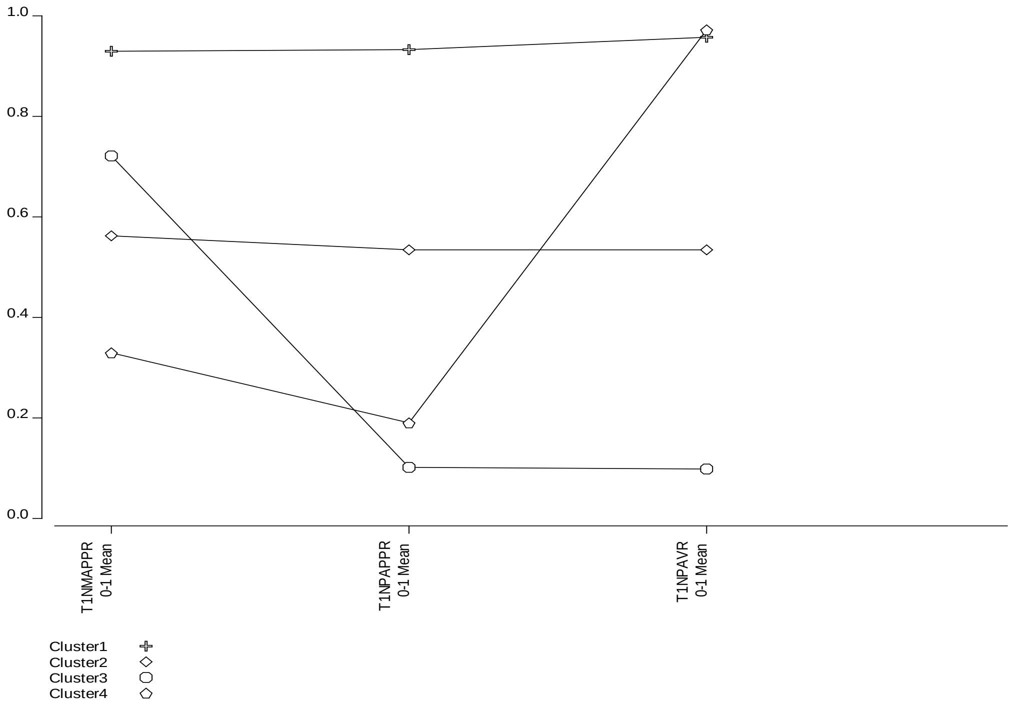
In the case of Numerical Test GOs at Time 1 the BIC and p-value show Model 2 and Model 3, respectively, as providing the best fit to the data. However, the bootstrap p-value shows Model 4 as providing the best fit because it has a bootstrap p-value greater than 0.05 and the least number of parameters. Therefore, this was chosen as the best-fitting Model. The conditional probabilities and profile plot for Model 4 are presented below (Table 8.40. and Figure 8.7.).

Table 8.40. Conditional Probabilities of Numerical Test GOs with Model 4

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Cluster Size	56% (40)	19% (14)	18% (13)	6 % (4)
NTMAP				
Low	<.01	.12	.04	.40
Moderate	.14	.63	.49	.55
High	.86	.24	.48	.06
NTPAP				
Low	<.01	.05	.80	.62
Moderate	.13	.83	.20	.37
High	.87	.12	<.01	<.01
NTPAV				
Low	<.01	.03	.80	<.01
Moderate	.09	.87	.20	.06
High	.91	.10	<.01	.94

Key: NTMAP = Numerical Test Mastery-approach Goal Orientation; NTPAP= Numerical Test Performance-approach Goal Orientation; NTPAV= Numerical Test Performance-avoidance Goal Orientation; The numbers in brackets indicate the number of participants in each cluster.

Figure 8.7. Profile Plot for Model 4



Key: T1NTMAPPR = Time 1 Numerical Test Mastery-Approach Goal Orientation; T1NTPAPPR = Time 1 Numerical Test Performance-Approach Goal Orientation; T1NTPAVR = Time 1 Numerical Test Performance-Avoidance Goal Orientation; Cluster 1 = High Goal Orientations Cluster; Cluster 2 = High Mastery, Moderate Performance Cluster; Cluster 3 = High Mastery, Low Performance Cluster; Cluster 4 = High Performance-Avoidance Cluster.

Clusters 1, 2, 3 and 4 were made up of 56%, 19%, 18% and 6% of the sample respectively. The GO profiles obtained here are very similar to the GO profiles obtained from the LCA of General GOs at Time 1. Clusters 1, 2, 3 and 4 are very similar to the 'High GOs', 'High Mastery, Moderate Performance', 'High Mastery, Low Performance' and 'High Performance-Avoidance' clusters (obtained for General GOs at Time 1), respectively. A more detailed comparison of the Numerical Test and General GO profiles will be presented in Chapter 9 Section 9.2.3. The LCA for Numerical Test GOs at Time 2 is presented next.

Table 8.41. LCA of Numerical Test GOs at Time 2 (N=71)

Model	Number of Clusters	LL	BIC	Npar	L^2	df	p-value	Bootstrap p-value	Class. Err.
1	1	-185.39	396.36	6	97.97	20	<.01	<.01	<.01
2	2	-158.60	359.83	10	44.39	16	<.01	<.01	.03
3	3	-144.42	348.51	14	16.02	12	.19	.05	.04
4	4	-139.69	356.11	18	6.57	8	.58	.48	.05
5	5	-139.29	372.37	22	5.78	4	.22	.35	.18

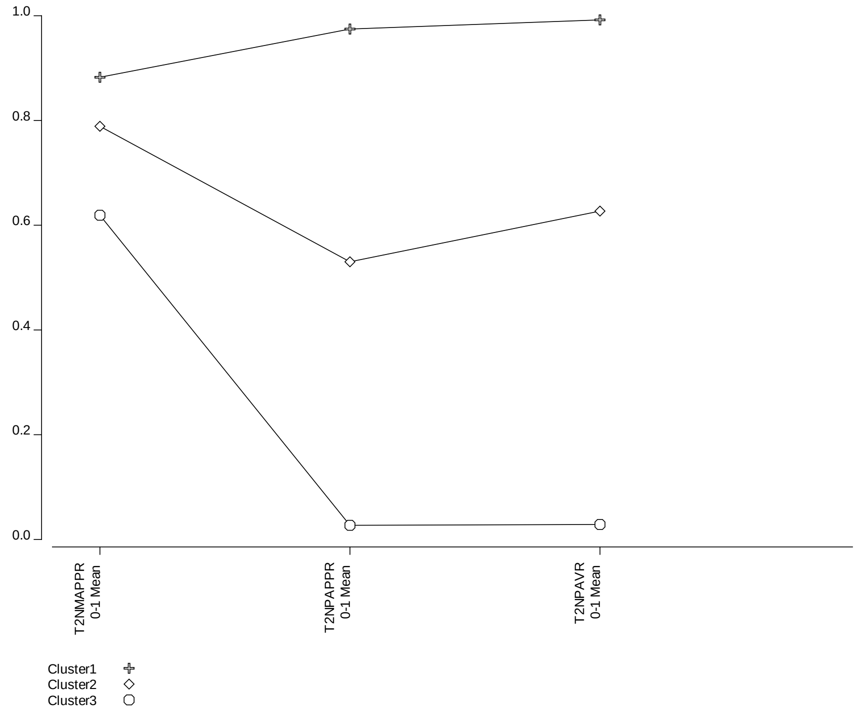
In the case of Numerical Test GOs at Time 2, the BIC, p-value and bootstrap p-value all point towards Model 3 providing the best fit to the data. This model has the lowest BIC value and it is the model having a p-value and bootstrap p-value greater than 0.05 with the lowest number of parameters. The conditional probabilities and profile plot for Model 3 are presented below.

Table 8.42. Conditional Probabilities of Numerical Test GOs with Model 3

	Cluster 1	Cluster 2	Cluster 3
Cluster Size	54% (38)	33% (24)	13% (9)
NTMAP			
Low	<.01	.03	.11
Moderate	.22	.37	.54
High	.77	.61	.35
NTPAP			
Low	<.01	.05	.95
Moderate	.05	.83	.05
High	.95	.11	<.01
NTPAV			
Low	<.01	.01	.94
Moderate	.02	.72	.06
High	.98	.27	<.01

Key: NTMAP = Numerical Test Mastery-approach Goal Orientation; NTPAP= Numerical Test Performance-approach Goal Orientation; NTPAV= Numerical Test Performance-avoidance Goal Orientation; The numbers in brackets indicate the number of participants in each cluster.

Figure 8.8. Profile Plot for Model 3



Key: T2NTMAPPR = Time 2 Numerical Test Mastery-Approach Goal Orientation; T2NTPAPPR = Time 2 Numerical Test Performance-Approach Goal Orientation; T2NTPAVR = Time 2 Numerical Test Performance-Avoidance Goal Orientation; Cluster 1 = High Goal Orientations Cluster; Cluster 2 = High Mastery, Moderate Performance Cluster; Cluster 3 = High Mastery, Low Performance Cluster; Cluster 4 = High Performance-Avoidance Cluster.

The three clusters obtained from this LCA are very similar to three out of the four clusters obtained for General and Numerical Test GOs at Time 1. Clusters 1, 2, and 3 were made up of 54%, 33% and 13% of the sample, respectively. Due to the similarities with the General GO clusters, Clusters 1, 2 and 3 may also be referred to as 'High GOs', 'High Mastery, Moderate Performance' and 'High Mastery, Low Performance', respectively.

Since the analyses presented above provide an answer to Research Question 1, it was thought appropriate to discuss this Research Question next.

Research Question 1. Using LCA as a method of clustering goal orientations, how many different types of goal orientation profiles are there and what are the characteristics of each goal orientation profile? Does the 2x2 model of goal orientations significantly improve on the 3-factor model in terms of identifying goal orientation profiles?

In answer to the Research Question 1, four main types of GO profiles emerged from the LCA of General GOs: ‘High GOs’, ‘High Mastery, Moderate Performance’, ‘High Mastery, Low Performance’ and ‘High Performance-Avoidance’ profiles. Moreover, the LCAs for the Hypothetical Task, Verbal and Numerical Test GO profiles obtained were very similar to the General GO profiles. Consequently, they support the results obtained for the types of General GO profiles. As discussed in Section 8.5., when the LCAs were carried out using the 2x2 and 3-factor models of GOs no adequate fit was found for the General and Numerical Test GOs at Time 1 when using the 2x2 model of GOs. On the other hand, when using the 3-factor model adequate fit was found for all the GOs at both Time 1 and Time 2. Consequently, it seems as though overall the 2x2 model of GOs does not necessarily improve on the 3-factor model in terms of GO profiles.

Thus far some of the psychometric properties of the scales and variables used in the current study were presented. Moreover, decisions were made as to whether the 3-factor or 2x2 models of GOs should be used (for the purposes of the present study) in analysing GOs from the profile and non-profile perspectives. The next section provides further information about the variables used in the current study by providing the correlational analyses results of all the variables used.

8.6. Intercorrelational Analyses

Three correlation matrices are presented in this section. The first one (Table 8.43.) provides the correlational analyses results for the variables in the survey study. The data used in this correlational analysis were collected at Time Q1 and Time Q2. Since all participants were included in this analysis the sample size varies from 187 to 631 (depending on whether participants completed the Time Q1 or Time Q2 questionnaire or both).

The second correlation matrix (Table 8.44.) provides the correlational analyses results for variables in the experimental study. Therefore, the data used for this analysis were collected at Time E1 and Time E2. Since only experimental participants were included in this analysis, the sample size varies from between 49 to 71.

The third correlation matrix (Table 8.44) indicates the correlational analysis results for variables across the survey and experiments for experimental participants only. This matrix was included since some of the correlations presented in it are used to answer a few of the research questions and hypotheses (e.g. Research Question 4c). Similarly to the second correlation matrix only experimental participants were included in this analysis therefore, the sample size varies from between 49 to 71 too.

Due to the large number of correlations tested there is a larger possibility of Type 1 error occurring. Corrections such as the Bonferroni control for Type 1 error. However, in doing so they increase the probability of Type II error (Perneger, 1998). In order to take Type I error into consideration without increasing the chances of Type II error a decision was made not to use a statistical correction but rather to discuss the possibility of Type I error whenever correlations are reported (in answer to any of the research questions and hypotheses).

Table 8.43. Intercorrelational Analyses of Survey Study Variables (N=187-631)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. GEN MAP T1	1															
2. GEN MAV T1	.54**	1														
3. GEN PAP T1	.27**	.23**	1													
4. GEN PAV T1	.13**	.29**	.60**	1												
5. HYP MAP T1	.42**	.39**	.12**	.14**	1											
6. HYP MAV T1	.30**	.41**	.11**	.23**	.55**	1										
7. HYP PAP T1	.22**	.22**	.54**	.48**	.29**	.26**	1									
8. HYP PAV T1	.19**	.32**	.41**	.52**	.37**	.52**	.62**	1								
9. GEN MAP T2	.56**	.34**	.19**	.08	.38**	.21**	.26**	.22**	1							
10. GEN MAV T2	.35**	.47**	.07	.09	.28**	.37**	.08	.28**	.59**	1						
11. GEN PAP T2	.08	.22**	.54**	.46**	.23**	.21**	.49**	.41**	.35**	.25**	1					
12. GEN PAV T2	<-.01	.21**	.38**	.47**	.14	.28**	.37**	.42**	.25**	.38**	.69**	1				
13. HYP MAP T2	.40**	.41**	.11	.14	.57**	.35**	.27**	.30**	.54**	.50**	.27**	.28**	1			
14. HYP MAV T2	.15*	.29**	.07	.07	.36**	.54**	.11	.25**	.27**	.55**	.19*	.38**	.51**	1		
15. HYP PAP T2	.11	.20**	.43**	.37**	.18*	.20**	.63**	.45**	.26**	.21**	.63**	.56**	.34**	.20**	1	
16. HYP PAV T2	.09	.27**	.27**	.35**	.24**	.34**	.40**	.44**	.25**	.41**	.52**	.69**	.47**	.54**	.68**	1

Key: Gen=General; HT=Hypothetical Task; T1=Time 1; T2=Time 2; MAP=Mastery Approach Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation **ρ<0.01 * ρ<0.05

Table 8.44. Intercorrelational Analyses of Experimental Study Variables (N=49-71)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. VT M.E. T1	1															
2. NT M.E. T1	.51**	1														
3. VT Perf. T1	-.20	-.18	1													
4. NT Perf. T1	.10	<.01	.38**	1												
5. VT MAP T1	.24*	.27*	-.16	.25*	1											
6. VT MAV T1	-.04	.02	-.02	.22	.54**	1										
7. VT PAP T1	.13	.276*	<.01	.12	.48**	.34**	1									
8. VT PAV T1	.10	.21	.09	.15	.30*	.21	.84**	1								
9. NT MAP T1	.16	.36**	-.07	.28*	.74**	.49**	.39**	.27*	1							
10. NT MAV T1	.07	.30*	-.16	-.03	.46**	.68**	.35**	.21	.64**	1						
11. NT PAP T1	.07	.17	<.01	.19	.39**	.43**	.75**	.71**	.51**	.48**	1					
12. NT PAV T1	.04	.18	.02	.15	.37**	.33**	.84**	.81**	.37**	.36**	.79**	1				
13. VT S. E. T1	-.06	-.15	.08	-.02	.25*	.20	.28*	.18	.13	.09	<.01	.18	1			
14. NT S. E. T1	.09	-.02	.08	.38**	.25*	.33**	.32**	.30*	.40**	.27*	.47**	.39**	.21	1		
15. VT M.E. T2	.61**	.51**	-.26*	.02	.24*	.06	.14	.08	.26*	.18	.09	.12	-.13	<-.01	1	
16. VT Perf. T2	<.01	.03	.52**	.25*	-.17	-.07	.11	.15	-.07	-.06	<.01	.15	.16	<.01	-.10	1
17. NT M.E. T2	.49**	.52**	-.25*	-.12	.03	-.19	<-.01	-.02	.05	-.06	-.09	-.11	-.05	-.12	.54**	-.06
18. NT Perf. T2	-.14	-.21	.34**	.43**	-.02	.20	.16	.14	.13	.13	.31**	.17	-.03	.49**	-.28*	.23

Key: S.E.=Self-efficacy; M.E.=Mental Effort; T.E.=Task Experience; Perf.=Performance; T1=Time 1; T2=Time 2; MAP=Mastery Approach Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation; NT=Numerical Test; VT=Verbal Test.

**ρ<0.01 * ρ<0.05

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
19. VT MAP T2	.14	.12	-.05	.29*	.67**	.48**	.38**	.24*	.72**	.44**	.39**	.32**	.26*	.25*	.34**	-.10
20. VT MAV T2	<.01	.02	-.03	.24*	.51**	.56**	.37**	.29*	.63**	.51**	.48**	.33**	.11	.19	.27*	-.09
21. VT PAP T2	<.01	.06	.10	.22	.31**	.40**	.71**	.72**	.30*	.26*	.64**	.63**	.30*	.36**	.16	.19
22. VT PAV T2	.04	.03	.04	.15	.22	.29*	.65**	.67**	.23	.22	.60**	.59**	.18	.25*	.17	.13
23. NT MAP T2	<-01	.03	.02	.35**	.51**	.45**	.27*	.22	.68**	.49**	.42**	.28*	.14	.40**	.16	<-.01
24. NT MAV T2	-.07	<-.01	.03	.24*	.39**	.53**	.32**	.30*	.58**	.52**	.42**	.31**	.19	.26*	.15	.04
25. NT PAP T2	.05	.07	<.01	.21	.23	.30*	.59**	.65**	.27*	.24*	.65**	.60**	.13	.45**	.19	.07
26. NT PAV T2	-.06	-.02	.03	.14	.21	.38**	.67**	.71**	.23	.27*	.66**	.70**	.12	.40**	.12	.02
27. VT S. E. T2	-.22	-.30*	.24*	.04	.13	.15	.25*	.18	.12	.12	.12	.22	.63**	.36**	-.17	.23
28. NT S. E. T2	.06	-.02	.04	.39**	.35**	.49**	.39**	.33**	.45**	.37**	.58**	.45**	.14	.74**	.05	<.01
29. VT Practice	-.04	-.10	-.02	-.25*	-.36**	-.13	-.21	-.22	-.23	-.17	-.15	-.11	-.15	-.04	-.07	.05
30. NT Practice	<-.01	-.04	-.06	-.24*	-.41**	-.22	-.21	-.18	-.27*	-.25*	-.17	-.19	-.23	-.07	-.07	.03
31. VT T.E.	<-.01	.07	.19	.15	.17	.10	.09	.14	.13	.28*	.08	.03	.21	.05	-.17	.25*
32. NT T.E.	-.12	<-.01	.14	.30*	.34**	.25*	.27*	.22	.28*	.23	.23*	.23	.26*	.33**	-.13	<-.01

Key: S.E.=Self-efficacy; M.E.=Mental Effort; T.E.=Task Experience; Perf.=Performance; T1=Time 1; T2=Time 2; MAP=Mastery Approach Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation; NT = Numerical Test; VT = Verbal Test. **ρ<0.01 * ρ<0.05

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
17. NT M.E. T2	1															
18. NT Perf. T2	-.38**	1														
19. VT MAP T2	.06	-.04	1													
20. VT MAV T2	-.17	.16	.75**	1												
21. VT PAP T2	-.11	.30*	.42**	.50**	1											
22. VT PAV T2	-.13	.26*	.37**	.52**	.88**	1										
23. NT MAP T2	-.10	.34**	.66**	.66**	.40**	.28*	1									
24. NT MAV T2	-.08	.19	.68**	.80**	.50**	.43**	.76**	1								
25. NT PAP T2	-.02	.43**	.29*	.43**	.82**	.75**	.49**	.45**	1							
26. NT PAV T2	-.15	.40**	.29*	.47**	.88**	.82**	.38**	.47**	.88**	1						
27. VT S. E. T2	-.21	.14	.15	.18	.32**	.30*	.20	.26*	.20	.24*	1					
28. NT S. E. T2	-.26*	.54**	.38**	.47**	.57**	.46**	.61**	.47**	.65**	.62**	.28*	1				
29. VT Practice	.04	-.15	-.30*	-.21	-.24*	-.18	-.29*	-.28*	-.17	-.15	-.12	-.15	1			
30. NT Practice	.04	-.14	-.30*	-.28*	-.25*	-.26*	-.28*	-.29*	-.19	-.21	-.27*	-.19	.83**	1		
31. VT T.E.	-.20	.17	.05	.06	.12	.13	.18	.15	.03	<.01	.31**	.16	-.53**	-.44**	1	
32. NT T.E.	-.13	.36**	.16	.13	.21	.19	.32**	.21	.22	.24*	.34**	.43**	-.55**	-.57**	.56**	1

Key: S.E. = Self-efficacy; M.E. = Mental Effort; T.E. = Task Experience; Perf. = Performance; T1=Time 1; T2=Time 2; MAP=Mastery Approach Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation; NT = Numerical Test; VT = Verbal Test.
**ρ<0.01 * ρ<0.05

Table 8.45. Intercorrelational Analyses of Variables across Survey and Experiment (N=49-71)

	1. Gen MAP T1	2. Gen MAV T1	3. Gen PAP T1	4. Gen PAV T1	5. HYP MAP T1	6. HYP MAV T1	7. HYP PAP T1	8. HYP PAV T1	9. Gen MAP T2	10. Gen MAV T2	11. Gen PAP T2	12. Gen PAV T2	13. HYP MAP T2	14. HYP MAV T2	15. HYP PAP T2	16. HYP PAV T2
17. VT M.E. T1	.26*	.23	.29*	.25*	.38**	.25*	.12	.11	.24	.12	.15	.21	.15	.23	.32*	.14
18. NT M.E. T1	.12	.02	.27*	.30*	.15	.15	.13	.08	.07	.05	.09	<.01	.27	.10	.26	.15
19. VT Perf. T1	-.18	.10	-.06	.11	-.11	-.25*	-.11	-.05	-.29*	-.19	-.18	-.08	-.31*	-.35*	-.25	-.19
20. NT Perf. T1	<-.01	.03	.13	.10	.14	-.06	.02	.09	.08	-.09	.08	.11	.12	<-.01	.14	.11
21. VT MAP T1	.47**	.30*	.26*	<-.01	.33**	.26*	.16	.25*	.59**	.45**	.33*	.23	.59**	.51**	.32*	.26
22. VT MAV T1	.38**	.27*	.28*	-.05	<.01	.13	.13	.22	.33*	.34*	.29*	.20	.33*	.31*	.27	.22
23. VT PAP T1	.31*	.30*	.40**	.28*	.26*	.33**	.35**	.49**	.40**	.41**	.48**	.42**	.41**	.30*	.47**	.41**
24. VT PAV T1	.16	.36**	.36**	.45**	.23	.36**	.39**	.53**	.33*	.45**	.59**	.57**	.34*	.32*	.62**	.53**
25. NT MAP T1	.34**	.26*	.33**	.09	.24*	.17	.16	.21	.34*	.36*	.30*	.19	.50**	.38**	.30*	.29*
26. NT MAV T1	.41**	.28*	.27*	-.05	.15	.22	.11	.15	.27	.28*	.16	.06	.33*	.27	.13	.14
27. NT PAP T1	.23	.15	.47**	.17	.07	.16	.39**	.38**	.23	.20	.50**	.37**	.20	.12	.53**	.31*
28. NT PAV T1	.20	.34**	.39**	.30*	.23	.33**	.42**	.53**	.34*	.35*	.50**	.42**	.33*	.21	.56**	.43**
29. VT S. E. T1	.33**	.29*	-.10	-.21	-.02	.07	-.13	.02	.29*	.41**	.08	.19	.18	.36**	.06	.26
30. NT S. E. T1	.32**	.36**	.38**	.13	.07	.10	.39**	.36**	.22	.09	.19	.13	.08	-.02	.38**	.19
31. VT M.E. T2	.09	.16	.25*	.26*	.48**	.27*	.23	.21	.20	.02	.10	.06	.23	.10	.26	.11

	1. Gen MAP T1	2. Gen MAV T1	3. Gen PAP T1	4. Gen PAV T1	5. HYP MAP T1	6. HYP MAV T1	7. HYP PAP T1	8. HYP PAV T1	9. Gen MAP T2	10. Gen MAV T2	11. Gen PAP T2	12. Gen PAV T2	13. HYP MAP T2	14. HYP MAV T2	15. HYP PAP T2	16. HYP PAV T2
32. VT Perf. T2	-.05	.03	.04	.06	-.14	-.08	-.14	-.07	.10	.04	-.05	<-.01	-.05	-.04	-.16	-.02
33. NT M.E. T2	-.05	.03	.11	.25*	.17	-.03	.04	-.02	-.09	-.12	-.12	-.12	-.02	-.05	.02	-.03
34. NT Perf. T2	-.09	.07	.22	.09	-.13	-.18	.03	.10	.07	.02	.20	.22	-.04	-.11	.21	.12
35. VT MAP T2	.29*	.23	.22	.03	.29*	.21	.10	.25*	.31*	.36*	.18	.22	.39**	.42**	.20	.26
36. VT MAV T2	.15	.24*	.32**	.08	.23	.18	.18	.27*	.24	.36*	.31*	.33*	.35*	.39**	.33*	.32*
37. VT PAP T2	.09	.22	.37**	.26*	.14	.25*	.31**	.50**	.36**	.41**	.54**	.55**	.38**	.35*	.49**	.55**
38. VT PAV T2	.10	.16	.38**	.24*	.18	.29*	.33**	.47**	.30*	.44**	.53**	.60**	.39**	.37**	.54**	.61**
39. NT MAP T2	.16	.31*	.17	<.01	.27*	.09	.14	.14	.22	.27	.22	.17	.21	.15	.11	.05
40. NT MAV T2	.09	.24*	.18	.05	.18	.07	.15	.17	.16	.31*	.28	.27	.27	.34*	.22	.27
41. NT PAP T2	.05	.23	.47**	.30*	.13	.13	.43**	.43**	.27	.25	.57**	.50**	.28	.19	.57**	.41**
42. NT PAV T2	.03	.27*	.47**	.36**	.16	.22	.46**	.58**	.27	.34*	.57**	.55**	.31*	.22	.62**	.54**
43. VT S. E. T2	.24	.22	-.07	-.22	-.02	-.08	-.03	<.01	.09	.23	-.11	.03	.04	.04	<-.01	.07
44. NT S. E. T2	.20	.25*	.49**	.10	.07	.13	.34**	.29*	.35*	.26	.39**	.24	.23	.11	.44**	.20
45. VT Practice	-.19	<-.01	-.15	.04	-.16	-.19	.09	-.10	-.35*	-.22	-.03	-.04	-.24	-.28	-.05	-.10
46. NT Practice	-.20	.02	-.20	.07	-.07	-.07	.10	-.09	-.28*	-.19	<.01	-.03	-.15	-.18	-.06	-.11
47. VT T.E.	.22	<-.01	-.05	-.20	-.16	<-.01	-.23	-.29*	.28	.28	-.08	-.05	.08	.19	-.12	.02
48. NT T.E.	.02	<.01	.09	.03	.02	<.01	.05	.06	.31*	.15	.09	-.06	.19	<-.01	.10	<.01

Key: Gen=General; HT=Hypothetical Task; S.E.=Self-efficacy; M.E.=Mental Effort; T.E.=Task Experience; Perf.=Performance; T1=Time 1; T2=Time 2; MAP=Mastery Approach Goal Orientation; PAP=Performance Approach Goal Orientation; PAV=Performance Avoidance Goal Orientation; NT = Numerical Test; VT = Verbal Test. **ρ<0.01 * ρ<0.05

The correlation matrices presented above provide the answers to a number of Research Questions and were the only tests required for a few of the Hypotheses. These Research Questions and Hypotheses will be addressed below. Moreover, as explained earlier, some additional Research Questions which have the same theme as the Research Questions and Hypotheses addressed by the correlational analyses will also be discussed below.

Before focusing on the relevant Research Questions and Hypotheses (relating to the correlation matrices) a few correlations of interest are addressed. These correlations of interest, which are not directly related to any of the Research Questions or Hypotheses, relate to three main themes. The main themes and reasons for examining each theme are presented below.

a) **Correlations between the four GOs.** Examining the correlations between the four GOs will provide a better understanding of the structure of the 2x2 model of GOs and whether each of the four GOs in this model is differentiated enough to warrant measuring them using different scales (e.g. measuring MAP and MAV GOs separately as opposed to together).

b) **Correlations between task-experience at Time 1 and practice at Time 2 with self-efficacy, and performance.** Task Experience and Practice were measured in this study since it was thought that these might influence the self-efficacy and performance of participants. Since no Research Questions or Hypotheses directly address these relationships it was thought reasonable to report them at this point in the study. Examining these correlations might provide a better basis for understanding the Research Questions and Hypotheses that focus on the relationships between GOs and self-efficacy and performance.

c) **Correlations between the GOs (General, Verbal test, and Numerical test) and Practice.** Since Practice was included as a covariate in a number of analyses which investigated the relationships between GOs and other variables (including mental effort, self-efficacy and performance) it was thought appropriate to investigate the relationships between Practice and GOs so as to have a better basis for understanding the analyses that include practice as a covariate.

Each of the themes described above will be discussed in Sections 8.6.1., 8.6.2. and 8.6.3., respectively.

8.6.1. Correlations between the four Goal Orientations

In Chapter 7 the correlations between the four GOs found in the study by Elliot and Murayama (2007) who developed the AGQ-R were presented (Section 7.1.5.1.). These indicated that the four GOs were low to moderately correlated. Moreover, correlations for GOs having the same definition but a different valence (e.g. MAP and MAV) were found to be higher than those for GOs having different definitions but the same valence (e.g. MAP and PAP). This was found to be the case in the present study too as indicated in Table 8.43. For example, for General GOs at Time 1, the correlation between MAP and MAV GOs was 0.54 (ρ<.01) and the correlation between PAP and PAV GOs was found to be 0.60 (ρ<.01). On the other hand, the correlation between MAP and PAP GOs (for the same sample) was 0.27 (ρ<.01) and the correlation between MAV and PAV GOs was 0.29 (ρ<.01). This pattern of correlations was also found for General GOs at Time 2. The correlations between the four GOs ranged from non-significant to 0.68 (ρ<.01) in the study by Elliot and Murayama (2008). The intercorrelations between the General GOs (both at Time 1 and at Time 2) in this study ranged between 0.13 (ρ<.01) and 0.69 (ρ<.01). Therefore, with respect to General GOs, the results in this study correspond with those obtained by Elliot & Murayama (2008).

In terms of the overall size of the correlations, the intercorrelations for the Hypothetical Task GOs (at both Time 1 and Time 2) are similar to those of General GOs. However, the Verbal and Numerical Test GO intercorrelations (at Time 1 and Time 2) are higher than the General and Hypothetical Task intercorrelations (the former range from non-significant to 0.88, ρ<.01, whilst the latter range from non-significant to 0.69, ρ<.01). Similarly to the study by Elliot and Murayama (2008) as well as to the pattern observed for General GOs, Tables 8.43. and 8.44. show that task-specific GO scales sharing the same definition (but having a different valence) had higher correlations than the scales sharing the same valence but (but having a different definition). However, the Hypothetical Task GOs at Time 2 was an exception since the correlation between MAV and PAV GOs was slightly higher than the correlation between MAP and MAV GOs (0.54 and 0.51, $\rho<.01$, respectively). Overall, the results obtained in this study correspond with those of Elliot and Murayama (2008) with respect to the intercorrelations between GOs. Since the correlations for General and Hypothetical Task GOs at Time 1 and Time 2 were all significant at $\rho<.01$, it is unlikely that any of these significant correlations are a result of Type I error.

8.6.2. Correlations between Verbal and Numerical test task-experience (at Time 1) and practice (at Time 2) with self-efficacy, and performance

Table 8.44. shows that the correlation between task experience and self-efficacy on the Verbal Test at Time 1 was not significant. However, Numerical Test task experience and self-efficacy at Time 1 were found to have a significant positive correlation of 0.33 ($\rho<.01$). This correlation indicates that having practised Numerical skills is positively related to a somewhat higher self-efficacy on the Numerical Test. Although it is possible that the significant correlation found on the Numerical Test may be due to Type I error, this is quite unlikely at a $\rho<.01$.

A possible explanation for the differences in the relationships between Verbal and Numerical tests and self-efficacy is that people may feel more strongly about their numeric ability than about their verbal ability. It might be the case that people feel either very confident or not at all confident about their numeracy skills but do not have these same strong feelings of confidence (or lack of confidence) about their verbal ability. If participants do not feel at all confident about their numeric ability and do not practise at all before the test, they might feel much less confident (and therefore have lower self-efficacy) about their performance on the test. On the other hand, a participant who feels confident about their Numeric ability because they practise this skill quite often may feel confident (and therefore have a higher self-efficacy) about their numeracy skills.

The correlational analyses also indicate that Verbal test task experience was not found to be significantly correlated with performance ($r = -0.19$, $\rho > .05$). However, Numerical test task experience was positively related to performance ($r = 0.30$, $\rho < .05$). Therefore, it seems as though practising numerical skills does in fact relate to higher performance. In this case, the 0.05 significance level must be kept in mind when interpreting the results due to the possibility of this significant correlation being a result of Type I error. However, since the results obtained here reflect the results obtained when assessing the relationships between the aptitude tests and self-efficacy there is a strong possibility that the relationship is in fact significant and not the result of Type I error.

No significant correlations between practice and self-efficacy were found on the Verbal and Numerical tests. There were also no significant correlations between practice and performance (on the Verbal and Numerical tests). This may be due to the fact that the majority of participants only had approximately two weeks between their first and second experimental sessions. Therefore, they had limited time to practise. Two weeks may not have been enough time for their confidence in their ability to change significantly or for their performance to significantly increase (assuming that most of the participants who practised did not practise intensively for two weeks).

8.6.3. Correlations between GOs (General, Verbal test, and Numerical test) and Practice

Although not directly related to any of the Research Questions or Hypotheses in the current study the correlations between GOs and practice on tests were thought to be of interest. There is a possibility that people adopting particular GOs (e.g. MAP) might be more likely to practise tasks in order to improve their learning or performance.

The results presented in Table 8.45. indicate that there were no significant correlations between General GOs (at Time 1) and practice. With respect to the Verbal and Numerical tests, there were significant negative correlations between Verbal and Numerical MAP GOs and practice (Verbal test: $r = -0.36$, $\rho<.01$; Numerical test: $r = -0.27$, $\rho<.05$). There was also a significant negative correlation between a MAV GO and practice on the Numerical test at Time 1 ($r = -0.25$, $\rho<.05$). These negative correlations are difficult to explain. One would expect a person with a MAP GO to practise more in order to increase their learning. Moreover, participants with a MAV GO would also be expected to practise the tasks more so as not to forget them or to avoid misunderstanding them. The possibility of Type I error further complicates interpretation of these correlation results. In the case of MAP GOs and practice, significant correlations were found for both tests (with one of the correlations being significant at $\rho<.01$). Consequently, it is quite unlikely that these significant results are a consequence of Type I error. In the case of the MAV GO, this result was only obtained on the Numerical Test and at $\rho<.05$. Therefore, it is possible that this significant correlation is a result of Type I error. Further investigation of these relationships is necessary in order to be able to provide an explanation for the findings of this study and to determine whether these results are accurate (and not the result of Type I error). This will be discussed further in the section on recommendations for future research in Chapter 11 (Section 11.3.).

As mentioned earlier, the correlational analyses results answer a number of Research Questions and test a few of the Hypotheses for the current study. These Hypotheses and Research Questions include Hypotheses 2a and 2b as well as Research Questions 6b, 6c, 7b, 8a, 8b, 8c and 8d. These Research Questions and Hypotheses relate to the relationships between GOs and self-efficacy, mental effort and performance. Research Questions 6a, 7a, and 9, also focus on the relationships between GOs and self-efficacy, mental effort and performance, respectively. Consequently, they will also be discussed in this chapter. Those Research Questions and Hypotheses which required considerable further analyses of data are addressed in Chapter 9.

8.7. Research Questions and Hypotheses addressed by the Correlation Matrices

Since the Research Questions and Hypotheses have been grouped according to theme they will not be presented in the numerical order assigned to them throughout the literature review (e.g. Hypothesis 1, Hypothesis 2, etc). For example, Hypotheses 2a and 2b and Research Questions 6a, 6b and 6c all focus on the relationships between GOs and self-efficacy. Consequently, they will be discussed as a group in the same sub-section (8.7.1.). Research Questions 7a and 7b focus on the relationships between GOs and mental effort. The answers to these Research Questions are discussed in Section 8.7.2. Research Questions 8a, 8b, 8c, 8d and 9 address the relationships between GOs and performance and are discussed in sub-section 8.7.3.

Self-efficacy, mental effort and performance were only measured on the Verbal and Numerical Tests and not on the Hypothetical Tasks. Consequently, only the Verbal and Numerical Test GOs (and GO profiles) were used in the analyses to answer Research Questions and Hypotheses regarding the self-efficacy, mental effort or performance of 'task-specific GOs'. In order to understand the correlational analyses results better, the results of this study will be compared with those of previous studies. So as to compare like with like, the results of this study will be compared with those of studies investigating the *correlations* between GOs and self-efficacy, mental effort and performance.

Moreover, since the 2x2 model of GOs was used for the non-profile perspective analyses, the results of these analyses will be compared to the results of studies using the three-factor model for MAP, PAP and PAV GOs and with the results of studies using the 2x2 model of GOs for MAP, MAV, PAP and PAV GOs. Given that the 3-factor model was used in the profile perspective analyses, the results of these analyses will be compared to the results of studies using the 3-factor model when assessing the relationships between GO profiles and performance.*

8.7.1. Analyses of the relationships between GOs and Self-efficacy

This sub-section focuses on the Research Questions and Hypotheses which address the relationships between GOs and self-efficacy. These include Hypotheses 2a and 2b as well as Research Questions 6a, 6b and 6c.

Hypothesis 2a. Task-specific mastery-approach goal orientations are expected to be significantly positively correlated with self-efficacy.

As indicated in Table 8.44. the MAP GO and self-efficacy are significantly positively correlated on the Numerical Tests at Time 1 and Time 2 ($r=.41$, $\rho<.01$, and $r=.63$, $\rho<.01$ respectively) and on the Verbal Test at Time 1 ($r=.26$, $\rho<.05$). However, no significant correlations were found between the MAP GO and self-efficacy on the Verbal Test at Time 2. Since the Verbal Test correlation at Time 1 was not significant and the one at Time 2 was found to be significant at $\rho<.05$, it is possible that the significant Time 2 correlation is a result of Type I error. Consequently, although overall, there seems to be significant support for Hypothesis 2a, the Verbal Test correlation results should be interpreted with caution. The results presented above indicate that a MAP GO seems to be more highly correlated with self-efficacy on the Numerical Tests than on the Verbal Tests.

*Studies using the profile perspective only investigated the relationships between GO profiles and performance.

A number of previous studies found a MAP GO to be quite highly positively related to self-efficacy. For example, Bong (2009) found correlation coefficients ranging from 0.58 to 0.86 (ρ<.01). Sins et al. (2008) found a positive significant correlation of 0.59 (ρ<.01) whilst Bong (2001) found correlation coefficients ranging from 0.57 to 0.72 (ρ<.01). However, other studies found lower correlations between a MAP GO and self-efficacy. For example, Tanaka (2007) and Morris and Kavussanu (2008) found significant positive correlations of 0.27 (ρ<.01) and 0.31 (ρ<.01), respectively, between a MAP GO and self-efficacy.

The results of the Numerical Test correlations are similar in strength to those of the studies by Bong (2009), Bong (2001) and Sins et al. (2008). The correlation coefficient obtained for the Verbal Test at Time 1 seems to be quite similar in strength to those obtained in the studies by Tanaka (2007) and Morris and Kavussanu (2008). However, the non-significant relationship found for the Verbal Test at Time 2 does not correspond with the results of previous studies. Since the correlation coefficients obtained on the Verbal Tests are lower than those on the Numerical Tests it was thought appropriate to test whether there were any significant differences between the correlation coefficients on the Verbal and Numerical tests. In order to do this Fischer z was computed. The results are presented in Table 8.46. When the z-statistic is negative this shows that the first correlation input was smaller than the second. For example in the case of the Verbal and Numerical Test at Time 1, the negative z-statistic indicates that the Verbal Test correlation coefficient was smaller than the Numerical Test correlation coefficient.

Table 8.46. Testing for Significant Differences between Correlation Coefficients on Verbal and Numerical Tests at Time 1 and Time 2

Time Point	Comparison and Ns		z-statistic	p-value
Time 1	VT (N=68)	NT (N=68)	-.97	.33
Time 2	VT (N=67)	NT (N=68)	-3.29	<.01

Key: VT = Verbal Test; NT= Numerical Test

As shown in Table 8.46. there was no significant difference between Verbal and Numerical test correlations with self-efficacy at Time 1. However, significant differences between the correlation coefficients were found at Time 2 ($z=-3.29$, $p<.01$). It is possible that the type of task moderates the relationship between GOs and self-efficacy. However, this would need to be investigated further before any conclusions are drawn. This will be discussed further in Chapter 11 (Section 11.3.) when presenting the recommendations for future research.

Hypothesis 2b. Task-specific performance-approach goal orientations are expected to be significantly positively correlated with self-efficacy.

As indicated in Table 8.44. the PAP GO was significantly positively correlated with self-efficacy on the Verbal tests at Time 1 and Time 2 ($r=.28$, $\rho<.01$, and $r=.32$, $\rho<.01$ respectively) and on the Numerical tests at Time 1 and Time 2 ($r=.47$, $\rho<.01$, and $r=.65$, $\rho<.01$ respectively). Therefore, Hypothesis 2b was supported. Since all the correlations were found to be significant and at a $\rho<.01$, it is quite unlikely that these significant correlations are the result of Type I error.

Previous studies assessing the correlation coefficients between a PAP GO and self-efficacy obtained correlation coefficients ranging between 0.16 ($\rho<.01$) and 0.68 ($\rho<.01$). The correlations obtained for the Verbal Tests in this study were similar to those of studies on the lower end of the continuum such as Tanaka (2007) and Morris and Kavussanu (2008), who obtained correlation coefficients of 0.26 ($\rho<.01$) and 0.25 ($\rho<.01$), respectively. However, the correlation coefficients obtained on the Numerical Test were more similar to those of studies at the higher end of the continuum, for example Bong (2009) and Bong (2001) who obtained correlation coefficients ranging between 0.42 ($\rho<.01$) and 0.68 ($\rho<.01$) for different school subjects and participants of different ages.

Similarly to the results of Hypothesis 2a, self-efficacy is more highly correlated with PAP GO on the Numerical tests than on the Verbal tests. Consequently, the Fischer z statistic was computed to test for significant differences between the correlation coefficients of Verbal and Numerical test PAP GOs and self-efficacy. The results of the Fischer z tests are presented in Table 8.47.

Table 8.47. Testing for Significant Differences between Correlation Coefficients on Verbal and Numerical Tests at Time 1 and Time 2

Time Point	Comparison and Ns		z-statistic	p-value
Time 1	VT (N=71)	NT (N=71)	1.3	.19
Time 2	VT (N=71)	NT (N=70)	2.58	<.01

Key: VT = Verbal Test; NT= Numerical Test

The results presented in Table 8.47. are similar to those obtained in Table 8.46., in that, no significant difference between correlation coefficients was found at Time 1 ($z=-1.3$, $p>.05$). However, there was a significant difference between the correlation coefficients at Time 2 ($z=-2.58$, $p<.01$). Therefore, these results also indicate a strong possibility that type of task might influence the relationship between a PAP GO and self-efficacy. This will be discussed in further detail in Chapter 10 Section 10.2.

Research Question 6b. How do task-specific mastery-avoidance goal orientations correlate with self-efficacy?

Table 8.44. shows that no significant correlations were found between a MAV GO and Verbal test self-efficacy at Time 1 or Time 2 ($r=.20$, $p>.05$; $r=.18$, $p>.05$). However, significant positive relationships were found on the Numerical Tests at Time 1 and Time 2 ($r=.27$, $p<.05$; $r=.47$, $p<.01$, respectively).

The results of this study do not correspond with the results of the studies by Radosevich et al. (2007), Lau et al. (2008) and Bong (2009, for Upper Elementary School students) since these found significant negative relationships between a MAV GO and self-efficacy. Similarly to the Verbal Test results of this study, Morris and Kavussanu (2008) and Bong (2009, for Middle Elementary and Middle School students) found no significant relationship between a MAV GO and self-efficacy. On the other hand, Bong (2009) found significant positive relationships between a MAV GO and self-efficacy for lower elementary school students. The results of this study are similar to those of Bong (2009) in that non-significant and positive relationships were found between a MAV GO and self-efficacy. However, in this study the differences found were NOT for participants of different ages but for the different tasks that participants completed.

Bong (2009), found correlation coefficients ranging from non-significant to 0.26 ($p<.01$) whilst in this study the correlation coefficients ranged between non-significant and 0.47 ($p<.01$). Therefore, some of the correlations obtained in this study are higher than those obtained in previous research. However, both in previous studies as well as in the current study, the strength of the relationship between a MAV GO and self-efficacy seems to be lower than for MAP and PAP GOs with self-efficacy. In order to test whether, for the results of this study, this difference is significant Fisher z tests were carried out. The results of these tests indicated that although it seems as though MAP and PAP GOs are more strongly related to self-efficacy than MAV GOs are, these differences are not significant.

Similarly to the results of Hypotheses 2a and 2b, the correlation coefficients between a MAV GO and self-efficacy were higher on the Numerical test than on the Verbal test at both Time 1 and Time 2 (0.20, $p>.05$; 0.18, $p>.05$; 0.27, $p<.05$; 0.47, $p<.01$ for the Verbal Test Time 1, Verbal Test Time 2, Numerical Test Time 1 and Numerical Test Time 2, respectively). Again, it seems as though the type of task might be influencing the relationship between MAV GOs and self-efficacy. In the case of the Numerical Test correlations, the results should be interpreted with caution due to the possibility of Type I error. However, although the Numerical Test correlation at Time 2 was found to be significant at $p<.05$, the result obtained reflects the result obtained at Time 1 and is consistent with the results of previous correlations. Consequently, it is unlikely to be the result of Type I error.

In order to test for significant differences between the correlation coefficients on Verbal and Numerical tests Fischer z was calculated. The results are presented in Table 8.48.

Table 8.48. Testing for Significant Differences between Correlation Coefficients on Verbal and Numerical Tests at Time 1 and Time 2

Time Point	Comparison and Ns		z-statistic	p-value
Time 1	VT (N=71)	NT (N=70)	-.43	.67
Time 2	VT (N=70)	NT (N=70)	-1.9	.06

Key: VT=Verbal Test Goal Orientation; NT=Numerical Test Goal Orientation.

This time there were no significant differences between the correlation coefficients on the Verbal and Numerical tests at Time 1 or Time 2. However, at Time 2, the difference is very nearly significant. Overall, it seems as though a MAV GO is weakly to moderately positively correlated with self-efficacy, if at all.

Research Question 6c. How do task-specific performance-avoidance goal orientations correlate with self-efficacy?

The correlational analyses results presented in Table 8.44. indicate that a PAV GO is non-significantly or weakly positively related to self-efficacy on the Verbal test ($r=.18$, $\rho>.05$; $r=.30$, $\rho<.05$ at Time 1 and Time 2 respectively). However, the PAV GO and self-efficacy were more strongly positively related on the Numerical test ($r=.39$, $\rho<.01$; $r=.62$, $\rho<.01$ at Time 1 and Time 2 respectively). In this case, the Verbal Test correlations should be interpreted with caution due to the possibility of Type I error.

Previous GO studies assessing the relationship between a PAV GO and self-efficacy have found very inconsistent results. For example, Sins et al. (2008), Morris and Kavussanu (2008) and Tanaka (2007) found non-significant relationships between a PAV GO and self-efficacy. The results obtained for the Time 1 Verbal Test correspond with the results of these studies. Other studies including those by Radosevich et al. (2007), VandeWalle et al. (2001), Elliot and Church (1997), Liem et al. (2008) and Lau et al. (2008) found significant negative correlations between a PAV GO and self-efficacy. The results of this study are not consistent with the results of these previously mentioned studies. Bong (2009) found significant positive, significant negative and non-significant relationships between PAV GOs and self-efficacy depending on the age of participants.

Moreover, Bong (2001) found significant positive and non-significant relationships between PAV GOs and self-efficacy depending on the school subject and age of participants. The results of Bong (2001) are very similar to the results obtained in this study in that non-significant and significant positive relationships were found across tasks. Similarly to the relationships between MAP, MAV and PAP GOs, the correlation coefficients obtained for the Numerical tests are much stronger than those on the Verbal Tests. Fischer z was computed to test for significant differences between these correlation coefficients. The results are presented in Table 8.49.

Table 8.49. Testing for Significant Differences between Correlation Coefficients at Time 1 and Time 2

Time Point	Comparison and Ns		z-statistic	p-value
Time 1	VT (N=71)	NT (N=71)	-1.34	.18
Time 2	VT (N=70)	NT (N=71)	-2.41	.02

Key: VT=Verbal Test Goal Orientation; NT=Numerical Test Goal Orientation.

The results obtained here are identical to the results obtained for Hypotheses 2a and 2b, in that, no significant differences between the correlations were found at Time 1 but there were significant differences at Time 2. The results of the current study indicate that a PAV GO may be significantly positively related to self-efficacy. However, this relationship is possibly moderated by the type of task.

Similarly to the relationship between a MAV GO and self-efficacy, the correlations for a PAV GO (and self-efficacy) seem to be lower than those for the approach GOs. Again, Fisher z tests were carried out to test for significant differences in the strengths of these correlations. However, no significant differences were found in the strengths of the correlations for MAP, PAP and PAV GOs with self-efficacy. The results for Hypotheses 2a and 2b and Research Questions 6b and 6c indicate that, overall, it seems as though the four GOs are all positively related to self-efficacy to some extent.

Moreover, although it seems as though the approach GOs are more highly correlated with self-efficacy than the avoidance GOs these differences were not found to be significant. In addition, since it was found that for the MAP, PAP and PAV GOs the Numerical Test GOs were significantly more highly correlated with self-efficacy than the Verbal Test GOs it may be the case that task type (or participants' perceptions of the task) might moderate the relationships between the GOs and self-efficacy.

Research Question 6a. Do the different task-specific GO profiles score significantly differently on self-efficacy?

In order to answer this Research Question One-Way Analyses of Variance were carried out. The data collected at Time E1 were used in these analyses. It was thought appropriate to use the data at Time E1 because there was no induction at this time point. Consequently, the results obtained would **not** be a result of the interactions between the induced GOs and the GO profiles. This was also the case when examining the differences in the mental effort and performance of participants adopting different GO profiles (Sections 8.7.2. and 8.7.3., respectively).

Using the LCA results presented in Sections 8.5.3. and 8.5.4. participants were assigned to GO clusters using the posterior classification function in Latent Gold. This involves calculating participants' posterior class-membership probabilities. This computation is carried out by using individuals' estimated model parameters and their observed scores (Vermunt & Magidson, 2002). One-way Analyses of Variance were then carried out using GO clusters as the independent variable and self-efficacy as the dependent variable. The results of the analyses are presented in Tables 8.50. and 8.51. The small cluster sizes (34, 23 and 14 in Clusters 1, 2 and 3 respectively, on the Verbal Test and 40, 13, 13 and 5 in Clusters 1, 2, 3 and 4, respectively, on the Numerical Test) due to the small experimental sample size should be kept in mind when interpreting the following results (as well as the ANOVA results presented in Sections 8.7.2. and 8.7.3.). This limitation will be discussed further in Chapter 11 Sections 11.2. and 11.3.

In order to be able to understand the results presented in this Section better, it was thought appropriate to provide a brief description of the GO profiles obtained from the LCAs for Verbal and Numerical test GOs. The results presented in Sections 8.5.3. and 8.5.4. show the different types of GO profiles adopted by participants on the Verbal and Numerical tests, respectively. Three clusters were obtained as a result of the LCA for Verbal test GOs at Time 1. Participants in Cluster 1 were high on all three GOs. Participants in Cluster 2 were moderate to high on all three GOs. However, they had a very slightly higher MAP GO than PAP and PAV GOs. Participants in Cluster 3 had a high MAP GO and low PAP and PAV GOs. With respect to the results of the LCA for Numerical test GOs at Time 1, four types of GO profiles were obtained. Participants in Cluster 1 were found to be high on all three GOs. Participants in Cluster 2 were moderate on all three GOs. Cluster 3 was characterised by participants having a high MAP GO and low PAP and PAV GOs. Participants in Cluster 4 were found to have a low MAP GO, an even lower PAP GO and a high PAV GO. The clusters obtained from the LCAs for Verbal and Numerical test GOs were very similar to the clusters obtained from the LCA of the General GOs. These similarities are discussed in further detail in Chapter 9 Section 9.2.3.

Table 8.50. One-Way ANOVA to test for differences in self-efficacy as a result of Verbal Test GO profiles adopted (N=71)

Source of Variance	SS	Df	MS	F	Sig.
Between Groups	1.58	2	.79	2.23	.12
Within Groups	24.13	68	.36		
Total	25.71	70			

Table 8.51. One-Way ANOVA to test for differences in self-efficacy as a result of Numerical Test GO profiles adopted (N=71)

Source of Variance	SS	Df	MS	F	Sig.
Between Groups	11.24	3	3.75	5.88	<.01
Within Groups	42.69	67	.64		
Total	53.93	70			

Table 8.50. indicates that there were no significant differences in the relationships between the different GO profiles and self-efficacy on the Verbal test ($F=2.23$; $\rho>.05$). However, as indicated in Table 8.51., significant differences were found between the

different GO profiles and self-efficacy on the Numerical test ($F=5.88$; $\rho<.01$). The LSD post hoc test indicated that there were significant differences between Cluster 1 and Cluster 2; Cluster 1 and Cluster 3; Cluster 1 and Cluster 4. Participants in Cluster 1 have higher levels of self-efficacy than participants in Clusters 2, 3, and 4 (see Table 8.52.). Therefore, on the Numerical test, participants in Cluster 1 had the highest levels of self-efficacy. Since participants in Cluster 1 are also high on all three GOs too it may seem that these participants are possibly answering 'strongly agree' on all measures irrespective of what is being measured. However, as will be presented in Section 8.7.3. these participants also had the highest levels of performance. This provides support against the theory that participants in Cluster 1 are simply agreeing with all statements on the measures.

The results of the relationships between GO profiles and self-efficacy seem to be consistent with the results obtained from the non-profile perspective, in that, the relationship between GOs and self-efficacy seems to be affected by the type of task at hand. This emerging pattern will be discussed further in Chapter 10 (Section 10.2.2.).

Table 8.52. Self-efficacy means on Verbal and Numerical Tests at Time 1 for participants in each GO cluster.

GO Cluster	Mean Self-efficacy Score on Verbal Test (Time 1)	Mean Self-efficacy Score on Numerical Test (Time 1)
Cluster 1	3.76	3.89
Cluster 2	3.71	2.99
Cluster 3	3.37	3.18
Cluster 4	N/A	3.14

Key: Cluster 1=High Goal Orientations Cluster; Cluster 2=High Mastery, Moderate Performance Cluster; Cluster 3=High Mastery, Low Performance Cluster; Cluster 4:High Performance-Avoidance Cluster.

8.7.2. Analyses of the relationships between GOs and Mental Effort

This sub-section focuses on Research Question 7b, the results of which are presented in Table 8.44. It addresses the relationships between the four GOs and mental effort. In order maintain thematic consistency, Research Question 7a is also discussed in this sub-section since it focuses on the relationships between GOs and mental effort (from the profile perspective).

Research Question 7b. How do the different task-specific goal orientations correlate with mental effort (if at all)?

The data used for answering this Research Question were obtained during the experimental study at Time E1 and Time E2. The results presented in Table 8.44. indicate that in all cases except for the Numerical test at Time 2 a MAP GO was significantly positively related to mental effort ($r=.24$, $\rho<.05$; $r=.34$, $\rho<.01$; $r=.36$, $\rho<.01$; $r= -.10$, $\rho>.05$ for Verbal test Time 1, Verbal Test Time 2, Numerical Test Time 1, and Numerical Test Time 2, respectively). It seems as though, overall, adopting a MAP GO relates to investing more effort when carrying out the tasks. Since the Verbal Test Time 1 correlation is significant at $\rho<.05$ it is possible that this is the result of Type I error. However, since the Time 2 correlation is significant at $\rho<.01$, there is a good possibility that the result is truly significant. Nevertheless, this should be kept in mind when interpreting the results.

For the Verbal Test at Time 2 and the Numerical Test at Time 1 a MAV GO was also significantly positively related to mental effort ($r=.27$, $\rho<.05$; $r=.30$, , $\rho<.05$, respectively). However, there were no significant relationships between a MAV GO and mental effort on the Verbal Test at Time 1 and the Numerical Test at Time 2. PAP and PAV GOs were **not** found to be significantly related to mental effort. Both significant correlations were found at $\rho<.05$. The inconsistency of these results and the fact that they were obtained at a significance level of $\rho<.05$ make it quite possible that these significant correlations are the result of Type I error. Further research into these relationships is required in order to make sound interpretations of the results.

Since correlational analyses were used in this study, the results obtained will only be compared with those studies in which the correlations between GOs and effort were presented. Consequently, the study by Phan (2009) was omitted from the comparison. As discussed in Chapter 5 (Section 5.3.) all the studies reviewed found significant positive relationships between a MGO and effort ($r=.28$, $\rho<.01$; $r=.48$, $\rho<.01$, $r=.47$, $\rho<.05$ for the studies by Elliot et al., 1999; Agbuga & Xiang, 2008; and Wolters, 2004, respectively). The results of this study (for the Verbal Tests as well as the Numerical

Test at Time 1) are consistent with those obtained in previous studies for a MAP GO and self-efficacy. The correlation strengths obtained in this study were quite similar to those obtained by Elliot et al. (1999) but slightly lower than those obtained by Agbuga and Xiang (2008) and Wolters (2004). In this study, the Numerical Test MAP GO at Time 2 was not found to be significantly related to mental effort. This result is not consistent with the other results obtained in this study and with the results of previous research studies. It is not clear why this non-significant relationship was found. However, there is a possibility that task characteristics might influence the relationship between GOs and effort. This will be discussed in further detail in Chapter 10 Section 10.3. It is also possible that, as mentioned earlier, the significant correlations were obtained as a result of Type I error.

Out of the studies reviewed in literature, none used the 2x2 model of GOs. Therefore, it was not possible to compare the results of this study with those obtained in previous studies with respect to the relationship between a MAV GO and effort. The fact that both significant and non-significant relationships were found between MAV GOs and mental effort on the Verbal and Numerical Tests indicates the need to further investigate these relationships. It also indicates the possibility that other variables such as task characteristics should be taken into account when investigating these relationships.

Previous studies found significant positive relationships between a PAP GO and effort whilst no significant relationships were found in this study. Therefore, the results of this study were not consistent with the results of previous studies for the relationships between a PAP GO and effort. Regarding the PAV GO, the results of the present study correspond with those of Elliot et al. (1999) who found no significant relationship between a PAV GO and effort. However, they are inconsistent with the results obtained by Wolters (2004) and Agbuga and Xiang (2008) who found significant negative and significant positive relationships, respectively, between PAV GOs and effort. The similarities and differences between the results of this study and those of previous studies as well as possible explanations for these will be discussed further in Chapter 10 Section 10.3.

Research Question 7a. Do the different task-specific GO profiles score significantly differently on mental effort?

The experimental data collected at Time E1 were used in the following analyses. Similarly to Research Question 6a one-way Analyses of Variance were carried out in order to provide an answer to this Research Question. The same cluster classification of participants to GO profiles was used as in the analyses of Research Question 6a. Please refer to Sections 8.5.3. and 8.5.4. for descriptions of the Verbal and Numerical Test GO profiles (clusters) obtained. The results are presented in Table 8.53. and 8.54.

Table 8.53. One-Way ANOVA to test for differences in mental effort as a result of Verbal Test GO profiles adopted (N=71)

Source of Variance	SS	Df	MS	F	Sig.
Between Groups	8.99	2	4.49	3.15	.05
Within Groups	96.90	68	1.43		
Total	105.89	70			

Table 8.54. One-Way ANOVA to test for differences in mental effort as a result of Numerical Test GO profiles adopted (N=71)

Source of Variance	SS	Df	MS	F	Sig.
Between Groups	13.47	3	4.49	2.52	.07
Within Groups	119.27	67	1.78		
Total	132.73	70			

Table 8.53. shows that there were significant differences in mental effort depending on the type of GO profile adopted on the Verbal test ($F=3.15$; $\rho=.05$). The post hoc test (LSD) indicated that participants in Cluster 2 scored significantly lower than those in Clusters 1 and 3 (see Table 8.55.). As indicated in Table 8.54. there were no significant differences in mental effort as a result of the different GO profiles adopted on the Numerical test ($F=2.52$; $\rho>.05$). In response to Research Question 7a, different Verbal test GO profiles seem to relate differently to mental effort. However, different Numerical test GO profiles do not seem to relate differently to mental effort. Since the results of the latter were very nearly significant it may be wise to further investigate these relationships, especially due to the small sample size used in this study. The

results obtained here also point towards the possibility that the relationships between GOs and mental effort may be moderated by task type. This emerging pattern of differences in the relationships between GOs and other variables depending on the task at hand might be important, especially if GOs are found to be task-specific rather than general stable traits. This will be discussed further in Chapter 10 Section 10.3.

Table 8.55. Mental Effort means on Verbal and Numerical Tests at Time 1 for participants in each GO cluster.

GO Cluster	Mean Mental Effort Score on Verbal Test (Time 1)	Mean Mental Effort Score on Numerical Test (Time 1)
Cluster 1	6.56	6.93
Cluster 2	5.83	5.92
Cluster 3	6.64	6.69
Cluster 4	N/A	5.80

Key: Cluster 1=High Goal Orientations Cluster; Cluster 2=High Mastery, Moderate Performance Cluster; Cluster 3=High Mastery, Low Performance Cluster; Cluster 4:High Performance-Avoidance Cluster.

8.7.3. Analyses of the relationships between GOs and Performance

The Research Questions related to investigating the relationships between GOs and performance are discussed in this sub-section. The experimental data collected at Time E1 and Time E2 were used to answer these Research Questions. Each relevant Research Question is presented followed by a description and discussion of the results obtained.

Research Question 8a. How do task-specific mastery-approach goal orientations correlate with performance on tasks (if at all)?

The results presented in Table 8.44. indicate that a MAP GO was significantly positively related to performance on the Numerical test at Time 1 and at Time 2 ($r=.28$, $\rho<.05$; $r=.34$, $\rho<.01$, respectively). No significant correlations were found between a MAP GO and performance on the Verbal tests. Although there is the possibility of the Numerical Test Time 2 correlation being a result of Type I error this is quite unlikely seeing that it is consistent with the result obtained on the Numerical Test at Time 1 (which had a significant correlation at $\rho<.01$).

Past research findings have been rather inconsistent with respect to the relationship between a mastery/MAP GO and performance. Some studies found non-significant relationships (e.g. Elliot & McGregor, 2001) whilst others found significant positive relationships (e.g. Elliot et al., 1999). Four of the five studies reviewed obtained different results for participants depending on the task, age of participants or the time at which they participated (e.g. Study 1 or Study 2). For example, Elliot et al. (1999) found a MGO to be significantly positively related to performance in Study 1 but not in study 2. Yeo et al. (2009) found a significant positive relationship between a MAP GO and performance on an air traffic control task but not on exam performance. The results of this study correspond with those of previous studies in that both non-significant and significant positive relationships were found on the Verbal and Numerical Tests, respectively. As was discussed previously, it is possible that the inconsistencies between the results of the different studies and those across tasks in the same study are a result of the relationship between GOs and performance being influenced by the type of task at hand. This possibility will be discussed in further detail in Chapter 10 Section 10.4.

Research Question 8b. How do task-specific mastery-avoidance goal orientations correlate with performance on tasks (if at all)?

The results presented in Table 8.44. indicate that no significant relationships were found between a MAV GO and performance. Three of the studies reviewed provided the correlational analyses results for a MAV GO with performance. Two out of these three studies (those by Elliot & McGregor, 2001, and Yeo et al., 2009) found a non-significant relationship between a MAV GO and performance. On the other hand, Bong (2009) found a significant negative relationship between a MAV GO and performance for Middle Elementary school students and non-significant relationships for Lower and Upper Elementary as well as Middle School students. Consequently, the results of this study are consistent with the results of Elliot and McGregor (2001), Yeo et al. (2009) and Bong (2009, for Lower and Upper Elementary as well as Middle School students).

Research Question 8c: How do task-specific performance-approach goal orientations correlate with performance on tasks (if at all)?

The results presented in Table 8.44. indicate that the only significant relationship found was that between the Numerical test PAP GO and performance at Time 2 ($r=.43$, $\rho<.01$). It is quite unlikely that a correlation found at $\rho<.01$ is a result of Type I error. Therefore, this is not a likely explanation for the single correlation found. The GO inductions introduced at Time 2 may be a contaminating factor since they may have contributed to changes in performance, mental effort, or self-efficacy (or any combination of these) on the tasks at Time 2. However, as will be discussed in Chapter 9 Section 9.1.2., the GO inductions were not successful. Consequently, it is highly unlikely that these influenced the performance of participants at Time 2. In answer to Research Question 8c, the Numerical Test PAP GO at Time 2 was found to be significantly related to performance. However, no other significant relationships were found between a PAP GO and performance.

Previous studies found significant positive or non-significant relationships between PAP GOs and performance. What is especially notable is that all the studies reviewed found inconsistent relationships across tasks, the time at which they participated (e.g. Study 1 or Study 2), or for participants of different ages, when investigating the relationships between PAP GOs and performance. For example, Yeo et al. (2009) found significant positive relationships on the air traffic control task and non-significant relationships for exam performance. On the other hand, Bong (2009) found significant positive relationships for Upper Elementary and Middle School students and non-significant relationships for Lower and Middle Elementary School students. The results of this study are consistent with those of previous research studies in that significant positive and non-significant relationships were found on different tasks (that is, the Verbal and Numerical Tests). Moreover, different relationships between a PAP GO and performance were found over time for the Numerical Test. These results strongly point towards the relationships between a PAP GO and performance being moderated by task type. These results will be discussed in further detail in Chapter 10 Section 10.4.

Research Question 8d: How do task-specific performance- avoidance goal orientations correlate with performance on tasks (if at all)?

Similarly to the PAP GO results, Table 8.44. indicates that only the PAV GO on the Numerical Test at Time 2 was found to be significantly positively related to performance ($r=.40$, $\rho<.01$). Similarly to the Numerical Test PAP results, this correlation is unlikely to be the result of Type I error since it was found to be significant at a $\rho<.01$. In addition, again, there is the issue of the GO inductions at Time 2 being a contaminating factor. However, since these were not successful, they are probably not a major issue when investigating the relationships between GOs and performance at Time 2. The answer to Research Question 8d is that the Numerical Test PAV GO at Time 2 was found to be significantly positively related to performance. However, no other significant relationships were found between a PAV GO and performance.

With respect to previous research, Church et al. (2001), and Elliot et al. (1999) found a PAV GO to be significantly negatively related to performance. Church et al. (2001) found significant negative correlations with performance on both the chemistry exam and with the SAT scores ($r=-0.27$ and -0.19, respectively, $\rho<.01$) and Elliot et al. (1999) found significant negative correlations in both their studies ($r=-0.27$ and -0.30, $\rho<.01$). Again, three of the studies reviewed found both significant negative and non-significant relationships between a PAV GO and performance depending on the task, age of participants, or the time at which participants took part in the study (e.g. Study 1 or Study 2). For example, Elliot and McGregor (2001) found a non-significant relationship between PAV GOs and performance in Study 2 and a significant negative relationship in Study 3. Moreover, Yeo et al. (2009) found a significant negative relationship for exam performance and a non-significant relationship on the air traffic control task.

Similarly to the relationships between a PAP GO and task performance, it is possible that the type of task influences the relationship between GOs and task performance. This might explain why a PAV GO was only found to be significantly related to performance on the Numerical task. However, the results of the current study are not consistent with the results of previous studies in that a significant *positive* relationship was found between a PAV GO and task performance in this study whilst in all other studies non-significant or negative relationships were found. Possible explanations for this and further discussion on the matter is provided in Chapter 10 Section 10.4.

Research Question 9 Do the different task-specific GO profiles score significantly differently on task performance?

One-Way Analyses of Variance were carried out in order to answer this Research Question. Similarly to the other analyses investigating the relationships between GO profiles and other variables (e.g. self-efficacy and mental effort), the cluster classification of participants to GO profiles was used as an independent variable in the analyses. Please refer to Sections 8.5.3. and 8.5.4. for descriptions of the Verbal and Numerical Test GO profiles obtained. Participants' performance on the Verbal and Numerical tests was included as the dependent variable. The results of the analysis are presented in Tables 8.56. and 8.57. below.

Table 8.56. One-Way ANOVA to differences in performance as a result of Verbal Test GO profiles adopted (N=71)

Source of Variance	SS	Df	MS	F	Sig.
Between Groups	3.61	2	1.80	.15	.86
Within Groups	839.58	68	12.35		
Total	843.18	70			

Table 8.57. One-Way ANOVA to differences in performance as a result of Numerical Test GO profiles adopted (N=71)

Source of Variance	SS	Df	MS	F	Sig.
Between Groups	72.36	3	24.12	5.59	<.01
Within Groups	289.13	67	4.32		
Total	361.49	70			

The results presented in Table 8.56. indicate that there were no significant differences in the performance of participants having different GO profiles on the Verbal test (F=.15; ρ>.05). On the other hand, Table 8.57. shows that there were significant differences in the performance of participants having different GO profiles on the Numerical test. The post hoc tests (LSD) indicated that participants in Cluster 1 had higher performance than participants in Clusters 2 and 4 (refer to Table 8.58.).

There seems to be a pattern emerging throughout the analyses of the present study. As with a number of analyses carried out so far, the relationships between different GO profiles and performance seem to vary depending on the task at hand. This influence of task type will need to be looked into further since it has been quite persistent throughout the analyses. Further investigating this pattern may provide some insight into the inconsistent findings in literature (and in the current study) with respect to the relationships between GOs and variables such as self-efficacy, mental effort and performance. This will be discussed in further detail in Chapter 10 Section 10.4. and Chapter 11 Section 11.3.

Table 8.58. Mean Performance Score on Verbal and Numerical Tests at Time 1 for participants in each GO cluster.

GO Cluster	Mean Performance Score on Verbal Test (Time 1)	Mean Performance Score on Numerical Test (Time 1)
Cluster 1	15.44	6.85
Cluster 2	15.39	4.54
Cluster 3	14.86	3.18
Cluster 4	N/A	3.14

Key: Cluster 1=High Goal Orientations Cluster; Cluster 2=High Mastery, Moderate Performance Cluster; Cluster 3=High Mastery, Low Performance Cluster; Cluster 4:High Performance-Avoidance Cluster.

8.8. Synopsis

In this chapter the exploratory analyses results were presented. Moreover, decisions were made with respect to model choice (3-factor vs. 2x2) for the current study. In presenting the results of the exploratory analyses a number of Research Questions and Hypotheses were addressed. These related to the relationships between GOs and self-efficacy, performance, and mental effort as well as one Research Question relating to the types of GO profiles (Research Question 1). The next chapter presents the results for those Hypotheses and Research Questions which were not directly answered by means of the exploratory analyses and required a substantial amount of further analyses. These include Research Questions and Hypotheses addressing the stability and task-specificity of GOs, as well as those focusing on the success and influence (on the performance of participants) of the GO inductions.

Chapter 9: Further Analyses

9.0. Introduction

The previous chapter focused on the exploratory analyses of data for this study and addressed the Research Questions and Hypotheses which were answered or tested as a result of these analyses. This chapter deals with those Research Questions and Hypotheses which required substantial further analyses in order to be answered or tested. The three themes addressed in this chapter include: the stability of GOs over time, task-specificity of GOs, and the interactions between state and trait GOs.

Similarly to the previous chapter, this one is organised according to theme so that Research Questions and Hypotheses having the same theme are grouped together. First, the issue of the stability of GOs is addressed (Section 9.1.). Following this, the questions regarding task-specificity (Section 9.2.) are discussed. Last but not least the effects of the interactions between Trait and State GOs on performance are assessed (Section 9.3.). In order to avoid having an unnecessarily long chapter any non-significant results are not presented but are reported as non-significant in the text.

9.1. Assessing the Stability of General and Task-Specific Goal Orientations over time

This section focuses on those Research Questions which address the stability of General and Task-Specific GOs (including Hypothetical Task, Verbal Test and Numerical Test GOs) over time. The data collected at Time Q1 and Time Q2 were used to assess the stability of General and Hypothetical Task GOs whilst the data collected at Time E1 and Time E2 were used to assess the stability of Verbal and Numerical test GOs over time.

The stability of GOs was examined from the profile and non-profile perspectives. The latter was assessed in terms of differential continuity and mean level change whilst the stability of GO profiles was assessed using LCAs and posterior classification (described in Section 8.7.1.). The first part of this section (sub-section 9.1.1.) focuses on the stability of General GOs whilst the second part (sub-section 9.1.2.) addresses the stability of task-specific GOs.

9.1.1. Assessing the Stability of General GOs

As mentioned earlier the stability of General GOs was assessed from both the profile and non-profile perspectives. The results of the analyses for GO profiles are presented first. This is followed by the results of the analyses from the non-profile perspective.

Research Question 2a. Do individuals' General goal orientation profiles change over time?

In order to provide an answer to this Research Question the results of the LCAs for General GOs at Time 1 and Time 2 were used (please refer to Chapter 8 Section 8.5.). Participants were assigned to clusters using posterior classification. The GO profiles of participants from Time 1 to Time 2 were then compared. The results of this comparison are provided in Table 9.1. In interpreting the results of GO profile comparisons (throughout the study) it should be kept in mind that due to the exact nature of each cluster changing slightly (over time and across tasks) the analyses examining the number of participants staying in the same clusters and those changing clusters are inevitably a bit approximate.

Table 9.1. Frequency Table indicating the General Goal Orientation Profiles Adopted by Participants at Time 1 and Time 2. (N=183)

	General GO Profile Cluster at Time 2				**Total**
		1	**2**	**3**	
General GO Profile Cluster at Time 1	**1**	*101*	35	3	139
	2	13	*21*	5	39
	3	0	2	*1*	3
	4	0	2	0	2
	Total	114	60	9	183

Table 9.1. indicates the frequencies of participants in each Cluster at Time 1 and Time 2 with respect to their General GO profiles. The numbers on the diagonal (those in

italics) indicate the frequencies of participants that adopted the same General GO profiles at Time 1 and Time 2. Therefore, overall, 123 participants (67%) adopted the same General GO profile at Time 1 and Time 2. On the other hand, 60 participants (33%) adopted different General GO profiles at Time 2 than they did at Time 1. In order to assess the stability of GO profiles over time in a more objective manner (by taking the sample size and number of clusters into account) a decision was made to compare the distribution of people to clusters from Time 1 to Time 2 presented in Table 9.1. to the distribution of people to clusters (from Time 1 to Time 2) by chance. A chi-square test could not be used with the raw data in this case for two main reasons. Firstly, our data consist of repeated measures which violates one of the assumptions of the chi-square. Secondly, examining whether the frequencies in all clusters were distributed equally was not of interest in this study. Therefore, *before* using the chi-square test, the number of people one would expect to find in clusters by chance, *if*, (given the total number of people in each cluster on each occasion) people had distributed themselves proportionately amongst clusters, was calculated. For example, if 60 out of 100 people were in Cluster 1 at Time 1 and 30 out of the same 100 people were in Cluster 1 at Time 2, the number of individuals one would expect to stay in Cluster 1 (from Time 1 to Time 2) by chance is: $\frac{60 \text{x} 30}{100}$ = 18 people.

Since only the stability of the number of people in the diagonal is of interest for the purposes of this study (i.e. the number of people adopting the same GO profile at Time 1 and Time 2), the above calculation was only performed for people in the diagonal. The formula used to compute the proportions of people expected to fall into the top left category (of Table 9.1.) by chance is:

$$\frac{\text{Number of People in Cluster 1 at Time 1 x Number of People in Cluster 1 at Time 2}}{\text{Total Number of People}}$$

The same formula was repeated for participants falling into Cluster 2 at Time 1 and Time 2 as well as those falling into Cluster 3 at Time 1 and Time 2. Using the formula presented above the following frequencies were obtained:

Table 9.2. Observed Frequencies and Proportions Expected to Remain in the same Clusters (from Time 1 to Time 2) by Chance

	Cluster 1	Cluster 2	Cluster 3
Observed	101	21	1
Proportions by chance	87	13	0

Key: Cluster 1=High Goal Orientations Cluster; Cluster 2=High Mastery, Moderate Performance Cluster; Cluster 3=High Mastery, Low Performance Cluster.

Following from the results presented in Table 9.2., and keeping in mind that the total number of participants was 183, the total numbers of participants remaining in the same cluster and those changing cluster from Time 1 to Time 2 is presented in Table 9.3. for the Observed Frequencies and the Proportions by Chance.

Table 9.3. Total Numbers of Participants remaining in the Same Cluster and Total Number Changing Cluster from Time 1 to Time 2

	Remain in Same Cluster from Time 1 to Time 2	Change Cluster from Time 1 to Time 2	Total
Observed	123	60	183
Proportions by chance	100	83	183
Total	223	143	366

A Chi-square test was then carried out using the frequencies presented in Table 9.3. The X^2_{obt} in this case was 6.07 whilst X^2_{crit} is 6.64 ($\rho<.01$) and 3.84 ($\rho<.05$). Therefore, the results indicate that at a significance level of $\rho<.05$, one could be confident that more participants remained in the same clusters over time than they would have by chance alone. These results point towards the possibility of General GO profiles showing some stability over time. The procedure presented above was also used to examine the stability of task-specific GO profiles over time (Section 9.1.2.5.) and the task-specificity of GOs (Section 9.2.1.) as well as to assess whether General GO profiles are different from task-specific GO profiles (Section 9.2.3.).

Research Question 2b. Do individuals' General goal orientations change significantly over time?

Changes in participants' General GOs over time from the non-profile perspective were assessed in terms of (a) mean level change and (b) differential continuity. In order to examine mean level change over time paired sample t-tests were carried out. The correlational analyses presented in Chapter 8 Section 8.6. were used to assess the differential continuity of General GOs.

Table 9.4. Assessing Mean Level Change of General GOs from Time 1 to Time 2

Variables	Time 1 Mean	Time 1 SD	Time 2 Mean	Time 2 SD	Df	T-value	Sig.
GEN MAP	3.93	.57	3.89	.60	187	.84	.40
GEN MAV	3.77	.60	3.71	.63	183	1.24	.22
GEN PAP	3.94	.66	3.81	.71	186	2.74	<.01
GEN PAV	3.98	.72	3.81	.76	187	3.15	<.01

Key: GEN MAP = General mastery-approach Goal Orientation; GEN MAV = General mastery-avoidance Goal Orientation GEN PAP = General performance-approach Goal Orientation; GEN PAV = General performance-avoidance Goal Orientation

The results of the paired sample t-test presented in Table 9.4. indicate that although all the mean General GO scores seem to decrease over time, only the mean General PAP and PAV GOs decreased significantly over time ($t=2.74$ and 3.15, $\rho<.01$ respectively). The results of the correlational analyses used to measure differential continuity were presented in Chapter 8 (Section 8.6.). These results indicate that the correlation coefficients between the four General GOs at Time 1 and Time 2 ranged between 0.47 ($\rho<0.01$) and 0.56 ($\rho<0.01$). Consequently, people's General GOs relative to each other seem to be somewhat stable over time. However, in order to more objectively assess the significance of the correlational analyses results, the correlation coefficients obtained in this study will be compared with stability correlation coefficients from other studies on GOs as well as from studies assessing the stability of personality traits (since these have been widely researched and generally assumed to be stable over time).

With respect to GO studies, Fryer and Elliot (2007) found correlations of 0.57 to 0.78 ($\rho<0.001$) and Elliot and McGregor (2001) found correlation coefficients ranging between 0.70 and 0.74 ($\rho<0.01$). The correlation coefficients obtained in these studies are higher than those obtained in the present study. However, the GOs measured in the studies by Fryer and Elliot (2007) and Elliot and McGregor (2001) could be considered to be task-specific since the measures used focused on the GOs adopted on a particular college course. The lower correlation coefficients obtained in the present study may be a result of the fact that general measures of GOs were used. Therefore, the correlation coefficients obtained for General GOs as well as those obtained in other studies will be compared to those of the task-specific GOs (obtained in this study) so as to assess whether task-specific GOs are more stable than General GOs in terms of differential continuity.

Payne et al. (2007) calculated stability coefficient estimates for mastery, PAP and PAV GOs during their meta-analysis. Their results indicate stability coefficient estimates of 0.66 (k=20), 0.70 (k=16) and 0.73 (k=4), with 'k' being the number of studies included, for mastery, PAP and PAV GOs, respectively. These correlations are for the stability of GOs from one to fourteen weeks. These stability coefficients are higher than those obtained in the present study. However, it is difficult to tell whether the coefficients obtained from the study by Payne et al. (2007) are for General or task-specific GOs. Payne et al. (2007) also found that the relationships between the time interval (between GO measures) and the coefficients of stability were negative for all three GOs (r=-0.20, -0.29, and -0.74, for mastery, PAP and PAV GOs respectively). Therefore, the longer the time frames between the administrations, the smaller the coefficients of stability. Since the time intervals between the Time 1 and Time 2 General GO measures ranged from 5 to 51 weeks in this study, the lower coefficients obtained may have resulted from the longer time interval between the measures. In order to examine this possibility further, participants were divided into groups according to the time interval between their Time Q1 and Time Q2 questionnaires. Subsequently, correlational analyses were carried out in order to investigate the stability of General GOs over time depending on the time interval between the two measures.

Since the numbers of participants who completed the questionnaires at different points in time were not equal, the time intervals for analysing data were chosen in a way for there to be roughly equal numbers of participants in each group. For example, a substantial number of participants completed the second questionnaire 4-8 weeks after the first questionnaire (N=94). On the other hand the same number of participants completed the second questionnaire between 17 to 51 weeks after the first questionnaire. Splitting participants (who completed the Time Q2 questionnaire 17 to 51 weeks subsequent to the Time Q1 questionnaire) into smaller groups would not have been feasible for statistical analyses. Consequently, participants were split up into two groups for the purpose of these analyses. One group consisted of participants who completed the Time Q2 questionnaire 4 to 8 weeks subsequent to the Time Q1 questionnaire and the second group was made up of those participants who completed the Time Q2 questionnaire 9 to 51 weeks after the Time Q1 questionnaire. The results of these analyses are presented in Tables 9.5. and 9.6. In both tables all the correlations of interest were found to be significant at ρ<.01. Consequently, the probability of these being the result of Type I error is highly unlikely.

Table 9.5. Correlations between General GOs at Time 1 and Time 2 for participants who completed Time Q2 questionnaire 4-8 weeks after Time Q1 Questionnaire (N≈93)

Variables	1	2	3	4	5	6	7	8
1. GEN MAP T1	1.00							
2. GEN MAV T1	.67**	1.00						
3. GEN PAP T1	.30**	.33**	1.00					
4. GEN PAV T1	.13	.29**	.50**	1.00				
5. GEN MAP T2	**.63****	.44**	.30**	.25*	1.00			
6. GEN MAV T2	.32**	**.38****	.04	.06	.53**	1.00		
7. GEN PAP T2	.09	.20	**.69****	.52	.41**	.14	1.00	
8. GEN PAV T2	-.03	.14	.45**	**.53****	.31**	.34	.64**	1.00

Key: GEN MAP = General Mastery-Approach Goal Orientation; GEN MAV = General Mastery-Avoidance Goal Orientation GEN PAP = General Performance-Approach Goal Orientation; GEN PAV = General Performance-Avoidance Goal Orientation; T1 = Time 1; T2 = Time2 *ρ<.05 **ρ<.01

Table 9.6. Correlations between General GOs at Time 1 and Time 2 for participants who completed Time Q2 questionnaire 9-51 weeks after Time Q1 Questionnaire (N≈94)

Variables	1	2	3	4	5	6	7	8
1. GEN MAP T1	1.00							
2. GEN MAV T1	.37**	1.00						
3. GEN PAP T1	.25*	.30**	1.00					
4. GEN PAV T1	-.08	.36**	.66**	1.00				
5. GEN MAP T2	**.50****	.30**	.18	-.04	1.00			
6. GEN MAV T2	.39**	**.56****	.15	.14	.62**	1.00		
7. GEN PAP T2	.08	.23*	**.38****	.40**	.31**	.37**	1.00	
8. GEN PAV T2	.02	.29**	.32**	**.42****	.17	.45**	.75**	1.00

Key: GEN MAP = General Mastery-Approach Goal Orientation; GEN MAV = General Mastery-Avoidance Goal Orientation GEN PAP = General Performance-Approach Goal Orientation; GEN PAV = General Performance-avoidance Goal Orientation; T1 = Time 1; T2 = Time2 *ρ<.05 **ρ<.01

Similarly to the results obtained by Payne et al. (2007) the stability of the GOs over time seems to be decreasing in terms of correlations over time with the exception of the MAV GO which seems to be increasing over time. It is not clear why the stability of MAV GO seems to be increasing with a longer time interval. Further investigation is required in order to clarify this. So as to test whether the correlation coefficients presented in Table 9.5. are significantly different from those presented in Table 9.6. Fisher z tests were carried out. The results are presented in Table 9.7.

Table 9.7. Testing for Significant Differences between Correlation Coefficients for General GOs at Time 1 and Time 2 (for different Time intervals between Time Q1 and Time Q2 questionnaires).

GO	Comparison and Ns		z-statistic	p-value
MAP	4-8 weeks (N=94)	9-51 weeks (N=94)	1.3	.19
MAV	4-8 weeks (N=92)	9-51 weeks (N=92)	-1.55	.12
PAP	4-8 weeks (N=94)	9-51 weeks (N=93)	3.01	<.01
PAV	4-8 weeks (N=95)	9-51 weeks (N=93)	.96	.34

The Fisher z test results indicate that only the stability of the PAP GO significantly decreases with a longer the time interval between the questionnaires. Moreover, although the strength of the correlation coefficients for MAV GO seems to increase with a greater time interval, this increase is not statistically significant. The implications of these results are discussed in further detail in Chapter 10 Section 10.6.

Since General GOs are assumed to be general, stable traits, it was thought useful to compare the correlation coefficients obtained for General GOs over time with those for personality traits. This was considered to be useful since personality traits are also thought to be general stable traits and their stability has been investigated for far longer than that of GOs. Since hardly any studies, if at all, assessed the stability of **General** GOs over time it was thought to be helpful to use the stability coefficients of personality traits as a point for comparison. Rantanen et al. (2007) assessed the stability of the Big 5 personality traits over a nine year period. They found test-retest correlation coefficients ranging between 0.64 and 0.81 ($\rho<.001$) for men and between 0.55 and 0.81 ($\rho<.001$) for women. Additionally, Viswesvaran and Ones (2000) found mean coefficients of stability ranging between 0.69 to 0.76 for the Big Five personality traits over a period of one to two years. These correlation coefficients are higher than the ones obtained in the present study even though the time intervals in the studies by Rantanen et al. (2007) and Viswesvaran and Ones (2000) were much longer than the ones in the current study.

Overall it seems that, in terms of mean-level change, participants' mastery GOs tend to remain stable over time for this sample. However, participants' performance GOs change significantly from Time 1 to Time 2. Moreover, in terms of differential continuity, participants' GOs are not as stable as personality traits (especially those having a time interval of between 9 and 51 weeks). The results obtained in this study seem to challenge the assumption of stability of GOs from the non-profile perspective. Therefore, overall it seems as though from the non-profile perspective, General GOs are not as stable as they were initially thought to be. At first glance the results obtained from the profile and non-profile perspectives seem to be rather inconsistent with the former indicating stability and the latter indicating change over time. However, the profile perspective results show that stability is only better than chance at $\rho<0.05$. This is not enough evidence to support a claim that General GO profiles are stable over time. The implications of these results will be discussed in further detail in Chapter 10 Section 10.6. Research Questions 5a and 5b, which address the stability of task-specific GOs (that is, Hypothetical Task, Verbal Test and Numerical Test GOs) over time are presented next.

9.1.2. Assessing the Stability of Task-Specific GOs

The MAP and PAP GO inductions may have been a contaminating factor when assessing the stability of Verbal and Numerical Test GOs over time. However, using only the control group would have drastically reduced the sample size. As will become evident throughout this section, the inductions were not successful. Consequently, a decision was made to include the whole experimental sample when assessing the stability of Verbal and Numerical Test GOs over time. However, the possible presence of a contaminating factor will be kept in mind when interpreting the results. The results of the analyses assessing the stability of task-specific GOs over time from the non-profile perspective (and in doing so testing the success of the inductions) are presented first.

Research Question 5b. Are task-specific goal orientations stable over time?

The stability of task-specific GOs over time from the non-profile perspective was assessed in terms of mean-level change as well as differential continuity. Paired samples t-tests and correlational analyses were carried out in order to assess the stability of Hypothetical Task GOs over time. Repeated Measures Analyses of Variance and correlational analyses were carried out in order to assess the stability of Verbal and Numerical test GOs over time. The results of the analyses assessing the stability of Hypothetical Task GOs over time are presented first (sub-section 9.1.2.1.) and are followed by the presentation of results assessing the stability of Verbal Test GOs over time (sub-section 9.1.2.2.) and Numerical Tests over time (sub-section 9.1.2.3.).

9.1.2.1. Assessing the Stability of Hypothetical Task Goal Orientations over time

The data included in the analyses for examining the stability of Hypothetical Task GOs over time were collected at Time Q1 and Time Q2. The results obtained when assessing mean-level change in Hypothetical Task GOs over time are presented in Table 9.8.

Table 9.8. Assessing Mean Level Change for Hypothetical Task GOs at Time 1 and Time 2 (N≈186)

Variables	HYP GO T1 Mean	HYP GO T1 SD	HYP GO T2 Mean	HYP GO T2 SD	Df	T-value	Sig.
MAP	4.01	.65	3.93	.70	191	1.82	.07
MAV	3.70	.70	3.61	.77	189	1.56	.12
PAP	3.74	.81	3.70	.85	191	.58	.56
PAV	3.83	.66	3.72	.75	191	1.88	.06

Key: HYP = Hypothetical Task Goal Orientation; T1 = Time 1; T2 = Time 2

In terms of mean-level change, there were no significant differences in Hypothetical Task GOs from Time 1 to Time 2. Although the values obtained for MAP and PAV GOs over time were very nearly significant, it seems as though mean levels of Hypothetical Task GOs seem to be rather stable over time. The results presented in Table 8.43. (Chapter 8) show the results for the correlational analyses of Hypothetical Task GOs at Time 1 and Time 2. These results indicate that the correlation coefficients for the four Hypothetical Task GOs at Time 1 and Time 2 range between 0.44 ($\rho<0.01$) and 0.63 ($\rho<0.01$). These correlations are of similar strength to those obtained for General GOs at Time 1 and Time 2 (which ranged from 0.47 to 0.56, $\rho<0.01$). Since the time interval between Time Q1 and Time Q2 varied quite a lot (from 4 to 51 weeks) similar analyses to those for General GOs were carried out in order to examine whether the stability of Hypothetical Task GOs decreased with an increasing time interval. The results of these analyses are presented in Tables 9.9. and 9.10. In both tables all the correlations of interest were found to be significant at $\rho<.01$. Consequently, the probability of these being the result of Type I error is highly unlikely.

Table 9.9. Correlations between Hypothetical Task GOs at Time 1 and Time 2 for participants who completed Time Q2 questionnaire 4-8 weeks after Time Q1 Questionnaire (N≈99)

Variables	1	2	3	4	5	6	7	8
1. HYP MAP T1	1.00							
2. HYP MAV T1	.52**	1.00						
3. HYP PAP T1	.38**	.38**	1.00					
4. HYP PAV T1	.36**	.55**	.62**	1.00				
5. HYP MAP T2	**.53****	.18	.27**	.22*	1.00			
6. HYP MAV T2	.20	**.46****	.14	.14	.47**	1.00		
7. HYP PAP T2	.10	.11	**.54****	.37**	.39**	.25*	1.00	
8. HYP PAV T2	.12	.19	.37**	**.34****	.57**	.51**	.76**	1.00

Key: HYP MAP = Hypothetical Task Mastery-Approach Goal Orientation; HYP MAV = Hypothetical Task Mastery-Avoidance Goal Orientation; HYP PAP = Hypothetical Task Performance-Approach Goal Orientation; HYP PAV = Hypothetical Task Performance-Avoidance Goal Orientation; T1 = Time 1; T2 = Time2 *ρ<.05 **ρ<.01

Table 9.10. Correlations between Hypothetical Task GOs at Time 1 and Time 2 for participants who completed Time Q2 questionnaire 9-51 weeks after Time Q1 Questionnaire (N≈98)

Variables	1	2	3	4	5	6	7	8
1. HYP MAP T1	1.00							
2. HYP MAV T1	.69**	1.00						
3. HYP PAP T1	.35**	.27**	1.00					
4. HYP PAV T1	.53**	.60**	.60**	1.00				
5. HYP MAP T2	**.56****	.47	.16**	.34**	1.00			
6. HYP MAV T2	.51**	**.57****	.07	.38**	.60*	1.00		
7. HYP PAP T2	.18	.19	**.55****	.41**	.32**	.23*	1.00	
8. HYP PAV T2	.28**	.37**	.29**	**.41****	.44**	.61**	.67**	1.00

Key: HYP MAP = Hypothetical Task Mastery-Approach Goal Orientation; HYP MAV = Hypothetical Task Mastery-Avoidance Goal Orientation; HYP PAP = Hypothetical Task Performance-Approach Goal Orientation; HYP PAV = Hypothetical Task Performance-Avoidance Goal Orientation; T1 = Time 1; T2 = Time2 *ρ<.05 **ρ<.01

It was expected that the longer the time interval between Time Q1 and Time Q2 the lower the correlation coefficients would be. However, the results above seem to indicate that the longer the time interval between measures, the higher the correlation coefficients! However, when Fisher z tests were carried out these differences in the strengths of the correlation coefficients for the two different time intervals were not significant.

In order to be able to assess the stability of Hypothetical Task GOs more objectively, the stability coefficients obtained are compared with those obtained in other studies. As mentioned earlier, Fryer and Elliot (2007) found correlations of 0.57 to 0.78 ($\rho<0.001$) whilst Elliot and McGregor (2001) found correlation coefficients ranging between 0.70 and 0.74 ($\rho<0.01$) for the four GOs over time. Moreover, as a result of their meta-analysis, Payne et al. (2007) obtained stability coefficient estimates of 0.66 (k=20), 0.70 (k=16) and 0.73 (k=4), with 'k' being the number of studies included, for mastery, PAP and PAV GOs, respectively. The correlations from the study by Payne et al. (2007) are for the stability of GOs from one to fourteen weeks. It seems as though the correlation coefficients obtained in previous studies are slightly higher than those obtained in the present study. However, overall, the results of this study nevertheless point towards Hypothetical task GOs being quite stable over time. These results will be discussed in further detail in Chapter 10 Section 10.7.

9.1.2.2. Assessing the Stability of Verbal Test Goal Orientations over time

The data included in the analyses for examining the stability of Verbal Test GOs over time were collected at Time E1 and Time E2. The mean-level change results are discussed first followed by the differential continuity results.

Analysis of Variance results indicated that there was no significant change in the mean level MAP GO on the Verbal test (for all three experimental groups) from Time 1 to Time 2 ($F=.02$; $\rho=.89$). Consequently, in terms of mean-level change, Verbal Test MAP GO seems to be stable over time. There was (only just!) a significant difference between the mean-level MAP GO scores of the different experimental groups ($F=3.18$; $\rho=.05$). However, the interaction effect of Time by Condition (which reflects the effect of the GO induction) was not significant ($F=.02$; $\rho=.98$). Therefore, it seems as though the MAP GO induction was not successful on the Verbal test since the differences in mean-level MAP GO are across groups but NOT across groups over time. It may be that for some reason (other than the inductions) participants' in the different experimental groups adopted different levels of MAP GO. Possible reasons for this may be the small sample sizes in each experimental group and the fact that participants were not completely randomly assigned to experimental conditions (for the reasons explained in the methodology, Chapter 7 Section 7.2.).

Similarly to the MAP Verbal Test GOs, there were no significant changes in participants' (in all experimental conditions) mean-level Verbal Test MAV GO from Time 1 to Time 2 ($F=.86$; $\rho=.36$). Also similarly to the Verbal Test MAV GO there was a significant difference in the mean-level MAV GO across experimental groups ($F=4.59$; $\rho<.01$). However, again, this was not a result of the inductions since the Time by Condition interaction effect was not significant ($F=.17$; $\rho=.84$). These results show that, in terms of mean-level change, the Verbal Test MAV GO seems to be stable over time.

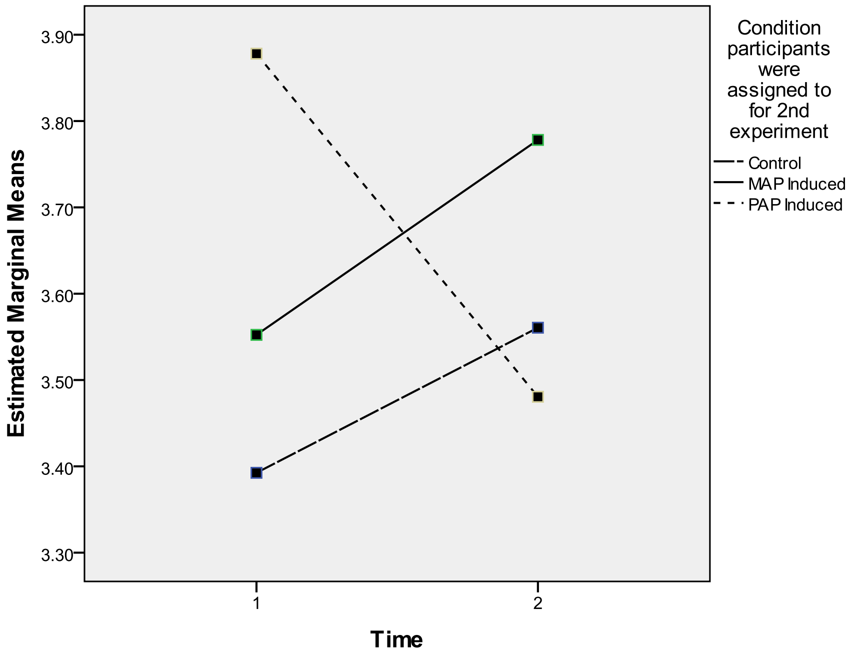
No significant changes in the mean-level PAP GO on the Verbal Test ($F=.01$; $\rho=.91$) were found. Therefore, in terms of mean-level change, the Verbal Test PAP GO seems to be stable over time. The results also show that there were no significant differences in the mean-level PAP GO adopted by participants in different experimental groups ($F=.43$; $\rho=.65$). Moreover, there were no significant interaction effects between Time and Condition ($F=.15$; $\rho=.86$). Therefore, the mean-level PAP GO on the Verbal test did not change as a result of the inductions indicating that the PAP GO inductions on the Verbal Test were not successful.

There were no significant mean-level changes in participants' (in all experimental groups) Verbal Test PAV GO from Time 1 to Time 2 ($F<.01$, $\rho=.92$). Therefore, in terms of mean-level change, it seems as though all four Verbal Test GOs tend to remain stable over time. However, contrary to the Verbal Test MAP, MAV and PAP GOs there was a significant Time by Experimental Condition interaction ($F=4.21$, $\rho=.02$) for the Verbal Test PAV GO (as indicated in Table 9.11.). The mean-level PAV GO of participants in the PAP induction group seems to be decreasing from Time 1 to Time 2. It is possible that the focus on a PAP GO resulting from the induction caused participants' PAV GO to decrease. Therefore, although the PAP GO induction did not seem to be successful on the Verbal Test (since the Verbal Test PAP GO of participants in the PAP induction group did not increase significantly as a result of the inductions) it may have influenced participants' PAV GO. These results will be compared with those obtained for the PAV Numerical Test GOs (Section 9.1.2.3.) in order to determine whether a pattern could be established.

Table 9.11. Repeated Measures ANOVA to Examine Mean-Level Change of Verbal Test Performance-Avoidance GOs over Time (N=71)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	63.85	1	63.85	43.76	<.01
Task Experience on Verbal Test	.04	1	.04	.03	.87
Practice on Verbal Test	3.29	1	3.29	2.25	.14
Experimental Condition	1.20	2	.60	.41	.67
Error	94.85	65	1.46		
Within Subject					
Time	<.01	1	<.01	<.01	.92
Time* Task Experience on Verbal Test	.07	1	.07	.25	.62
Time* Practice on Verbal Test	.11	1	.11	.39	.53
Time* Experimental Condition	2.36	2	1.18	4.21	.02
Error	18.26	65	.28		

Figure 9.1. Estimated Marginal Means of Verbal Test Performance -Avoidance GOs over Time



Covariates appearing in the model are evaluated at the following values: Task Experience on Verbal Test Time 1 = 2.2628, Practice on Verbal Test between Time 1 and Time 2 = 1.5286

The stability of Verbal Test GOs was also assessed in terms of differential continuity. The results presented in Table 8.44. (Chapter 8) indicate the correlations for each of the four GOs on the Verbal Test from Time E1 to Time E2. These correlation coefficients range from 0.56 to 0.71 ($\rho<0.01$). Since they were all found to be significant at $\rho<0.01$, it is highly unlikely that they are the result of Type I error. These correlations are quite high and are similar in strength to the correlation coefficients obtained by Fryer and Elliot (2007) who obtained correlations of 0.57 to 0.78 ($\rho<0.001$). However, they are slightly lower than the coefficients obtained by Elliot and McGregor (2001). Overall, the correlation coefficients for Verbal Test GOs over time seem to indicate a good level of stability.

9.1.2.3. Assessing the Stability of Numerical Test Goal Orientations over time

The stability of Numerical Test GOs was also assessed in terms of mean-level change (using Analysis of Variance) and differential continuity. As was done in the previous section the mean-level change results are presented first.

No significant differences were found in the mean-level MAP GO adopted by participants (in all three experimental groups) on the Numerical tests from Time 1 to Time 2. Therefore, in terms of mean-level change, the Numerical Test MAP GO indicates stability over time. There were also no significant differences in the mean-level MAP GO across the different experimental groups ($F=2.14$; $\rho=.13$). Moreover, the interaction effects between Time and experimental condition were non-significant ($F=.44$; $\rho=.65$). Therefore, the mean-level MAP GO adopted by participants in different experimental groups did not change as a result of the inductions on the Numerical Test. Consequently, the MAP induction does not seem to have worked on either the Verbal or the Numerical tests.

No significant changes were found in the mean-level MAV GO of participants (in all experimental groups) on the Numerical test from Time 1 to Time 2 ($F=.36$; $\rho=.55$). There were also no statistically significant differences in the mean-level MAV GO for participants in different experimental groups.

The results obtained for the Numerical Test PAP GO over time are consistent with those for the MAP and MAV Numerical Test GOs over time. No significant changes were found in the mean-level PAP GO on the Numerical Test from Time 1 to Time 2. Moreover, there were no significant interaction effects between Time and experimental Condition ($F=.84$; $\rho=.44$). Consequently, it seems as though the PAP GO induction was not successful on the Numerical test either.

Similarly to the other Numerical Test GOs, there were no significant changes in the mean-level PAV GO of participants (in all experimental groups) on the Numerical Test from Time 1 to Time 2 ($F=.24$; $\rho=.63$). The differences in the mean-level PAV GO across experimental groups were also statistically non-significant. In addition, contrary to the results obtained on the Verbal Test, there was no significant time by condition interaction effect. Thus, the PAP induction did not influence the PAV GO of participants on the Numerical Test. Overall the results indicate that, in terms of mean-level change, participants Numerical Test GOs seem to remain stable from Time 1 to Time 2.

Unfortunately, the results indicate that neither the MAP nor the PAP GO inductions were successful in this experimental study. Although the PAP induction seems to have influenced the Verbal Test PAV GO, this was not found to be the case for the Numerical Test PAV GO. It is not clear why the PAP induction seemed to influence the PAV GO of participants on the Verbal Test but not on the Numerical Test. Again, it is possible that this relationship was influenced by task type. For example, if participants do not feel as confident about their numeracy skills as they do about their verbal skills, the focus on a PAP GO might not be enough to decrease their PAV GO. Further investigation of GO inductions is necessary in order to be able to understand these relationships better. This will be discussed in further detail in Sections 10.10. and 11.3.

When the LCAs of Verbal and Numerical Test GOs were carried out (Chapter 8 Sections 8.5.3. and 8.5.4.), it was found that 34 participants adopted the 'high GOs' profile on the Verbal Test at Time 1 and 40 participants adopted this GO profile on the Numerical Test (at Time 1). The inductions would not have had any influence on the GOs of these participants since they already had high MAP and PAP GOs. Ideally, in order to test the success of the inductions, the analyses should only have included participants who had low to moderate MAP GOs (to test the MAP GO induction) and PAP GOs (to test the PAP GO induction). However, due to the small sample size this was not feasible as there would have been only about 12 participants in each experimental group if the participants having a 'high GOs' profile were not included in the analyses. The implications of this are discussed in further detail in Chapter 10 (Section 10.10) and Chapter 11 (Section 11.2.).

In terms of differential continuity for Numerical Test GOs over time, Table 8.44. (Chapter 8) shows the results obtained for the correlational analyses of participants' Numerical Test GOs over time. The correlation coefficients obtained range from 0.52 to 0.70 ($\rho<0.01$). Like the correlation coefficients obtained on the Verbal Tests, since they were all found to be significant at $\rho<0.01$, it is highly unlikely that they are the result of Type I error. Again, similarly to the Verbal Test correlations the Numerical Test correlations are quite similar to those obtained by Fryer and Elliot (2007). However, once again, they are slightly lower than those obtained by Elliot and McGregor (2001). Overall, these correlation coefficients seem to indicate a good level of stability for participants' Numerical Test GOs over time. The overall results of these analyses indicate that both in terms of mean-level change as well as in terms of differential continuity there seems to be evidence of stability for task-specific GOs over time. These results will be discussed in further detail in Chapter 10 Section 10.7.

Before assessing the stability of task-specific GO **profiles** over time (in answer to Research Question 5a) a sub-section of this Chapter is dedicated to comparing the stability of General GOs with that of task-specific GOs. This decision was made due to the fact that, from the results presented above, it seems as though General GOs are less stable over time than task-specific GOs. If this is the case, then GOs might be more accurately measured using task-specific measures as opposed to General measures. The comparative results are presented in Section 9.1.2.4.

9.1.2.4. Comparing the Stability of General Goal Orientations to that of Task-Specific Goal Orientations.

In order test whether there are significant differences between the stability coefficients of General GOs and Task-Specific GOs Fisher z tests were carried out. The stability coefficient of each General GO was compared with that of the corresponding Hypothetical Task, Verbal Test and Numerical Test GOs. In addition, since the Hypothetical Task GOs stability coefficients seemed to be lower than the Verbal and Numerical Test ones, the stability coefficient of each of the Hypothetical Task GO was compared with that of the corresponding Verbal and Numerical Test GOs.

For General and Hypothetical Task GOs the time intervals between Q1 and Q2 ranged from 5 to 51 weeks. On the other hand for Verbal and Numerical Test GOs the time intervals between Time E1 and Time E2 ranged from 1 to 31 weeks. In order to reduce variation it was decided that only those participants who had a time interval of up to 10 weeks between Time Q1 and Time Q2 (for General and Hypothetical Task GOs) and between Time E1 and Time E2 (for Verbal and Numerical Test GOs) should be included in the analyses. In this way, any significant differences in the stability would **not** be a result of the different time intervals. The results are presented in Table 9.12.

Table 9.12. Testing for Significant Differences between the Stability Coefficients of General and Task-specific GOs and between Hypothetical Task and Aptitude Test GOs

GO	Comparison and Ns		z-statistic	p-value
MAP	GEN (N=128)	HYP (N=127)	0.12	0.90
MAV	GEN (N=124)	HYP (N=127)	0.17	0.34
PAP	GEN (N=128)	HYP (N=126)	0.45	0.90
PAV	GEN (N=128)	HYP (N=127)	0.67	0.50
MAP	GEN (N=128)	VT (N=56)	-0.78	0.44
MAV	GEN (N=124)	VT (N=56)	-1.97	0.05
PAP	GEN (N=128)	VT (N=56)	-1.31	0.19
PAV	GEN (N=128)	VT (N=56)	-2.26	0.02
MAP	GEN (N=128)	NT (N=56)	-1	0.30
MAV	GEN (N=124)	NT (N=54)	-1.66	0.10
PAP	GEN (N=128)	NT (N=56)	-0.61	0.54
PAV	GEN (N=128)	NT (N=56)	-2.38	0.02
MAP	HYP (N=127)	VT (N=56)	-0.87	0.38
MAV	HYP (N=127)	VT (N=56)	-1.23	0.22
PAP	HYP (N=126)	VT (N=56)	-1.21	0.23
PAV	HYP (N=127)	VT (N=56)	-2.78	<0.01
MAP	HYP (N=127)	NT (N=56)	-1.08	0.28
MAV	HYP (N=127)	NT (N=54)	-0.93	0.35
PAP	HYP (N=126)	NT (N=56)	-0.51	0.61
PAV	HYP (N=127)	NT (N=56)	-2.9	<0.01

Key: MAP=Mastery-Approach Goal Orientation; MAV=Mastery-Avoidance Goal Orientation; PAP=Performance-Approach Goal Orientation; PAV=Performance-Avoidance Goal Orientation.

The results presented in Table 9.12. indicate that Verbal and Numerical Test PAV GOs are significantly more stable than General and Hypothetical Task PAV GOs. Moreover, it seems as though a Verbal Test MAV GO is significantly more stable than a General MAV GO. Consequently, it seems as though even after the attempted inductions (which may have contaminated the stability), Verbal and Numerical Test GOs look to be quite stable over time. No other significant differences between the correlation coefficients were found. These results are discussed in further detail in Chapter 10 Section 10.7. The next sub-section presents the results of the analyses carried out in order to answer Research Question 5a.

9.1.2.5. Research Question 5a. Are task-specific goal orientation **profiles** stable over time?

In order to answer this Research Question the results from the LCAs of Hypothetical Task, Verbal Test and Numerical Test GOs at Time 1 and Time 2 were used (Sections 8.5.2., 8.5.3. and 8.5.4., respectively). The GO profiles adopted by participants at Time 1 and Time 2 on each task are compared. The comparison of Hypothetical Task GO profiles at Time 1 and Time 2 are presented first. This is followed by the analyses of the Verbal and Numerical Test GO profiles over time, respectively.

Table 9.13. Frequency Table indicating the Hypothetical Task Goal Orientation Profiles Adopted by Participants at Time 1 and Time 2. (N=187)

		Hypothetical Task GO Profile Cluster at Time 2			**Total**
Hypothetical Task GO Profile Cluster at Time 1		**1**	**2**	**3**	
	1	*106*	24	8	138
	2	19	*15*	4	38
	3	0	7	*2*	9
	4	1	0	1	2
	Total	126	46	15	187

Table 9.13. indicates that 123 participants (66%) adopted the same GO profile on the Hypothetical Task at Time 1 and Time 2. On the other hand, 64 participants (34%) adopted a different GO profile at Time 2 than they did at Time 1. These frequencies were used to calculate the proportion of participants that would be expected to remain in the same clusters by chance alone (Table 9.14.)

Table 9.14. Observed Frequencies and Proportions Expected to Remain in the same Clusters (from Time 1 to Time 2) by Chance

	Cluster 1	Cluster 2	Cluster 3
Observed	106	15	2
Proportions by chance	93	9	1

Following from the results presented in Table 9.14., and keeping in mind that the total number of participants was 187, the total numbers of participants remaining in the same cluster and those changing cluster from Time 1 to Time 2 is presented in Table 9.15. for the Observed Frequencies and the Proportions by Chance.

Table 9.15. Total Numbers of Participants remaining in the Same Cluster and Total Number Changing Cluster from Time 1 to Time 2

	Remain in Same Cluster from Time 1 to Time 2	Change Cluster from Time 1 to Time 2	Total
Observed	123	64	187
Proportions by chance	103	84	187
Total	226	148	374

A Chi-square test was then carried out using the frequencies presented in Table 9.15. The X^2_{obt} in this case was 4.46 whilst X^2_{crit} is 6.64 ($\rho<.01$) and 3.84 ($\rho<.05$). Therefore, the results indicate that more participants remained in the same clusters over time than they would have by chance alone at a significance level of $\rho<.05$. The results presented above will also be compared with those obtained for the Verbal and Numerical Test GO profiles over time. The results of the analyses for assessing stability of Verbal Test GO profiles over time are presented next.

The data collected at Time E1 and Time E2 were used in the analyses of Verbal Test GO profiles over time. The analyses of the stability of Verbal Test GO profiles over time are presented below.

Table 9.16. Frequency Table indicating the Verbal Test GO Profiles Adopted by Participants at Time 1 and Time 2. (N=68)

		Verbal Test GO Profile Cluster at Time 2			Total
Verbal Test GO Profile Cluster at Time 1		**1**	**2**	**3**	
	1	*23*	7	2	32
	2	9	*12*	2	23
	3	2	3	*8*	13
	Total	34	22	12	68

The frequency table shows that 43 participants (63%) adopted the same GO profile on the Verbal Test at Time 1 and Time 2 whilst 25 participants (37%) adopted different GO profiles on the Verbal Test at Time 1 and Time 2. In order to assess the stability of Verbal Test GO profiles further, the computations described in Section 9.1.1. were carried out and the results are presented in Tables 9.17. and 9.18.

Table 9.17. Observed Frequencies and Proportions Expected to Remain in the same Clusters (from Time 1 to Time 2) by Chance

	Cluster 1	Cluster 2	Cluster 3
Observed	23	12	8
Proportions by chance	16	7	2

Following from the results presented in Table 9.17., and keeping in mind that the total number of participants was 68, the total numbers of participants remaining in the same cluster and those changing cluster from Time 1 to Time 2 is presented in Table 9.18. for the Observed Frequencies and the Proportions by Chance.

Table 9.18. Total Numbers of Participants remaining in the Same Cluster and Total Number Changing Cluster from Time 1 to Time 2

	Remain in Same Cluster from Time 1 to Time 2	Change Cluster from Time 1 to Time 2	Total
Observed	43	25	68
Proportions by chance	25	43	68
Total	68	68	136

A Chi-square test was carried out using the frequencies presented in Table 9.18. The X^2_{obt} in this case was 9.53 whilst X^2_{crit} is 6.64 ($\rho<.01$). Therefore, the results indicate that more participants remained in the same clusters over time than they would have by chance alone. These results seem to indicate a possibility of Verbal Test GO profiles being stable over time. The results of the analyses assessing the stability of Numerical Test GO profiles over time are presented next.

Table 9.19. Frequency Table indicating the Numerical Test Goal Orientation Profiles Adopted by Participants at Time 1 and Time 2. (N=71)

	Numerical Test GO Profile Cluster at Time 2				Total
		1	**2**	**3**	
Numerical Test GO Profile Cluster at Time 1	**1**	*30*	10	0	40
	2	4	*5*	4	13
	3	1	7	*5*	13
	4	2	3	0	5
	Total	37	25	9	71

Table 9.19. shows that 40 participants (56%) adopted the same GO profile on the Numerical Test at both Time 1 and Time 2. On the other hand, 31 participants (44%) adopted different GO profiles on the Numerical Test at Time 1 and Time 2. The same computations used to assess the stability of Verbal Test GO profiles over time were used here. The results are presented below.

Table 9.20. Observed Frequencies and Proportions Expected to Remain in the same Clusters (from Time 1 to Time 2) by Chance

	Cluster 1	Cluster 2	Cluster 3
Observed	30	5	5
Proportions by chance	21	5	2

Following from the results presented in Table 9.20., and keeping in mind that the total number of participants was 71, the total numbers of participants remaining in the same cluster and those changing cluster from Time 1 to Time 2 are presented in Table 9.21. for the Observed Frequencies and the Proportions by Chance.

Table 9.21. Total Numbers of Participants remaining in the Same Cluster and Total Number Changing Cluster from Time 1 to Time 2

	Remain in Same Cluster from Time 1 to Time 2	Change Cluster from Time 1 to Time 2	Total
Observed	40	31	71
Proportions by chance	28	43	71
Total	68	74	142

A Chi-square test was carried out using the frequencies presented in Table 9.21. The X^2_{obt} in this case was 4.07 whilst X^2_{crit} is 6.64 ($\rho<.01$) and 3.84 ($\rho<.05$). Therefore, the results indicate that more participants remained in the same clusters over time than they would have by chance alone at $\rho<.05$. These results point towards the possibility of Numerical Test GO profiles being stable over time.

Overall, the task-specific GO profile results seem to indicate that task-specific GO profiles may be stable over time. The results indicate that for Verbal Test GO profiles one can be confident at a significance level of 0.01 that more participants remained in the same clusters over time than they would have by chance alone. In contrast, for Hypothetical Task and Numerical Test GO profiles one can be confident at a significance level of 0.05 that that more participants remained in the same clusters over time than they would have by chance alone. The results obtained in this study do not provide any definite conclusions regarding the stability of task-specific GO profiles over time. They do, however, provide an initial indication. Recommendations for future research investigating the stability of task-specific GO profiles over time will be made in Chapter 11 Section 11.3. The next section of this chapter addresses the issue of Generality versus Task-Specificity of GOs.

9.2. Assessing Generality and/or Task-Specificity of Goal Orientations

This section focuses on examining whether GOs are general or whether they are more accurately measured using task-specific measures. The results presented in this section address Research Questions 4a, 4b, 4c and 4d. First the Hypothetical Task, Verbal Test and Numerical Test GOs are compared (from the profile and non-profile perspectives). Following this, participants' General GOs are compared with their Hypothetical Task, Verbal Test and Numerical Test GOs (from the profile and non-profile perspectives).

9.2.1. Assessing the Task-Specificity of Goal Orientation Profiles

This sub-section addresses Research Question 4a.

Research Question 4a. Do participants adopt different goal orientation profiles across tasks?

In order to answer this Research Question three comparisons were made. Firstly, Hypothetical Task GO profiles (at Time 1) were compared with Verbal Test GO profiles (at Time 1). Secondly, Hypothetical Task GO profiles (at Time 1) were compared with Numerical Test GO profiles (at Time 1) and thirdly, Verbal Test GO profiles (at Time 1) were compared with Numerical Test GO profiles (at Time 1). The results of the LCAs for GOs on the Hypothetical Task (Table 8.31., Table 8.32., Figure 8.3.) Verbal Test (Table 8.35., Table 8.36., Figure 8.5.) and Numerical Test (Table 8.39., Table 8.40., Figure 8.7.) at Time 1 were used for making these comparisons.

Before comparing the GO profiles on different tasks it was necessary to compare the clusters obtained from the LCAs of the different task-specific GOs since it would only be possible to compare like with like. For example, it was necessary to check whether the 3 GO profile clusters obtained from the LCA of Verbal Test GOs (at Time 1) were similar to 3 of the 4 GO profile clusters obtained from the LCA of Hypothetical Task GOs (at Time 1). The comparison of the clusters indicated that the GO profiles adopted on different tasks were very similar with the exception of Cluster 4 on the Hypothetical Task and Numerical Test. Consequently, (with the exception of Cluster 4 on the Hypothetical Task and Numerical Test) participants in the same clusters across tasks are assumed to have adopted the same GO profiles. Again, since the clusters are not *exactly* the same analyses of whether participants change clusters or stay in the same one is necessarily approximate.

The posterior classification results used in the analyses of data for answering Research Question 5a were used to draw up the frequency tables indicating the GO profiles adopted by participants across tasks. The results comparing the GO profiles adopted by participants on different tasks are presented in Tables 9.22. through to 9.30. Hypothetical Task and Verbal Test GO profiles will be compared first. Next, Hypothetical Task and Numerical Test GO profiles will be compared. Finally, a comparison of the GO profiles adopted by participants on the Verbal and Numerical Tests is presented. The computations described in Section 9.1.1. are used to assess the task-specificity of GO profiles.

Table 9.22. Frequency Table indicating the Hypothetical Task and Verbal Test Goal Orientation Profiles Adopted by Participants at Time 1 (N=67)

		Verbal Test GO Profile Cluster at Time 1			Total
Hypothetical Task GO Profile Cluster at Time 1		**1**	**2**	**3**	
	1	*31*	15	6	52
	2	1	*5*	5	11
	3	1	1	*2*	4
	Total	33	21	13	67

The results in Table 9.22. show that 38 participants (57%) adopted the same GO profile on the Hypothetical Task and the Verbal Test whilst 29 participants (43%) adopted a different GO profile. Therefore, nearly half of the participants adopted a different GO profile on the different tasks. The observed frequencies of participants in each cluster as well as the proportions of participants expected to be in each cluster by chance are presented in Table 9.23.

Table 9.23. Observed Frequencies and Proportions Expected to Remain in the same Clusters across the Hypothetical Task and Verbal Test by Chance

	Cluster 1	Cluster 2	Cluster 3
Observed	31	5	2
Proportions by chance	26	3	1

Following from the results presented in Table 9.23., and keeping in mind that the total number of participants was 67, the total numbers of participants remaining in the same cluster and those changing cluster across the Hypothetical Task and Verbal Test are presented in Table 9.24. for the Observed Frequencies and the Proportions by Chance.

Table 9.24. Total Numbers of Participants remaining in the Same Cluster and Total Number Changing Cluster across the Hypothetical Task and Verbal Test

	Remain in Same Cluster across tasks	Change Cluster across tasks	Total
Observed	38	29	67
Proportions by chance	30	37	67
Total	68	66	134

A Chi-square test was carried out using the frequencies presented in Table 9.24. The X^2_{obt} in this case was 1.87 whilst X^2_{crit} is 6.64 ($\rho<.01$) and 3.84 ($\rho<.05$). Therefore, the results indicate that more participants would have remained in the same clusters across tasks by chance alone thus pointing towards participants adopting different Hypothetical Task and Verbal Test GO profiles. The implications of these findings will be discussed in Chapter 10 Section 10.8.1. A comparison of Hypothetical Task and Numerical Test GO profiles is presented next.

Table 9.25. Frequency Table indicating the Hypothetical Task and Numerical Test Goal Orientation Profiles Adopted by Participants at Time 1 (N=67)

<table>
<tr><td></td><td colspan="5">Numerical Test GO Profile Cluster at Time 1</td><td>Total</td></tr>
<tr><td rowspan="4">Hypothetical Task GO Profile Cluster at Time 1</td><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td></td></tr>
<tr><td>1</td><td>36</td><td>6</td><td>5</td><td>5</td><td>52</td></tr>
<tr><td>2</td><td>2</td><td>4</td><td>5</td><td>0</td><td>11</td></tr>
<tr><td>3</td><td>1</td><td>2</td><td>1</td><td>0</td><td>4</td></tr>
<tr><td></td><td>Total</td><td>39</td><td>12</td><td>11</td><td>5</td><td>67</td></tr>
</table>

Table 9.25. shows that 41 participants (61%) adopted the same GO profile on the Hypothetical Task as they did on the Numerical Test. Once again the observed

frequencies were compared with the frequencies one would expect to obtain by chance. The results of this comparison are presented in Tables 9.26. and 9.27.

Table 9.26. Observed Frequencies and Proportions Expected to Remain in the same Clusters across the Hypothetical Task and Numerical Test by Chance

	Cluster 1	Cluster 2	Cluster 3
Observed	36	4	1
Proportions by chance	30	2	1

Following from the results presented in Table 9.26., and keeping in mind that the total number of participants was 67, the total numbers of participants remaining in the same cluster and those changing cluster across the Hypothetical Task and Numerical Test are presented in Table 9.27. for the Observed Frequencies and the Proportions by Chance.

Table 9.27. Total Numbers of Participants remaining in the Same Cluster and Total Number Changing Cluster across the Hypothetical Task and Numerical Test

	Remain in Same Cluster across tasks	Change Cluster across tasks	Total
Observed	41	26	67
Proportions by chance	33	34	67
Total	74	60	134

The X^2_{obt} from the Chi-square test in this case was 1.93 whilst X^2_{crit} is 6.64 ($\rho<.01$) and 3.84 ($\rho<.05$). Therefore, the results indicate that more participants would have remained in the same clusters across tasks by chance alone. These results point towards the possibility that participants seem to adopt different Hypothetical Task and Numerical Test GO profiles. The implications of these findings will be discussed in Chapter 10 Section 10.8.1. and Chapter 11 Section 11.1. The comparison of Verbal and Numerical Tests GO profiles at Time 1 is presented next.

Table 9.28. Frequency Table indicating the Verbal and Numerical Test Goal Orientation Profiles Adopted by Participants at Time 1 (N=71)

		Numerical Test GO Profile Cluster at Time 1				**Total**
Verbal Test GO Profile Cluster at Time 1		**1**	**2**	**3**	**4**	
	1	*31*	1	0	2	34
	2	7	*10*	3	3	23
	3	2	2	*10*	0	14
	Total	40	13	13	5	71

51 participants (72%) seem to have adopted the same GO profiles on the Verbal and Numerical Tests. Therefore, it seems as though more participants adopted the same GO profiles across the Verbal and Numerical Tests than they did across the Hypothetical Task and Verbal and Numerical Tests, respectively. These observed frequencies were compared with the frequencies one would expect to obtain by chance (refer to Tables 9.29. and 9.30.)

Table 9.29. Observed Frequencies and Proportions Expected to Remain in the same Clusters across the Verbal and Numerical Tests by Chance

	Cluster 1	**Cluster 2**	**Cluster 3**
Observed	31	10	10
Proportions by chance	19	4	3

The total numbers of participants remaining in the same cluster and those changing cluster across the Verbal and Numerical Tests are presented in Table 9.30.

Table 9.30. Total Numbers of Participants remaining in the Same Cluster and Total Number Changing Cluster across the Verbal and Numerical Tests

	Remain in Same Cluster across tasks	**Change Cluster across tasks**	**Total**
Observed	51	20	71
Proportions by chance	26	45	71
Total	77	65	142

The Chi-square test produced a X^2_{obt} of 17.7 (X^2_{crit} is 6.64, ρ<.01). Therefore, the results indicate that (many!) more participants remained in the same clusters across the Verbal and Numerical Tests than they would have by chance alone thus showing that participants seem to adopt very similar Verbal and Numerical Test GO profiles.

There are three possible explanations for more participants adopting different Hypothetical Task and Verbal (and Numerical) Test GO profiles but similar Verbal and Numerical Test GO profiles. Firstly, the Hypothetical Task GOs were measured at a different point in time than the Verbal and Numerical Test GOs. Consequently, the adoption of different GO profiles may be due to lack of stability over time rather than across tasks (from here on referred to as 'time differences'). Since Verbal and Numerical Test GOs were measured during the same experimental session (Time E1), this might have decreased the variation in GO profiles adopted on these two tasks.

Secondly, the Verbal and Numerical Test GOs were measured under very similar conditions whilst the Hypothetical Task was measured in a very different context. The Verbal and Numerical Test GOs were measured under experimental conditions (at Time E1) whilst the Hypothetical Task GOs were measured during the survey (at Time Q1). Consequently, this variation in the adoption of GO profiles may have resulted due to situational variance (from here on referred to as 'situational differences').

Thirdly, the adoption of different GO profiles may have resulted from task variation since the Verbal and Numerical Tests were more similar to each other than they were to the Hypothetical Task. It may be said that Verbal and Numerical Tests fall into the same domain, possibly the 'academic domain' whilst the Hypothetical Tasks cannot be classified in the same domain as the Verbal and Numerical Tests. Therefore, it is possible that GO profiles are domain-specific.

Unfortunately, due to these different possibilities, it is not possible to answer this Research Question in a straightforward manner. However, the results do seem to indicate a strong possibility that GO profiles are domain-specific. These findings will be discussed in further detail in Chapter 10 Section 10.8.1. Next the task-specificity of GOs from the non-profile perspective is presented.

9.2.2. Assessing the Task-Specificity of Goal Orientations

It was thought necessary to investigate the task-specificity of GOs from the non-profile perspective since this might provide further insight into the results obtained with respect to the task-specificity of GO *profiles*. This section addresses Research Question 4c.

Research Question 4c. Do participants' adopt different goal orientations across tasks?

The data collected at Time Q1 and Time E1 were used in these analyses. In order to answer this Research Question participants' Hypothetical Task GOs were compared with their Verbal and Numerical Test GOs. Moreover, participants' Verbal and Numerical Test GOs were compared with each other. Task-specificity was assessed in terms of mean-level change as well as differential continuity. First the differential continuity results will be presented. Following this the mean-level change results will be presented.

The correlational analyses results for assessing the differential continuity of GOs across tasks were provided in Chapter 8 Tables 8.44 and 8.45. The correlation coefficients obtained for Hypothetical Task GOs and Verbal Test GOs ranged from non-significant to 0.61 ($\rho<.01$). Since there was only one non-significant correlation (for the MAV GOs) and the rest were significant at $\rho<.01$, it is quite unlikely that the significant correlations found were a result of Type I error. The correlations for Hypothetical Task GOs and Numerical Test GOs ranged between non-significant and 0.57 ($\rho<.01$). In this case, the MAP and MAV GO correlations should be interpreted with caution due to the possibility of Type I error. The PAP and PAV GO correlations were all significant at $\rho<.01$. The correlation coefficients for Verbal and Numerical Test GOs (at Time 1) ranged from 0.68 to 0.81 ($\rho<.01$). Since they were all significant at $\rho<.01$, it is highly unlikely that they are the result of Type I error. The first noticeable thing is that the correlation coefficients for Verbal and Numerical Tests are much stronger than those for the Hypothetical Task and Verbal and Numerical Tests, respectively. In order to test whether there were any significant differences between the strengths of these correlations Fisher z tests were carried out. The results are presented in Table 9.31.

In order to make things slightly simpler, the correlations between the Hypothetical Task and Verbal Test GOs will be referred to as 'Hypothetical Verbal'. The correlations between the Hypothetical Task and the Numerical Test GOs will be referred to as 'Hypothetical Numerical' and the correlations between the Verbal and Numerical Test GOs will be referred to as 'Aptitude Test'.

Table 9.31. Testing for Significant Differences in the correlation coefficients of the Task-Specific GOs

GO	Comparison and Ns		z-statistic	p-value
MAP	HYPV (N=69)	APT (N=71)	-1.58	.11
MAV	HYPV (N=68)	APT (N=70)	-2.92	<.01
PAP	HYPV (N=68)	APT (N=71)	-2.67	<.01
PAV	HYPV (N=68)	APT (N=71)	-3.1	<.01
MAP	HYPN (N=69)	APT (N=71)	-2.32	.02
MAV	HYPN (N=67)	APT (N=70)	-3.16	<.01
PAP	HYPN (N=68)	APT (N=71)	-2.21	.03
PAV	HYPN (N=68)	APT (N=71)	-3.85	<.01

Key: HYPV=Correlation between Hypothetical Task and Verbal Test Goal Orientations; HYPN= Correlation between Hypothetical Task and Numerical Test Goal Orientations; APT= Correlation between Verbal and Numerical Test Goal Orientations.

The Fisher z test results indicate clearly that there are significant differences between the strengths of the correlation coefficients of GOs for the Hypothetical Verbal and Aptitude Test as well as for Hypothetical Numerical and Aptitude Tests. The only exception is for the Hypothetical Verbal and Aptitude Test MAP GO. It seems as though there is significantly more stability of GOs across the Aptitude Tests than there is across the Hypothetical Tasks and aptitude tests. This is consistent with the results obtained when assessing the task-specificity of GO profiles. These differential continuity results will be compared with the mean-level change results (presented below).

Repeated measures Analyses of Variance were carried out using the data collected at Time Q1 and Time E1 to examine the mean-level change of participants' GOs across tasks. The mean GO scores on each task were presented in Chapter 8 Section 8.2. Task Experience was included as a covariate in these analyses since it might have influenced the type of GOs that participants adopted on the Verbal and Numerical Tests. Practice was not included this time since only the data collected at Time 1 were used. Practice refers to the amount of practice on tests between Time 1 and Time 2 therefore it was not relevant in this case. This time the task was the independent variable and the GO being assessed was the dependent variable. The significant results are presented in Table 9.32. through to Table 9.38.

Table 9.32. Assessing Mean Level Change of Mastery-Approach GOs across the Hypothetical Task and Verbal Test (N=69)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	258.84	1	258.84	457.90	<.01
Task Experience on Verbal Test	<.01	1	<.01	<.01	.95
Error	37.87	67	.57		
Within Subject					
Task	2.53	1	2.53	9.51	<.01
Task * Task Experience on Verbal Test	1.45	1	1.45	5.44	.02
Error	17.83	67	.27		

Table 9.33. Assessing Mean Level Change of Performance-Approach GO across the Hypothetical Task and Verbal Test (N=68)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	237.10	1	237.10	264.80	<.01
Task Experience on Verbal Test	.32	1	.32	.36	.55
Error	59.10	66	.90		
Within Subject					
Task	4.53	1	4.53	11.03	<.01
Task * Task Experience on Verbal Test	2.00	1	2.00	4.85	.03
Error	27.07	66	.41		

Table 9.34. Assessing Mean Level Change of Performance-Avoidance GO across the Hypothetical Task and Verbal Test (N=68)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	237.46	1	237.46	251.36	<.01
Task Experience on Verbal Test	.08	1	.08	.08	.78
Error	62.35	66	.95		
Within Subject					
Task	6.11	1	6.11	22.92	<.01
Task * Task Experience on Verbal Test	3.42	1	3.42	12.84	<.01
Error	17.59	66	.27		

Table 9.35. Assessing Mean Level Change of Mastery-Approach GO across the Hypothetical Task and Numerical Test (N=69)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	183.83	1	183.83	294.62	<.01
Task Experience on Numerical Test	1.66	1	1.66	2.65	.11
Error	41.81	67	.62		
Within Subject					
Task	3.34	1	3.34	8.74	<.01
Task * Task Experience on Numerical Test	1.30	1	1.30	3.41	.07
Error	25.58	67	.38		

Table 9.36. Assessing Mean Level Change of Mastery-Avoidance GO across the Hypothetical Task and Numerical Test (N=67)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	156.87	1	156.87	244.56	<.01
Task Experience on Numerical Test	1.11	1	1.11	1.73	.19
Error	41.69	65	.64		
Within Subject					
Task	3.42	1	3.42	8.45	<.01
Task * Task Experience on Numerical Test	1.09	1	1.09	2.68	.11
Error	26.34	65	.41		

Table 9.37. Assessing Mean Level Change of Performance-Approach GO across the Hypothetical Task and Numerical Test (N=68)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	149.80	1	149.80	141.62	<.01
Task Experience on Numerical Test	2.35	1	2.35	2.22	.14
Error	69.81	66	1.06		
Within Subject					
Task	4.00	1	4.00	8.36	<.01
Task * Task Experience on Numerical Test	1.25	1	1.25	2.61	.11
Error	31.58	66	.48		

Table 9.38. Assessing Mean Level Change of Performance-Avoidance GO across the Hypothetical Task and Numerical Test (N=68)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	153.87	1	153.87	149.67	<.01
Task Experience on Numerical Test	3.24	1	3.24	3.16	.08
Error	67.85	66	1.03		
Within Subject					
Task	3.93	1	3.93	11.03	<.01
Task * Task Experience on Numerical Test	1.77	1	1.77	4.97	.03
Error	23.52	66	.36		

No significant differences in mean-levels across Verbal and Numerical Test GOs were found. However, participants' Hypothetical Task GOs were significantly higher than their Verbal and Numerical Test GOs in all cases except for the MAV GOs across the Hypothetical Task and Verbal Test. These results reflect the Fisher z test results presented in Table 9.12. The only difference is that for the Fisher z results there were no significant differences in the correlation strengths for the MAP Hypothetical Verbal and Aptitude Test and a significant difference in the correlation strengths for the MAV Hypothetical Verbal and Aptitude Test.

As discussed earlier, it may be the case that there were no significant differences between the Verbal and Numerical Test GOs because these are quite similar to each other, in that they are both academic tasks. On the other hand, the Hypothetical Tasks were very different from both the Verbal and the Numerical Tests. Consequently, in answer to Research Question 4c, yes, GOs do seem to change significantly across tasks.

However, these differences only seem to occur when the tasks are very different from each other. In fact, it seems possible that GOs may be domain-specific as opposed to task-specific. This possibility will be discussed further in Chapter 10 Section 10.8.1. In order to eliminate the possibility that these observed differences were due to situational differences (survey vs. experiment) or time differences (Verbal and Numerical Test were measured on the same day whilst Hypothetical Task GOs were measured on a different day) further research is required. This will be discussed in Chapter 11 Section 11.3.

9.2.3. Examining Differences between General and Task-Specific Goal Orientation Profiles

In order to assess the utility of using task-specific versus general measures of GOs in research it was thought useful to examine whether there are any differences between the General GOs of participants and their task-specific GOs. The differences between General and Task-Specific GO *profiles* of participants are addressed first (in response to Research Question 4b) followed by the analyses of differences from the non-profile perspective (Section 9.2.4.).

Research Question 4b. Are participants' task-specific goal orientation profiles different from their General goal orientation profiles?

The results of the analyses presented in Sections 8.5.1., 8.5.2., 8.5.3. and 8.5.4. (which presented the results of the LCAs of General and Task-specific GOs) were used to answer this Research Question. The posterior classification of participants to clusters (carried out in order to answer Research Questions 2a and 5a) was used to assess whether participants General GO profiles were different from their task-specific GO profiles. The results of these comparisons are presented in Table 9.39. through to Table 9.47. The comparison between the General and Hypothetical Task GO profiles is presented first.

Table 9.39. Frequency Table indicating the General and Hypothetical Task Goal Orientation Profiles Adopted by Participants at Time 1 (N=617)

		Hypothetical Task GO Profile Cluster at Time 1				**Total**
General GO Profile Cluster at Time 1		**1**	**2**	**3**	**4**	
	1	*394*	63	12	2	471
	2	78	*41*	10	0	129
	3	1	4	*3*	1	9
	4	1	4	0	3	8
	Total	474	112	25	6	617

The results presented above show that 441 participants (71%) adopted the same General and Hypothetical Task GO profiles whilst 176 participants (29%) adopted different General and Hypothetical Task GO profiles. These results seem to indicate that there was not much variation in the General and Hypothetical Task GO profiles adopted by participants. However, before drawing any conclusions, the frequencies presented above will be compared to the frequencies expected by chance (using the methods described in Section 9.1.1.). The results are presented in Tables 9.40. and 9.41.

Table 9.40. Observed Frequencies and Proportions Expected to Remain in the same General and Hypothetical Task GO Clusters by Chance

	Cluster 1	**Cluster 2**	**Cluster 3**	**Cluster 4**
Observed	394	41	3	3
Proportions by chance	362	23	0	0

The total numbers of participants remaining in the same cluster and those changing cluster for General and Hypothetical Task GOs is presented in Table 9.41. for the Observed Frequencies and the Proportions by Chance.

Table 9.41. Total Numbers of Participants remaining in the Same Cluster and Total Number Changing Cluster General and Hypothetical Task GOs

	Remain in Same Cluster	**Change Cluster**	**Total**
Observed	441	176	617
Proportions by chance	385	232	617
Total	826	408	1234

A Chi-square test was carried out using the frequencies presented in Table 9.41. The X^2_{obt} in this case was 11.49 whilst X^2_{crit} is 6.64 ($\rho<.01$). The results indicate that more participants remained in the same clusters than they would have by chance alone (at $\rho<.01$). These results seem to point towards the possibility of participants adopting similar General and Hypothetical Task GO profiles. The comparison of the General and Verbal Test GO profiles adopted by participants is presented next.

Table 9.42. Frequency Table indicating the General and Verbal Test Goal Orientation Profiles Adopted by Participants at Time 1 (N=67)

		Verbal Test GO Profile Cluster at Time 1			**Total**
		1	**2**	**3**	
General GO Profile Cluster at Time 1	**1**	*30*	8	6	44
	2	2	*14*	5	21
	3	0	1	*0*	1
	4	0	0	1	1
	Total	32	23	12	67

The results presented in Table 9.42. show that 44 participants (66%) adopted the same Verbal Test and General GO profiles whilst 23 participants (34%) had a different Verbal Test and General GO profiles. The frequencies presented above were compared to those expected by chance (Tables 9.43. and 9.44.).

Table 9.43. Observed Frequencies and Proportions Expected to Remain in the same General and Verbal Test GO Clusters by Chance

	Cluster 1	**Cluster 2**	**Cluster 3**
Observed	30	14	0
Proportions by chance	21	7	0

The total numbers of participants remaining in the same cluster and those changing cluster for General and Verbal Test GOs are presented in Table 9.44. for the Observed Frequencies and the Proportions by Chance.

Table 9.44. Total Numbers of Participants remaining in the Same Cluster and Total Number Changing Cluster General and Verbal Test GOs

	Remain in Same Cluster	Change Cluster	Total
Observed	44	23	67
Proportions by chance	28	39	67
Total	72	62	134

The Chi-square test carried out produced a X^2_{obt} of 7.69 (X^2_{crit} = 6.64, ρ<.01). Therefore, the results indicate that more participants remained in the same clusters than they would have by chance alone (at ρ<.01). Consequently, it seems as though participants may be adopting similar General and Verbal Test GO profiles. The comparison of participants' General and Numerical Test GO profiles is presented next.

Table 9.45. Frequency Table indicating the General and Numerical Test Goal Orientation Profiles Adopted by Participants at Time 1 (N=71)

		Numerical Test GO Profile Cluster at Time 1				Total
		1	**2**	**3**	**4**	
General GO Profile Cluster at Time 1	**1**	*30*	5	7	2	44
	2	8	*7*	3	3	21
	3	0	1	*0*	0	1
	4	0	0	1	0	1
	Total	38	13	11	5	67

Table 9.45. shows that 37 participants (55%) adopted the same General and Numerical Test GO profiles. However, 30 participants (45%) adopted different General and Numerical Test GO profiles. The analyses results to test whether more or less participants than would be expected by chance alone changed cluster (or not) are presented below (Tables 9.46. and 9.47.).

Table 9.46. Observed Frequencies and Proportions Expected to Remain in the same General and Numerical Test GO Clusters by Chance

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Observed	30	7	0	0
Proportions by chance	25	4	0	0

The total numbers of participants remaining in the same cluster and those changing cluster for General and Numerical Test GOs is presented in Table 9.47. for the Observed Frequencies and the Proportions by Chance.

Table 9.47. Total Numbers of Participants remaining in the Same Cluster and Total Number Changing Cluster General and Numerical Test GOs

	Remain in Same Cluster	Change Cluster	Total
Observed	37	30	67
Proportions by chance	29	38	67
Total	66	68	134

The X^2_{obt} in this case was 1.91 whilst X^2_{crit} is 6.64 ($\rho<.01$) and 3.84 ($\rho<.05$). Therefore, the results indicate that more participants would have remained in the same clusters by chance alone. These results indicate that participants may be adopting different General and Numerical Test GO profiles.

Overall, the chi-square results point towards the possibility that General GO profiles are different to Numerical Test GO profiles but not necessarily different to Hypothetical Task and Verbal Test GO profiles. However, as described earlier, these results are not enough to draw any solid conclusions regarding the task-specificity of GO profiles. They do however, provide an indication that General GO profiles may be different to task-specific GO profiles (particularly Numerical Test GO profiles). Furthermore, it is not entirely clear why General GO profiles seem to be more different to Numerical Test GO profiles than they are to Hypothetical Task and Verbal Test GO profiles. Additional investigation of the differences between General and task-specific GO profiles is definitely required before any conclusions may be drawn.

The answer to Research Question 4b is that at a significance level of $\rho<.01$ more participants would be expected to adopt the same General and Numerical Test GO profiles *by chance alone*. However, at a significance level of $\rho<.05$ more participants *than would be expected by chance alone* adopt similar General, Verbal Test and Hypothetical Task GO profiles. The next section takes this examination of the similarities and/or differences between General and Task-specific GOs a step further by comparing the General and Task-specific GOs from the non-profile perspective.

9.2.4. Examining Differences between General and Task-Specific Goal Orientations

This section focuses on examining differences between General and Task-Specific GOs from the non-profile perspective and provides the results required to answer Research Question 4d.

Research Question 4d. Are participants' task-specific goal orientations significantly different from their General goal orientations?

The data collected at Time Q1 and Time E1 were used to answer this Research Question. Similarly to Section 9.2.2., changes were assessed in terms of differential continuity as well as mean-level change. The differential continuity results are presented first and are followed by the mean-level change results.

The correlational analyses results for General and Task-Specific GOs were presented in Chapter 8 Tables 8.43, 8.44. and 8.45. The results indicate that the correlation coefficients for participants' General GOs with the Hypothetical Task GOs at Time 1 ranged from 0.38 ($\rho<0.01$) to 0.52 ($\rho<0.01$). Those for participants' General and Verbal Test GOs at Time 1 ranged from 0.27 ($\rho<0.01$) to 0.47 ($\rho<0.01$) whilst the ones for participants' General and Numerical Test GOs ranged from 0.28 ($\rho<0.01$) to 0.47 ($\rho<0.01$). These correlation coefficients are all relatively low when compared to the correlation coefficients assessing stability over time (ranging from 0.44 to 0.71 at $\rho<0.01$ for General, Hypothetical Task, Verbal and Numerical Test GOs over time). Since they were all found to be significant at $\rho<0.01$ it is unlikely that there is any Type I error here.

Repeated Measures Analyses of Variance were carried out in order to assess the mean-level change across participants' General and Verbal Test GOs as well as across participants' General and Numerical Test GOs. Similarly to the previous section Task

Experience was included as a covariate in these analyses. Task (that is, General GOs versus Verbal Test and Numerical Test GOs) was the independent variable whereas the relevant GO was the dependent variable. Paired samples t-tests were carried out to assess the mean-level change across participants' General and Hypothetical Task GOs (since these data were collected at Time 1 and there were no covariates to include in the analyses). The *significant* results are presented in Table 9.48. through to Table 9.54.

Table 9.48. Assessing Mean Level Change for Performance-Approach across the General GOs measure and Verbal Test (N=69)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	216.34	1	216.34	256.90	<.01
Task Experience on Verbal Test	.08	1	.08	.10	.76
Error	56.42	67	.84		
Within Subject					
PAP GO	1.58	1	1.58	4.31	.04
PAP GO * Task Experience on Verbal Test	.46	1	.46	1.26	.27
Error (PAP GO)	24.62	67	.37		

Table 9.49. Assessing Mean Level Change for Performance-Avoidance across the General GOs measure and Verbal Test (N=67)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	233.61	1	233.61	230.06	<.01
Task Experience on Verbal Test	<.01	1	<.01	<.01	.96
Error	66.00	65	1.02		
Within Subject					
PAV GO	4.88	1	4.88	13.61	<.01
PAV GO * Task Experience on Verbal Test	2.65	1	2.65	7.39	<.01
Error (PAV GO)	23.30	65	.36		

Table 9.50. Assessing Mean Level Change for Mastery-Approach across the General GOs measure and Numerical Test (N=69)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	174.04	1	174.04	270.75	<.01
Task Experience on Numerical Test	1.67	1	1.67	2.60	.11
Error	43.07	67	.64		
Within Subject					
MAP GO	2.13	1	2.13	6.64	<.01
MAP GO * Task Experience on Numerical Test	1.29	1	1.29	4.01	.05
Error (MAP GO)	21.51	67	.32		

Table 9.51. Assessing Mean Level Change for Mastery-Avoidance across the General GOs measure and Numerical Test (N=68)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	154.92	1	154.92	252.63	<.01
Task Experience on Numerical Test	1.18	1	1.18	1.92	.17
Error	40.47	66	.61		
Within Subject					
MAP GO	2.84	1	2.85	8.27	<.01
MAP GO*Task Experience on Numerical Test	1.01	1	1.01	2.94	.09
Error (MAP GO)	22.72	66	.34		

Table 9.52. Assessing Mean Level Change for Performance-Approach across the General GOs measure and Numerical Test (N=69)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	146.57	1	146.57	145.12	<.01
Task Experience on Numerical Test	3.16	1	3.16	3.13	.08
Error	67.67	67	1.01		
Within Subject					
PAP GO	3.40	1	3.40	8.46	<.01
PAP GO * Task Experience on Numerical Test	1.23	1	1.23	3.07	.08
Error (PAP GO)	26.92	67	.40		

Table 9.53. Assessing Mean Level Change for Performance-Avoidance across the General GOs measure and Numerical Test (N=67)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	159.84	1	159.84	163.66	<.01
Task Experience on Numerical Test	2.62	1	2.62	2.69	.11
Error	63.48	65	.98		
Within Subject					
PAV GO	3.59	1	3.59	6.70	<.01
PAV GO * Task Experience on Numerical Test	1.80	1	1.80	3.36	.07
Error (PAV GO)	34.87	65	.54		

Table 9.54. Assessing Mean Level Change in GOs across the General GO measures and the Hypothetical Task (N≈65)

Variables	GEN GO Mean	GEN GO SD	HYP GO Mean	HYP GO SD	Df	T-value	Sig
MAP	3.88	.56	3.96	.66	623	-2.87	<.01
MAV	3.76	.64	3.71	.69	620	1.70	.09
PAP	3.96	.67	3.80	.76	624	5.78	<.01
PAV	3.98	.74	3.87	.62	619	3.86	<.01

Key: GEN = General; HYP = Hypothetical Task

In terms of mean-level change, General and Verbal Test GOs were not found to be significantly different from each other for MAP and MAV GOs. However, the PAP and PAV General GOs were significantly higher than the corresponding Verbal Test GOs. Moreover, all four General GOs were significantly higher than the corresponding Numerical Test GOs. The MAP General GO was significantly lower than the MAP Hypothetical Task GO whilst the PAP and PAV General GOs were significantly higher than the PAP and PAV Hypothetical Task GOs, respectively. Therefore, in response to Research Question 4d, taken together, these results indicate that General GOs are significantly different from task-specific GOs though in absolute terms the differences are small. These findings will be discussed in further detail in Chapter 10 Section 10.8.2. The next section focuses on the effects of the interactions between Trait and Induced GOs on performance.

9.3. Examining the Effects (if any) of the Interactions between Trait and Induced GOs on Participant Performance

In Section 9.1.2. the results indicated that the inductions did not seem to be successful. Nevertheless it was thought necessary to investigate if there were any interaction effects (between the Trait and Induced GOs) on the performance of participants. This decision was made because there was a possibility that although participants did not consciously change their GOs, there might have still been an influence on their performance. If GOs were found to be general and stable the General GOs of participants would have been used as the 'trait' GOs in these analyses. However, since the results presented so far provide some evidence that participants' General GOs may be different from their task-specific GOs it was thought best to use the task-specific (Verbal and Numerical Test) GOs measured at Time 1 (when no inductions were present) as the trait GOs. This decision was made in order to ensure that any differences in the mean levels of GOs were not a result of different 'types' (e.g. General vs. Verbal Test) of GOs being measured but a result of the inductions. Therefore, in order to test the GO interactions on the Verbal Tests, the Verbal Test GOs at Time 1 were considered to be the 'trait GOs' whereas the Verbal Test GOs at Time 2 were considered to be the 'induced GOs'. Similarly, the Numerical Test GOs at Time 1 and Time 2 were considered to be the 'trait' and 'induced' GOs, respectively, when assessing the interactions on the Numerical Tests. The results of the analyses carried out in order to test these interaction effects address Hypothesis 1 and Research Questions 3a, 3b, 3c and 3d which are discussed below. The data used in these analyses were collected at Time E1 (Verbal and Numerical Test GOs and Performance) and Time E2 (Verbal and Numerical Test GOs and Performance).

Research Question 3a addresses the interaction effects between 'trait' Verbal and Numerical Test GO **profiles** (i.e. Verbal and Numerical Test GO profiles at Time E1) and induced MAP and PAP GOs on performance. On the other hand, Hypothesis 1 and Research Questions 3b, 3c and 3d focus on the interaction effects between trait and induced GOs on performance from the non-profile perspective. Research Question 3a is answered first followed by Hypothesis 1 and Research Questions 3b, 3c, and 3d.

9.3.1. Research Question 3a. How do trait goal orientation profiles interact with induced mastery-approach and induced performance-approach goal orientations in order to influence the task performance of participants?

The experimental sample consisted of 71 participants at Time 2. The results presented in Chapter 8 Section 8.5.3. (Table 8.36.) indicated that at Time 1, 48%, 29%, 23% of participants (N=71) had Verbal Test GO profiles corresponding to Clusters 1, 2 and 3, respectively. The 29% and 23% of participants in Clusters 2 and 3 were assigned to the three experimental groups. Therefore, the sample size for participants having a Cluster 2 or Cluster 3 GO profile in each experimental group would not have been large enough to carry out statistical tests on. This resulted in Cluster 1 being the only cluster with a large enough sample to be tested. However, participants in this cluster were high on all the GOs. Consequently, the inductions would not have had much effect on participants in this cluster since they were designed to increase GO scores that were already near the top of the possible range. This was the same for Numerical Test GO profiles. Consequently, as a result of the small experimental sample size it was not possible to answer this Research Question.

9.3.2. Hypothesis 1. Individuals holding a trait mastery-approach goal orientation are expected to perform significantly better when a performance-approach goal orientation is induced as opposed to when a mastery-approach goal orientation is induced.

The focus of this Hypothesis was to test for differences in performance (depending on induction condition) for participants having a trait MAP GO. Therefore, only participants having a moderate to high Verbal Test MAP GO at Time 1 were included in these analyses. Ideally, only participants having a high Verbal Test MAP GO should have been included in the analyses. However, this would have made the sample size too small to analyse. For example, 51 participants had a high Verbal Test MAP GO at Time 1. However, at Time 2 these were assigned to three experimental groups, thus having only approximately 17 participants in each group. Consequently, participants having moderate Verbal Test MAP GO were also included in the analyses. Similarly, only participants having a moderate to high Numerical Test MAP GO at Time 1 were included in the analyses for assessing mean-level change in performance on the Numerical Test (as a result of the inductions). Moreover, had the experimental sample size been larger, only participants having low to moderate Verbal (or Numerical) Test PAP GOs at Time 1 would have been included. As mentioned in Section 9.1.2. the inductions would not have had much influence on participants who already had considerably high PAP GOs. However, due to the small experimental sample size and because a considerable portion of the sample size (as discussed in Section 9.1.2.) had high Verbal Test (and Numerical Test) PAP GOs it was not possible to exclude these participants.

In order to test this Hypothesis the performance of participants having a moderate to high Verbal/Numerical Test MAP GO at Time E1 (when there were no inductions) and Time E2 (when the GO inductions were made) was assessed. Repeated measures Analyses of Variance were carried out. This time Test Performance was the dependent variable, Time was a within-subjects variable and the Experimental Condition (that is, whether participants were assigned to the Control, MAP or PAP induction groups) was the between-subjects variable. Participants in all three experimental conditions were included in the analyses. Moreover, task experience and practice on the respective tests were included as covariates since these may have influenced participants' performance.

No significant changes in the performance of participants (having a moderate to high Verbal Test MAP GOs at Time 1) as a result of the experimental manipulations were found since the Time by Experimental Condition interaction was not significant ($F=0.55$, $p=0.58$). Consequently, with respect to the Verbal Test, Hypothesis 1 is not supported.

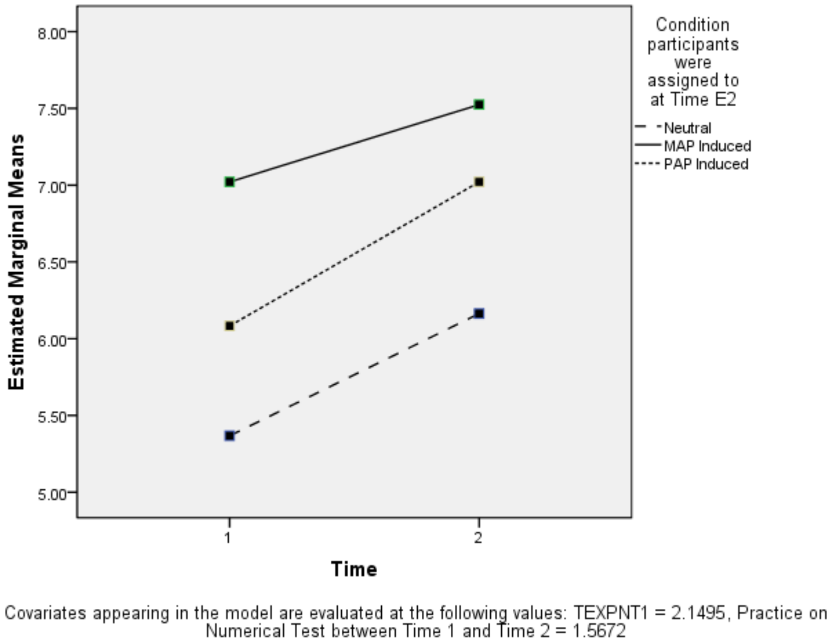
The results presented in Table 9.55. and Figure 9.2. indicate that, for the Numerical Tests, there was a significant difference in the performance of participants in different experimental conditions ($F=4.07$, $\rho=0.02$). However, there were no significant differences in Numerical Test performance over time ($F=0.85$, $\rho= 0.36$). In addition, there were no significant interaction effects (between Verbal Test MAP GO and MAP and PAP inductions) on performance (F=0.17, ρ= 0.85). Consequently, Hypothesis 1 was not supported for the Numerical Test either. The fact that there was a significant difference in the performance of participants in different experimental conditions (even at Time E1) indicates that more people with higher levels of verbal ability must have been assigned to the MAP induction group than the Control and PAP induction groups. This was an unfortunate happening which was probably magnified by the small sample size.

It is possible that the lack of support for Hypothesis 1 may have been caused by the inductions not being entirely successful. Moreover, as explained earlier, Hypothesis 1 may have been supported if only participants having a high Verbal (or Numerical) Test MAP GO and a low to moderate Verbal (or Numerical) Test PAP GO been included in the analyses. This will be discussed further in Chapter 10 Section 10.10.

Table 9.55. Repeated Measures ANOVA to test for changes in Numerical Test Performance from Time 1 to Time 2 depending on the Experimental Condition participants were assigned to (N=67)

Source of Variance	SS	Df	MS	F	Sig.
Between Subjects					
Intercept	29.42	1	29.42	4.68	.03
Task Experience on Numerical Test	65.31	1	65.31	10.39	<.01
Practice on Numerical Test	4.26	1	4.26	.68	.41
Experimental Condition	51.18	2	25.59	4.07	.02
Error	389.74	62	6.29		
Within Subject					
Time	2.77	1	2.77	.85	.36
Time*Task Experience on Numerical Test	5.45	1	5.45	1.67	.20
Time*Practice on Numerical Test	3.29	1	3.29	1.00	.32
Time*Experimental Condition	1.07	2	.54	.17	.85
Error	201.91	62	3.26		

Figure 9.2. Estimated Marginal Means of Numerical Test Performance from Time 1 to Time 2



9.3.3. Interaction Effects on Performance for Trait Mastery-Avoidance, Performance-Approach and Performance-Avoidance GOs and state Mastery-Approach and Performance-Approach GOs

Research Questions 3b, 3c and 3d focus on the interaction effects on performance of trait MAV GO (Research Questions 3b), PAP GO (Research Question 3c) and PAV GO (Research Question 3d) with state MAP and PAP GOs.

Since a considerable number of participants had a ‘high GOs’ profile on the Verbal and Numerical Tests (refer to Chapter 8 Sections 8.5.3. and 8.5.4.), many of the participants who were included in the analyses for Hypothesis 1 were also included in the analyses for these Research Questions. Consequently, the results of the analyses for Research Questions 3b, 3c and 3d are very similar to each other. Similarly to the results of Hypothesis 1, the results obtained indicated that there were no significant interaction effects on the (Verbal and Numerical Test) performance of participants having moderate to high trait MAV, PAP and PAV GOs when MAP and PAP GOs were induced.

9.4. Summary of Results

Before proceeding to the next chapter, a summary table of all the results obtained in this research study is provided in Table 9.56. The results are presented in the same order that they were presented in Chapters 8 and 9.

Table 9.56. Summary of Results

Hypothesis or Research Question	Result
Research Question 1. Using LCA as a method of clustering GOs, how many different types of GO profiles are there and what are the characteristics of each GO profile? Does the 2x2 model of GOs significantly improve on the 3-factor model in terms of identifying GO profiles?	Four main types of GO profiles emerged: a) High GOs b) High Mastery, Moderate Performance c) High Mastery, Low Performance d) High Performance-Avoidance In this study, for GO profiles, the 2x2 model of GOs was not found to necessarily improve on the 3-factor model in terms of the statistical viability and interpretability of profiles.
Relationships between GOs and Self-Efficacy	
Hypothesis 2a. Task-specific MAP GOs are expected to be significantly positively correlated with self-efficacy.	Supported (except for the Verbal Test at Time 2).
Hypothesis 2b. Task-specific PAP GOs are expected to be significantly positively correlated with self-efficacy.	Supported.
Research Question 6b. How do task-specific MAV GOs correlate with self-efficacy?	Verbal and Numerical Test MAV GOs are weakly related to self-efficacy, if at all.

Hypothesis or Research Question	Result
Research Question 6c. How do task-specific PAV GOs correlate with self-efficacy?	Verbal Test PAV GOs were found to be weakly related to self-efficacy (if at all) whilst Numerical Test PAV GOs were found to be strongly related to self-efficacy. The relationship between a PAV GO and self-efficacy seems to be influenced by the type of task at hand.
Research Question 6a. Do the different task-specific GO profiles score significantly differently on self-efficacy?	The different Verbal Test GO profiles did not relate differently to self-efficacy. However, there were significant differences between the relationships of different Numerical Test GO profiles and self-efficacy. For the latter, participants in Cluster 1 (‘High GOs’ profile) were found to have significantly higher levels of self-efficacy than participants in the other 3 clusters.

Hypothesis or Research Question	Result
Relationships between GOs and Mental Effort	
Research Question 7b. How do the different task-specific GOs correlate with mental effort (if at all)?	a) MAP GOs were found to be significantly positively correlated with mental effort on the Verbal and Numerical Tests (except for the Numerical test at Time 2). b) MAV GOs were found to be significantly positively related to mental effort on the Verbal Test at Time E2 and on the Numerical Test at Time E1. No significant relationships were found on the Verbal Test at Time E1 and on the Numerical Test at Time E2. c) PAP GOs were not found to be significantly related to mental effort on the Verbal or Numerical Tests. d) PAV GOs were not found to be significantly related to mental effort on the Verbal or Numerical Tests.

Hypothesis or Research Question	Result
Research Question 7a. Do the different task-specific GO profiles score significantly differently on mental effort?	There were significant differences in the mental effort scores of participants who adopted different GO profiles on the Verbal Test, but not on the Numerical Tests. For the former, participants adopting the 'High GOs' and the 'High Mastery, Low Performance' GO profiles were found to invest significantly higher levels of mental effort than participants adopting the 'High Mastery, Moderate Performance' GO profile.
Relationships between GOs and Performance	
Research Question 8a. How do task-specific MAP GOs correlate with performance on tasks (if at all)?	MAP GOs were found to be significantly positively related to performance on the Numerical Tests but not on the Verbal Tests.
Research Question 8b. How do task-specific MAV GOs correlate with performance on tasks (if at all)?	MAV GOs were not found to be significantly related to performance.
Research Question 8c: How do task-specific PAP GOs correlate with performance on tasks (if at all)?	Only the Numerical Test PAP GO at Time 2 was significantly positively correlated with performance.

Hypothesis or Research Question	Result
Research Question 8d: How do task-specific PAV GOs correlate with performance on tasks (if at all)?	The only significant correlation found was a positive one between a Numerical Test PAV GO at Time 2 and performance.
Research Question 9. Do the different task-specific GO profiles score significantly differently on task performance?	The different Verbal Test GO profiles were not significantly differently related to performance. However, there were significant differences in the Numerical Test performance of participants adopting different GO profiles. For the latter, participants adopting the 'High GOs' profile were found to have significantly higher levels of performance than participants adopting the 'High Mastery, Moderate Performance' and 'High Performance-Avoidance' profiles.
Assessing the Stability of General GOs over Time	
Research Question 2a. Do individuals' General GO **profiles** change over time?	The comparison results of participants' General GO profiles at Time 1 and Time 2 indicate that 67% of participants adopted the same General GO profile at Time 2 as they did at Time 1. Moreover, more people than would have been expected by chance adopted the same General GO profile from Time 1 to Time 2 $X^2(1, N=183) = 6.07, p<.05$.

Hypothesis or Research Question	Result
Research Question 2b. Do individuals' General GOs change significantly over time?	• In terms of mean-level change it seems as though participants' MAP and MAV GOs tend to remain stable over time whilst their PAP and PAV GOs decrease significantly from Time 1 to Time 2. • In terms of differential continuity participants' General GOs are not as stable as personality traits (reported in other studies). Moreover, the correlation strength for General PAP GOs was found to decrease significantly (z-statistic=3.01, $\rho<0.01$) the longer the time interval between questionnaires.
Assessing the Stability of Task-Specific GOs over Time	
Research Question 5b. Are task-specific GOs stable over time?	• In terms of mean-level change no significant differences in the GO scores of participants from Time 1 to Time 2 (on the Hypothetical Task, Verbal Test and Numerical Test) were found. • In terms of correlations over time, correlation coefficients ranging between 0.44 to 0.71 ($\rho<0.01$) were found for task-specific GOs over time. Hypothetical Task GOs were no less stable (as assessed by correlations over time) over a 9-51 weeks period than over a 4-8 week period. Overall, the results indicate that task-specific GOs are fairly stable over time.

Hypothesis or Research Question	Result
Research Question 5a. Are task-specific GO **profiles** stable over time?	The results show that 66%, 63% and 56% of participants adopted the same GO profile from Time 1 to Time 2 on the Hypothetical Task, Verbal Test and Numerical Test, respectively. Moreover, the Chi-square test results indicated that more participants than would have been expected by chance adopted the same Hypothetical Task, Verbal Test and Numerical Test GO profile from Time 1 to Time 2 [X^2 (1, N=187) = 4.46, p<.05; X^2 (1, N=68) = 9.53, p<.01; X2 (1, N=71) = 4.07, p<.05, respectively for Hypothetical Task, Verbal Test and Numerical Test GO profiles over time].
Assessing the Generality and/or Task-Specificity of GOs	
Research Question 4a. Do participants adopt different GO **profiles** across tasks?	The Chi-square results indicated that more participants would have been expected to adopt the same GO profiles on the Hypothetical Task and Verbal Test [X^2 (1, N=67) = 1.87, p>.05] as well as on the Hypothetical Task and Numerical Test [X^2 (1, N=67) = 1.93, p>.05] *by chance alone*. However, *more participants than would have been expected by chance alone* adopted the same GO profiles on the Verbal and Numerical Tests [X^2 (1, N=71) = 17.7, p<.01]. These results seem to point towards the domain-specificity of GO profiles.

Hypothesis or Research Question	Result
Research Question 4c. Do participants' adopt different goal orientations across tasks?	• Correlations for Hypothetical Task and Verbal Test GOs ranged from 0.31 ($\rho<0.05$) to 0.59 ($\rho<0.01$). Those for Hypothetical Task and Numerical Test GOs ranged from 0.27 ($\rho<0.05$) to 0.53 ($\rho<0.01$) whilst the ones for Verbal and Numerical Test GOs ranged from 0.68 ($\rho<0.01$) to 0.81 ($\rho<0.01$). Fisher z tests indicated that, overall, Verbal and Numerical Test GOs were significantly more highly correlated with each other than with Hypothetical Task GOs. • The mean-level change results reflected the correlation results in that there were no significant differences between Verbal and Numerical Tests GOs. However, overall, Hypothetical Task GOs were found to be significantly higher than Verbal and Numerical Test GOs. • These results also point towards the domain-specificity of GOs.
Research Question 4b. Are participants' task-specific GO **profiles** different from their General GO profiles?	The Chi-square tests indicated that more participants than would be expected by chance alone adopted the same General and Hypothetical Task GO profiles [X^2 (1, N=617) = 11.49, p<.01] as well as the same General and Verbal Test GO profiles [X^2 (1, N=67) = 7.69, p<.01]. However, more participants would be expected to adopt the same General and Numerical Test GO profiles [X^2 (1, N=67) = 1.91, p>.05] by chance alone.

Hypothesis or Research Question	**Result**
Research Question 4d. Are participants' task-specific GOs significantly different from their General GOs?	• Correlations between General and Hypothetical Task GOs ranged from 0.38 to 0.52 (ρ<0.01). Those between General and Verbal Test GOs ranged from 0.27 to 0.47 (ρ<0.01) whilst the correlations between General and Numerical Test GOs ranged from 0.28 to 0.47 (ρ<0.01). These correlation coefficients are quite low especially when compared with those of stability of GOs over time (e.g. Research Question 5b). • The results for mean-level change indicated that General PAP and General PAV GOs were significantly higher than the respective Verbal Test GOs. All four General GOs were significantly higher than the respective Numerical Test GOs. In addition, the MAP Hypothetical Task GO was found to be significantly higher than the respective General GO whilst the Hypothetical PAP and PAV GOs were found to be significantly lower than the respective General GOs. Taken together, these results provide a good indication of participants' task-specific GOs being significantly different from their General GOs.

Hypothesis or Research Question	Result
Examining the Effects of the Interactions between General and Induced GOs on Participants' Performance	
Research Question 3a. How do trait GO profiles interact with induced MAP and induced PAP GOs in order to influence task performance of participants?	It was not possible to answer this Research Question due to the small experimental sample size.
Hypothesis 1. Individuals holding a trait mastery-approach goal orientation are expected to perform significantly better when a performance-approach goal orientation is induced as opposed to when a mastery-approach goal orientation is induced.	No interaction effects (between trait MAP and induced MAP and PAP GOs) on performance were found. Consequently, this Hypothesis was not supported.
Research Question 3b. What effects will the relationships between trait MAV GOs and induced MAP and induced PAP GOs have on the performance of participants?	No interaction effects (between trait MAV and induced MAP and PAP GOs) on performance were found.
Research Question 3c. What effects will the relationships between trait PAP GOs and induced MAP and induced PAP GOs have on the performance of participants?	No interaction effects (between trait PAP and induced MAP and PAP GOs) on performance were found.
Research Question 3d. What effects will the relationships between trait PAV GOs and induced MAP and induced PAP GOs have on the performance of participants?	No interaction effects (between trait PAV and induced MAP and PAP GOs) on performance were found.

9.5. Synopsis

Following the presentation of the results in this chapter and the previous one (Chapter 8) a discussion of the findings of this study will be provided in the next chapter. The same order of themes as that in Chapters 8 and 9 is maintained.

Chapter 10: Discussion

10.0. Introduction

In this chapter the findings from this research study (presented in Chapters 8 and 9) are discussed and compared with the results of previous research (presented in Chapters 2 to 5). The same order of themes specified in Chapters 8 and 9 is maintained throughout this chapter. Therefore, the results of the LCA of General GOs are discussed first. Following this, the findings regarding the relationships between GOs and self-efficacy, mental effort and performance are described. Next, the results regarding the stability and task-specificity of GOs will be discussed. Finally, the results concerning the interaction effects between General and Induced GOs on performance are reviewed.

10.1. Latent Class Analysis of General Goal Orientations and choosing between the 2x2 and 3-factor models of Goal Orientations for the profile analyses

The main focus of this section is on Research Question 1 which examines the number and types of GO profiles emerging from the LCA of General GOs and questions whether the 2x2 model of GOs significantly improves on the 3-factor model in terms of identifying GO profiles. The latter is discussed first. Following this, the General GO profile results obtained are discussed and compared with GO profiles obtained in previous studies.

In order to determine whether the 2x2 model of GOs significantly improves on the 3-factor model LCAs were carried out using both the 3-factor and the 2x2 models of GOs. The results indicated that there was inadequate model fit for General and Numerical Test GOs at Time 1 when using the 2x2 model of GOs. Consequently, for the purposes of the current study, the 2x2 model did not seem to significantly improve on the 3-factor model in terms of GO profiles. As a result, it was decided that the 3-factor model of GOs should be used in all analyses involving GO profiles in the current study.

With respect to the number and types of GO profiles that emerged from the analysis, the LCA results for General GOs at Time 1 revealed four types of GO profiles when using the 3-factor model of GOs. These included ‘High GOs’; ‘High Mastery, Moderate Performance’; ‘High Mastery, Low Performance’; and ‘High Performance-Avoidance’ GO profiles. The LCAs of General GOs at Time 2 and Hypothetical Task, Verbal and Numerical Test GOs at Time 1 and Time 2 revealed remarkably similar GO profiles to those obtained for General GOs at Time 1. A number of times (e.g. for General and Hypothetical Task GOs at Time 2) only 3 out of the 4 profiles emerged. This was thought to be due to the smaller sample sizes.

Since the 3-factor model of GOs was used for examining GO profiles in this study it was thought appropriate to compare the GO profiles obtained from this study to those of other studies using the 3-factor model. Consequently, the study by Cano and Berben (2009) was excluded from the comparison since they used the 2x2 model of GOs in their study. In addition, the GO profiles obtained from the 3-factor model (NOT the ones obtained using the 2x2 model) in the study by Pastor et al. (2007) were used for comparison purposes. Table 10.1. presents the General GO profiles obtained in the current study as well as those from the studies by Pastor et al. (2007) and Fortunato and Goldblatt (2006).

Table 10.1. Comparison of GO profiles obtained in this study with those obtained in previous studies

	Pastor et al. (2007) N=1868	**Fortunato & Goldblatt (2006) N=311**	**Present Study N=628**
Cluster 1	(12%) MAP: High PAP: High PAV: Moderate	(32%) MGO : Low PAP : Moderate PAV : Moderate	(67%) MGO : High PAP : High PAV : High
Cluster 2	(9%) MAP: High PAP: High PAV: Mod Low	(18%) MGO : Moderate PAP : Low PAV : Low	(29%) MGO : High PAP : Moderate PAV : Moderate
Cluster 3	(25%) MAP: Mod High PAP: Mod High PAV: Moderate	(28%) MGO : Moderate PAP : High PAV : High	(2%) MGO : High PAP : Low PAV : Low
Cluster 4	(44%) MAP: Mod High PAP: Moderate PAV: Mod Low	(22%) MGO : High PAP : Moderate PAV : Low	(2%) MGO : Low PAP : Low PAV : High
Cluster 5	(10%) MAP: Moderate PAP: Low PAV: Mod Low		

Key: MAP=Mastery-Approach Goal Orientation; MGO=Mastery Goal Orientation; PAP=Performance-Approach Goal Orientation; PAV=Performance-Avoidance Goal Orientation.

It is currently extremely difficult to compare GO profiles across studies. This is mainly due to the fact that it is tricky to tell whether what is considered to be a low, moderate, or high GO in this study would also be considered to be low, moderate or high (respectively) in the other studies examining GO profiles. For example, it may be the case that what was considered to be a high GO in this study would be considered to be moderate in the study by Pastor et al. (2007). It is not easy to compare mean GO scores for the 3 GOs in each profile across studies for two main reasons. Firstly, the three studies (being compared above) made use of different GO measures: the AGQ-R was used in this study, the AGQ was used in the study by Pastor et al. (2007), whilst Fortunato and Goldblatt (2006) used the GO measure developed by VandeWalle (1997). Secondly, although the AGQ and the AGQ-R may be argued to be reasonably similar, a 5-point Likert scale was used in the AGQ-R in this study whereas Pastor et al.

(2007) used a 7-point Likert scale in their study. As a result comparisons between the GO profiles across studies will not be exact.

Bearing the above in mind, Table 10.1. indicates that there are a number of similar clusters across the three studies. For example, Cluster 5 in the study by Pastor et al. (2007) and Cluster 2 obtained by Fortunato and Goldblatt (2006) are similar to the 'High Mastery, Low Performance' profile obtained in the present study (Cluster 3) in that the MAP GOs in these clusters are higher than the PAP and PAV GOs. However, the percentage of participants adopting this type of GO profile in the current study is much lower than the percentages in the other studies. A second notable commonality is that Clusters 3, 3 and 1 from the studies by Pastor et al (2007), Fortunato and Goldblatt (2006) and the present study, respectively, all seem to have moderate to high GOs for all three GOs in the profiles. However, this time the percentage of participants adopting this GO profile in the present study is much higher compared to the percentages in the other studies. Clusters 2 and 4 from the studies by Pastor et al (2007) and Fortunato and Goldblatt (2006) may be argued to be similar in that the PAV GOs in these profiles are lower than the MAP and PAP GOs. Consequently, participants adopting this particular GO profile seem to have high approach and low avoidance GOs. Again, there is a difference in the percentages of participants adopting this type of GO profile across studies. A higher percentage of participants adopt this type of GO profile in the study by Fortunato and Goldblatt (2006). Another similarity is between Cluster 1 from the study by Fortunato and Goldblatt (2006) and Cluster 4 (the High Performance Avoidance GO profile) of the present study. A closer look at Cluster 1 (of Fortunato and Goldblatt, 2006) showed that the PAP GO in this profile was lower than the PAV GO in the same profile. Consequently, it seems as though both profiles tend to have higher PAV GOs than MAP and PAP GOs. However, the percentage of participants adopting this type of GO profile in the present study was much lower when compared with Fortunato and Goldblatt (2006).

Although it may seem possible that Cluster 1 from the study by Pastor et al. (2007) is similar to Cluster 2 from the current study (the High Mastery, Moderate Performance profile), in the former study the PAP GO mean was actually higher than the MAP GO mean. Consequently, the 2 clusters seem to be rather different from each other. Finally, Pastor et al. (2007) had an additional cluster (Cluster 4) consisting of moderate approach and low avoidance GOs. This cluster seems to be quite different from the clusters obtained in the present study and that by Fortunato and Goldblatt (2006).

Although a number of similar clusters were found, the percentages of participants adopting the different types of GO profiles seems to differ across studies. This is possibly due to the participant demographics and/or type of tasks that GOs were measured on. For example, in this study participants were asked to complete aptitude tests which would not influence the course grade of those participants who were students. Moreover, a number of participants were employed or retired. This may have greatly influenced the type of GO profiles adopted. In the study by Pastor et al. (2007) GOs were measured at an Assessment Day whilst Fortunato and Goldblatt (2006) measured GOs on a university course. Since the results of this study show some evidence of domain-specificity it is possible that the different percentages obtained were a result of different tasks GOs being measured in the different studies.

Since a number of similar profiles were obtained across studies using different GO measures, scales and tasks, it seems as though there is ground for future studies to investigate whether it is possible to obtain a comprehensive set of GO profiles. In order to achieve this it would be necessary to make a final decision regarding the dimensionality of GOs as well as agree on a GO measure. However, the advantages of this would be that researchers will be able to effectively compare GO profiles (as well as their antecedents and consequences) across studies. This will enable researchers to assess whether certain GO profiles are more beneficial than others and investigate whether it is possible to encourage employees to adopt the more beneficial GO profiles. The relevant recommendations for future research are made in Chapter 11 Section 11.3. The relationships between GOs (as well as GO profiles) and self-efficacy are discussed next.

10.2. The relationships between Goal Orientations and Self-Efficacy

Hypotheses 2a and 2b as well as Research Questions 6a, 6b and 6c focused on the relationships between GOs and self-efficacy. The relationships between the GOs from the non-profile perspective and self-efficacy are focused on first. Following this, the relationships between GO profiles and self-efficacy are discussed.

10.2.1. Relationships between Goal Orientations and Self-Efficacy from the Non-Profile Perspective

Since numerous studies investigated the relationships between GOs and self-efficacy it was thought useful to present a comparison table (Table 10.2. below) indicating similarities and differences between the results of this study and those of previous studies.

Table 10.2. Comparison across studies for relationships between Goal Orientations and Self-Efficacy

GO being Investigated	Results of Present Study	Significant Positive Relationship Found	Significant Negative Relationship Found	No Significant Relationship Found
Mastery/Mastery-Approach GO	• Significant Positive relationship in all cases except on Verbal Test at Time 2	• Elliot & Church (1997) • Liem et al. (2008) • Lau et al. (2008) • Morris & Kavussanu (2008) • Tanaka (2007) • Linnenbrink (2005) • Sins et al. (2008) • Bong (2009) • Radosevich et al. (2007) • Bong (2001) • Wolters et al. (1996) • VandeWalle et al. (2001)		
Mastery-Avoidance GO	• No significant relationships on Verbal Test. • Significant positive relationships on Numerical Test	• Bong (2009)[1]	• Lau et al. (2008) • Radosevich et al. (2007) • Bong (2009)[2]	• Morris & Kavussanu (2008) • Bong (2009)[3]

Table 10.2. continued.

GO being Investigated	Results of Present Study	Significant Positive Relationship Found	Significant Negative Relationship Found	No Significant Relationship Found
Performance-Approach GO	• Significant positive relationship.	• Liem et al. (2008) • Lau et al. (2008) • Morris & Kavussanu (2008) • Elliot & Church (1997) • Tanaka (2007) • Linnenbrink (2005) • Bong (2009) • Radosevich et al. (2007) • Bong (2001)		• VandeWalle et al. (2001)
Performance-Avoidance GO	• No significant relationship for Verbal Test at Time 1 • Weak positive (significant) relationship found for Verbal Test at Time 2. • Significant positive relationships on Numerical Test (at Time 1 and Time 2)	• Bong (2009)[1] • Bong (2001)[6]	• Liem et al. (2008) • Lau et al. (2008) • Elliot & Church (1997) • Radosevich et al. (2007) • Bong (2009)[4] • VandeWalle et al. (2001)	• Morris & Kavussanu (2008) • Tanaka (2007) • Sins et al. (2008) • Bong (2009)[5] • Bong (2001)[7]

[1] For Lower Elementary; [2] For Upper Elementary; [3] For Middle Elementary and Middle School; [4] For Middle School; [5] For Middle and Upper Elementary; [6]For English, Maths and Science in Middle School and for Science in High School; [7]For Korean and Science in Middle School and Korean, English and Maths in High School.

Table 10.2. shows that all the studies reviewed found a MGO/MAP GO to be significantly positively correlated with self-efficacy. The results obtained in this study are consistent with those of previous research with the exception of the Verbal Test at Time 2. Moreover, as discussed in Chapter 8, it is possible that the correlation found for the MAP GO at Time 1 might be the result of Type I error, in which case Hypothesis 2a would not be entirely supported. This may be considered to be a limitation since it is not possible to draw clear conclusions regarding the support or lack of support for Hypothesis 2a. Further research is necessary in order to be able to draw conclusions as to the relationships between a MAP GO and self-efficacy on different tasks.

The findings of the present study also indicate that the Numerical Test MAP GO was found to be significantly more strongly correlated with self-efficacy than the Verbal Test MAP GO at Time 2 but not at Time 1. This suggests that the relationships between GOs and self-efficacy may be moderated by task type and the person's prior experience of it. Task difficulty is a possible characteristic of tasks that influences the relationships between GOs and self-efficacy. For example, the Numerical Test may be perceived as being more difficult than the Verbal Test, consequently, participants who are confident enough to adopt a strong MAP GO on the Numerical Test would probably also have high self-efficacy on the test. On the other hand, if the Verbal Test is not perceived to be difficult, participants might not feel the need to adopt a strong MAP GO on this test since it involves skills that people tend to practice on a day-to-day basis. Consequently, although they may have high self-efficacy scores on the Verbal Test they may not necessarily have high MAP GO scores too.

However, this does not explain why there were significant differences in the correlations strengths (for a MAP GO and self-efficacy on the Verbal and Numerical Tests) at Time 2 and not at Time 1. Since there were GO inductions at Time 2, one might assume that these differences occurred as a result of the inductions. However, since the inductions were not found to be successful (Chapter 9 Section 9.1.2.) this is highly unlikely. A possible explanation for these differences is that at Time 2 the participants already had a good idea of what the tests were like and their level of difficulty. As a result, the effects of task difficulty may have been more pronounced at

Time 2 than they were at Time 1. Moreover, participants completed the self-efficacy measures following the example questions but prior to completing each test. Consequently, they would not have had as good an idea about the test difficulty at Time 1 as they did at Time 2. These differences in the relationships between GOs and self-efficacy depending on task type may account for the differences in findings across studies. Overall however, it seems as though a MAP GO is significantly positively related to self-efficacy. A plausible explanation for this relationship is that the focus of a MAP GO is on improving one's understanding of a task. Consequently, one would probably need to feel quite confident about their ability in order to adopt such a GO. The opposite may also be the case. One may choose to adopt a MAP because he/she feels confident about his/her ability to improve understanding.

The relationship between a MAV GO and self-efficacy is much less straightforward than that for a MAP GO and self-efficacy. As indicated in Table 10.2., previous studies found significant positive, negative, as well as non-significant relationships between a MAV GO and self-efficacy. In this study non-significant relationships were found between a MAV GO and self-efficacy on the Verbal Test. However, significant positive relationships were found on the Numerical Test. Therefore, the results for the Numerical Test (at Time 1 and Time 2) are consistent with those of Bong (2009, for Lower Elementary School students). On the other hand, the results for the Verbal Test (at Time 1 and Time 2) are consistent with the results of Morris and Kavussanu (2008) and Bong (2009, for Middle Elementary and Middle School students). These differences obtained across tasks may be explained by the possibility that the relationships between a MAV GO and self-efficacy are moderated by task type. Similarly to the results for the MAP GO, the Numerical Test MAV GO was found to be significantly more strongly correlated with self-efficacy than the Verbal Test MAV GO. Furthermore, again similarly to the MAP GO, these significant differences were only found at Time 2 and not at Time 1. Consequently, it seems as though previous experience of the task and possibly some task characteristics may be influencing the relationship between a MAV GO and self-efficacy. It is not easy to explain why and how a MAV GO is related to self-efficacy. For example, a focus on not forgetting or not misunderstanding a task could be interpreted as being a negative approach to tasks (hence the term 'avoidance') because a person may be worried that they will not be able to understand the new task. In such a case the negative relationship between a MAV GO and self-efficacy could be explained by the individual trying not to misunderstand/forget a task because they do not feel confident about their ability. However, it may be the case that a person does feel confident about their ability and chooses to adopt both MAP *and* MAV GOs because they want to make sure that they learn the new task properly and do not misunderstand it. In such a case the MAV GO may be positively correlated with self-efficacy. In order to understand this relationship better it may be useful to investigate the *reasons* for adopting a MAV GO as well as if (and how) task characteristics such as task difficulty moderate this relationship. Recommendations for such research will be made in Chapter 11 (Section 11.3).

The relationships between a PAP GO and self-efficacy have been quite consistent across studies (including the present one) since all the studies reviewed found a significant positive relationship between a PAP GO and self-efficacy. The only exception is the study by VandeWalle et al. (2001) who found a non-significant relationship. Similarly to the MAP GO it is understandable how a PAP GO and self-efficacy would be positively related to each other. When a person adopts a PAP GO their focus is on performing better than others. One would probably need to feel quite confident about their ability if their focus is on being one of the best. The opposite may also be the case. One may choose to adopt a PAP GO because he/she feels confident about his/her ability to do better than others. Overall, the results of this study and previous ones suggest that adopting a PAP GO on tasks may be quite beneficial since self-efficacy on tasks has been associated with a number of positive outcomes such as increased performance (e.g. Pajares, 1997; Bouffard-Bouchard, 1990). However, research investigating the direction of causality needs to be carried out prior to making recommendations regarding 'beneficial' GOs. Similarly to the relationships between MAP and MAV GOs and self-efficacy, the Numerical Test PAP GO was found to be significantly more highly correlated to self-efficacy than the Verbal Test PAP GO. Again, these significant differences were found at Time 2 but not at Time 1.

Previous studies have not found consistent relationships between a PAV GO and self-efficacy. As indicated in Table 10.2. some studies found significant negative relationships and other studies found non-significant relationships. Moreover, Bong (2001) found significant positive, negative and non-significant relationships between a PAV GO and self-efficacy depending on the subject and age of participants and Bong (2009) found significant positive, negative and non-significant relationships depending on the age of participants. Similarly to the relationship between a MAV GO and self-efficacy, it is not easy to explain the relationships between a PAV GO and self-efficacy. One may expect a person with a high PAV GO to have low levels of self-efficacy since it may be assumed that if you aim to try and not be the worst you cannot be feeling very confident about your skills on the task. However, it may be argued that if a person adopts a high PAV GO they may have high self-efficacy because they are aiming not to be the worst on a task *as opposed to* simply giving up or not trying to do better than anyone else. For example, if a group of people are learning how to use a new machine at work an employee might adopt a high PAV GO because he/she feels confident that he/she will not be the worst at using this new machine for the first time. Other employees who are not confident about their ability to use the new machine might choose not to compare their performance with that of others. On the other hand, in a different situation a person may choose to adopt a PAV GO because they are worried that they might look silly if they are the worst performer on a task. In such a case the person may not be feeling confident about their ability. Consequently, (similarly to the relationship between a MAV GO and self-efficacy) it is possible that the relationships between a PAV GO and self-efficacy are influenced by the reasons for adopting such a GO. Task characteristics, such as task difficulty, may also be influencing the relationships between a PAV GO and self-efficacy as will be described shortly.

The results of the present study are very similar to those obtained by Bong (2001) in that a non-significant relationship was found between a Verbal Test PAV GO and self-efficacy at Time 1 and a weak positive relationship was found at Time 2. However, the Numerical Test PAV GO was found to be significantly positively correlated with self-efficacy at both Time 1 and Time 2. The inconsistencies found (in the relationships between a PAV GO and self-efficacy) across tasks in the study by Bong (2001) provide further support for the possibility that task type may moderate the relationships between GOs and self-efficacy. Similarly to the relationships between the other three GOs and self-efficacy, the Numerical Test PAV GO was found to be more strongly correlated with self-efficacy than the Verbal Test PAV GO. However, again similarly to the other three GOs, these significant differences were only found at Time 2 and not at Time 1.

Taken together, the results obtained in this study as well as those in previous studies indicate that, first and foremost, MAP and PAP GOs seem to be quite consistently significantly positively related to self-efficacy. Consequently, they seem to be beneficial GOs to adopt on tasks. The results are not as clear-cut with respect to the relationships between the avoidance GOs (MAV and PAV GOs) and self-efficacy. Moreover, there also seems to be a distinct possibility that these relationships (as well as those for the approach GOs and self-efficacy) are moderated by task type (possibly task difficulty or perceived task difficulty). Previous research provides some evidence for this possibility. Mangos and Steele-Johnson (2001) found that subjective task complexity (perceived task difficulty) completely mediated the effects of GOs on self-efficacy. The implications of these findings as well as recommendations for future research will be made in Chapter 11 (Sections 11.1. and 11.3., respectively). Before discussing the results obtained with respect to GOs and mental effort, the relationships between GO *profiles* and self-efficacy are discussed.

10.2.2. The Relationship between Goal Orientation Profiles and Self-Efficacy

The results presented in Chapter 8 (Tables 8.50. and 8.51.) show that there were no significant differences in the self-efficacy of participants adopting different GO profiles on the Verbal Test. However, there were significant differences in the self-efficacy of participants adopting different GO profiles on the Numerical Test. The results presented in Table 8.52. show that participants in the 'High GOs' cluster had the highest levels of self-efficacy whilst participants in the 'High Mastery, Moderate Performance' cluster had the lowest levels of self-efficacy. Since the individual GO results indicated that MAP and PAP GOs are strongly related to self-efficacy whilst

MAV and PAV GOs are not as strongly related, it seems as though the lower PAP GO in the 'High Mastery, Moderate Performance' cluster might be responsible for the significantly lower levels of self-efficacy of participants in this cluster.

Since there were no significant differences in the self-efficacy of participants adopting different GO profiles on the Verbal Test but significant differences for the Numerical Test this might be a further indication that the relationships between GOs and self-efficacy are in fact moderated by task type. Since participants adopting different GO profiles were found to have different levels of self-efficacy it might also be worth investigating which profiles might be more beneficial than others. For example, in this case, participants adopting the 'High GOs' profile were found to have the highest levels of self-efficacy on the Numerical Test whilst participants adopting the 'High Mastery, Moderate Performance' GO profile were found to have the lowest levels of self-efficacy (on the Numerical Test). Consequently, adopting the former GO profile may have more beneficial effects than adopting the latter. However, prior to investigating this any further it would be necessary to investigate the direction of causality since it might be the self-efficacy that causes the adoption of particular GO profiles. It is also possible that the different results obtained on the Verbal and Numerical Tests are a result of the small experimental sample size (resulting in small cluster sizes). Therefore, it is possible that either Type I or Type II error occurred due to the small cluster sizes. The small cluster sizes should be taken into serious consideration when interpreting these results. Further research is required before any clear conclusions can be drawn regarding the relationships between GO profiles and self-efficacy on different tasks. Suggestions for future research regarding the relationships between GO profiles and self-efficacy will be made in Chapter 11 Section 11.3. The next section focuses on the results obtained when assessing the relationships between GOs and mental effort.

10.3. The relationships between Goal Orientations and Mental Effort

As was discussed in Chapter 5, only three of the studies reviewed examined the correlations between GOs and mental effort. These all used the 3-factor model. Since it was found that MGO scales generally include only MAP items (as was discussed in Chapter 5 Section 5.2.1.) the MAP GO scale in this study is compared to the MGO scales in the previously mentioned studies. In order to make the comparisons across studies as clear as possible a table comparing the results obtained in this study with those obtained in previous studies was drawn up (Table 10.3. below).

Table 10.3. Comparison across studies for relationships between Goal Orientations and Mental Effort

GO being Investigated	Results of Present Study	Significant Positive Relationship Found	Significant Negative Relationship Found	No Significant Relationship Found
Mastery/Mastery-Approach GO	• Significant positive relationship except for Numerical Test at Time 2	• Wolters (2004) • Agbuga and Xiang (2008) • Elliot et al. (1999)		
Mastery-Avoidance GO	• Significant positive relationship for Numerical Test at Time 1 and Verbal Test at Time 2 • No significant relationship for Numerical Test at Time 2 and Verbal Test at Time 1			
Performance-Approach GO	• No significant relationships	• Agbuga and Xiang (2008) • Elliot et al. (1999) • Wolters (2004)		
Performance-Avoidance GO	• No significant relationships	• Agbuga and Xiang (2008)	• Wolters (2004)	• Elliot et al. (1999)

Table 10.3. shows that previous GO studies all found significant positive relationships between a MAP GO and effort. Overall, the results of this study support previous research findings with the exception of the Numerical Test MAP GO at Time 2 which was not found to be significantly positively related to mental effort. A possible explanation for this may be that again, the relationships between GOs and mental effort are moderated by task type. It may be the case that if participants perceive a task as being too difficult this reduces the amount of mental effort invested by participants as both goal-setting and expectancy theories would predict. Another possible explanation is that participants may have adopted a MAP GO and viewed the experimental study as a learning opportunity but then did not invest too much mental effort when they came across difficulties during the Numerical Task (possibly because they did not value the Numerical task highly and/or because they knew the tests were not for "real"). These explanations are only possibilities and the relationships between a MAP GO and mental effort definitely need to be investigated further before any reliable conclusions may be drawn. However, overall, the results of this study and those of previous studies do indicate that a MAP GO seems to be significantly positively related to mental effort on tasks.

Unfortunately, none of the studies reviewed examined the relationships between a MAV GO and effort. Consequently, there is no comparison point for the results of this study. The results obtained are actually quite confusing since significant positive relationships were found between a MAV GO and mental effort on the Verbal Test at Time 2 and on the Numerical Test at Time 1. However, no significant relationships were found on the Verbal Test at Time 1 and the Numerical Test at Time 2. Overall, the relationships between a MAV GO and mental effort are quite weak (when present). This indicates that at times adopting a MAV GO **might** be related to investing more mental effort on tasks (or vice versa). However, the relationships between a MAV GO and mental effort are not as strong as those between a MAP GO and mental effort. It is not clear why the correlations between a MAV GO and mental effort are significant on different tasks at different time points and non-significant at other times. Once again task characteristics (such as task value and/or task difficulty) may possibly be influencing the relationships between a MAV GO and mental effort. Alternatively, as discussed in Chapter 8, it is quite possible that these significant results were due to type I error. Consequently, it is not possible to offer a clear conclusion for the relationships between MAV GOs and mental effort. The large number of variables included in this study (creating a very large correlation matrix) may be considered to be a limitation since it increases the probability of type I error. Consequently, this should be kept in mind when interpreting the results.

The results of previous studies found a PAP GO to be significantly positively related to effort. However, this study did not find any significant relationships between a PAP GO and mental effort. This was quite a surprising finding since it was expected that a participant who is interested in performing better than others would invest more mental effort on tasks. It is possible that the non-significant findings in the current study are a result of the types of tasks used or perhaps the task value. For example, since participants' performance on these tasks did not have any significant influence on their university or work performance they may have not valued the tasks highly. Consequently, although they may have aimed to do better than others on the tasks (and adopted a PAP GO) they may not have invested as much mental effort as they would have done if these tasks were to influence their university or work performance (e.g. their final university grade or their chances of being promoted). With respect to previous studies, Elliot et al. (1999) assessed the relationships between GOs and mental effort for students' exams. Consequently, participants adopting a PAP GO in this study may have been more motivated to invest effort in order to do better than others on their exams. Wolters (2004) used mathematics grades and participants' GOs with respect to their mathematics classes. Agbuga and Xiang (2008) measured GOs during physical education classes. Since physical education classes may foster a competitive environment, it is possible that the significant positive relationship found between a PAP GO and effort in the study by Agbuga and Xiang (2008) was down to the task chosen too. The inconsistent findings obtained in this study when compared with previous research studies need to be investigated further in order to clarify the relationships between a PAP GO and effort. This study seems to indicate that adopting a high PAP GO may not increase the level of mental effort invested. However, previous studies indicate otherwise. Consequently, no clear-cut conclusions may be drawn from the results of the present study with respect to the relationships between a PAP GO and mental effort apart from the fact that task value (or some other task characteristic) may possibly be influencing these relationships.

The relationships between a PAV GO and effort have been very inconsistent in the past with studies finding positive, negative and non-significant relationships (Agbuga & Xiang, 2008; Wolters, 2004; and Elliot et al., 1999, respectively). The results of the present study correspond with those obtained by Elliot et al. (1999) in that no significant relationships were found between a PAV GO and mental effort. It may be argued that a person who does not want to perform worst at a task (i.e. a person adopting a PAV GO) would tend to invest more mental effort than a person who is not interested in how their performance compares with that of others. However, only the results obtained by Agbuga and Xiang (2008) support this line of reasoning. Clearly, further investigation of this relationship is required. Since it is possible that task type (e.g. task difficulty and/or task value) influences the relationships between GOs and mental effort it may be the case that task characteristics could account for the differences in results across studies. Recommendations for future research, in order to clarify the relationships between GOs and mental effort, are made in Chapter 11 Section 11.3. The results obtained for the relationships between GO profiles and mental effort are discussed next.

The GO profile results indicated that participants adopting different GO profiles had significantly different mean-level mental effort scores on the Verbal Test but not on the Numerical Test. Participants in the 'High Mastery, Moderate Performance' Cluster had the lowest mean-levels of mental effort on the Verbal Test whilst participants in the 'High GOs' cluster had the highest mean-levels of mental effort. As described in the previous section, participants in the former cluster also had the lowest levels of self-efficacy. Consequently, it seems as though adopting the 'High Mastery, Moderate Performance' GO profile might not be very beneficial. A general discussion regarding which GOs and GO profiles might be considered to be more beneficial than others is provided in Section 10.5. The results obtained indicate that adopting a high PAP GO (and/or PAV GO) seems to make a difference with respect to the amount of mental effort invested since participants adopting a lower PAP GO (and/or PAV GO) seem to invest significantly less mental effort on tasks than those adopting high PAP and PAV GOs. The GO profile results seem to somewhat contradict the non-profile perspective results since, as was previously discussed, PAP and PAV GOs were not found to be significantly related to mental effort. This finding does however fit in nicely with the research findings of the studies reviewed which found a PAP GO to be significantly positively correlated with mental effort. Again, the different findings across the Verbal and Numerical Tests seem to indicate that the relationships between GO profiles and mental effort may be moderated by the type of task (similarly to self-efficacy). Due to the nature of the tasks, it is possible that task difficulty influenced the amount of mental effort invested by participants on the different tests. However, as described in Section 10.2.2. it is possible that the different results obtained on the Verbal and Numerical Tests are a result of the small experimental sample size (resulting in small cluster sizes). Therefore, it is possible that either Type I or Type II error occurred due to the small cluster sizes. The small cluster sizes should be taken into serious consideration when interpreting these results. The small cluster sizes could also be responsible for the similarities in the relationships between GO profiles and other variables (mental effort and self-efficacy) e.g. the finding that participants having a 'high GOs' profile were found to have both higher self-efficacy and mental effort scores than participants adopting other profiles. Consequently, these similarities in the relationships between GOs and other variables should also be interpreted with caution.

Taken together, the results of the current study and those of previous studies seem to indicate that mental effort is mostly related to the approach GOs but not as much to the avoidance GOs. The results also indicate that participants adopting the 'High GOs' profile seem to invest higher levels of mental effort than those adopting the 'High Mastery, Moderate Performance' profile. Moreover, the GO profile results provide an indication of the relationships between mental effort and GOs being moderated by task type. However, due to the small sample size issue further research is required before making any sweeping conclusions and practical recommendations regarding promoting a MAP GO in order to increase mental effort on tasks. Recommendations for such research are made in Chapter 11 Section 11.3. Next, the relationships between GOs (and GO profiles) and performance are discussed.

10.4. The relationships between Goal Orientations and Performance

The relationships between GOs and performance are of extreme interest in a number of areas of psychology. Consequently, they have been widely researched. In Chapter 8 (Section 8.7.3.) the results of this study from the non-profile perspective were compared with the correlational analyses results of previous studies. In order to maintain clarity it was thought appropriate to present a comparison table (Table 10.4.) showing the results obtained in the current study and those of previous studies prior to discussing the results.

Table 10.4. Comparison across studies for relationships between Goal Orientations and Performance

GO being Investigated	Results of Present Study	Significant Positive Relationship Found	Significant Negative Relationship Found	No Significant Relationship Found
Mastery GO/Mastery-Approach GO	• Significant positive relationships for Numerical Tests. • Non-significant relationships for Verbal Tests.	• Bong (2009)[1] • Yeo et al. (2009)[3] • Church et al. (2001)[5] • Elliot et al. (1999)[7]		• Elliot et al. (1999)[8] • Yeo et al. (2009)[4] • Bong (2009)[2] • Elliot & McGregor (2001) • Church et al. (2001)[6]
Mastery Avoidance GO	• Non-significant		• Bong (2009)[10]	• Elliot & McGregor (2001) • Bong (2009)[11] • Yeo et al. (2009)[9]
Performance-Approach GO	• Significant positive relationship for Numerical Test at Time 2. • Non-significant relationships for Numerical Test at Time 1 and Verbal Tests.	• Elliot et al. (1999)[12] • Church et al. (2001)[14] • Elliot & McGregor (2001)[16] • Yeo et al. (2009)[18] • Bong (2009)[20]		• Elliot et al. (1999)[13] • Church et al. (2001)[15] • Elliot & McGregor (2001)[17] • Yeo et al. (2009)[19] • Bong (2009)[21]
Performance-Avoidance GO	• Significant positive relationship for Numerical Test at Time 2. • Non-significant relationships for Numerical Test at Time 1 and Verbal Tests.		• Elliot et al. (1999) • Church et al. (2001) • Elliot & McGregor (2001)[17] • Bong (2009)[22] • Yeo et al. (2009)[19]	• Elliot & McGregor (2001)[16] • Bong (2009)[23] • Yeo et al. (2009)[18]

[1] For Middle and Upper Elementary and Middle School; [2] For Lower Elementary; [3]On air traffic control task; [4]On exam; [5]For Graded Performance; [6]For SAT scores; [7]In Study 1; [8]In Study 2; [9]On exam; [10]For Middle Elementary; [11]For Lower and Upper Elementary and Middle School; [12]In Study 1; [13]In Study 2; [14]For Graded Performance; [15]For SAT scores; [16]For Study 2; [17]For Study 3; [18]On air traffic control task; [19]On exam; [20] For Upper Elementary and Middle School; [21] For Lower and Middle Elementary; [22]For Middle and Upper Elementary and Middle School; [23]For Lower Elementary.

The results presented in Table 10.4. indicate that a few of the studies reviewed found a significant positive relationship between a MGO/MAP GO and performance whilst the rest did not find any significant relationships. All the studies reviewed, except that by Elliot and McGregor (2001) found different relationships between a MGO/MAP GO and performance depending on the task type, time at which participants took part in the study, or age of participants. For example, Bong (2009) found a significant positive relationship between a MAP GO and performance for Middle and Upper Elementary and Middle School students and a non-significant relationship for lower elementary school students. Church et al. (2001) found significant positive relationships for graded performance but not for SAT scores. It is possible that the differences occurring within studies are due to general GO measures being used or participants being quite young. However, these differences (e.g. Yeo et al., 2009) may also be a result of differences across tasks.

The results of the present study are similar to those of previous studies in that different relationships between a MAP GO and performance were found on different tasks. Significant positive relationships were found between a MAP GO and performance on the Numerical Tests but non-significant relationships were found on the Verbal Tests. Consequently, it seems as though some task characteristic/s might be moderating the relationships between a MAP GO and performance. This possible moderation effect was also found for the relationships between GOs and self-efficacy as well as mental effort. Although it was quite an unexpected finding, it is also an extremely important one. If task characteristics moderate the relationships between GOs and other variables, this may explain the inconsistencies in results across studies as well as the inconsistencies for GOs on different tasks within studies. Recommendations for future research based on these findings are presented in Chapter 11 Section 11.3.

The relationships between a MAV GO and performance in this study were found to be consistent with the results obtained by Elliot and McGregor (2001), Bong (2009, for Lower and Upper Elementary and Middle School students) and Yeo et al. (2009, for exam performance). Bong (2009) also found significant negative relationships between a MAV GO and performance for Middle Elementary School students. Overall, these results indicate that a MAV GO does not seem to be beneficial to performance.

The results of studies assessing the relationships between a PAP GO and performance are not straightforward. Table 10.4. indicates that some studies found significant positive relationships and others found non-significant relationships. All the studies reviewed obtained inconsistent results across tasks, participant ages, or time at which participants took part in the study. The results of this study are very similar to those of previous studies since a significant positive relationship was found between a PAP GO and performance on the Numerical Test at Time 2 but non-significant relationships were found on the Numerical Test at Time 1 as well as on the Verbal Tests. The inconsistencies found here (and in previous studies) point towards the possibility that some task characteristics are moderating the relationship between GOs and performance.

Finally, it seems as though previous studies found significant negative and/or non-significant relationships between a PAV GO and performance. Again, most of the studies reviewed found different relationships between a PAV GO and performance (within the same research study) depending on the task type, study, or age of participants. The results of this study correspond with those of previous studies in that different relationships were found depending on task type. However, they are not consistent with previous research results in that a significant **positive** relationship was found for the Numerical Test PAV GO at Time 2 (as opposed to significant negative or non-significant relationships). Once again, it seems as though task type may be moderating the relationships between GOs and performance.

The possibility of task characteristics moderating the relationships between GOs and performance was investigated by three studies reviewed. Steele-Johnson et al. (2000) investigated differences in performance as a result of GOs adopted on simple and difficult tasks. They hypothesised that when a task is simple, rehearsing strategies (associated with performance GOs) as opposed to elaborate strategies (associated with mastery GOs) may have beneficial effects on performance. On the other hand, when the task is difficult, dedicating cognitive resources to mastering the task (associated with mastery GOs) may be more beneficial than rehearsing known but not ideal task strategies (associated with performance GOs). They found partial support for their hypothesis in that "individuals with a performance goal orientation outperformed those with a learning orientation on a simple task, but no goal orientation effects were observed in the difficult task condition" (Steele-Johnson et al., 2000:730). Steele-Johnson et al. (2000) did not actually measure task difficulty but rather they assigned simple and difficult tasks to participants. However, according to Mangos and Steele-Johnson (2001) it is important to examine the effects of *subjective* task complexity (or task difficulty) as well as *objective* task complexity on the relationships between GOs and performance. According to Mangos and Steele-Johnson (2001:171) subjective task complexity refers to "perceptions of task complexity" whilst objective task complexity refers to "complexity related to task characteristics or behavioural demands of the task". The study by Steele-Johnson et al. (2000) investigated the effects of objective task complexity on the relationships between GOs and performance. Mangos and Steele-Johnson (2001) investigated how subjective task complexity mediates the relationships between induced GOs and performance. They induced mastery and performance GOs and found that GO effects on performance were mediated by subjective task complexity. Their results indicated that participants in the induced mastery GO condition reported higher levels of subjective task complexity than participants in the induced performance GO condition. They also found that subjective task complexity had a significant negative effect on performance and participants in the induced performance GO condition performed better than participants in the induced mastery GO condition. The authors' explanation for these findings are that participants having high mastery GOs look for higher levels of challenge which causes them to invest more effort on tasks. This increased effort in turn leads to an increase in subjective task complexity which has a negative influence on performance. This explanation is not consistent with that of Steele-Johnson et al. (2000) who suggest that mastery GOs are associated with the use of better cognitive strategies on difficult tasks (which in turn should lead to higher performance). Having said that, Steele-Johnson et al. (2000) did not find support for participants having high mastery GOs performing better on more complex tasks. Yeo et al. (2009) also investigated the effect of task difficulty (which they refer to as 'task demands') on the relationships between GOs and performance. They found that the relationship between a PAP GO and performance switched from positive to negative as task demands increased. Although further research is definitely required in order to understand these relationships better, these studies, along with the results of the present study indicate that it is important to take into consideration task characteristics such as task difficulty in order to better understand the relationships between GOs and performance.

The results of this study are also important because they provide evidence that a PAV GO is not necessarily detrimental to performance. Consequently, although the approach GOs seem to be more consistently significantly positively related to performance, the avoidance GOs may also be significantly positively related, or at least not significantly negatively related. However, before making any decisions regarding which GOs should be promoted (if it is possible for people to change their GOs) research must be carried out in order to investigate which task characteristics might be moderating the relationships between GOs and performance and how. Research examining the direction of causality of the relationships between GOs and performance is also necessary. These recommendations for future research will be discussed in further detail in Chapter 11 Section 11.3.

When the relationships between GOs and performance were examined in terms of GO profiles it was found that participants adopting different GO profiles on the Numerical Test had significantly different levels of performance. Participants adopting the 'High GOs' profile were found to have significantly higher levels of performance than participants adopting the 'High Mastery, Moderate Performance' profile and the 'High Performance-Avoidance' profile. These results are consistent with those obtained when examining the relationships between GO profiles and self-efficacy and mental effort. As discussed in Sections 10.2.2. and Section 10.3. the small cluster sizes should be kept in mind when interpreting the results obtained.

Pastor et al. (2007) and Fortunato and Goldblatt (2006) also investigated the relationships between GO profiles and performance in their studies. A comparison of the results of this study (for Numerical Test GO profiles) and those of the studies by Pastor et al. (2007) and Fortunato and Goldblatt (2006) revealed some interesting findings. Previously (in Section 10.1.), the GO profiles obtained from the three studies were compared and similarities in the profiles obtained across studies were discussed. In order to maintain clarity, a table (Table 10.5.) was drawn up so as to indicate the similar GO profiles obtained across studies. The performance of participants in each cluster, compared with that of participants in different clusters, is indicated in brackets for each of the studies.

Table 10.5. Relationships between Goal Orientation Profiles and Performance

Type of GO Profile	Present Study [Numerical Test Performance]	Pastor et al. (2007) [Semester GPA]	Fortunato & Goldblatt (2006) [Exam Performance]
'High Mastery, Low Performance'	3 (low)	5 (low)	2 (low)
'High GOs'	1 (high)	3 (average)	3 (high)
'High Approach, Low Avoidance'		2 (high)	4 (high)
'High Performance-Avoidance'	4 (low)		1 (low)*

Key: * On exams 1 and 2.

The Numerical Test performance of participants in Cluster 3 (in this study) was not significantly lower than that of participants in Cluster 1. However, the mean performance scores on the Numerical Test (see Table 8.58.) of participants in Cluster 3 (mean = 3.18) do seem to be quite low compared to the mean performance scores of participants in Cluster 1 (mean=6.85). Consequently, the performance of participants in Cluster 3 was included as 'low' in Table 10.5. rather than average.

Table 10.5. shows that the results across studies with respect to the relationships between GO profiles and performance seem to be quite consistent with participants adopting 'High GOs' and 'High Approach, Low Avoidance' profiles performing better than participants adopting 'High Mastery, Low Performance' and 'High Performance

Avoidance' GO profiles. Consequently, it seems as though some GO profiles may be more beneficial than others in terms of performance. This will be discussed in further detail in Section 10.5.

When analyses were carried out in order to test for significant differences in performance (depending on the GO profile adopted) on the Verbal Test no significant differences were found. These results provide further support for the possibility that the relationships between GOs and performance may be moderated by task type. Understanding how the relationships between GOs and performance are moderated by the type of task may provide invaluable insight into which GOs are most beneficial in which circumstances. For example, it may be the case that if a person is already good at selling a particular computer software program, adopting a MAP GO will not significantly increase their sales performance because they already understand how to sell the computer software program and will only make small increases in learning and performance. On the other hand, if this person adopts a PAP GO they may perform significantly better because of the different standards (performing better than the other salespeople) set by adopting the PAP GO. Another person might not fully understand the techniques required to sell the same computer software, in which case adopting a MAP GO might significantly improve this person's sales. Task characteristics such as task difficulty and task value may also influence the relationships between GOs and performance. Recommendations for future research based on the findings of this study are made in Chapter 11 Section 11.3. Prior to discussing the stability and task-specificity of GOs the next section addresses the question regarding whether a particular GO or GO profile is better than the others.

10.5. Is one Goal Orientation or Goal Orientation Profile better than the others?

Since GOs were found to be related to variables such as mental effort and performance researchers have been searching to discover whether there is a 'best' GO which will improve people's performance, mental effort, self-efficacy, and use of better cognitive strategies, amongst others. The discovery of a 'best' GO would make a huge difference to organisations, education and sports (amongst others). It may lead to the development of strategies to encourage people to adopt this 'best' GO. As a result they may perform better, invest more effort and feel more confident about their abilities. Overall, the results of this study and those of previous studies, point towards the approach GOs being significantly positively related to self-efficacy, mental effort and performance. In contrast, the relationships between the avoidance GOs and self-efficacy, mental effort and performance have not been entirely consistent. Therefore, it seems as though approach GOs may be more beneficial than avoidance GOs (if high levels of self-efficacy, mental effort and performance are considered desirable).

A recurring finding throughout this study is that the relationships between GOs and other variables seem to be moderated by task type. As discussed earlier, a number of other studies (e.g. Bong, 2001; Yeo et al., 2009; and Church et al., 2001) also found GOs to be related differently to variables on different tasks. Consequently, it may be time to stop attempting to find the 'best' GO and focus instead on determining which task characteristics cause GOs to be more or less related to other variables. Such research may be able to explain the inconsistencies found across studies (and within the same studies across tasks) for the relationships between GOs and other variables. Recommendations for future research of this kind are made in Chapter 11 Section 11.3.

In terms of GO profiles, the results seem to indicate that the 'High GOs' profile might be a beneficial profile to adopt since it is more strongly related to self-efficacy, mental effort and performance than other GO profiles. On the other hand, the 'High Mastery, Moderate Performance' profile does not seem to be quite so beneficial since participants adopting this profile seemed to have the lowest levels of self-efficacy and mental effort. Participants adopting this profile were also found to have significantly lower levels of performance than participants adopting the 'High GOs' profile. Participants adopting the 'High Performance-Avoidance' profile were also found to have significantly lower levels of performance than those adopting the 'High GOs' profile. Therefore, this profile too might not be such a beneficial one to adopt. As described in Section 10.4., the results obtained in this study were consistent with those obtained by Pastor et al. (2007) and Fortunato and Goldblatt (2006), with respect to the relationships between GO profiles and performance. Consequently, there seems to be a growing body of evidence that certain GO profiles seem to be more beneficial than others. More specifically, adopting 'High GOs' or 'High Approach, Low Avoidance' GO profiles may be more beneficial than adopting 'High Performance-Avoidance' or 'High Mastery, Moderate Performance' GO profiles. The main difference between the two sets of profiles (those that are more strongly correlated vs. those that are less strongly correlated with performance) is that the former have a high PAP GO whilst the latter have a moderate to low PAP GO. This indicates that a PAP GO may be an important GO to adopt. This finding contradicts the previously prevailing belief that mastery GOs are adaptive whilst performance GOs are non-adaptive (e.g. Meece & Holt, 1993; Schraw et al., 1995). Instead, it seems as though adopting both MAP and PAP GOs may be advantageous since the 'more beneficial' profiles were found to have high MAP and PAP GOs. The profile results reflect the results obtained using the non-profile perspective in which the approach GOs were found to be related to self-efficacy, mental effort and performance.

As one would expect from the names of the concepts themselves, the 'approach' GOs seem to be more positive and constructive than the 'avoidance' GOs. However, this is not to say that adopting avoidance GOs would be disadvantageous or reduce the beneficial effects of the approach GOs. In fact, participants who scored highly on all four GOs ('High GOs' profile) seemed to have high self-efficacy, mental effort and performance on tasks. As discussed earlier (Section 10.2.1.) it is possible that the *reasons* for adopting the avoidance GOs may influence the outcome (thus explaining the inconsistent results obtained across studies). Since the relationships between GO **profiles** and performance have been quite consistent across studies so far, this may be an indication that it is better to use profile perspective as opposed to the non-profile perspective when investigating these relationships.

The results of this study also point towards the relationships between GO profiles and self-efficacy, mental effort and performance being moderated by task type. This was evident since no significant differences were found in the self-efficacy and performance of participants adopting different GO profiles on the Verbal Test but significant differences were found on the Numerical Test. Moreover, no significant differences in mental effort were found for participants having different GO profiles on the Numerical Test but significant differences were found on the Verbal Test. Once again, suggestions for future research based on these findings will be made in the next Chapter (Section 11.3.). Moving away from the relationships between GOs and other variables, the next section focuses on the stability of General GOs over time.

10.6. Examining the Stability of General Goal Orientations over Time

Research Questions 2a and 2b focused on the stability of General GOs over time (from the profile and non-profile perspectives). The non-profile perspective results will be discussed first since they might provide more insight into the profile perspective results. The stability of GOs over time from the non-profile perspective was assessed in terms of correlations over time and in terms of mean-level change. The mean-level change results indicated that General PAP and PAV GOs decreased significantly from Time Q1 to Time Q2. It is not easy to explain why General PAP and PAV GOs changed significantly over time but General MAP and MAV GOs did not. General GOs are assumed to be stable dispositions. However, the changes observed in this study suggest that this is not necessarily the case. Since the majority of participants in this study were students, it is possible that the stability of General MAP and MAV GOs over time is a result of the constant focus on learning encouraged at university. On the other hand, General PAP and PAV GOs may have been more susceptible to change as a result of changing situational factors. For example, if participants had been working on group assignments the strong emphasis on teamwork (as opposed to competition) may have influenced their performance GOs.

The correlations over time were found to be lower than those of other GO studies. This may be because the GO studies reviewed assessed correlations over time using task-specific GO measures. If General GO measures are less accurate than task-specific GO measures this may have been the cause of the low correlations for General GOs over time. This is possibly the case since General GOs were found to be significantly different from task-specific GOs (as will be discussed in Section 10.8. below). Since

General GOs are assumed to be general, stable traits it was thought useful to compare their stability over time with those of other general, stable traits. Personality traits were chosen for comparison since these have been widely researched and found to be stable traits. The correlation coefficients for General GOs over time were found to be lower than those of personality traits thus indicating less stability over time. These findings contradict the assumption that GOs are stable dispositions.

Since the time interval between the General GO measures at Time 1 and Time 2 varied from between 4 to 51 weeks, correlation coefficients for participants having a 4-8 week time interval and those having a 9-51 week time interval were drawn up. The correlation coefficients for MAP, PAP and PAV GOs seemed to be lower for participants having a longer time interval between the Time 1 and Time 2 questionnaires. The MAV GO however, seemed to be an exception, with the stability increasing with a longer time interval. This finding was quite unexpected and it is still not clear why the stability of MAV GOs would increase with a longer time interval. However, when Fisher z tests were carried out, the changes in stability for MAP, MAV and PAV GOs were not found to be significant. The PAP General GO however, was found to have significantly lower stability the longer the time interval between Time 1 and Time 2 measures. This finding was consistent with Payne et al. (2007), who found that stability over time decreased when the time intervals between measures were longer. However, Payne et al. (2007), who used a 3-factor model of GOs in their study, also found this decrease in stability for MAP and PAV GOs.

Clearly, the results of this study along with those of Payne et al. (2007) indicate that further research into the stability of General GOs over time is necessary since there is a growing repertoire of evidence that General GOs are not quite as stable as they were initially thought to be. These findings are not entirely surprising because although a number of researchers assume that GOs are general, stable traits (as discussed in Chapter 4 Section 4.1.) most studies tend to measure GOs using task-specific measures. The use of task-specific measures and the assumption that GOs are general, stable traits are rather contradictory (which is partially why this issue was addressed in the current study). General GOs not being stable would mean that they are more state-like rather than trait-like. Consequently, it might be easier to encourage individuals to adopt GOs which may be more beneficial for them in different circumstances than if they were trait-like. For example, if MAP GOs are found to be highly beneficial during training whilst PAP GOs are found to be more beneficial on the job it might be possible to develop ways to help employees to adapt their GOs depending on the situation e.g. to adopt a MAP GO during training and a PAP GO on the job. Moreover, if General GOs are not stable over time, then the whole idea of trait GOs interacting with state GOs might not be feasible. Rather than assessing interaction effects it may be possible to manipulate GOs and examine the effects of these manipulations without having to worry about possible interactions.

The comparison of participants' GO profiles from Time Q1 to Time Q2 indicated that 67% of participants adopted the same General GO profile over time. Moreover, it was found that more participants adopted the same General GO profile from Time 1 to Time 2 than would have been expected by chance alone (at $\rho<0.05$). This tendency towards no cluster change seems to point towards the possibility of General GO **profiles** being stable over time. However, the results of this study alone are not enough to support such a claim. It is possible that this significant result is due to type I error. *If* GO profiles were found to be stable over time the profile results would contradict the non-profile results with respect to the stability of General GOs over time. A potential explanation for these (possibly) contradictory results is that although there may be fluctuations in participants' GOs, overall, participants are still adopting the same GO profiles over time. For example, the mean-level General PAP GO of a participant adopting a 'High Mastery, Moderate Performance' GO profile may decrease significantly from a certain point in time to another. Nevertheless, the lower mean General PAP GO score may still be considered to be within the 'moderate' range when compared to that of participants adopting a 'High Performance Avoidance' GO profile. However, as described earlier, the results of this study do not provide enough evidence to make a claim that General GO profiles are stable over time. Hence, before taking the explanation of these 'possible contradictions' any further additional research into the stability of General GO profiles over time is required.

Recommendations for such research are made in Chapter 11 Section 11.3. The next section addresses the stability of task-specific GOs over time.

10.7. Examining the Stability of Task-Specific Goal Orientations over Time

The results relating to Research Questions 5a and 5b focus on determining the stability of task-specific GOs over time (from the profile and non-profile perspectives). The task-specific GOs included Verbal and Numerical Test GOs as well as Hypothetical Task GOs. In keeping with the same order as that of Chapter 9, Research Question 5b is discussed first.

The stability of task-specific GOs over time was assessed in terms of mean-level change as well as correlations over time. The results presented in Chapter 9 (Section 9.1.2.) show that there were no significant changes in the mean scores of participants over time for all four GOs on the Hypothetical Task, as well as the Verbal and Numerical Tests. This indicates good levels of stability over time for the task-specific GOs. The Verbal and Numerical Test GOs were therefore found to show stability over time notwithstanding the induction attempts. Although there are other possible reasons for the inductions not being entirely successful (as will be discussed in Section 10.9. below) this lack of change in the Verbal and Numerical Test GOs over time provides further support of their stability. Nearly significant differences were found when assessing the mean-level change of Hypothetical Task MAP and PAV GOs over time. Although it is possible that these were due to the longer time intervals between measures, the correlational analyses do not quite support this explanation since no significant differences in the strengths of the correlation coefficients were found for participants having different time intervals between the Time Q1 and Time Q2 questionnaires. Possible explanations for these nearly significant differences are provided (next) when discussing the correlational analyses.

The results for the correlations over time indicated high levels of stability for Verbal and Numerical Test GOs and slightly lower levels of stability for the Hypothetical Task GOs. The correlation coefficients for Verbal and Numerical Test were very similar to those obtained by Fryer and Elliot (2007) but slightly lower than those found by Elliot and McGregor (2001). When the correlations over time for Verbal and Numerical Tests were compared with those of the Hypothetical Task GOs (Chapter 9 Section 9.1.2.) the Hypothetical Task PAV GO was found to have significantly lower stability than the respective Verbal and Numerical Test GOs. Therefore, it seems as though Hypothetical Task GOs may not be as stable as Verbal and Numerical Test GOs. A possible reason for this is that participants were asked to imagine the GOs they would adopt on the Hypothetical Task whereas they had actually completed the Verbal and Numerical Tests. Consequently, the measures for Hypothetical Task GOs may not have been as accurate as those for the Verbal and Numerical Tests resulting in more variation in the responses. This explanation may also account for the lower stability of General GOs over time. Additional research into the stability of task-specific GOs over time is required in order to further clarify whether these are in fact stable over time (especially longer periods of time). Recommendations for future research on this matter are presented in Chapter 11 Section 11.3. The results regarding the stability of task-specific GO *profiles* over time are discussed next.

The GO profile results indicated that 66%, 63% and 56% of participants adopted the same GO profile at Time 1 and Time 2 on the Hypothetical Task, Verbal Test, and Numerical Test, respectively. When the observed frequencies of participants to clusters (GO profiles) were compared with those that would have been expected by chance the Chi-square test results obtained (see Tables 9.13., 9.16., and 9.19.) indicate that more people than would have been expected by chance alone at $\rho<.01$ adopted the same Verbal Test GO profile from Time E1 to Time E2. This was also the case for Numerical and Hypothetical Task GO profiles but at $\rho<.05$. The results show that fewer participants changed clusters on the Verbal Test from Time 1 to Time 2 than they did for the Numerical Test and Hypothetical Task. The higher changes across clusters for the Hypothetical Task than the Verbal Test may have been due to the fact that participants did not actually complete these tasks and were therefore not as certain (and more susceptible to change) than they would have been had they actually completed the task. However, it may also be a result of the much smaller sample size in the experiment than in the survey. With respect to the changes in Numerical Test

GO profiles over time, it is possible that task difficulty may have contributed towards these changes in clusters. Although these results indicate that GO profiles are more stable than what would have been expected by chance further research investigating the stability of task-specific GOs and GO profiles over time is required before any concrete conclusions are drawn.

Taken together, the results obtained when assessing the stability of General and Task-specific GOs over time indicate that, in terms of the non-profile perspective, task-specific GOs seem to have higher levels of stability over time than General GOs. In fact, General GOs do not seem to be as stable as they were initially thought to be. In terms of GO profiles, more participants would have been expected to change clusters over time by chance alone for both General and Task-specific GOs. These results seem to point towards the stability of General and Task-specific GO profiles over time. However, the results of this study alone are not enough to make such a claim and further investigation of the stability of GO profiles (General and Task-Specific) over time is definitely required.

10.8. Assessing the Generality and/or Task-Specificity of Goal Orientations

In order to determine whether GOs are General or task-specific the stability of participants' GOs *across tasks* was examined. Moreover, participants' General GOs were compared with their task-specific GOs. These comparisons were made using both the profile and non-profile perspectives. In order to maintain the same order as Chapter 9 the comparison of GOs across tasks (from the profile and non-profile perspectives) is discussed first.

10.8.1. Assessing the Task-Specificity of Goal Orientations

The GO profile results indicated that a higher percentage of participants adopted the same GO profile on the Verbal and Numerical Tests (72%) than they did on the Hypothetical Task and Verbal Test (57%) and on the Hypothetical Task and Numerical Test (61%). The Chi-square test results (presented in Section 9.2.1.) showed that more participants would be expected to adopt the same Hypothetical Task and Verbal Test GO profiles by chance alone. This was also the case for the Hypothetical Task and Numerical Test GO profiles adopted by participants. However, more participants than would have been expected by chance alone adopted the same Verbal and Numerical Test GO profiles (at $p<0.01$). Before discussing these differences any further, the non-profile perspective results will be described.

The non-profile perspective results reflected those from the profile perspective. Overall, the mean-level change results indicated that Verbal and Numerical Test GOs were not significantly different from each other. However, participants seemed to have significantly higher Hypothetical Task GOs than Verbal and Numerical Test GOs (Chapter 9 Section 9.2.2). Moreover, the Fisher z test results showed that the Verbal and Numerical Test GOs were found to be significantly more strongly correlated with each other than with the Hypothetical Task GOs. Duda and Nicholls (1992) did not find any differences in participants' GOs across domains. Bong (2001) and Magson et al. (2008) found performance GOs to generalise across tasks and MGOs to be task-specific. On the contrary in this study, overall, significant changes were found across the Hypothetical Task and Verbal Test as well as across the Hypothetical Task and Numerical Test. These findings were consistent with those of Anderman and Midgley (1997). The type of tasks chosen in the different studies may account for the different results obtained across studies.

As discussed in Chapter 9 Section 9.2.1., as opposed to task-specificity, the results of this study seem to provide more support for domain-specificity of GOs. Verbal and Numerical Tests may be considered to fall within the same domain, that is, the academic domain. No significant differences in GOs or GO profiles were observed across Verbal and Numerical Tests. On the other hand, the Hypothetical Tasks would fall into different domains (e.g. sales and training) than the Verbal and Numerical Tests. Significant differences were found between Hypothetical Task and Verbal Test GOs (and GO profiles) as well as between Hypothetical Task and Numerical Test GOs (and GO profiles). Consequently, the results obtained in this study seem to indicate domain-specificity as opposed to task-specificity. It is possible that different studies obtained different results when assessing changes in GOs across tasks due to the nature of the tasks chosen. The non-significant differences found may be a result of tasks measured being in the same domain. On the other hand, any differences found may have resulted from domain-specificity.

The findings presented above imply that it might be better to use task- or domain-specific measures of GOs as opposed to General measures because one may not be measuring the GOs of interest when using General measures. For example, if a researcher would like to measure participants' GOs during training and simply uses a General GO measure, the participants' responses on the General GO measure might not necessarily be an accurate reflection of their GOs during training. On the other hand, if the researcher adapts a GO measure to the training task at hand, this will be more likely to provide an accurate representation of the GOs being adopted on the this task. However, before drawing any conclusions regarding the Generality, Domain- or Task-specificity of GOs, the results assessing the similarities and differences between General and Task-Specific GOs are discussed.

10.8.2. Comparing Participants' General Goal Orientations with their Task-Specific Goal Orientations

In-keeping with the same structure as the results, the profile perspective results will be discussed first followed by the non-profile perspective results. The results presented in Chapter 9 (Section 9.2.3.) indicate that 71% of participants adopted the same General and Hypothetical Task GO profiles. Moreover, 66% of the experimental participants adopted the same General and Verbal Test GO profiles and 55% adopted the same General and Numerical Test GO profiles. The Chi-square test results indicated that more participants than would have been expected by chance alone adopted the same General and Hypothetical Task GO profiles. This was also found to be the case for General and Verbal Test GO profiles. However, more participants would have been expected to adopt the same General and Numerical Test GO profiles by chance alone (at $\rho<0.01$). The results obtained in this study are not enough to come to a definite conclusion regarding General and Numerical Test GO profiles being significantly different from each other. However, they raise a flag regarding the utility of measuring General GOs as opposed to task-specific (or domain-specific) GO. Before discussing this any further, the results comparing General and Task-specific GOs from the non-profile perspective are reviewed.

Tables 8.43. and 8.45. presented the correlation coefficients for General GOs with Hypothetical Task, as well as with Verbal and Numerical Test GOs. These correlations were on the low side (ranging between 0.28 and 0.52, $\rho<0.01$) compared with the correlations for General and Task-Specific GOs over time (ranging between 0.44 and 0.78, $\rho<0.01$). This points towards participants' General GOs being different from their task-specific GOs.

The mean-level change results showed that participants' General GOs were found to be significantly higher than their Verbal (PAP and PAV) and Numerical Test GOs. In addition, participants General PAP and PAV GOs were found to be significantly higher than their respective Hypothetical Task GOs whilst participants' General MAP GO was found to be significantly lower than their respective Hypothetical Task GO. With the exception of the Hypothetical Task MAP GO, the participants' General GOs were found to be significantly higher than their task-specific GOs. This may be due to General measures of GOs not being specific enough. For example, it is possible that when given a General measure of GOs participants may think back to times when they adopted the different GOs and therefore tend to score more highly on each of the GOs than they would if they were given a task-specific measure. This explanation is based on the assumption that GOs are not stable traits and that participants tend to adopt different GOs at different times. However, the results obtained when assessing the stability of GOs do reflect this possibility. The finding that a MAP Hypothetical Task GO was significantly higher than the respective General GO is not consistent with this explanation. However, it is possible, as mentioned earlier that the Hypothetical Task GO measures were not as accurate as the Verbal and Numerical Test GO measures since participants did not actually complete the tasks. Taken together, the results of this study seem to indicate that there is a strong possibility of General GOs being different from Task-specific GOs.

When assessing the extent to which General GOs are similar to Task-Specific GOs the non-profile perspective analyses did not totally correspond with the profile analyses. The non-profile results showed General GOs to be significantly different from Hypothetical Task, Verbal and Numerical Test GOs overall. However, the profile results showed that only for General and Numerical Test GO profiles were more participants expected to adopt the same GO profiles by chance alone ($\rho<0.01$). These inconsistencies across the findings may be due to the GO profiles not being as sensitive to changes as GOs from the non-profile perspective (as discussed in Section 10.6.). The implications of these findings are discussed in Section 11.1.

Overall, the results point towards General GOs being different from Task-specific GOs. Although there is not enough evidence as yet to conclude that General GO profiles are different from task-specific GO profiles, this study provides a good indication of this possibility. Therefore, if General measures of GOs are used they may not be accurately measuring the actual GOs adopted by participants on the task at hand. Consequently, the results of this study strongly suggest that it might be better to use domain- or task-specific measures of GOs as opposed to General measures. Although the results of this study point towards domain-specificity it may still be useful to use *task*-specific measures of GOs as opposed to domain-specific measures. This is because as discussed in Sections 10.3., 10.4. and 10.5. there is a strong possibility that task characteristics may influence the relationships between GOs and other variables.

10.9. Is it best to use Goal Orientations or Goal Orientation profiles in research and practice?

On a number of occasions throughout this study the GO profile results were not entirely consistent with the results obtained when examining GOs from the non-profile perspective (e.g. when assessing whether participants adopt different General and Task-Specific GOs). This leads to the question of whether it is best to examine GOs in terms of the profile or non-profile perspective.

As mentioned earlier (Section 10.6.), it may be the case that even though mean-level changes in GOs are statistically significant, these changes might not be large enough to change the GO profile adopted by the individual. If this is the case, then would it be more useful to use the profile perspective or would this not provide sufficient information regarding participants' GOs? The differences in results obtained when using the profile and non-profile perspectives may also provide some insight into the inconsistent findings across different studies examining GOs. Although as yet it is not possible to provide a straightforward answer to the question posed above, it seems as though it might be useful to make use of the different perspectives depending on the aims one would like to achieve. For example, if a researcher is interested in investigating how and why GOs change over time and across tasks, it might be useful to use the non-profile perspective since this will provide more detail. On the other hand, if a researcher is more concerned about discovering patterns in the relationships between GOs and other variables on different tasks, then the profile perspective might be more appropriate for his/her purposes. However, prior to making any recommendations regarding which perspective should be used further research into the utility and accuracy of measuring GOs and GO profiles is required. Recommendations for such research are made Chapter 11 Section 11.3. The next section focuses on the interaction effects of General and Induced GOs on the performance of participants.

10.10. Examining the Effects of the Interactions between Trait and Induced Goal Orientations on Participants' Performance

In Chapter 4 studies investigating the interactions between state and trait GOs were discussed. The three studies discussed, those by Chen and Mathieu (2008), Gerhardt and Luzadis (2009) and Jagacinski et al. (2001), all used a 2-factor model of GOs. Consequently, this study attempted to further knowledge on these interactions by using the 2x2 model of GOs as well as examining the interaction effects using the GO profile approach. Unfortunately, due to the small sample size it was not possible to investigate the interaction effects from the profile perspective.

Prior to assessing the interaction effects of trait and induced GOs on performance it was found that the inductions were not successful. This greatly reduced the chances of there being any interaction effects on performance. In fact, when tested, no significant interaction effects on performance were found. Great attention was paid to the way that successful inductions were carried out in previous studies and the inductions of the current study were based on these (e.g. Chen & Mathieu, 2008; Kozlowski et al., 2001). There is a strong possibility that the lack of success of the inductions may not be down to the way the inductions were carried out but a result of the fact that a large number of participants who were in the MAP and PAP induction conditions already had high MAP and PAP GOs, respectively. Consequently, the inductions might not have made much of a difference to these participants' GOs. If only participants who had low MAP and PAP GOs had been included in the respective induction conditions the inductions might have been successful and the possibility of interaction effects on performance would have increased greatly. However, unfortunately, due to the small experimental sample size it was not possible to do this. The finding in Chapter 9 (Section 9.1.2.) that the Verbal Test PAP induction seemed to decrease participants' PAV GOs indicates that there is a possibility of the inductions having influenced GOs. Another possible reason for the inductions not being successful is that in quite a few cases there was not a big time lag between the first and second experimental sessions. Consequently, participants may have answered the Time E2 GO questionnaires similarly to the Time E1 GO questionnaires. Therefore, the lack of a longer time lag between the Time E1 and Time E2 experiments may be considered a limitation. Consequently, GO inductions should be definitely be investigated further. Such recommendations for future research will be made in Chapter 11 (Section 11.3.). As discussed in the previous sections, the results of this study seem to strongly suggest that GOs are domain-specific. Consequently, investigating the interactions between state and trait GOs might not necessarily be appropriate or useful. The finding that GOs are domain-specific is inconsistent with the assumption that GOs are general dispositions (traits). This brings into question the utility of investigating the interactions between trait and state GOs. However, this does not mean that GOs should not be induced or that GO inductions should not be investigated further. On the contrary, GO manipulations may be extremely useful if certain GOs are found to be more ‘beneficial’ than others. In such a case investigating how to promote the ‘beneficial’ GOs might be of great benefit to organisations. As discussed earlier, the fact that the majority of the sample in this study had a ‘High GOs’ profile may have been the cause of the unsuccessful induction attempts. The implications of these results as well as recommendations for future research are discussed in Chapter 11 (Sections 11.1. and 11.3.).

10.11. Synopsis

In this chapter the results of this study were discussed and compared with results of previous GO studies. This revealed a number of important findings which are summarised below.

- For the purposes of this study the 2x2 model of GOs did not seem to improve on the 3-factor model in terms of GO profiles.
- A comparison of GO profiles found in this study and those obtained in previous studies revealed a number of common GO profiles (refer to Section 10.1.).
- Overall, MAP and PAP GOs were found to be more strongly related to self-efficacy, mental effort and performance than MAV and PAV GOs were.
- The relationships between GOs (and GO profiles) and other variables (that is, self-efficacy, mental effort, and performance) seems to be moderated by task type (possibly task difficulty and/or task value).
- The present study and previous studies indicate that the ‘High GOs’ and ‘High Approach, Low Avoidance’ GO profiles may be more beneficial profiles to adopt than the ‘High Performance-Avoidance’, ‘High Mastery, Low Performance’ and ‘High Mastery, Moderate Performance’ GO profiles since they were found to be more strongly related to self-efficacy, mental effort and performance.
- General GOs do not seem to be quite so stable over time. However, more participants would have been expected to change clusters from Time 1 to Time 2 by chance alone (at $\rho<0.01$). Therefore there is a possibility that General GO profiles may stable over time.
- Task-specific GOs and GO profiles seem to be stable over time.
- Participants’ GOs (and GO profiles) seem to be domain-specific.

- Overall participants were found to have significantly higher General GOs than Task-specific GOs. Moreover, at a significance level of 0.01, more participants would have been expected to adopt the same General and Numerical Test GO **profiles** by chance alone.

The theoretical and practical implications, limitations of the current study as well as recommendations for future research are discussed in the next chapter.

Chapter 11: Conclusion

11.0. Introduction

In the previous chapter the research findings of this study were discussed and compared with those of previous studies. In this chapter the theoretical and practical implications of these research findings are discussed. This is followed by a description of the limitations of the current study and a section proposing recommendations for future research.

11.1. Theoretical and Practical Implications

The findings of this study give rise to a number of implications regarding theory and practice related to the concept of GOs. The theoretical implications are discussed first and will be followed by a description of the practical implications of this study.

11.1.1. Theoretical Implications

As things stand, it is extremely difficult to compare the results of GO studies since these use different models and measures of GOs. Moreover, there seems to be an issue of results being inconsistent even when similar models and measures are used. The results of this study indicate that these inconsistencies may be resulting from (a) GOs being examined in terms of the non-profile perspective as opposed to the profile perspective, (b) assumptions being made about the stability and generality of GOs, and (c) the relationships between GOs and other variables being moderated by task type. Consequently, a number of points need to be taken into consideration when carrying out GO research in the future.

Firstly, it may be useful to use GO profiles as opposed to analysing GOs from the non-profile perspective. Since people can and do adopt multiple GOs this might provide a more holistic picture of the GOs that people adopt. It is possible that GO profiles may not be as sensitive to fluctuations as the individual GO scales are. However, if these differences are not large enough to make a difference to the overall profile that an individual adopts, are they worth pursuing? It may be the case that by assessing GOs from the *non-profile* perspective researchers may end up focusing on details and lose sight of the bigger picture. For example, it is possible (as mentioned in Chapter 10) that when GOs are analysed from the non-profile perspective, a person's mastery-approach GO decreases significantly over time. If this person adopts the 'High GOs' profile, this decrease might be trivial because they may still have a high mastery-approach GO compared to individuals adopting the 'High Performance-Avoidance' GO profile. Consequently, using the profile perspective may provide a better overall understanding compared to the non-profile perspective.

Secondly, since the GO profiles obtained in this study were similar to GO profiles obtained in previous studies, this might be an indication that it is possible to obtain a comprehensive set of GO profiles. This may open new doors with respect to theory and research on GOs. For example, having a common set of GO profiles might make it easier to compare results across studies and allow for more generalisation. It might also reduce variation across studies if a common set of GO profiles are used in research.

A third implication of the findings is that using General measures might not be an accurate way of measuring GOs. General GOs were found to be significantly different from the Hypothetical Task, as well as Verbal and Numerical Test GOs. Consequently, using General measures of GOs and assuming that participants adopt these GOs irrespective of the task or situation may well provide inaccurate results. These results along with those obtained when assessing the stability of General GOs (from the non-profile perspective) challenge the assumption that GOs are general stable traits. As a result it seems as though using more specific measures (task- or domain-specific) of GOs in future research may be more appropriate. Moreover, investigating the interactions between General GOs (trait) and state GOs might not be suitable. However, since task-specific GOs were found to be stable over time it may be possible to investigate the interactions between task-specific GOs and induced GOs.

Finally, an unexpected and yet extremely important finding from this study is that it seems as though the relationships between GOs and variables such as self-efficacy, mental effort and performance are moderated by task type (possibly task difficulty and/or task value). As described in Chapter 10 (Sections 10.2. and 10.4.) a number of studies (e.g. Mangos & Steele-Johnson, 2001; Steele-Johnson et al., 2000; Yeo et al., 2009) found that task difficulty/complexity does in fact influence the relationships between GOs and other variables (such as self-efficacy and performance). This finding may have a major influence on future GO research since it may be the reason underlying inconsistencies in previous research results (with respect to the relationships between GOs and other variables). If this is the case, it could be possible to determine what characteristics of tasks influence these relationships. This, in turn, may allow researchers to modify tasks and develop strategies in order to obtain the most beneficial effects from the relationships between GOs and other variables. For example, if task value is found to increase the strength of the relationships between GOs and performance, then creating a better understanding of the importance of a task and promoting the desirable GOs may increase self-efficacy and performance on the task.

11.1.2. Practical Implications

The findings of this study have four main practical implications. Firstly, since General GOs were found to be different from task-specific GOs it would probably not be wise to use GOs in selection because they seem to be quite changeable. If GOs were to be measured during selection the results may not accurately reflect the GOs that recruits would adopt on different tasks or in other situations. An additional issue with the use of GOs in selection is that prospective employees may not answer GO measures entirely truthfully if they perceived certain items (the mastery- and performance-avoidance items) as being less desirable to the employer than others.

Secondly, since common GO profiles were obtained in three studies (the present study, that by Pastor et al., 2007; and that by Fortunato and Goldblatt, 2006) it might be possible to develop a comprehensive set of GO profiles. This may be more useful to organisations than the non-profile perspective since it might provide a more holistic understanding of the GOs being adopted by employees.

Thirdly, the GO profile results indicate that the ‘High GOs’ and ‘High Approach, Low Avoidance’ GO profiles may be more beneficial profiles to adopt than the ‘High Performance-Avoidance’, ‘High Mastery, Low Performance’ and ‘High Mastery, Moderate Performance’ GO profiles. Since the ‘more beneficial’ GO profiles include having high mastery-approach and performance-approach GOs it might be advantageous for organisations to promote these two types of GOs (or the ‘High GOs’ and ‘High Approach, Low Avoidance’ GO profiles). This could have a positive effect on the self-efficacy, motivation and performance of employees. Promoting both mastery-approach and performance-approach GOs within an organisation might prove difficult. The performance-approach GO focuses on doing better than others (thus introducing competition) whilst the mastery-approach GO focuses on learning (which is not always easy in a competitive environment). For example, in a sales company a salesperson may choose to use the one sales strategy that they are good at in order to increase their sales performance and not ‘waste time’ on learning new sales strategies because of the stiff competition in the organisation. Learning a new sales strategy may reduce short-term performance until the salesperson masters it. However, the new technique may enhance performance in the long-term when the salesperson has a larger repertoire of selling techniques which may be beneficial in different circumstances. Therefore, it is probably best for organisations to promote a balance of Mastery-Approach and Performance-Approach GOs for example, by praising and rewarding employees who perform well as well as fostering a learning environment by creating training opportunities and not punishing mistakes. However, it is possible that one cannot simply ‘promote’ certain GOs in organisations if the organisational culture is inconsistent with these GOs. As mentioned in Chapter 1 there was a strong emphasis on performance-approach GOs in the call centre I used to work in. This was part of the call-centre culture. Employees knew that it was all about competition and that whoever got the most sales and the best call times got bonuses and got promoted. There was no time for learning and mistakes were punished harshly. It would probably not be possible to ‘promote’ a mastery-approach GO in such an organisation unless there is a change in the organisational culture. The prospect of promoting GOs in organisations and how this links in with organisational culture should definitely be looked into once more knowledge regarding the nature of GOs and the ways in which they relate to other variables is established.

Finally, the possibility that task characteristics seem to moderate the relationships between GOs (and GO profiles) and other variables (e.g. performance) should also be taken into account by organisations. They may need to examine job characteristics in order to make the most out of the relationships between GOs and variables such as mental effort and performance. For example, if selling a particular product is particularly difficult, adopting high mastery-approach and performance-approach GOs might not be enough to ensure high sales. Employees may have high mastery-approach and performance-approach GOs but not the adequate skills to do well at selling this product. However, these employees may do better than others if the company were to provide a training course on how to sell this product and emphasises the importance of selling it. These employees would also probably have higher performance than they would have without attending the training course.

11.2. Limitations of the Current Study

The main limitation of this study was the small experimental sample size. This was found to be a limitation for three main reasons. Firstly, it resulted in some of the analyses not being carried out since it would not have been statistically feasible to do so (e.g. Research Question 3a). Secondly, the inductions could not be properly tested since the experimental sample size was too small to be able to include only participants having low Mastery-Approach and Performance-Approach GOs in the respective experimental induction groups. Thirdly, although analyses were carried out to investigate whether participants adopting different GO profiles had different levels of performance, self-efficacy and mental effort these should be interpreted with caution due to the small sample sizes in each GO profile cluster.

Since a number of participants were employed and retired individuals, promoting a mastery-approach GO on the aptitude tests was not reasonable because they had no reason to improve their learning on the tests. Consequently, these participants were not randomly assigned to experimental groups but rather they were allocated to the control and performance-approach induction groups. This may have influenced the effectiveness of the tests of the inductions.

The aim was to make the study as work-related as possible by using aptitude tests and inviting employed participants to participate. However, the fact that the study was not carried out in an organisational setting means that it was a little removed from GOs in day to day work. Consequently, as will be discussed in Section 11.3., it would be useful to carry out further research on the nature of GOs in an organisational setting.

The model choice and item inclusion in the scales may also be considered a limitation. With respect to model choice, although the CFA results indicated that the 2x2 model provided the best fit to the data, this was still not an excellent fit. Moreover, the 2x2 model did not provide adequate fit when examining GOs in terms of profiles. The different factor structures obtained for General and Hypothetical Task GOs when carrying out the EFAs also attest to the unclarity in the factor structure. If the 2x2 model is in fact the optimal factor structure this would mean that the LCAs are based on analysis of a sub-optimal factor structure, which may make the clusters harder to replicate. However, since the 2x2 model did not provide adequate fit to the data when carrying out the LCAs it was not possible to use the 2x2 model for the analyses of GO profiles.

Item inclusion on scales may be considered a limitation. The reliability analyses as well as the factor analyses results (EFA and CFA) indicated that some items (particularly items 1, 8, 10 and 11) seemed to be problematic in some instances but not in others. The fact that they were only problematic when measuring some types of GOs (e.g. General GOs) but not others (e.g. Verbal Test GOs) made it difficult to decide which items to include on the scales. For the sake of consistency and comparability it was essential to keep the same items on the scales measuring the different GOs.

Consequently, a decision was made to include all the items on all the scales since removal of the problem items would have caused significant decreases in reliability on the scales overall. This could be considered a limitation due to the problem items causing some scales to have lower reliability than others.

The modifications made to GO items measuring different types of GOs (e.g. General and Verbal Test GOs) may also be considered a limitation since it introduced some variation across the GO scales. However, as discussed in Chapter 7 (Sections 7.1.5.1. and 7.2.5.1.) these modifications were kept to a bare minimum in order to maintain as much consistency as possible across the GO scales.

As mentioned at various points throughout Chapters 8 and 10 (e.g. Sections 8.6., 8.6.2., 8.7.2., 10.2.2., 10.3.), the large correlation matrices increase the probability of Type I error. In order to take this into account without increasing the probability of Type II error whenever the correlational analysis results were used in answering research questions the issue of Type I error was addressed. In most instances the probability of Type 1 error was quite low (based on the high significance levels obtained and the consistency across results). However, there were instances when there was a possibility that the results were a consequence of Type 1 error. As discussed at various points throughout Chapter 10 (e.g. Section 10.2.1. when examining the relationships between a MAP GO and self-efficacy) this was a limitation due to the fact that in these instances it was not always possible to draw clear-cut conclusions from the results.

An additional limitation was caused by the time intervals between the two questionnaires, the two experiments and the questionnaires and experiments varying across the groups of participants. For example, due to student holidays and exams as well as problems gaining access to the aptitude tests there were not always (at least) four weeks between the two experimental sessions and between the questionnaires and experimental sessions as planned. Consequently, the time intervals for examining the stability of Verbal and Numerical Test GOs over time was not very long in most cases. Additionally, the time interval between the Time Q1 and Time Q2 questionnaires ranged from 4 to 51 weeks. This was mainly due to the geographical location of some experimental participants (e.g. participants from Malta and those away from Loughborough) which made it difficult to carry out the experiments at exact 4 week intervals. It was also a result of taking longer than expected to gain access to the aptitude tests. For example, a number of participants completed the Time Q1 questionnaire in March 2009 and the Time Q2 questionnaire after participating in the experiments, which took place in October through to December 2009 (since they had left for their summer vacations by the time I gained access to the aptitude tests). This variation in time intervals between questionnaires and experiments may have introduced bias.

As mentioned above, the time interval between the two experiments was not always as long as initially planned. This shorter time interval may have influenced the success of the inductions. With a short time interval between experimental sessions, participants may have remembered their answers on the Time E1 questionnaires and answered in a similar way at Time 2. This would have resulted in the inductions being unsuccessful. Consequently, although the inductions were not successful in the current study they definitely need to be investigated further.

The complexity of this study (caused by the various types of GOs measured, the number of time points at which they were measured and the additional variables assessed) made it quite difficult to portray a clear, comprehensive picture regarding the nature of GOs and their relationships with variables of interest. This, compounded by the fact that these were all examined from the profile and non-profile perspectives, led to the attainment of a number of inconsistent results (e.g. the stability of General GOs from the profile and non-profile perspective). This could be considered a limitation in that although some questions were answered, new ones were created and drawing conclusions from the results was not always possible. The complexity of this study and the inconsistent results obtained (e.g. with respect to the factor structure, the stability and specificity of GOs) may be considered a limitation. However, they may also be considered a strength since they show how essential it is to discover more about the (intricate) nature of GOs before moving on to assess complex relationships with other variables. Bearing in mind the research findings, implications and limitations of the current study, recommendations for future research are presented below.

11.3. Recommendations for Future Research

In this study choosing between the 2x2 and 3-factor model was found to be quite problematic. In fact, the 2x2 model was used in the non-profile perspective analyses whilst the 3-factor model was used in the profile perspective analyses. It is therefore recommended that further research into the dimensionality of GOs is carried out in order to assess whether the 2x2 model of GOs significantly improves on the 3-factor model. The main difference between these two models is the mastery-avoidance GO. This concept was developed and is mostly used in an academic environment (e.g. with college and university students). Its focus is on not forgetting or misunderstanding what one is learning. Consequently, this GO might not be quite as useful in an organisational setting as it is in an educational setting. As a result, it may be useful to assess the utility of the mastery-avoidance GO in organisations. Therefore, research carried out (from the profile and non-profile perspectives) having employed participants might be especially useful in determining the utility of the 2x2 model over the 3-factor model in organisations.

Since some GO profiles obtained in this study were similar to those obtained in other studies it is suggested that research should be carried out in order to determine whether a comprehensive set of GO profiles could be obtained. It is also recommended that further research (with large sample sizes, if possible) using the Achievement Goal Questionnaire-Revised should be carried out since this has been used in a number of research studies and has been shown to have good reliability and validity (as described in Chapter 7 Section 7.1.5.1.). It is essential to use the same measure and scales in future research so that any differences in GO profiles found would not be a result of the measures and/or scales being different. Furthermore, it would be much easier to compare GO scores or means across studies in order to determine whether the GOs obtained are low, moderate or high compared with those in other studies. If these research studies find similar profiles then it should be possible to create a comprehensive set of GO profiles. This will enable researchers to compare their results with those of other studies and integrate findings on GOs more easily. Moreover, further research using the profile perspective is required in order to find out more about the relationships between GO profiles and variables such as self-efficacy, mental effort and performance. Since these relationships were only assessed on Verbal and Numerical Tests in this study, it would be useful to see how GO profiles are related to these variables on other tasks too. This is especially important since the results of this study point towards the relationships between GOs and other variables being moderated by task type. This finding indicates that research investigating what task characteristics influence the relationships between GOs and other variables (and how) may be extremely beneficial. Once such research is carried out it might become feasible to investigate the direction of causality between GOs and variables such as self-efficacy, performance and mental effort.

With respect to stability of GOs and GO profiles over time, further research is necessary to establish whether General and Task-Specific GOs (and GO profiles) are in fact stable over time. Ideally, longer time intervals between measures should be used to assess long-term stability. It is also considered useful to examine why the profile and non-profile perspective results were not entirely consistent and assess which perspective should be used in future GO research and practice. Relating to the issue of generality versus task-specificity of GOs, it is recommended that additional research is carried out in order to assess the task-specificity of GOs. This study provided some evidence of domain-specificity, thus pointing towards more specific measures of GOs being more accurate than General measures. However, further research (especially with respect to the specificity of GO **profiles**) is definitely required before any such conclusions may be reliably drawn.

The correlations for the Verbal and Numerical Tests indicated that mastery-approach GOs were negatively related to practice. Moreover, the mastery-avoidance GO on the Numerical Test was also found to be significantly negatively related to practice. These results are quite difficult to interpret since, if participants are keen to learn more (mastery-approach GO) and/or not forget or misunderstand what they have learnt (mastery-avoidance GO) one would expect them to practise more. Since it is unclear why these negative correlations were obtained it is suggested that further research investigating the relationships between GOs and practice should be carried out. Moreover, since the inductions were not successful in this study further research regarding the interaction effects of trait and state GOs is recommended. The finding that the performance-approach GO induction influenced the performance-avoidance GO of participants on the Verbal Test indicates the possibility that GO inductions may well be successful (especially with a larger sample size). It might prove useful to use task-specific measures as the 'trait' measures since GOs were found to be domain-specific. Moreover, it would be considered ideal if interaction effects are measured on different tasks.

11.4. Concluding Remarks

The findings of this study provided some support for previous research findings and created new directions for future research. There is still much GO research necessary before this concept can start to be used reliably in organisations. However, it is strongly believed that the concept of GOs has great potential for use organisations and will ultimately benefit both employers and employees since it has been found to consistently relate to variables such as self-efficacy, mental effort and performance.

I started this PhD strongly believing that I could radically improve knowledge on GOs and that my experiments would enable me to make straightforward and clear cut conclusions regarding the stability and dimensionality of GOs. Little did I know what lay ahead of me! Although I did not find any definite answers regarding GOs I have obtained some interesting results. However, more importantly, I have gained invaluable knowledge about the research process which will no doubt provide me with an excellent platform from which to embark on my research career.

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Appendices

Appendix A
Time Q1 Questionnaires

Loughborough University

Dear Participant,

My name is Debbie Naudi and I am currently completing a PhD at the Loughborough University Business School. My PhD focuses on the ways in which people approach activities. I have compiled three short questionnaires which I am asking you to kindly complete. In the first questionnaire I ask about the ways in which you approach life activities in general. In the second questionnaire I ask about the ways in which you approach a particular task whilst the third questionnaire is a personality questionnaire. Please note that participation in this study is completely voluntary and you may withdraw from this study at any point in time without any negative consequences whatsoever. The information in these questionnaires shall be kept in **very strict confidentiality** throughout the study and will only be used for this research project. If you would like any further information regarding the nature of this study or the results obtained please feel free to contact me on the following e-mail address: D.Naudi@lboro.ac.uk

Your help is very much appreciated!

Kind Regards

Debbie Naudi

About You

In a few months time I will be asking you to complete another (shorter) questionnaire. Therefore, it is important for me to take your contact details in order to be able to send out the second questionnaire. Your personal details will **ONLY** be used for the purpose of this study and will be kept in **very strict confidentiality.** Findings in general will be reported in research papers; however, no individual will be identifiable.

Please use BLOCK capitals throughout

Name: ....

Age: Years …….. Months ………..   **Gender:** Male ☐   Female ☐

E-mail address: ……………………………………………………………………………………………..............

How would you describe your ethnicity? ………………………………………………………………

What course are you in? ………………………………………………………………………………………….

General Activities. The following items refer to activities in life in general e.g. fixing something; doing a sport in your free time; cooking; working on the computer etc. Please provide answers to the following items by keeping in mind the approach that you would GENERALLY adopt when pursuing such activities.

Some of the questions may look similar to each other but please do not worry about appearing to be consistent. Answer each question on its own merits.

Please circle **ONE** answer for each of the items below.

		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	My aim is to completely master everything I do.	1	2	3	4	5
2	I strive to do well compared with others in everything I do.	1	2	3	4	5
3	My goal is to learn as much as possible about the things I do.	1	2	3	4	5
4	My aim is to perform well relative to others in everything I do.	1	2	3	4	5
5	My aim is to ensure I do not miss out on new learning opportunities.	1	2	3	4	5
6	My goal is to avoid performing poorly compared to others in everything that I do.	1	2	3	4	5
7	I strive to understand the content of the things I do as much as possible.	1	2	3	4	5
8	My goal is to perform better than others in everything I do.	1	2	3	4	5
9	My goal is to avoid missing opportunities to fully understand an activity.	1	2	3	4	5
10	I strive to avoid performing worse than others in everything that I do.	1	2	3	4	5
11	I strive to avoid an incomplete understanding of the things I do.	1	2	3	4	5
12	My aim is to avoid doing worse than others in everything that I do.	1	2	3	4	5

Task Scenario. Please read the work scenario provided below and complete the questionnaire that follows. Kindly keep in mind how you would approach the task described below when providing answers to the questionnaire.

Some of the questions may look similar to each other (and to the previous questionnaire) but please do not worry about appearing to be consistent. Answer each question on its own merits.

Scenario: You are a sales person in a company and have been asked to sell a new range of carpets that have just appeared on the market. These carpets are harder to sell than the other carpets since they are higher in price. Your boss does not set any sales target for you for the time being since this is a new product.

Please answer the questions below keeping in mind the approach you will adopt when carrying out this task.

		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	I will aim to completely master selling the new carpets.	1	2	3	4	5
2	I will strive to do better at selling the new carpets compared to my colleagues.	1	2	3	4	5
3	My goal will be to learn as much as possible regarding how to sell these new carpets.	1	2	3	4	5
4	My aim will be to sell more new carpets relative to my colleagues.	1	2	3	4	5
5	My aim will be to avoid learning less than I possibly could about selling these new carpets.	1	2	3	4	5
6	My goal will be to avoid selling fewer new carpets compared to my colleagues.	1	2	3	4	5
7	I will be striving to understand how to sell these new carpets as thoroughly as possible.	1	2	3	4	5
8	My goal will be to perform better than my colleagues at selling these new carpets.	1	2	3	4	5
9	My goal will be to avoid learning less than it is possible to learn about selling new carpets.	1	2	3	4	5
10	My goal will be to avoid missing opportunities to fully understand how to sell the new carpets.	1	2	3	4	5
11	I will be striving to avoid an incomplete understanding about how to sell the new carpets.	1	2	3	4	5
12	My aim will be to avoid doing worse than my colleagues when selling the new carpets.	1	2	3	4	5

<u>How I am in general.</u> Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which **<u>you agree or disagree with that statement.</u>** Please note that there are no right or wrong answers and that the answers will be used **SOLELY** for the purpose of this research study.

1	2	3	4	5
Disagree Strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

I am someone who…

1. _____ Is talkative
2. _____ Tends to find fault with others
3. _____ Does a thorough job
4. _____ Is depressed, blue
5. _____ Is original, comes up with new ideas
6. _____ Is reserved
7. _____ Is helpful and unselfish with others
8. _____ Can be somewhat careless
9. _____ Is relaxed, handles stress well.
10. _____ Is curious about many different things
11. _____ Is full of energy
12. _____ Starts quarrels with others
13. _____ Is a reliable worker
14. _____ Can be tense
15. _____ Is ingenious, a deep thinker
16. _____ Generates a lot of enthusiasm
17. _____ Has a forgiving nature
18. _____ Tends to be disorganized
19. _____ Worries a lot
20. _____ Has an active imagination
21. _____ Tends to be quiet
22. _____ Is generally trusting
23. _____ Tends to be lazy
24. _____ Is emotionally stable, not easily upset
25. _____ Is inventive
26. _____ Has an assertive personality
27. _____ Can be cold and aloof
28. _____ Perseveres until the task is finished
29. _____ Can be moody
30. _____ Values artistic, aesthetic experiences
31. _____ Is sometimes shy, inhibited
32. _____ Is considerate and kind to almost everyone
33. _____ Does things efficiently
34. _____ Remains calm in tense situations
35. _____ Prefers work that is routine
36. _____ Is outgoing, sociable
37. _____ Is sometimes rude to others
38. _____ Makes plans and follows through with them
39. _____ Gets nervous easily
40. _____ Likes to reflect, play with ideas
41. _____ Has few artistic interests
42. _____ Likes to cooperate with others
43. _____ Is easily distracted
44. _____ Is sophisticated in art, music, or literature

Optional Participation in Experiment:

Enhance your chances of being chosen for a job!

My study also requires that I carry out experiments. During these sessions you will be given the opportunity to complete aptitude tests. Employers very often ask job applicants to complete aptitude tests as part of their selection process. Therefore, apart from helping me in my research, your participation in these experiments will benefit you as you get the chance to practice and excel in aptitude tests used for job selection. You will also be given confidential feedback regarding your performance on these tests as well as advice regarding how to improve on them! In addition, you will be entered into a draw with the chance to win **one of three £50 cash prizes**.

If you agree to be contacted in the near future in order to participate in the experiment (as well as get the chance to win £50 cash!) please tick 'yes' below.

Yes ☐ No ☐

Thank you!

Dear Participant,

My name is Debbie Naudi and I am currently completing a PhD at the Loughborough University Business School. My PhD focuses on the ways in which people approach activities. I have compiled three short questionnaires which I am asking you to kindly complete. In the first questionnaire I ask about the ways in which you approach life activities in general. In the second questionnaire I ask about the ways in which you approach a particular task whilst the third questionnaire is a personality questionnaire. Please note that participation in this study is completely voluntary and you may withdraw from this study at any point in time without any negative consequences whatsoever. The information in these questionnaires shall be kept in **very strict confidentiality** throughout the study and will only be used for this research project. If you would like any further information regarding the nature of this study or the results obtained please feel free to contact me on the following e-mail address: D.Naudi@lboro.ac.uk

Your help is very much appreciated!

Kind Regards

Debbie Naudi

About You

In a few months time I will be asking you to complete another (shorter) questionnaire. Therefore, it is important for me to take your contact details in order to be able to send out the second questionnaire. Your personal details will **ONLY** be used for the purpose of this study and will be kept in **very strict confidentiality.** Findings in general will be reported in research papers; however, no individual will be identifiable.

Please use BLOCK capitals throughout

Name: ....

Age: Years …….. Months ……….. **Gender:** Male ☐ Female ☐

E-mail address: ………………………………………………………………………………………...............

How would you describe your ethnicity? ……………………………………………………………

What course are you in? ……………………………………………………………………………………….

<u>General Activities.</u> The following items refer to activities in life in general e.g. fixing something; doing a sport in your free time; cooking; working on the computer etc. Please provide answers to the following items by keeping in mind the approach that you would GENERALLY adopt when pursuing such activities.

Some of the questions may look similar to each other but please do not worry about appearing to be consistent. Answer each question on its own merits.

Please circle **ONE** answer for each of the items below.

		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	My aim is to completely master everything I do.	1	2	3	4	5
2	I strive to do well compared with others in everything I do.	1	2	3	4	5
3	My goal is to learn as much as possible about the things I do.	1	2	3	4	5
4	My aim is to perform well relative to others in everything I do.	1	2	3	4	5
5	My aim is to ensure I do not miss out on new learning opportunities.	1	2	3	4	5
6	My goal is to avoid performing poorly compared to others in everything that I do.	1	2	3	4	5
7	I strive to understand the content of the things I do as much as possible.	1	2	3	4	5
8	My goal is to perform better than others in everything I do.	1	2	3	4	5
9	My goal is to avoid missing opportunities to fully understand an activity.	1	2	3	4	5
10	I strive to avoid performing worse than others in everything that I do.	1	2	3	4	5
11	I strive to avoid an incomplete understanding of the things I do.	1	2	3	4	5
12	My aim is to avoid doing worse than others in everything that I do.	1	2	3	4	5

<u>Task Scenario.</u> Please read the work scenario provided below and complete the questionnaire that follows. Kindly keep in mind how you would approach the task described below when providing answers to the questionnaire.

Some of the questions may look similar to each other (and to the previous questionnaire) but please do not worry about appearing to be consistent. Answer each question on its own merits.

Scenario: Your department has been asked to attend a training course in order to learn how to use a new computer program that will be used on the job.

Please answer the questions below keeping in mind the approach you will adopt when carrying out this task.

		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	My aim will be to completely master the new computer program.	1	2	3	4	5
2	I will strive to do better in training compared to my colleagues.	1	2	3	4	5
3	My goal will be to learn as much as possible about this new computer program.	1	2	3	4	5
4	My aim will be to perform better during training relative to my colleagues.	1	2	3	4	5
5	My aim will be to avoid learning less than I possibly could about this new computer program.	1	2	3	4	5
6	My goal will be to avoid performing poorly during training compared to my colleagues.	1	2	3	4	5
7	I will be striving to understand the content of this computer program as thoroughly as possible.	1	2	3	4	5
8	My goal will be to perform better than my colleagues during training.	1	2	3	4	5
9	My goal will be to avoid learning less than it is possible to learn about this new computer program.	1	2	3	4	5
10	My goal will be to avoid missing opportunities to fully understand the new computer program.	1	2	3	4	5
11	I will be striving to avoid an incomplete understanding of this new computer program.	1	2	3	4	5
12	My aim will be to avoid doing worse than my colleagues during training.	1	2	3	4	5

<u>How I am in general.</u> Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which **<u>you agree or disagree with that statement.</u>** Please note that there are no right or wrong answers and that the answers will be used **SOLELY** for the purpose of this research study.

1	2	3	4	5
Disagree Strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly

I am someone who…

1. _____ Is talkative
2. _____ Tends to find fault with others
3. _____ Does a thorough job
4. _____ Is depressed, blue
5. _____ Is original, comes up with new ideas
6. _____ Is reserved
7. _____ Is helpful and unselfish with others
8. _____ Can be somewhat careless
9. _____ Is relaxed, handles stress well.
10. _____ Is curious about many different things
11. _____ Is full of energy
12. _____ Starts quarrels with others
13. _____ Is a reliable worker
14. _____ Can be tense
15. _____ Is ingenious, a deep thinker
16. _____ Generates a lot of enthusiasm
17. _____ Has a forgiving nature
18. _____ Tends to be disorganized
19. _____ Worries a lot
20. _____ Has an active imagination
21. _____ Tends to be quiet
22. _____ Is generally trusting
23. _____ Tends to be lazy
24. _____ Is emotionally stable, not easily upset
25. _____ Is inventive
26. _____ Has an assertive personality
27. _____ Can be cold and aloof
28. _____ Perseveres until the task is finished
29. _____ Can be moody
30. _____ Values artistic, aesthetic experiences
31. _____ Is sometimes shy, inhibited
32. _____ Is considerate and kind to almost everyone
33. _____ Does things efficiently
34. _____ Remains calm in tense situations
35. _____ Prefers work that is routine
36. _____ Is outgoing, sociable
37. _____ Is sometimes rude to others
38. _____ Makes plans and follows through with them
39. _____ Gets nervous easily
40. _____ Likes to reflect, play with ideas
41. _____ Has few artistic interests
42. _____ Likes to cooperate with others
43. _____ Is easily distracted
44. _____ Is sophisticated in art, music, or literature

Optional Participation in Experiment:

Enhance your chances of being chosen for a job!

My study also requires that I carry out experiments. During these sessions you will be given the opportunity to complete aptitude tests. Employers very often ask job applicants to complete aptitude tests as part of their selection process. Therefore, apart from helping me in my research, your participation in these experiments will benefit you as you get the chance to practice and excel in aptitude tests used for job selection. You will also be given confidential feedback regarding your performance on these tests as well as advice regarding how to improve on them! In addition, you will be entered into a draw with the chance to win **one of three £50 cash prizes**.

If you agree to be contacted in the near future in order to participate in the experiment (as well as get the chance to win £50 cash!) please tick 'yes' below.

Yes ☐ No ☐

Thank you!

APPENDIX B

TIME Q2 QUESTIONNAIRES

Dear Participant,

As you may remember, my name is Debbie Naudi and I am currently reading for a PhD at the Loughborough University Business School. My PhD focuses on the ways in which people approach activities. I have compiled a follow up questionnaire for you to kindly complete. This questionnaire consists of two sections. The first section is about the ways in which you approach life activities in general whilst the second section focuses on the ways in which you approach a particular task. Please note that participation in this study is completely voluntary and you may withdraw from this study at any point in time without any negative consequences whatsoever. The information in these questionnaires shall be kept in **very strict confidentiality** throughout the study and will only be used for this research project. If you would like any further information regarding the nature of this study or the results obtained please feel free to contact me on the following e-mail address: D.Naudi@lboro.ac.uk

Your help is very much appreciated!

Kind Regards

Debbie Naudi

About You

Since I would like to examine approaches to goals over time, I am required to take your name, age, and course in order to be able to match this questionnaire to the first questionnaire you completed. Your personal details will **ONLY** be used for the purpose of this study and will be kept in **very strict confidentiality.** Findings in general will be reported in research papers; however, no individual will be identifiable.

Please use BLOCK capitals throughout

Name: ____________________ **Age:** Years _____ Months _____

Students only: **What course are you in?** ______________________________________

General Activities. The following items refer to activities in life in general e.g. fixing something; doing a sport in your free time; cooking; working on the computer etc. Please provide answers to the following items by keeping in mind the approach that you would GENERALLY adopt when pursuing such activities.

Some of the questions may look similar to each other but please do not worry about appearing to be consistent. Answer each question on its own merits.

Please circle **ONE** answer for each of the items below.

		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	My aim is to completely master everything I do.	1	2	3	4	5
2	I strive to do well compared with others in everything I do.	1	2	3	4	5
3	My goal is to learn as much as possible about the things I do.	1	2	3	4	5
4	My aim is to perform well relative to others in everything I do.	1	2	3	4	5
5	My aim is to ensure I do not miss out on new learning opportunities.	1	2	3	4	5
6	My goal is to avoid performing poorly compared to others in everything that I do.	1	2	3	4	5
7	I strive to understand the content of the things I do as much as possible.	1	2	3	4	5
8	My goal is to perform better than others in everything I do.	1	2	3	4	5
9	My goal is to avoid missing opportunities to fully understand an activity.	1	2	3	4	5
10	I strive to avoid performing worse than others in everything that I do.	1	2	3	4	5
11	I strive to avoid an incomplete understanding of the things I do.	1	2	3	4	5
12	My aim is to avoid doing worse than others in everything that I do.	1	2	3	4	5

Task Scenario. Please read the work scenario provided below and complete the questionnaire that follows. Kindly keep in mind how you would approach the task described below when providing answers to the questionnaire.

Some of the questions may look similar to each other (and to the previous questionnaire) but please do not worry about appearing to be consistent. Answer each question on its own merits.

Scenario: You are a sales person in a company and have been asked to sell a new range of carpets that have just appeared on the market. These carpets are harder to sell than the other carpets since they are higher in price. Your boss does not set any sales target for you for the time being since this is a new product.

Please answer the questions below keeping in mind the approach you will adopt when carrying out this task.

		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	I will aim to completely master selling the new carpets.	1	2	3	4	5
2	I will strive to do better at selling the new carpets compared to my colleagues.	1	2	3	4	5
3	My goal will be to learn as much as possible regarding how to sell these new carpets.	1	2	3	4	5
4	My aim will be to sell more new carpets relative to my colleagues.	1	2	3	4	5
5	My aim will be to avoid learning less than I possibly could about selling these new carpets.	1	2	3	4	5
6	My goal will be to avoid selling fewer new carpets compared to my colleagues.	1	2	3	4	5
7	I will be striving to understand how to sell these new carpets as thoroughly as possible.	1	2	3	4	5
8	My goal will be to perform better than my colleagues at selling these new carpets.	1	2	3	4	5
9	My goal will be to avoid learning less than it is possible to learn about selling new carpets.	1	2	3	4	5
10	My goal will be to avoid missing opportunities to fully understand how to sell the new carpets.	1	2	3	4	5
11	I will be striving to avoid an incomplete understanding about how to sell the new carpets.	1	2	3	4	5
12	My aim will be to avoid doing worse than my colleagues when selling the new carpets.	1	2	3	4	5

Thank you!

Dear Participant,

As you may remember, my name is Debbie Naudi and I am currently reading for a PhD at the Loughborough University Business School. My PhD focuses on the ways in which people approach activities. I have compiled a follow up questionnaire for you to kindly complete. This questionnaire consists of two sections. The first section is about the ways in which you approach life activities in general whilst the second section focuses on the ways in which you approach a particular task. Please note that participation in this study is completely voluntary and you may withdraw from this study at any point in time without any negative consequences whatsoever. The information in these questionnaires shall be kept in **very strict confidentiality** throughout the study and will only be used for this research project. If you would like any further information regarding the nature of this study or the results obtained please feel free to contact me on the following e-mail address: D.Naudi@lboro.ac.uk

Your help is very much appreciated!

Kind Regards

Debbie Naudi

About You

Since I would like to examine approaches to goals over time, I am required to take your name, age, and course in order to be able to match this questionnaire to the first questionnaire you completed. Your personal details will **ONLY** be used for the purpose of this study and will be kept in **very strict confidentiality.** Findings in general will be reported in research papers; however, no individual will be identifiable.

Please use BLOCK capitals throughout

Name: ____________________ **Age:** Years _____ Months _____

Students only: **What course are you in?** _____________________________________

General Activities. The following items refer to activities in life in general e.g. fixing something; doing a sport in your free time; cooking; working on the computer etc. Please provide answers to the following items by keeping in mind the approach that you would GENERALLY adopt when pursuing such activities.

Some of the questions may look similar to each other but please do not worry about appearing to be consistent. Answer each question on its own merits.

Please circle **ONE** answer for each of the items below.

		Strongly Disagree	**Disagree**	**Neither Agree Nor Disagree**	**Agree**	**Strongly Agree**
1	My aim is to completely master everything I do.	1	2	3	4	5
2	I strive to do well compared with others in everything I do.	1	2	3	4	5
3	My goal is to learn as much as possible about the things I do.	1	2	3	4	5
4	My aim is to perform well relative to others in everything I do.	1	2	3	4	5
5	My aim is to ensure I do not miss out on new learning opportunities.	1	2	3	4	5
6	My goal is to avoid performing poorly compared to others in everything that I do.	1	2	3	4	5
7	I strive to understand the content of the things I do as much as possible.	1	2	3	4	5
8	My goal is to perform better than others in everything I do.	1	2	3	4	5
9	My goal is to avoid missing opportunities to fully understand an activity.	1	2	3	4	5
10	I strive to avoid performing worse than others in everything that I do.	1	2	3	4	5
11	I strive to avoid an incomplete understanding of the things I do.	1	2	3	4	5
12	My aim is to avoid doing worse than others in everything that I do.	1	2	3	4	5

Task Scenario. Please read the work scenario provided below and complete the questionnaire that follows. Kindly keep in mind how you would approach the task described below when providing answers to the questionnaire.

Some of the questions may look similar to each other (and to the previous questionnaire) but please do not worry about appearing to be consistent. Answer each question on its own merits.

Scenario: Your department has been asked to attend a training course in order to learn how to use a new computer program that will be used on the job.

Please answer the questions below keeping in mind the approach you will adopt when carrying out this task.

		Strongly Disagree	**Disagree**	**Neither Agree Nor Disagree**	**Agree**	**Strongly Agree**
1	My aim will be to completely master the new computer program.	1	2	3	4	5
2	I will strive to do better in training compared to my colleagues.	1	2	3	4	5
3	My goal will be to learn as much as possible about this new computer program.	1	2	3	4	5
4	My aim will be to perform better during training relative to my colleagues.	1	2	3	4	5
5	My aim will be to avoid learning less than I possibly could about this new computer program.	1	2	3	4	5
6	My goal will be to avoid performing poorly during training compared to my colleagues.	1	2	3	4	5
7	I will be striving to understand the content of this computer program as thoroughly as possible.	1	2	3	4	5
8	My goal will be to perform better than my colleagues during training.	1	2	3	4	5
9	My goal will be to avoid learning less than it is possible to learn about this new computer program.	1	2	3	4	5
10	My goal will be to avoid missing opportunities to fully understand the new computer program.	1	2	3	4	5
11	I will be striving to avoid an incomplete understanding of this new computer program.	1	2	3	4	5
12	My aim will be to avoid doing worse than my colleagues during training.	1	2	3	4	5

Thank you!

APPENDIX C
E-MAIL WITH TIME Q2
QUESTIONNAIRE

(Non-Experimental Participants)

Dear {name of participant}

My name is Debbie Naudi, I'm a PhD student at the Loughborough University Business School. About 2 months ago I handed out a questionnaire during your {name of module} lecture. I have a follow-up questionnaire (attached) which only takes 3 minutes to complete, however, it is extremely important for my research. I would really really appreciate it if you could kindly complete this questionnaire and send it back to me.

Thank you so much for your help and support and good luck in your exams!

Kind Regards

Debbie

Appendix D

E-mail sent Prior to Time 1 Experiment

Dear {name of participant}

My name is Debbie Naudi, I'm a PhD student at the Loughborough University Business School. A few weeks ago you kindly completed a questionnaire for my research study (during one of your lectures) and you indicated that you were interested in participating in my research experiments. By participating in these experiments you will be helping me greatly with my research. However, these experiments will also benefit you.

During the experimental sessions you will be given the opportunity to complete aptitude tests. Employers very often ask job applicants to complete aptitude tests as part of their selection process. Therefore, apart from helping me in my research, these experiments will provide you with the chance to practise and excel in aptitude tests used for job selection. The tests used in this experimental study are not practice tests found on websites, they are proper tests that have been purchased from a testing company. Therefore, you will gain a competitive edge over other job applicants when applying for a job in the future.

You will also be given confidential feedback regarding your performance on these tests as well as advice regarding how to improve on them! In addition, you will be entered into a draw with the chance to win **one of three £50 cash prizes**.

The experimental session will last 1 hour and you will be asked to attend two sessions in total. Following the second session I shall be providing you with feedback on the aptitude tests as well as feedback regarding the personality test and goal orientations.

The following is a list of dates when experiments will be taking place. If you are interested in taking part please choose a date and time from the list below and reply to this e-mail with the chosen date and time. If you are not able to attend any of the sessions below but would still like to participate, please send me an e-mail and I will arrange an extra session.

There will be a maximum of 10 participants per experimental session. I will provide you with further details regarding the experimental session closer the time.

Thank you for taking the time to help me with my research, it is very much appreciated!

Please choose **one** session for which it is preferable for you to attend from the list below.

Date	**Time**
{List of dates}	{List of Times}

Appendix E
Information Sheet and Consent Form

Loughborough University

Information Sheet for Participants

Dear Participant,

My name is Debbie Naudi and I am currently completing a PhD at the Loughborough University Business School. The focus of my PhD is about the ways in which people approach different activities. During this session I shall be asking you to carry out two different tasks: a verbal task and a numerical task. Before each task as well as on completion of each task I shall be asking you to complete a short questionnaire. This experiment should take approximately 1 hour and I shall be asking you to kindly attend another experiment after a period of 1 month. Feedback will be provided after the second session and you will be given a small item as a token of my appreciation. By attending the second experiment you will automatically be entered into a prize draw with the chance of winning one of three £50 cash prizes.

Please note that participation in this study is completely voluntary and you may withdraw from this study at any point in time without any negative consequences whatsoever. The answers to the questionnaires as well as the experiments shall be kept in very strict confidentiality throughout the study. If you would like any further information regarding the nature of this study or the results obtained please feel free to contact me (at any point in time) on the following e-mail address: D.Naudi@lboro.ac.uk

INFORMED CONSENT FORM

The purpose and details of this study have been explained to me. I understand that this study is designed to further scientific knowledge and that all procedures have been approved by the Loughborough University Ethical Advisory Committee.

I have read and understood the information sheet and this consent form.

I have had an opportunity to ask questions about my participation.

I understand that I am under no obligation to take part in the study.

I understand that I have the right to withdraw from this study at any stage for any reason, and that I will not be required to explain my reasons for withdrawing.

Chapter 12I understand that all the information I provide will be treated in strict confidence and will be kept anonymous and confidential to the researchers unless (under the statutory obligations of the agencies which the researchers are working with), it is judged that confidentiality will have to be breached for the safety of the participant or others.

I agree to participate in this study.

Your name ______________________________

Your signature ______________________________

Signature of investigator ______________________________

Date ______________________________

Appendix F
Self-Efficacy Questionnaire

NAME: ……………………………

My feelings about this task: The items below ask about your feelings regarding the task you are about to perform. Please circle **ONE** answer for each of the items below.

		Strongly Disagree	**Disagree**	**Neither Agree Nor Disagree**	**Agree**	**Strongly Agree**
1	I'm certain I can understand the most difficult items presented on this task.	1	2	3	4	5
2	I'm confident I can learn the basic concepts of this task.	1	2	3	4	5
3	I'm confident I can understand the most complex items presented on this task.	1	2	3	4	5
4	I'm confident I can do an excellent job on this task.	1	2	3	4	5
5	I expect to do well on this task.	1	2	3	4	5
6	I'm certain I can master the skills required for this task.	1	2	3	4	5
7	Considering the difficulty of this task and my skills, I think I will do well on this task.	1	2	3	4	5

Appendix G
Time E1 Experiment Instructions

<u>Neutral Task Instructions</u>

Prepare an information sheet and consent form on each desk before start of session. Also put 2 pencils, an eraser, a calculator, and some rough paper on each desk.

First of all I would like to thank you for attending this session. The session will take 1 hour. Could you all switch off you mobile phones please?

First I would like you to read the paper with the title 'information sheet' found on your desks. This sheet is for you to keep.

Do you have any questions?

You will also find an informed consent form on your desk. Could you kindly read and sign this form please? I am required to provide this information and ask you to sign a consent form for ethical purposes. This is required by the Loughborough University Ethical Advisory Committee. Once you have completed the forms could you all pass them forward please?

Count number of forms and check that all of them have been completed appropriately.

Hand out the answer sheets.

Please print your name in the space provided at the top of your answer sheet, surname first, then your first names.

Now fill in today's date which is the ……. Please ignore the reference number. Please do not use pens on the answer sheets, only use the pencils provided.

Hand out the verbal test booklets. **Please don't open these booklets until I tell you to do so.**

When all booklets have been handed out: **Now please turn to pages 2 and 3 of the booklet and follow the instructions while I read them aloud.**

In this test you will be asked to reason with written information drawn from the world of work. The test consists of a series of passages, each of which is followed by several statements. Your task is to assess whether each statement is either "true", "false", or "cannot say" in relation to the passage which preceded it.

So having read a passage and the statements which follow, you would;

fill in *circle A* if you think the statement is *true* in relation to the passage,
fill in *circle B* if you think the statement is *false* in relation to the passage,
fill in *circle C* if you *cannot say* whether the statement is true or false in relation to the passage.

You should assess each statement *only in relation to the passage which preceded it* and not in relation to any personal views or knowledge you might hold.
Do not write anything on this question booklet, but indicate your answer by completely filling in the appropriate circle on your answer sheet.

Before you start there are some example questions to complete. Look at the passage on the opposite page. Now, in your own time, read the passage and assess the statements which follow, according to the rules above. Choose what you think is the best answer for each statement, A, B, or C and mark your choice in the Examples Section on your answer sheet.

Hand out self-efficacy questionnaires. When everyone has finished the examples:

The answer to Example 1 is B, the statement is false given the information in the passage.

The answer to Example 2 is A, the statement is true given the information in the passage.

The answer to Example 3 is C, you cannot say from the information in the passage.

The answer to Example 4 is A, the statement is true given the information in the passage.

Are there any questions? If you are not clear about what you have to do, ask me now as I can't answer any questions once the test has started.

I have handed out a short questionnaire which I would like you to complete. Please don't forget to print your name at the top of this questionnaire.

Ask if everyone's ready and when they are…

Could you all pass your questionnaires forward please?

Count questionnaires and make sure that everyone has written their names on it.

Now could you look back at page 2 and follow whilst I read out the reminder points please?

- **The test consists of 24 questions and you will have 14 minutes in which to do them.**
- **Try to work quickly but accurately.**
- **Fill in completely the appropriate circles on the answer sheet.**
- **Do not make any marks on this booklet.**
- **Fully erase any answer you wish to change.**
- **If you are not sure of an answer mark your best choice, but avoid simply guessing.**

Are there any final questions?
Now turn over to page 5 and begin.

Start stopwatch on the word 'begin', and note the start time on a piece of paper. Walk around after 2 minutes and again after 10 minutes. After exactly 15 minutes say:

Please stop now. Pencils down. Close your booklets.

Collect in all the materials, booklets, answer sheets, pencils and erasers. Check that there are 10 booklets and 10 answer sheets, and check that all answer sheets have names on them.

Could you kindly complete this short questionnaire I'm handing out please?

Hand out post-test questionnaires.

Please don't forget to write your names down on the first page of the questionnaires.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please?

So that was the first half of the session. We're going to go through exactly the same process for the second aptitude test.

Hand out the answer sheets.

Please print your name in the space provided at the top of your answer sheet, surname first, then your first names.

Now fill in today's date which is the …….Once again, please ignore the reference number.

Hand out the numerical test booklets. **Please don't open these booklets until I tell you to do so.**

When all booklets have been handed out: **Now please turn to pages 2 and 3 of the booklet and follow the instructions while I read them aloud.**

In this test you will be using facts and figures taken from the world of work, to assess your ability to interpret and evaluate numerical information. All the information you need will be provided for you in the form of various tables and charts.

For each question you are given five answers to choose from. One, and only one, of the answers is correct in each case.

Do not write anything on this question booklet, but indicate your answer by completely filling in the appropriate circle on your answer sheet.

You may wish to use a calculator for this test. Rough paper is also provided to help you with any working out.

Before you start there are some example questions to complete. Look at these example questions below. Now, in your own time and using just the statistical information provided on the opposite page, choose what you think is the best answer for each question from the five alternatives given. Mark your choices in the Examples Section on your answer sheet.

When all have finished the examples, say:

The answer to Example 1 is B, 36 Older Adults.

The answer to Example 2 is C, 200, 000 tyres.

The answer to example 3 is D, 53.7%.

Are there any questions? If you are not clear about what you have to do, ask me now as I can't answer any questions once the test has started.

Now, I have handed out a short questionnaire which I would like you to complete. Please don't forget to print your name at the top of this questionnaire.

Ask if everyone's ready and when they are…

Could you all pass your questionnaires forward please?

Count questionnaires and make sure that everyone has written their names on it.

Now could you proceed to page 5 and follow whilst I read out the reminder points please?

- **The test consists of 12 questions and you will have 15 minutes in which to do them.**
- **Try to work quickly but accurately.**
- **Fill in completely the appropriate circles on the answer sheet.**
- **Do not make any marks on this booklet.**
- **Use the rough paper provided for your working out.**
- **Fully erase any answer you wish to change.**
- **If you are not sure of an answer mark your best choice, but avoid simply guessing.**

Are there any final questions?

Now turn over to page 6 and begin.

Start stopwatch on the word 'begin', and note the start time on a piece of paper. Walk around after 2 minutes and again after 10 minutes. After exactly 17 minutes say:

Please stop now. Pencils down. Close your booklets.

Collect in all the booklets and answer sheets. Check that there are 10 booklets and 10 answer sheets, and check that all answer sheets have names on them.

Could you kindly complete this short questionnaire I'm handing out please?

Hand out post-test questionnaires.

Please don't forget to write your names down on the first page of the questionnaires.

Collect calculators and place a BS pen on each desk.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please? *Collect questionnaires, pencils and erasers. Check that they all wrote their names on the questionnaire.*

Have you got any questions?

I will be asking you to come in again in approximately one month's time to complete the tests again and then I will give you personal feedback regarding your performance on the tests, your goal orientations, personality and advice on how to improve on these tests. That's it for today. I have placed a pen on each of your desks. That is for you to keep as a token of my appreciation.

Thank you so much for your participation, I really appreciate it!!

Neutral Task Instructions (Numerical Test First)

Prepare an information sheet and consent form on each desk before start of session. Also put 2 pencils, an eraser, a calculator, and some rough paper on each desk.

First of all I would like to thank you for attending this session. The session will take 1 hour. Could you all switch off you mobile phones please?

First I would like you to read the paper with the title 'information sheet' found on your desks. This sheet is for you to keep.

Do you have any questions?

You will also find an informed consent form on your desk. Could you kindly read and sign this form please? I am required to provide this information and ask you to sign a consent form for ethical purposes. This is required by the Loughborough University Ethical Advisory Committee. Once you have completed the forms could you all pass them forward please?

Count number of forms and check that all of them have been completed appropriately.

Hand out the answer sheets.

Please print your name in the space provided at the top of your answer sheet, surname first, then your first names.

Now fill in today's date which is the ……. Please ignore the reference number. Please do not use pens on the answer sheets, only use the pencils provided.

Hand out the numerical test booklets. **Please don't open these booklets until I tell you to do so.**

When all booklets have been handed out: **Now please turn to pages 2 and 3 of the booklet and follow the instructions while I read them aloud.**

In this test you will be using facts and figures taken from the world of work, to assess your ability to interpret and evaluate numerical information. All the information you need will be provided for you in the form of various tables and charts.

For each question you are given five answers to choose from. One, and only one, of the answers is correct in each case.

Do not write anything on this question booklet, but indicate your answer by completely filling in the appropriate circle on your answer sheet.

You may wish to use a calculator for this test. Rough paper is also provided to help you with any working out.

Before you start there are some example questions to complete. Look at these example questions below. Now, in your own time and using just the statistical information provided on the opposite page, choose what you think is the best answer for each question from the five alternatives given. Mark your choices in the Examples Section on your answer sheet.

When all have finished the examples, say:

The answer to Example 1 is B, 36 Older Adults.

The answer to Example 2 is C, 200, 000 tyres.

The answer to example 3 is D, 53.7%.

Are there any questions? If you are not clear about what you have to do, ask me now as I can't answer any questions once the test has started.

Now, I have handed out a short questionnaire which I would like you to complete. Please don't forget to print your name at the top of this questionnaire.

Ask if everyone's ready and when they are…

Could you all pass your questionnaires forward please?

Count questionnaires and make sure that everyone has written their names on it.

Now could you proceed to page 5 and follow whilst I read out the reminder points please?

- **The test consists of 12 questions and you will have 15 minutes in which to do them.**
- **Try to work quickly but accurately.**
- **Fill in completely the appropriate circles on the answer sheet.**
- **Do not make any marks on this booklet.**
- **Use the rough paper provided for your working out.**
- **Fully erase any answer you wish to change.**
- **If you are not sure of an answer mark your best choice, but avoid simply guessing.**

Are there any final questions?

Now turn over to page 6 and begin.

Start stopwatch on the word 'begin', and note the start time on a piece of paper. Walk around after 2 minutes and again after 10 minutes. After exactly 17 minutes say:

Please stop now. Pencils down. Close your booklets.

Collect in all the booklets and answer sheets. Check that there are 10 booklets and 10 answer sheets, and check that all answer sheets have names on them.

Could you kindly complete this short questionnaire I'm handing out please?

Hand out post-test questionnaires.

Please don't forget to write your names down on the first page of the questionnaires.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please?

Have you got any questions?

So that was the first half of the session. We're going to go through exactly the same process for the second aptitude test.

Hand out the answer sheets.

Please print your name in the space provided at the top of your answer sheet, surname first, then your first names.

Now fill in today's date which is the …….Once again, please ignore the reference number.

Hand out the verbal test booklets. **Please don't open these booklets until I tell you to do so.**

When all booklets have been handed out: **Now please turn to pages 2 and 3 of the booklet and follow the instructions while I read them aloud.**

In this test you will be asked to reason with written information drawn from the world of work. The test consists of a series of passages, each of which is followed by several statements. Your task is to assess whether each statement is either "true", "false", or "cannot say" in relation to the passage which preceded it.

So having read a passage and the statements which follow, you would;

fill in *circle A* if you think the statement is *true* in relation to the passage,

fill in *circle B* if you think the statement is *false* in relation to the passage,
fill in *circle C* if you *cannot say* whether the statement is true or false in relation to the passage.

You should assess each statement *only in relation to the passage which preceded it* and not in relation to any personal views or knowledge you might hold.

Do not write anything on this question booklet, but indicate your answer by completely filling in the appropriate circle on your answer sheet.

Before you start there are some example questions to complete. Look at the passage on the opposite page. Now, in your own time, read the passage and assess the statements which follow, according to the rules above. Choose what you think is the best answer for each statement, A, B, or C and mark your choice in the Examples Section on your answer sheet.

Hand out self-efficacy questionnaires. When everyone has finished the examples:

The answer to Example 1 is B; the statement is false given the information in the passage.

The answer to Example 2 is A, the statement is true given the information in the passage.

The answer to Example 3 is C, you cannot say from the information in the passage.

The answer to Example 4 is A, the statement is true given the information in the passage.

Are there any questions? If you are not clear about what you have to do, ask me now as I can't answer any questions once the test has started.

I have handed out a short questionnaire which I would like you to complete. Please don't forget to print your name at the top of this questionnaire.

Ask if everyone's ready and when they are…

Could you all pass your questionnaires forward please?

Count questionnaires and make sure that everyone has written their names on it.

Now could you look back at page 2 and follow whilst I read out the reminder points please?

- **The test consists of 24 questions and you will have 14 minutes in which to do them.**
- **Try to work quickly but accurately.**

- **Fill in completely the appropriate circles on the answer sheet.**
- **Do not make any marks on this booklet.**
- **Fully erase any answer you wish to change.**
- **If you are not sure of an answer mark your best choice, but avoid simply guessing.**

Are there any final questions?
Now turn over to page 5 and begin.

Start stopwatch on the word 'begin', and note the start time on a piece of paper. Walk around after 2 minutes and again after 10 minutes. After exactly 15 minutes say:

Please stop now. Pencils down. Close your booklets.

Collect in all the booklets and answer sheets. Check that there are 10 booklets and 10 answer sheets, and check that all answer sheets have names on them.

Could you kindly complete this short questionnaire I'm handing out please?

Hand out post-test questionnaires.

Please don't forget to write your names down on the first page of the questionnaires.

Collect calculators and place a BS pen on each desk.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please? *Collect questionnaires, pencils and erasers. Check that they all wrote their names on the questionnaire.*

Have you got any questions?

I will be asking you to come in again in approximately one month's time to complete the tests again and then I will give you personal feedback regarding your performance on the tests, your goal orientations, personality and advice on how to improve on these tests. That's it for today. I have placed a pen on each of your desks. That is for you to keep as a token of my appreciation.

Thank you so much for your participation, I really appreciate it!!

Appendix H
Time E1 Post-Test Questionnaire

NAME: …………………………………..

Your experience on this kind of task…

1.) Have you ever completed a numerical aptitude test?

Yes ☐ No ☐ Do not remember ☐

2.) Does your work involve using the skills required to perform well on the test just completed?

Frequently ☐ Sometimes ☐ Rarely ☐ Never ☐

3.) Do you practice this kind of task often?

Frequently ☐ Sometimes ☐ Rarely ☐ Never ☐

How much effort did I invest in the task? Please **circle** the most appropriate answer keeping in mind the task that you have just completed.

In solving the preceding task I invested:

1: very, very low mental effort

2: very low mental effort

3: low mental effort

4: rather low mental effort

5: neither low nor high mental effort

6: rather high mental effort

7: high mental effort

8: very high mental effort

9: very, very high mental effort

<u>How I approached the task:</u> The following items refer to the task that you have just carried out. Please answer these items keeping in mind the approach that you used for the task that you have just completed.

Some of the questions may look similar to each other but please do not worry about appearing to be consistent. Answer each question on its own merits.

Please circle **ONE** answer for each of the items below.

		Strongly Disagree	**Disagree**	**Neither Agree Nor Disagree**	**Agree**	**Strongly Agree**
1	My aim was to completely master this task.	1	2	3	4	5
2	I was striving to do well on this task compared to the other participants.	1	2	3	4	5
3	My goal was to learn as much as possible.	1	2	3	4	5
4	My aim was to perform well on this task relative to the other participants.	1	2	3	4	5
5	My aim was to avoid learning less than the maximum possible about this task.	1	2	3	4	5
6	My goal was to avoid performing poorly compared to others on this task.	1	2	3	4	5
7	I was striving to understand the content of this task as thoroughly as possible.	1	2	3	4	5
8	My goal was to perform better on this task than other participants.	1	2	3	4	5
9	My goal was to avoid learning less than it was possible to learn about this task.	1	2	3	4	5
10	I was striving to avoid performing worse than others on this task.	1	2	3	4	5
11	I was striving to avoid an incomplete understanding of this task.	1	2	3	4	5
12	My aim was to avoid doing worse than the other participants on this task.	1	2	3	4	5

NAME: …………………………………..

Your experience on this kind of task…

1.) Have you ever completed a verbal aptitude test?

Yes ☐ No ☐ Do not remember ☐

2.) Does your work involve using the skills required to perform well on the test just completed?

Frequently ☐ Sometimes ☐ Rarely ☐ Never ☐

3.) Do you practice this kind of task often?

Frequently ☐ Sometimes ☐ Rarely ☐ Never ☐

How much effort did I invest in the task? Please **circle** the most appropriate answer keeping in mind the task that you have just completed.

In solving the preceding task I invested:

1: very, very low mental effort

2: very low mental effort

3: low mental effort

4: rather low mental effort

5: neither low nor high mental effort

6: rather high mental effort

7: high mental effort

8: very high mental effort

9: very, very high mental effort

<u>How I approached the task:</u> The following items refer to the task that you have just carried out. Please answer these items keeping in mind the approach that you used for the task that you have just completed.

Some of the questions may look similar to each other but please do not worry about appearing to be consistent. Answer each question on its own merits.

Please circle **ONE** answer for each of the items below.

		Strongly Disagree	**Disagree**	**Neither Agree Nor Disagree**	**Agree**	**Strongly Agree**
1	My aim was to completely master this task.	1	2	3	4	5
2	I was striving to do well on this task compared to the other participants.	1	2	3	4	5
3	My goal was to learn as much as possible.	1	2	3	4	5
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5	My aim was to avoid learning less than the maximum possible about this task.	1	2	3	4	5
6	My goal was to avoid performing poorly compared to others on this task.	1	2	3	4	5
7	I was striving to understand the content of this task as thoroughly as possible.	1	2	3	4	5
8	My goal was to perform better on this task than other participants.	1	2	3	4	5
9	My goal was to avoid learning less than it was possible to learn about this task.	1	2	3	4	5
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APPENDIX I
TIME E2 EXPERIMENT
INSTRUCTIONS

<u>Neutral Task Instructions – Time 2</u>

Prepare an information sheet and consent form on each desk before start of session. Also put 2 pencils, an eraser, a calculator, and some rough paper on each desk.

First of all I would like to thank you for attending this session. The session will take 1 hour. Could you all switch off you mobile phones please?

First I would like you to read the paper with the title 'information sheet' found on your desks. This sheet is for you to keep.

Do you have any questions?

You will also find an informed consent form on your desk. Could you kindly read and sign this form please? I am required to provide this information and ask you to sign a consent form for ethical purposes. This is required by the Loughborough University Ethical Advisory Committee. Once you have completed the forms could you all pass them forward please?

Count number of forms and check that all of them have been completed appropriately.

Hand out the answer sheets.

Hand out the verbal test booklets. **Please don't open these booklets until I tell you to do so.**

When all booklets have been handed out: **Now please turn to page 2 of the booklet and follow the instructions while I read them aloud.**

In this test you will be asked to reason with written information drawn from the world of work. The test consists of a series of passages, each of which is followed by several statements. Your task is to assess whether each statement is either "true", "false", or "cannot say" in relation to the passage which preceded it.

So having read a passage and the statements which follow, you would;

fill in *circle A* if you think the statement is *true* in relation to the passage,
fill in *circle B* if you think the statement is *false* in relation to the passage,
fill in *circle C* if you *cannot say* whether the statement is true or false in relation to the passage.
You should assess each statement *only in relation to the passage which preceded it* and not in relation to any personal views or knowledge you might hold.

Do not write anything on this question booklet, but indicate your answer by completely filling in the appropriate circle on your answer sheet.

Before you start there are some example questions to complete. Look at the passage page 11. Now, in your own time, read the passage and assess the statements which follow, according to the rules above. Choose what you think is the best answer for each statement, A, B, or C and mark your choice in the Examples Section on your answer sheet.

Hand out self-efficacy questionnaires. When everyone has finished the examples:

The answer to Example 1 is A, the statement is true given the information in the passage.

The answer to Example 2 is C, you cannot say from the information in the passage.

The answer to Example 3 is A, the statement is true given the information in the passage.

The answer to Example 4 is C, you cannot say from the information in the passage.

Are there any questions? If you are not clear about what you have to do, ask me now as I can't answer any questions once the test has started.

I have handed out a short questionnaire which I would like you to complete. Please don't forget to print your name at the top of this questionnaire.

Ask if everyone's ready and when they are…

Could you all pass your questionnaires forward please?

Count questionnaires and make sure that everyone has written their names on it.

Now could you look back at page 2 and follow whilst I read out the reminder points please?

- **The test consists of 24 questions and you will have 14 minutes in which to do them.**
- **Try to work quickly but accurately.**
- **Fill in completely the appropriate circles on the answer sheet.**
- **Do not make any marks on this booklet.**
- **Fully erase any answer you wish to change.**
- **If you are not sure of an answer mark your best choice, but avoid simply guessing.**

Are there any final questions?

Please note that this time the 1st test question is Question 29. So please start using your answer sheets from Question 29.

Now turn over to page 12 and begin.

Start stopwatch on the word 'begin', and note the start time on a piece of paper. Walk around after 2 minutes and again after 10 minutes. After exactly 14 minutes say:

Please stop now. Pencils down. Close your booklets.

Collect in all the materials, booklets, answer sheets, pencils and erasers. Check that there are 10 booklets and 10 answer sheets, and check that all answer sheets have names on them.

Could you kindly complete this short questionnaire I'm handing out please?

Hand out post-test questionnaires.

Please don't forget to write your names down on the first page of the questionnaires.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please?

So that was the first half of the session. We're going to go through exactly the same process for the second aptitude test.

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Before you start there are some example questions to complete. Look at the example questions on page 8. Now, in your own time and using just the statistical information provided at the top of the page, choose what you think is the best answer for each question from the five alternatives given. Mark your choices in the Examples Section on your answer sheet.

When all have finished the examples, say:

The answer to Example 1 is A, Year 1.

The answer to Example 2 is D, £144, 000.

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Collect calculators.

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Have you got any questions?
Once I've scored all the tests and questionnaires I will send you all a feedback pack by e-mail. I would be very happy to provide you with a personal feedback session if you like. So if you would like to attend a personal feedback session could you kindly drop me an e-mail and I'll make sure that I set one up for you. I will also be sending you a final short questionnaire

by e-mail in about 1 month's time and I would really really appreciate it of you could complete it and send it back by e-mail. It's very very short, but it is also very important for the research that I am doing.

Also, the draw for the three £50 cash prizes will take place in December or January and you'll obviously be informed if you've won. Please note that your name will be put into the draw once you've completed the final short questionnaire that I will be sending you in 1 month's time.

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Hand out post-test questionnaires.

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Hand out the verbal test booklets. **Please don't open these booklets until I tell you to do so.**

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It is important that you keep in mind that this session is a chance for you to practice aptitude tests for when you apply for employment. So it is important that you use this opportunity to learn more about what it is like to take a verbal/numerical aptitude test. The results on these tests are not as important as the opportunity to learn more about aptitude tests.

Now turn over to page 12 and begin.

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Hand out post-test questionnaires.

Please don't forget to write your names down on the first page of the questionnaires.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please?

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When all have finished the examples, say:

The answer to Example 1 is A, Year 1.

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You may wish to use a calculator for this test. Rough paper is also provided to help you with any working out.

Before you start there are some example questions to complete. Look at the example questions on page 8. Now, in your own time and using just the statistical information provided at the top of the page, choose what you think is the best answer for each question from the five alternatives given. Mark your choices in the Examples Section on your answer sheet.

When all have finished the examples, say:

The answer to Example 1 is A, Year 1.

The answer to Example 2 is D, £144, 000.

The answer to example 3 is B, £5, 497, 000.

Are there any questions? If you are not clear about what you have to do, ask me now as I can't answer any questions once the test has started.

Now, I have handed out a short questionnaire which I would like you to complete. Please don't forget to print your name at the top of this questionnaire.

Ask if everyone's ready and when they are…

Could you all pass your questionnaires forward please?

Count questionnaires and make sure that everyone has written their names on it.

Now could you look back at page 2 and follow whilst I read out the reminder points please?

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- **Try to work quickly but accurately.**
- **Fill in completely the appropriate circles on the answer sheet.**
- **Do not make any marks on this booklet.**
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- **Fully erase any answer you wish to change.**
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Are there any final questions? Please note that this time the first test question is Question 19. So please start using your answer sheets from Question 19.

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Collect in all the booklets and answer sheets. Check that there are 10 booklets and 10 answer sheets, and check that all answer sheets have names on them.

Could you kindly complete this short questionnaire I'm handing out please?

Hand out post-test questionnaires.

Please don't forget to write your names down on the first page of the questionnaires.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please?

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Hand out the answer sheets.

Hand out the verbal test booklets. **Please don't open these booklets until I tell you to do so.**

When all booklets have been handed out: **Now please turn to page 2 of the booklet and follow the instructions while I read them aloud.**

In this test you will be asked to reason with written information drawn from the world of work. The test consists of a series of passages, each of which is followed by several statements. Your task is to assess whether each statement is either "true", "false", or "cannot say" in relation to the passage which preceded it.

So having read a passage and the statements which follow, you would;

fill in *circle A* if you think the statement is *true* in relation to the passage,
fill in *circle B* if you think the statement is *false* in relation to the passage,
fill in *circle C* if you *cannot say* whether the statement is true or false in relation to the passage.
You should assess each statement *only in relation to the passage which preceded it* and not in relation to any personal views or knowledge you might hold.

Do not write anything on this question booklet, but indicate your answer by completely filling in the appropriate circle on your answer sheet.

Before you start there are some example questions to complete. Look at the passage page 11. Now, in your own time, read the passage and assess the statements which follow, according to the rules above. Choose what you think is the best answer for each statement, A, B, or C and mark your choice in the Examples Section on your answer sheet.

Hand out self-efficacy questionnaires. When everyone has finished the examples:

The answer to Example 1 is A, the statement is true given the information in the passage.

The answer to Example 2 is C, you cannot say from the information in the passage.

The answer to Example 3 is A, the statement is true given the information in the passage.

The answer to Example 4 is C, you cannot say from the information in the passage.

Are there any questions? If you are not clear about what you have to do, ask me now as I can't answer any questions once the test has started.

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Are there any final questions?

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Now turn over to page 12 and begin.

Start stopwatch on the word 'begin', and note the start time on a piece of paper. Walk around after 2 minutes and again after 10 minutes. After exactly 14 minutes say:

Please stop now. Pencils down. Close your booklets.

Collect in all the materials, booklets, answer sheets, pencils and erasers. Check that there are 10 booklets and 10 answer sheets, and check that all answer sheets have names on them.

Could you kindly complete this short questionnaire I'm handing out please?

Hand out post-test questionnaires.

Please don't forget to write your names down on the first page of the questionnaires.

Collect calculators.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please?

Collect questionnaires, pencils and erasers. Check that they all wrote their names on the questionnaire.

Have you got any questions?

Once I've scored all the tests and questionnaires I will send you all a feedback pack by e-mail. I would be very happy to provide you with a personal feedback session if you like. So if you would like to attend a personal feedback session could you kindly drop me an e-mail and I'll make sure that I set one up for you. I will also be sending you a final short questionnaire by e-mail in about 1 month's time and I would really really appreciate it of you could complete it and send it back by e-mail. It's very very short, but it is also very important for the research that I am doing.

Also, the draw for the three £50 cash prizes will take place in December or January and you'll obviously be informed if you've won. Please note that your name will be put into the draw once you've completed the final short questionnaire that I will be sending you in 1 month's time.

Once again, thank you so much for your participation, I really appreciate it!!

<u>Performance-Approach Inducing Task Instructions – Time 2</u>

Prepare an information sheet and consent form on each desk before start of session. Also put 2 pencils, an eraser, a calculator, and some rough paper on each desk.

First of all I would like to thank you for attending this session. The session will take 1 hour. Could you all switch off you mobile phones please?

First I would like you to read the paper with the title 'information sheet' found on your desks. This sheet is for you to keep.

Do you have any questions?

You will also find an informed consent form on your desk. Could you kindly read and sign this form please? I am required to provide this information and ask you to sign a consent form for ethical purposes. This is required by the Loughborough University Ethical Advisory Committee. Once you have completed the forms could you all pass them forward please?

Count number of forms and check that all of them have been completed appropriately.

Hand out the answer sheets.

Hand out the verbal test booklets. **Please don't open these booklets until I tell you to do so.**

When all booklets have been handed out: **Now please turn to page 2 of the booklet and follow the instructions while I read them aloud.**

In this test you will be asked to reason with written information drawn from the world of work. The test consists of a series of passages, each of which is followed by several statements. Your task is to assess whether each statement is either "true", "false", or "cannot say" in relation to the passage which preceded it.

So having read a passage and the statements which follow, you would;

fill in *circle A* if you think the statement is *true* in relation to the passage,
fill in *circle B* if you think the statement is *false* in relation to the passage,
fill in *circle C* if you *cannot say* whether the statement is true or false in relation to the passage.
You should assess each statement *only in relation to the passage which preceded it* and not in relation to any personal views or knowledge you might hold.

Do not write anything on this question booklet, but indicate your answer by completely filling in the appropriate circle on your answer sheet.
Before you start there are some example questions to complete. Look at the passage page 11. Now, in your own time, read the passage and assess the statements which follow, according to the rules above. Choose what you think is the best answer for each statement, A, B, or C and mark your choice in the Examples Section on your answer sheet.

Hand out self-efficacy questionnaires. When everyone has finished the examples:

The answer to Example 1 is A, the statement is true given the information in the passage.

The answer to Example 2 is C, you cannot say from the information in the passage.

The answer to Example 3 is A, the statement is true given the information in the passage.

The answer to Example 4 is C, you cannot say from the information in the passage.

Are there any questions? If you are not clear about what you have to do, ask me now as I can't answer any questions once the test has started.

I have handed out a short questionnaire which I would like you to complete. Please don't forget to print your name at the top of this questionnaire.

Ask if everyone's ready and when they are…

Could you all pass your questionnaires forward please?

Count questionnaires and make sure that everyone has written their names on it.

Now could you look back at page 2 and follow whilst I read out the reminder points please?

- **The test consists of 24 questions and you will have 14 minutes in which to do them.**
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- **Fill in completely the appropriate circles on the answer sheet.**
- **Do not make any marks on this booklet.**
- **Fully erase any answer you wish to change.**
- **If you are not sure of an answer mark your best choice, but avoid simply guessing.**

Are there any final questions?

Please note that this time the 1st test question is Question 29. So please start using your answer sheets from Question 29.
This time I shall be comparing your performance on the test to the test norms and I shall also be comparing your performance on this test with the performance of other participants of my research. I would like to remind you that the results of this test will ONLY be used for the purpose of this research and will not have any influence whatsoever on your course since the results will be kept in very strict confidentiality.

Now turn over to page 12 and begin.

Start stopwatch on the word 'begin', and note the start time on a piece of paper. Walk around after 2 minutes and again after 10 minutes. After exactly 14 minutes say:

Please stop now. Pencils down. Close your booklets.

Collect in all the materials, booklets, answer sheets, pencils and erasers. Check that there are 10 booklets and 10 answer sheets, and check that all answer sheets have names on them.

Could you kindly complete this short questionnaire I'm handing out please?

Hand out post-test questionnaires.

Please don't forget to write your names down on the first page of the questionnaires.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please?

So that was the first half of the session. We're going to go through exactly the same process for the second aptitude test.

Hand out the answer sheets.

Hand out the numerical test booklets. **Please don't open these booklets until I tell you to do so.**

When all booklets have been handed out: **Now please turn to pages 2 of the booklet and follow the instructions while I read them aloud.**

In this test you will be using facts and figures taken from the world of work, to assess your ability to interpret and evaluate numerical information. All the information you need will be provided for you in the form of various tables and charts.

For each question you are given five answers to choose from. One, and only one, of the answers is correct in each case.

Do not write anything on this question booklet, but indicate your answer by completely filling in the appropriate circle on your answer sheet.

You may wish to use a calculator for this test. Rough paper is also provided to help you with any working out.

Before you start there are some example questions to complete. Look at the example questions on page 8. Now, in your own time and using just the statistical information provided at the top of the page, choose what you think is the best answer for each question from the five alternatives given. Mark your choices in the Examples Section on your answer sheet.

When all have finished the examples, say:

The answer to Example 1 is A, Year 1.

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Now turn over to page 9 and begin.

Start stopwatch on the word 'begin', and note the start time on a piece of paper. Walk around after 2 minutes and again after 10 minutes. After exactly 15 minutes say:

Please stop now. Pencils down. Close your booklets.

Collect in all the booklets and answer sheets. Check that there are 10 booklets and 10 answer sheets, and check that all answer sheets have names on them.

Could you kindly complete this short questionnaire I'm handing out please?

Hand out post-test questionnaires.

Please don’t forget to write your names down on the first page of the questionnaires.

Collect calculators.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please? *Collect questionnaires, pencils and erasers. Check that they all wrote their names on the questionnaire.*

Have you got any questions?

Once I’ve scored all the tests and questionnaires I will send you all a feedback pack by e-mail. I would be very happy to provide you with a personal feedback session if you like. So if you would like to attend a personal feedback session could you kindly drop me an e-mail and I’ll make sure that I set one up for you. I will also be sending you a final short questionnaire by e-mail in about 1 month’s time and I would really really appreciate it of you could complete it and send it back by e-mail. It’s very very short, but it is also very important for the research that I am doing.

Also, the draw for the three £50 cash prizes will take place in December or January and you’ll obviously be informed if you’ve won. Please note that your name will be put into the draw once you’ve completed the final short questionnaire that I will be sending you in 1 month’s time.

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First of all I would like to thank you for attending this session. The session will take 1 hour. Could you all switch off you mobile phones please?

First I would like you to read the paper with the title 'information sheet' found on your desks. This sheet is for you to keep.

Do you have any questions?

You will also find an informed consent form on your desk. Could you kindly read and sign this form please? I am required to provide this information and ask you to sign a consent form for ethical purposes. This is required by the Loughborough University Ethical Advisory Committee. Once you have completed the forms could you all pass them forward please?

Count number of forms and check that all of them have been completed appropriately.

Hand out the answer sheets.

Hand out the numerical test booklets. **Please don't open these booklets until I tell you to do so.**

When all booklets have been handed out: **Now please turn to page 2 of the booklet and follow the instructions while I read them aloud.**

In this test you will be using facts and figures taken from the world of work, to assess your ability to interpret and evaluate numerical information. All the information you need will be provided for you in the form of various tables and charts.

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Could you kindly complete this short questionnaire I'm handing out please?

Hand out post-test questionnaires.

Please don't forget to write your names down on the first page of the questionnaires.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please?

So that was the first half of the session. We're going to go through exactly the same process for the second aptitude test.

Hand out the answer sheets.

Hand out the verbal test booklets. **Please don't open these booklets until I tell you to do so.**

When all booklets have been handed out: **Now please turn to pages 2 of the booklet and follow the instructions while I read them aloud.**

In this test you will be asked to reason with written information drawn from the world of work. The test consists of a series of passages, each of which is followed by several statements. Your task is to assess whether each statement is either "true", "false", or "cannot say" in relation to the passage which preceded it.

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fill in *circle A* if you think the statement is *true* in relation to the passage,
fill in *circle B* if you think the statement is *false* in relation to the passage,
fill in *circle C* if you *cannot say* whether the statement is true or false in relation to the passage.
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Do not write anything on this question booklet, but indicate your answer by completely filling in the appropriate circle on your answer sheet.

Before you start there are some example questions to complete. Look at the passage page 11. Now, in your own time, read the passage and assess the statements which follow, according to the rules above. Choose what you think is the best answer for each statement, A, B, or C and mark your choice in the Examples Section on your answer sheet.

Hand out self-efficacy questionnaires. When everyone has finished the examples:

The answer to Example 1 is A, the statement is true given the information in the passage.

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The answer to Example 3 is A, the statement is true given the information in the passage.

The answer to Example 4 is C, you cannot say from the information in the passage.

Are there any questions? If you are not clear about what you have to do, ask me now as I can't answer any questions once the test has started.

I have handed out a short questionnaire which I would like you to complete. Please don't forget to print your name at the top of this questionnaire.

Ask if everyone's ready and when they are…

Could you all pass your questionnaires forward please?

Count questionnaires and make sure that everyone has written their names on it.

Now could you look back at page 2 and follow whilst I read out the reminder points please?

- **The test consists of 24 questions and you will have 14 minutes in which to do them.**
- **Try to work quickly but accurately.**
- **Fill in completely the appropriate circles on the answer sheet.**
- **Do not make any marks on this booklet.**
- **Fully erase any answer you wish to change.**
- **If you are not sure of an answer mark your best choice, but avoid simply guessing.**

Are there any final questions?

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Again, I would like you to keep in mind that this time I shall be comparing your performance on the test to the test norms and I shall also be comparing your performance on this test with the performance of other participants of my research. I would like to remind you that the results of this test will ONLY be used for the purpose of this research and will not have any influence whatsoever on your course since the results will be kept in very strict confidentiality.

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Could you kindly complete this short questionnaire I'm handing out please?

Hand out post-test questionnaires.

Please don't forget to write your names down on the first page of the questionnaires.

Collect calculators.

Has everyone completed the questionnaire? Can you all pass your questionnaires forward please?

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Have you got any questions?

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Once again, thank you so much for your participation, I really appreciate it!!

Appendix J
E-mail with
Time Q2 Questionnaire
(Experimental Participants)

Hi {name of participant}

How are you? I hope you had a fantastic Christmas and New Year! I've attached the 2nd questionnaire as I had mentioned in the experiment. I would really really appreciate it if could complete it and send it back to me, it should only take you about 3 minutes to complete! I'll be getting back to you about the feedback in a few weeks time if that's ok.

Thanks {and good luck in your exams - *if participant was a student*}!

Debbie

Appendix K
E-mail sent Prior to Time 2 Experiment

Hi {name of participant}

How are you? I hope all is well. I'm e-mailing you regarding part 2 of the experiment. I've put a list of times and dates when I will be carrying out experimental sessions next week. If you could kindly choose a slot and send me an e-mail with the time and day you'd like to attend I would really appreciate it!

This session will be exactly the same as the first session, only this time you'll be completing the second half of the verbal and numerical tests. I will then score the tests over the holidays and after your exams I'll provide you with feedback on the tests and give you tips on how to excel in these tests. I can also provide you with feedback on the questionnaires if you'd like that.

Date	**Time**
{list of dates}	{list of times}

If you cannot attend on any of the dates mentioned above please don't hesitate to contact me and I'll be very happy to organise an extra session.

Once again, thank you so much for your help and support, I really appreciate it!

I look forward to hearing from you.

Kind Regards

Debbie

Appendix L
Time E2 Post-Test Questionnaire

NAME: …………………………………..

Your experience on this kind of task…

2.) Have you completed any other verbal aptitude test (other than that in the first part of this experiment)?

Yes ☐ No ☐ Do not remember ☐

2.) Does your work involve using the skills required to perform well on the test just completed?

Frequently ☐ Sometimes ☐ Rarely ☐ Never ☐

3.) Have you practiced this kind of task since the first experiment?

Frequently ☐ Sometimes ☐ Rarely ☐ Never ☐

<u>How much effort did I invest in the task?</u> Please **circle** the most appropriate answer keeping in mind the task that you have just completed.

In solving the preceding task I invested:

1: very, very low mental effort

2: very low mental effort

3: low mental effort

4: rather low mental effort

5: neither low nor high mental effort

6: rather high mental effort

7: high mental effort

8: very high mental effort

9: very, very high mental effort

How I approached the task: The following items refer to the task that you have just carried out. Please answer these items keeping in mind the approach that you used for the task that you have just completed.

Some of the questions may look similar to each other but please do not worry about appearing to be consistent. Answer each question on its own merits.

Please circle **ONE** answer for each of the items below.

		Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
1	My aim was to completely master this task.	1	2	3	4	5
2	I was striving to do well on this task compared to the other participants.	1	2	3	4	5
3	My goal was to learn as much as possible.	1	2	3	4	5
4	My aim was to perform well on this task relative to the other participants.	1	2	3	4	5
5	My aim was to avoid learning less than the maximum possible about this task.	1	2	3	4	5
6	My goal was to avoid performing poorly compared to others on this task.	1	2	3	4	5
7	I was striving to understand the content of this task as thoroughly as possible.	1	2	3	4	5
8	My goal was to perform better on this task than other participants.	1	2	3	4	5
9	My goal was to avoid learning less than it was possible to learn about this task.	1	2	3	4	5
10	I was striving to avoid performing worse than others on this task.	1	2	3	4	5
11	I was striving to avoid an incomplete understanding of this task.	1	2	3	4	5
12	My aim was to avoid doing worse than the other participants on this task.	1	2	3	4	5

NAME: …………………………………..

Your experience on this kind of task…

3.) Have you completed any other numerical aptitude test (other than that in the first part of this experiment)?

Yes ☐ No ☐ Do not remember ☐

2.) Does your work involve using the skills required to perform well on the test just completed?

Frequently ☐ Sometimes ☐ Rarely ☐ Never ☐

3.) Have you practiced this kind of task since the first experiment?

Frequently ☐ Sometimes ☐ Rarely ☐ Never ☐

<u>How much effort did I invest in the task?</u> Please **circle** the most appropriate answer keeping in mind the task that you have just completed.

In solving the preceding task I invested:

1: very, very low mental effort

2: very low mental effort

3: low mental effort

4: rather low mental effort

5: neither low nor high mental effort

6: rather high mental effort

7: high mental effort

8: very high mental effort

9: very, very high mental effort

<u>How I approached the task:</u> The following items refer to the task that you have just carried out. Please answer these items keeping in mind the approach that you used for the task that you have just completed.

Some of the questions may look similar to each other but please do not worry about appearing to be consistent. Answer each question on its own merits.

Please circle **ONE** answer for each of the items below.

		Strongly Agree	**Agree**	**Neither Agree Nor Disagree**	**Disagree**	**Strongly Disagree**
1	My aim was to completely master this task.	1	2	3	4	5
2	I was striving to do well on this task compared to the other participants.	1	2	3	4	5
3	My goal was to learn as much as possible.	1	2	3	4	5
4	My aim was to perform well on this task relative to the other participants.	1	2	3	4	5
5	My aim was to avoid learning less than the maximum possible about this task.	1	2	3	4	5
6	My goal was to avoid performing poorly compared to others on this task.	1	2	3	4	5
7	I was striving to understand the content of this task as thoroughly as possible.	1	2	3	4	5
8	My goal was to perform better on this task than other participants.	1	2	3	4	5
9	My goal was to avoid learning less than it was possible to learn about this task.	1	2	3	4	5
10	I was striving to avoid performing worse than others on this task.	1	2	3	4	5
11	I was striving to avoid an incomplete understanding of this task.	1	2	3	4	5
12	My aim was to avoid doing worse than the other participants on this task.	1	2	3	4	5

APPENDIX M
EXPERIMENTAL FEEDBACK FORM TEMPLATE

Name:
<u>Test Scores:</u>

Numerical Test Time 1: *x*/12
Numerical Test Time 2: *x*/12

Verbal Test Time 1: *x*/24
Verbal Test Time 2: *x*/24

Well done!! Keep practicing…it will boost your confidence!!

The average score on the verbal test at Time 1 was 15 and at Time 2 was 14 (the maximum score was 21 at Time 1 and 20 at Time 2).

The average score on the numerical test at Time 1 was 6 and at Time 2 was 7 (the maximum score was 11 at Time 1 and 11 at Time 2).

Irrespectively of how well you fared on these tests there's always room for improvement! Keep in mind that even a 1 mark difference in your score can make the difference between getting a job or not!

With aptitude tests it is extremely important to practice. Practice can make an **immense** difference to your score and greatly increase your chances of getting a job!

<u>In order to do well on aptitude tests</u>

a) Make sure you know what you have to do before you start. If you do not understand the instructions ask the test administrator.

b) Read the instructions carefully before the test starts. Reading through them quickly might make you overlook important instructions and cause silly mistakes (e.g. if you do not mark the answer as they ask you to your answers will be counted as wrong or invalid).

c) Do not assume that instructions are the same as the last time you looked at them.

d) Work as quickly and accurately as you can once you start the test. Every question you leave unanswered is a missed scoring opportunity.

e) Check frequently to make sure that the question you are answering matches the corresponding space on the answer sheet.

f) If you find a question difficult, leave it and go back to it if you have time.

g) If you are uncertain about an answer enter your most reasoned choice (try not to simply guess it).

h) If you have spare time go back and check your answers.

i) Work as hard as you can throughout the test and go to the test with a positive attitude even if you've not done well on previous tests. Do not allow yourself to start off negatively since this will impact the way you work and therefore your results.

j) Give your full concentration, you cannot afford to be distracted by anything or anyone!

(Tolley & Thomas, 1996).

When taking a real (as opposed to a practice) test

a) Find out about as much as possible about the test in advance e.g. ask if you can get any example questions, whether it's power or speed test*, which types of test – verbal, numerical, spatial.

b) Make sure you get to the place of the test in good time so as not to get anxious.

c) Inform the employer or organisation about any disability you may have so that they may make any necessary arrangements for you.

d) Always take a watch!

e) Listen very carefully to all instructions given by the test administrator.

f) Do EXACTLY as you are told.

g) Work carefully through any practise questions provided.

h) When given the go ahead to begin read each test question carefully before answering it.

i) Keep an eye on the time.

j) Don't make assumptions - **especially during verbal tests**.

k) Do not hesitate to ask questions before a test in order to make sure you have understood correctly.

l) Stop working immediately when told to do so.

*Speed tests normally consist of fairly straightforward questions and you need to try and answer as many questions as possible in the allocated time. Power tests on the other hand consist of a small number of complex questions. The latter are normally given at the professional or managerial level.

Practice makes perfect!! The most important thing to do with aptitude tests is to get lots of practice. Every little improvement greatly enhances your chance of getting the job!

Excelling on Numeracy Tests

In order to excel on numeracy tests make sure that you know the following very well since they frequently turn up in numeracy tests:

a) weights and measures

b) units of time

c) addition, subtraction, multiplication, and division of fractions

d) calculating areas of shapes

e) calculating averages

f) calculating percentages

g) extracting information from line graphs, bar graphs, pie charts and statistical tables.

With numeracy tests, the more you can work things out without using a calculator the better it is because you learn to work much faster and many times speed is a very important factor in tests. So, for example, know your multiplication tables, learn how to compute averages and get comfortable working without a calculator as much as possible.

Some good websites to take a look at include:

- http://www.shldirect.com/practice_tests.html
- http://www.kent.ac.uk/careers/psychotests.htm
- http://www.psychometric-success.com/aptitude-tests/aptitude-tests-introduction.htm
- http://www.assessmentday.co.uk/
- http://www.prospects.ac.uk/cms/ShowPage/Home_page/Applications__CVs_and_interviews/Tests_and_exercises/Psychometric_tests/p!eLagFgF
- http://www.practicetests.co.uk/
- http://www.aptitudeonline.co.uk/

Also, if you're asked to attend an assessment day, you should consider taking a look at what 'in-tray tests/exercises' are and practising some of these. There are many practice tests on the internet, some useful websites include:

- http://www.careers.ed.ac.uk/STUDENTS/Applications_Interviews/AssessmentCentres/in-tray%20exercise/intray_exercise.htm
- http://www.psychometric-success.com/assessment-centers/assessment-center-in-tray-exercise.htm
- http://www.kent.ac.uk/careers/interviews/intray.htm

GOOD LUCK!!