TRANSFORMATION AND STUDY CHANGE AMONG HOSPITALITY AND TOURISM STUDENTS

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ABSTRACT

Over four decades of transformative-learning (TL) research, theorists have steadily called for the design of a quantitative instrument capturing the central tenants of individual transformation. The aim of this study is to introduce the Triggering Incident Student Survey (TISS) as a means to explore incidents experienced by learners that trigger reflective processes during a semester of study. The TISS was designed in the spirit of a post-positivist paradigm to evaluate central variables of TL, namely, triggers, emotions, forms of reflection, dialogue with important social actors and elicit demographic information on age, level of study, gender and cultural background. Data were gathered from 333 individuals on two occasions. With the data, and consistent with ideas in the TL literature, structural relationships were estimated to see if emotions mediated the influence of triggers on reflective ability or acted to disrupt that influence entirely. Further, again in line with the literature, structural models were established to test if dialogue with social actors facilitate transformation and if affection and cognition displayed reciprocal relations that is, there existed feedback between the constructs. This study has special relevance in hospitality education with its mix of practical, theoretical and internship elements and is unique in that no evidence exists as to what transforms individual learners within and outside of the classroom in the discipline of hospitality. Given the calls in the TL literature for quantitative studies and the criticisms of those that exist, the current study fills a substantial gap in the literature.

Data were gathered reliably and validly. Using the data it has been shown that among those studying hospitality, failures and personal dilemmas have effects on thinking processes, either directly or via positive and negative emotions. Differences between central variables were additionally dependent to varying degree on age, status, gender and culture and evidence was provided that learners seek varying interactions with students, friends and family during transformational processes. TISS findings also suggested that the relationships between positive emotions and cognitive reflection are reciprocal and mutually reinforcing.

A substantial contribution in this research arises from the testing of a quantitative instrument that overcomes criticisms in the literature of other surveys. Another substantial outcome is the setting of a robust analytical framework that can be exploited by TL theorists, practitioners and future researchers to further examine the central variables in studies of transformation in other disciplines, other educational contexts and other types of students.

Keywords: hospitality management education; transformative learning; transformation; triggering change; emotional mediators; forms of reflection; facilitators; moderators.

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GENERIC GLOSSARY

Assumptions Also termed "frames of reference" by Mezirow (1990, p.98) meaning filters used by an individual to interpret the world.

Central variables Key elements to transformation extracted from transformative learning theory (TLT) and defined in this thesis as triggers, emotions, forms of reflection and social actors that facilitate the process.

Critical reflection (CR) Heightened forms of cognition that "involve us becoming aware of *why* we perceive, think, feel or act as we do", bringing about a lasting change in meaning perspectives (Mezirow 1991, p. 108).

Disorienting dilemma Minor or major, instantaneous or emergent life events that trigger the process of transformation.

Emotions Positive and negative responses to organic, biological or psychological stimuli that are prerequisites for survival. These manifest themselves as cognitive-rational reactions or propel innate reflexive action. They are additionally socially constructed by individuals searching for and making meaning within a larger cultural and societal ideology (Theodosius 2008).

Facilitators Dialogues that support the process of transformation (Cranton 2006). In this thesis, reference is made to conversations with social actors such as friends, family and fellow students.

Forms of reflection (FoRs) A collective term for reflective and non-reflective thinking, which in this thesis includes four forms: habitual action, understanding, reflection and critical reflection.

Habitual action Undertaking activities without conscious thought (Kember et al. 2000).

Habits of mind The broad cognitive tendencies that individuals apply to interpret experiences (Cranton 2006).

Meaning perspectives refer "to the structure of cultural and psychological assumptions within which our past experience assimilates and transforms new experience" (Mezirow, 1985, p. 21). Once *habits of mind* have been altered, individuals see themselves and their place in the world in a different way and thus adopt a new meaning perspective.

Transformation Processes by which individuals become new in terms of their habits of mind, meaning perspectives and worldview. In the words of Stevens-Long et al. (2012, p.184), "Transformation enables people to move toward habits of mind and habits of being that are more inclusive, open, whole, and wise. Transformation can also endow us with more power to explain our experience and the power relations in which we are embedded".

Transformative learning What the learner does, feels or experiences during transformation in either formal or informal educational programs (Stevens-Long et al. 2012).

Transformative education Institutionally based initiatives aimed at transformative learning that are planned and set into curricular and pedagogical practices (Stevens-Long et al. 2012).

Reflection An individual's critique of his or her existing knowledge and the process of accumulating knowledge, in order to form new appreciations and interpretations of it.

Status The status of being either a new student at SHI or a student returning for another semester of study.

Understanding Using knowledge in tasks or while learning, although not evaluating or questioning that knowledge (Kember et al. 2000).

STATISTICAL GLOSSARY

Average Variance Extracted (AVE) A measure of average variation in measured items that is explained by a latent factor.

Bootstrapping Randomised resampling to estimate more robust standard errors than ML (see ML below) under conditions of non-normality with continuous data.

Chi-square goodness-of-model fit (x^2) A fit index calculated by multiplying the objective function F_{ML} by sample size minus one (see Maximum Likelihood). The logic of this test is to compare a predicted model with the observed data. "Thus, a statistically significant x^2 supports the alternate hypothesis ... meaning that the model estimates do not sufficiently reproduce the sample variances and covariances (i.e., the model does not fit the data well)" (Brown 2006, p.81). Chi-square increases with sample size and in large samples what is a good fitting model, is often rejected on the basis of chi-square being large, even when the difference between the observed and model implied variance-covariance matrix are small. Further, in non-normal data this statistic may not follow the assumed chi-square distribution.

Collinearity When two predictor variables have a high linear relationship (correlation). Thus true effects of the variables may not be detected. **Multicollinearity** occurs when there are high inter-correlations between three or more variables.

Confirmatory Factor Analysis (CFA) A hypothesis-driven procedure for estimating relationships between measured items (that is, alternatively referred to as observed items, scaled items or indicators) and their underlying latent constructs or factors.

Comparative Fit Index (CFI, Bentler 1990) A calculation of goodness of fit computing discrepancies in Chi-Square between an a priori researcher-suggested model and that of a baseline or null model, where indicator covariances are set to zero. CFI indices fall between 0 and 1 where values larger than 0.9 indicate good model fit (Bentler and Bonnett 1980, cited in Lance et al. 2006).

Composite Reliability Indicates scale reliability and the impact of error in observed items on factor reliability (Raykov and Grayson 2003).

Convergent Validity "The extent to which responses from alternative measurements of the same construct share variance" (Slavec
 and Drnovšek 2012, p.62).

Degrees of Freedom (Df) The difference between the knowns (off-diagonal correlations) and unknowns (number of parameters in a model) that is used to identify CFA and SEM models and is used in goodness of fit measures (Brown 2006).

Determinant "The determinant is a single number, i.e., (a scaler) that reflects the generalised measure of variance for the entire set of variables contained in" a variance-covariance matrix (Brown 2006, p.73).

Discriminant validity "The degree to which two measures designed to measure similar, but conceptually different constructs are related" (Slavec and Drnovšek 2012, p.62).

Estimators Estimates of model parameters obtained by attempting to minimise the disparity between an observed sample variance-covariance matrix and the model-implied variance-covariance matrix.

Invariance (measurement) Evaluating "across group equivalence" at the levels of measured items, their loadings, intercepts and residuals (Brown 2006, p.266).

Invariance (structural) Evaluating "across group equivalence" at the levels of latent factors assessing factor means, variances and covariances (Brown 2006, p.266).

Kaiser-Meyer-Ohlin (KMO) Measurement of sampling adequacy

The KMO statistic varies between 0 and 1. "A value of 0 indicates that the sum of partial correlations is large relative to the sum of correlations, indicating diffusion in the pattern of correlations (hence, factor analysis is likely to be inappropriate). A value close to 1 indicates that patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors" (Field, 2009, p. 647).

Latent construct (variable) In CFA, an unobserved underlying construct that explains covariation among a collection of observed measures or indicators. In PCA (see below), a variable that summarises common variation in a collection of observed measures or indicators.

Likelihood ratio test for differences between models A test in which the maximum likelihoods (see below) for two models are compared, where one model is nested in the other. In the nested model fewer parameters are estimated; in the parent model more parameters are freely estimated. If the difference between the chi-squared value for the smaller model (that is the nested model) and the chi-square value for the larger model (that is the parent model), is significant then this is evidence that the parent model fits the data better.

Maximum likelihood (ML) is used with continuous data that does not violate assumptions of normality. Under these assumptions, ML maximises an objective function, denoted by F_{ML}, which means that the difference between an observed variance-covariance matrix and a model implied variance-covariance matrix is minimised. **Robust ML (**ML with Satorra-Bentler scaled statistic**)** outperforms ML with non-normal data distributions.

Diagonally weighted least squares (DWLS) is used with non-normal and categorical data, most commonly with polychoric correlations (in cases beyond this thesis, polyserial correlations with continuous data may be used)**. Weighted least squares, mean and variance adjusted (WLSMV)** is useful with categorical, non-normal data and termed robust WLS by Muthén (1997, cited in Hoyle 2012, p.169-171). According to Lei (2009, cited in Hoyle 2012, p.173), **robust WLS** (either DWLS or WLSMV) outperforms ML in moderate samples (n >250) due to ML's inflated Chi-square and repressed standard errors.

Measured (observed) item Observed or collected data such as age, gender or responses to Likert-scale statements.

Measurement model The part of a CFA (see above) in which measured variables are linked to underpinning latent variables (see also structural equation modelling).

Multi-group Confirmatory Factor Analysis (MGCFA) A way of analysing whether a measurement model applies across different groups, such as gender and culture.

Modification indices Contributions to model chi-square when previous fixed parameters are set to be freely estimated.

p **values** The estimated probability that a parameter satisfies the null hypothesis. Values less than or equal to 0.01 are taken as "strong" evidence against the null hypothesis that a coefficient is zero; *p* values greater than 0.01 but no larger than 0.05 are considered "moderate" evidence; *p* values greater than 0.05 but no greater than 0.10 are taken as "weak" evidence; and *p* values exceeding 0.10 constitute "little" or "no" evidence against the null (Chance and Rossman 2006, Gelman 2013, p.70).

Principle Component Analysis (PCA) Dimension reduction that gathers variables (see Collinearity) into a smaller number of principle components that explain most of the variation in the data.

Residuals Unique variances or errors. These are obtained as the differences between the sample (observed) and model implied (proposed) covariances.

Root Mean Square Error of Approximation (RMSEA) A model fit diagnostic estimating the extent to which a model fits sample data "reasonably" well rather than absolutely, by assessing discrepancies between degrees of freedom (see Df) (Brown 2006, p.83) .

Standardised Root Mean Square Residual (SRMR) Unlike RMSEA, SRMR is an absolute measure of model fit evaluating the discrepancy between a sample correlation matrix and predicted model correlation matrix. This is calculated as the square root of the sum of squared residuals, relative to the number of inputs in the matrix.

Structural Equation Modelling (SEM) A system of equations hypothesising direct and/or indirect relationships between latent constructs.

Tucker-Lewis Index (TLI) TLI is a non-normed calculation of goodness of model fit where the upper range with values above 0.9 indicate "good model fit" (Bentler and Bonnett 1980, cited in Lance et al. 2006, p. 203). TLI like CFI, compares chi-square and Df discrepancies between the predicted model and a null model with one digression. However, TLI provides a greater penalty for model complexity than does the CFI.

Wald Test The Wald statistics are approximations to the log-likelihood test, which are valid in sufficiently large samples. They are convenient to use where many model comparisons are undertaken, as for example where many constraints on a model are considered one after the other. In this thesis the Wald statistic is applied to the significance of moderating effects and the extent to which multicollinearity occurs between interactions (Pornprasertmanit et al. 2016).

CHAPTER 1: INTRODUCTION

1.1 OVERVIEW ON CONCEPTUAL CONTRIBUTION OF THESIS

Much of the research within Higher Education (HE) focuses on the formalisation of learning contexts in terms of teaching, learning, assessment types, the role of instructional design, content, learning styles and the role of feedback as a formative learning element. Finger and Asun (2001) underline the increasing institutionalisation and commodification of education where measuring, quantifying, certifying and marketing education, along with adapting learning to the needs of the individual, are a priority more so than ever before.

The implication of this is that much of the educational curricula is controlled and rationally/objectively organized to maximize student learning. Torres and Moraes (2006) support this notion in contexts where curriculum design follows a Habermasian "instrumental rationality", thus without occasional consideration of the meaning of that which is learnt from a students' perspective. Although education is adapted to the individual needs of the learner, it is the meaning for the learner and his context, which determines the value of the curricula and the associated learning experience.

The notion of transformative learning, which is learning with a purposeful shift in an individual's worldview is relevant to a learning environment and educational curricula that questions this Habermasian "instrumental rationality". Transformative learning offers alternate approaches to curriculum design and the learner's experience, in that it promotes a more conscious method (or should) of how the learner makes meaning of content. The outcome is designed to make learners question the validity of past and current knowledge, what Mezirow calls involving "critical reflection *of* assumptions" (CRA) concerning problematic experiences (Kreber 2012, cited in Taylor et al. 2012, p.329); and subjective reframing, which concerns "critical self-reflection *on* assumptions" (CSRA)(Kreber 2012, cited in Taylor et al. 2012, p.329), relating to deeper psychological and cultural assumptions that "limit one's experience" (Kreber 2012, cited in Taylor et al. 2012, p.329 (See also section 2.4). Yet until now, outcomes remain unsubstantiated and lack validity, whereas the *process* of transformation has remained largely unexamined (Newman 2012).

Hence effort should be given, not to validate, or focus solely on the outcomes of TL; that is, *has* the learner *been* transformed*?* Rather returning to original formulations of the theory and concentrating on procedural dynamics may elucidate deeper insights into *how*, over time, the learner *becomes* transformed. Returning to original formulations of TL theory, allows for designing and testing an instrument that sheds light on the *process* of transformation. Further, linkages between the central elements of TL may be tested and if in fact these differ demographically, or are affected by social interactions with friends, family and peers. Further, with the model and instrument used in the current research, it is possible to seek reliable and valid insights to the transformation *process*, allowing for potentiality simultaneity between thinking and feeling.

Learning entails life experiences and histories that are brought into the classroom and directly influence a learners' meaning-making ability and the process of knowledge accumulation (Lawler 1991, cited in King 2000). "Learners share their experiences and resources with each other to create new knowledge" (Cranton 2006, p.5). The latter supports the view that learning in a formal setting, is not bound to and inseparable from that setting. Learning becomes an individual and social construct. Although a rationalisation for educational procedures and quality control is justifiable, the learning experience from the individuals' perspective is not only confined to the classroom. Living and learning with other students creates a community based on shared intellectual experiences, which is leavened by social interaction outside of the classroom. As a result, students are often more actively (and socially) involved with the course material than if they simply attended classes (Nicol 2008, p.26).

Making meaning of an experience does not necessarily follow collaboration exclusively and there are wide arrays of experiences directly influencing a learner's ability to make sense of their study experience and themselves in the context of these experiences. Some experiences could promote an individual's ability to reflect and promote learning that is long term and life changing, rather than surface short-term learning.

The array of experiences offered within any academic setting and the broader influences within and outside of the formal learning environment, highlights the importance of an existential approach to learning, where the learner generates her or his own view and representation of the world, and where learning is a necessary process in finding the "self" (Cranton 2006, Russell 2007, cited in Newby 2010, p.39, Newby 2010).

Through the lens of transformative learning (TL), educators attempt to promote critical reflection on hidden assumptions made by learners, contributing to the way in which individuals develop and view the "self" and hopefully result in new behaviours, especially towards their studies. As per Taylor and Cranton (2012, cited in Taylor 2012, p.555) a major focus within transformative learning involves the active fostering of "ways of knowing" in various disciplines, although little is known about transformative experiences at the individual level. Here the assumption is that subjective experience fosters transformation and does not always need to be consciously promoted. It is a process that is omnipresent within experience. Meaning making is not predominantly rational, conscious process, rather it happens as we evolve (Kegan 1982). This is referred to by Dirkx et al. (2006), as the extra-rational approach in which making meaning of an experience is closely linked to the unconscious domain. Hence, there are difficulties in defining transformational experiences, as to what triggers transformation for one person, may not trigger it for another. This depends on the way in which the experience is understood, and meaning is constructed (Jester and Hoggan 2009).

Any experience has the potential to transform an individual and his or her belief about old values, assumptions, and how they see themselves and the world. As such any experience is potentially a trigger or catalyst for change. It is these triggers and the capacity they have to result in increased and conscious critical reflection on themselves as students and their environments that are relevant to this study. The influences that trigger this type of transformation are commonly referred to as disorienting dilemmas (Mezirow 1978), threshold moments (Meyer et al. 2010) or boundary situations (Willis 2012, cited in Taylor and Cranton 2012). It is proposed in studies by King and Wright (2003) that in a formal learning environment, there should be a confluence of similar experiences and triggers amongst students and that this may apply to any academic environment. That is, while transformation is recognised as an individual experience, similar triggers potentially having similar effects across individuals. This provides encouragement via King and Wright (2003) to pursue for the first time an agenda responding to calls from other transformative-learning theorists to adopt new quantitative approaches (Newman 2012; Taylor and Cranton 2012).

In contemporary hospitality and tourism education (H&T), curricula are designed to expand cognitive and practical skills for future industry placement. The impetus behind curricula design is industry and hence, institutions gear their programmes to suit the sector's requirements. The concentration on employability where a student is measured on his "suitability" for a certain type of employment has resulted in an increased focus on curricula division between the academic (theoretical and applied learning) and practical (vocational) skills, in an attempt to bridge theory and practice (Yorke and Knight 2007; Nicol 2008; Closs and Antonello 2011). Within H&T, the learner acquires knowledge and skills from both these domains. Learners from abroad living in a multi-cultural environment, who are far from their home environments possibly for the first time, are exposed to a discordant mixture of impressions, insights and challenges in which they strive to make meaning. The influences imposed on them are not restricted to cultural and social elements, but include confronting foreign teaching and learning approaches.

The research reported here was conducted at a H&T school where learners are involved in both stringent academic programmes and also the accumulation of vocational, practical skills through planning and taking part in events, including housekeeping duties on campus, service training in the restaurants, and the like. In this environment, the range of possible experiences is extensive and individuals may encounter important moments over the course of their studies, which arise outside the formal classroom environment, and which may promote or inhibit critical reflection on themselves as learners. These are individually constructed and of personal nature. Examples within the learning environment may be failures in academic performance, successes in planning events and the influence of a multi-cultural environment. Examples of external influences may be a change in marital status or a change in employment of either one of the learners' parents.

Such influences may engender changes in emotions and reflection among learners and may reveal fundamental shifts in meaning-making processes related to transformation. In the literature review below, many authors highlight the scarcity of quantitative methodologies that measure and test the transformational process, a gap that is addressed here. A contribution of this research therefore is to design and estimate an initial model that measures individuals' emotions and reflection in response to important triggers.

Another contribution is related to methodological design, model extension and theoretical concepts of TL. There is a paucity of instruments on which to base testing within TL research. The instrument devised for the current research is found to clarify the relationships among key TL variables. This can act to stimulate the development of instruments in domains beyond hospitality, with the aim of solidifying, extending and consolidating TL theory, research and practice.

Finally, the research can offer insights into factors promoting transformation of learners in practice. A critic of TL states that current approaches to measuring transformation resides in the stories of "transformed" individuals and that their "affirmations have no validity" (Newman 2012, p.40). Similarly, in a review by Cheney (2010) of a decade of research into TL, only three methodologies were quantitative and there are criticisms of these (Cranton and Taylor 2012; Merriam and Kim 2012; Newman 2012; Taylor and Snyder 2012). These authors argue the need for quantitative studies to contribute to the development of TL in practice. The attendant estimation of models could contribute to educational practices, instructional design and should fuel discussions by educators and practitioners within and outside H&T education.

Events that occur inside and outside the learning context have the potential to induce or inhibit cognitive processes when individuals attempt to attach meaning to these events (Mezirow at al. 2009). Pertaining to the gaps in TL knowledge, in the current research an instrument is designed and data from it are used to estimate a model that tests the influence of triggers on emotions and attendant changes between the usages of reflection.

1.2 AIM AND OBJECTIVES

The process of transformation develops over time and often can be painful and ambiguous (Cranton 2006; Mezirow and Taylor 2009). Mezirow's ten step transformational model, described below in Section 2.1, acknowledges that an individual may enter this process at any stage, suggesting an iterative process that is cyclical in nature. This makes measuring the progression of an individual more challenging and has fuelled the case for identification of key transformational elements and how these influence progression through the process. The system of interlinkages between triggering incidents, emotions, levels of reflection and facilitators for transformation, based on Mezirows' original ten-step process of transformative learning (Mezirow 1978), are shown in Figure 1.2. Later sections will explore in greater detail the central elements of TL.

The central variables are noted by Taylor (1998, cited in Mezirow et al. 2009, p.4) as "reflection on experience (triggers)" and entering into "dialogue (with social actors)" to facilitate the process. Further, Baumgartner (2002, p.58) promotes the view that social interaction and dialogue "are integral to the transformational learning process". In later writings Mezirow acknowledges the role of emotions as inseparable to the transformation process, while for Dirkx, emotions are inseparable from cognition (Dirkx 2000, Kitchenham 2008).

Note that the figure includes feedbacks involving emotions and forms of reflection (Dirkx et al. 2006). It remains unclear whether the interlinkages within the figure actually operate and whether there is feedback (Mälkki 2010). The incidence of feedback is more aligned with the views expressed in more recent contributions. See for example King and Wright (2003), King (2005), Cranton (2006), Dirkx et al. (2006), Kitchenham (2008), Newman (2012) and Taylor and Cranton (2012).
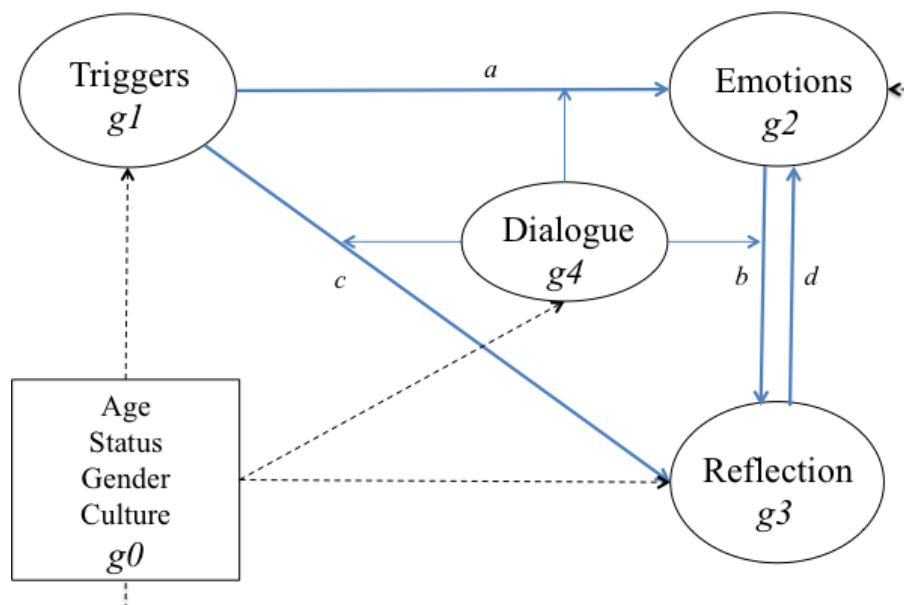
Figure 1.2: A proposed transformational-learning model

A careful reading of the literature to date indicates that no one has investigated in one study, all of the linkages above. Data have been gathered by the candidate that would allow investigation of these.

As already noted, there is doubt about what qualifies as a trigger and the extent to which triggering incidents are indeed triggers. It is recognised that events external to learning contexts can directly affect the way students reflect about themselves and their studies (King and Wright 2003). It follows that the detection of a discernible effect of triggers and their transmission could be problematic. It is not clear from the literature if there is a common or universal set of triggers relevant to a learning environment. Further it is not clear, even if there were universal triggers, that these would operate to induce reflection for all the people who experience them, or is it clear that the same intensity of effect is felt by all who experience the same triggers.

Other contributors point to the fact that the emotions felt in concert with a trigger and the intensity of them may affect whether or not the trigger induces reflection on learning. That is to say, there is doubt in the literature as to whether an important linkage of the theory actually operates. Further, there is doubt about other linkages and there is doubt about whether, if a linkage operates, its effect can be measured (Cranton 2000, cited in Newman 2012; Hoggan and Cranton 2015). Kitchenham acknowledges the form of the theory as represented in Figure 1.2:

> As more researchers test the theory... the evidence for the robustness and applicability of the theory will grow… Transformative learning has ... incorporated new constructs as they are debated and tested and will, undoubtedly, continue to influence adult learning praxis across many disciplines (Kitchenham 2008, p.120).

Even so, attempts to estimate and test linkages in the figure are limited in terms of number and scope. On the other hand Jester and Hoggan (2009) suggest that individuals' capacities for making meaning from life events may influence the occurrence of transformation. This would seem to imply that learning interventions may or may not induce reflection, or indeed critical reflection, and changes of behaviour such as becoming adept at complex problem solving (Closs and Antonello 2011). Moreover, an interpretation might be that external triggers as examples of life events might amplify the effect of classroom interventions on reflective abilities; equally an open question is what might mediate the linkage between learning environments and outcomes, such as reflective abilities fostered by a change of approach to study and attainment of learning outcomes.

Logically prior to assessing the relationship between intervention and problem-solving abilities, or other behavioural change, is the need to explore how triggers within the classroom or external to it, impact on the full range of Mezirows' learning outcomes. At one level these are classified as "non-reflective action"(consisting of "understanding and habitual action") and at the other, "reflective action" (a desired state of "reflection and critical reflection")(Mezirow 1991; Kember et al. 2000, p. 383; Peltier et al. 2005, p.252).

The aim in this research is to appraise relationships between triggering incidents, emotions and forms of reflection, referred to as "central variables" throughout this thesis. Underpinning this aim are three overarching research questions: Can a survey instrument be designed, with appropriate reliability and validity, to measure the central variables taking into account the roles of social actors that might facilitate the process of transformation? Are there differences in reporting on central variables for important groupings, defined by age, gender, culture, and status as a new or returning student? Finally, can quantitative evidence gathered with a survey instrument be used to detect and measure the functional connections between the central variables which theory suggests may involve mediated, moderated and feedback relationships (see Chapter 2).

Consequently, three overarching objectives are formed, as follows:

1. To design, pilot and apply surveys to gather data on variables highlighted in TL theory, including the central variables, before and after embarking on a semester of learning.
2. To extract latent constructs and evaluate their reliability, validity and measurement invariance, in particular, invariance of the structures of latent constructs across groups based on age, status, gender and culture.
3. To construct structural equation models for central variables to examine the mediated, moderated and feedback relationships of Figure 1.2.

In this research, an understanding will be gained of the role of transformation in a particular educational *environment*, as well as providing an insight into the relevance and applicability of theory. The 'environment' (referred to as the Swiss Hospitality Institute, SHI) is private sector, post-secondary, educational institution located in Switzerland and specialising in hospitality and tourism.

1.3 THESIS STRUCTURE

Commencing with definitions and the historical development of TL theory, theoretical positions on the central variables and relationships are discussed in the literature review of Chapter 2. In Chapter 3 methodological considerations underpinning this research, philosophical standpoints, the research context and site, the formulation of hypotheses based on the objectives, the design of the instrument and data collection are set out. Findings are discussed in Chapter 4 for each of the central variables beginning with an initial description of the gathered data, followed by latent variable analysis and measurement invariance, consistent with Objectives 1 and 2. Later, in the same chapter, structural relationships between central variables as per Objective 3 are considered. These include mediated, moderated and feedback linkages involving central variables. Overall, the intention is to present evidence on the linkages in Figure 1.2 and their moderators as proposed in the TL literature.

In the discussions in Chapter 5, the contributions of this investigation are positioned against current literature and research in the broader field of transformation and transformative learning. In the final chapter, a summary is given of contributions made using the methodological design posited in Chapter 3. Also in the final chapter, a discussion is provided of limitations, directions for further research and recommendations to practitioners that follow from this quantitative study of TL – the first to locate latent variables and estimate the relationships between them.

CHAPTER 2: LITERATURE REVIEW

Transformative learning has pervaded the majority of public sectors and academic fields since the early 1970's (Mezirow 1978). Originally proposed and developed as a form of instructional design and a means of liberating the individual through alternate ways of learning, it has been considered in a number of disciplines and settings. In Mezirow et al.'s (2009) book *Transformative Learning in Practice*, the role of transformative learning in higher education, workplace education, community and social change is considered. These practices are extended in *The Handbook of Transformative Learning* by Taylor at al. (2012) examining perspectives on transformative learning, cultural influences, settings such as online platforms and whether there is dialogue within groups, and issues dealing with the practices and ethics of transformative learning. There are tensions between theory and practice as to what TL is, whether it is simply exemplary teaching, and how and under what circumstances learners might transform (Cranton and Taylor 2012, cited in Taylor et al. 2012). The following sections consider contributions made by scholars to the emergence of TL theory. Overlaps with current higher educational practices are considered also.

It can be asked if there are competing theories and what re-interpretations are possible of the concepts and processes studied in TL. A recent study by Hoggan (2016) examined 206 articles related to TL and as a result, defined TL as a "metatheory" (p.77), in the sense of underpinning multiple interpretations and applications of theory. Overton (2007, in Wallis 2010, p.76) extended this definition as a "set of interlocking principles that describe what is acceptable and unacceptable for theory". That is, TL is seen by Hoggan (2016) in this way.

TL theory has been applied across a wide range of disciplines such as agriculture, spirituality and health care, just to mention a few and consistent with its role as metatheory. Yet two dangers arise for TL theory. The first lies in the overuse of the word *transformation* to describe a fundamental shift of an individual's worldview (Hoggan 2016). In accepting dominant rational and extra-rational approaches to TL (see section 1.1, p.2) and the definition of TL as metatheory, numerous authors argue for empirical investigation via different approaches to validate the *process* of *transformation* (Cranton and Taylor 2012; Merriam and Kim 2012; Newman 2012; Taylor and Snyder 2012). Secondly, as proposed by Overtin (2007, in Wallis 2010), the principles of any metatheory should be subjected to empirical testing; the approach that is adopted in this research. The following sections consider contributions made by scholars to transformative learning theory. Overlaps with current higher educational practices are considered also.

2.1 TRANSFORMATIVE LEARNING: DEFINITIONS AND DEVELOPMENT

Transformative learning (TL) has been described as "a change in ourselves, our emotions, our thoughts, our world-views, and our relationship to others, toward a more just society" (Mezirow and Taylor 2009, p. 35). It is a process in which an individual becomes "new", has brought about a change in character (Simpson 2010, cited in Newman 2012) with an accompanying change in behaviour that encourages a deeper understanding via critical reflection on one's own assumptions (Cranton 2006). Transformed individuals are thought to surface assumptions, so that they gain awareness of them, assess them and/or alter them if deemed appropriate. The purpose of surfacing assumptions is that learners become aware of the underlying assumptions that guide and structure the way they make meaning out of their experiences and the world about them (Cranton and Carusetta 2004, Cranton 2006). This is thought to make learners "more inclusive, discriminating, reflective, open, and emotionally able to change" (Mezirow et al. 2009, p. 22). TL originated in research on American women returning to education or their previous occupations after long absences (Mezirow 1978). It was found that the women underwent a process of personal transformation, whereby they assessed their views and judgements of the world through a process of critical self-reflection (Kitchenham 2008).

The founder of TL, Jack Mezirow, proposed a 10-step process in 1978, through which learners could proceed on their journeys of transformation. Mezirow's original 10 steps are shown in Table 2.1a. Mezirow saw the 10 steps as a linear process of self-development in that a movement to a next step – after the first – would occur only if the preliminary step was attained.

Step	Phase
1	A disorienting dilemma
2	Feelings of fear, anger, guilt or shame
3	Critically assessing assumptions about the world
4	Realising others have gone through what they are feeling
5	Revising belief systems and exploring new ones
6	Planning a course of action
7	Gaining the knowledge and skills for implementing new plans
8	Trying on the new role
9	Becoming competent and confident with the new change
10	Reintegrating new perspectives into life

Table 2.1a Mezirow's (1978) ten steps on the way to transformative learning

The first step consists of the occurrence of a disorienting dilemma also referred to as a *trigger*, which is considered to be a minor or major, instantaneous or emergent life event which might arise in the classroom, the broader learning environment or in broader social and family lives and might involve bereavement, moving, illness or partnership breakdown. Such events are thought to trigger processes that can propel a learner through the 10 steps. Attaining a step was only possible through a process of critical reflection on previous steps and dialogue with others in which the learner tested the validity of the assumptions guiding his or her world view, or what Mezirow called "meaning schemes" (Cranton 2006, p.22). The ten-step process was later revised to include an eleventh step: "altering present relationships and forging new relationships" (Kitchenham 2008, p.109).

2.1.1 FOUNDATIONS AND CRITICISMS OF TRANSFORMATIVE LEARNING

Writers such as Kuhn, Freire and Habermas influenced conceptualisations and terminologies used in TL theory. These influences are presented in Table 2.1b (adapted from Kitchenham 2008, p.106).

Terminology	Influence
• Frame of reference • Habit of mind	Kuhn (1962) and Freire (1970)
• Disorienting dilemma • Critical self-reflection	Freire (1970)
• Learning processes • Meaning scheme	Habermas (1971)
• Perspective transformation • Meaning perspective	Kuhn (1962) and Habermas (1971)

Table 2.1b Influences on transformative learning (adapted from Kitchenham 2008, p.106)

Kitchenham's table begins with the notion of frame of reference. For him, this concept is rooted in the work of Kuhn (1962) and Freire (1970). Within the TL context, Kitchenham (2008, p.107) summarised Kuhn's notion of paradigm as a "frame of reference" that encompasses "habits of mind" and "meaning perspectives". The outcome of changing habits of mind and meaning perspectives was termed "perspective transformation" by Kitchenham and described as the ultimate goal of TL (Finger and Asun 2001). Thus, for Kitchenham the links between the first and last rows of Table 2.1b are clear. The second and third rows of the table include references to the terms disorienting dilemmas, critical self-reflection and meaning schemes that above are seen as having been adopted by TL theorists.

Also in the third row of Table 2.1b the Habermasian notion of learning processes occurs. For Habermas, knowledge is accumulated and reflected on in the forms of instrumental, communicative and emancipatory learning (referred to as KoK in this thesis; Habermas, 1981; Cranton 2006; Kitchenham 2008; Mezirow et al. 2009; Taylor et al. 2012). These are discussed briefly in the next three paragraphs. Mezirow's TL theory was even more extensively influenced by the works of Habermas, which incorporated a set of perspectives for understanding the world and the functioning of the self within that world (Finger and Asun 2001, Cranton 2006, Kitchenham 2008, Mezirow et al. 2009). The concepts of perspective transformation and meaning perspective were borrowed from Habermasian discourse analysis. The first of these is the means of surfacing latent assumptions through a process of critical reflection and dialogue and move towards a new meaning perspective (White 1995; Finger and Asun 2001; Newman 2012).

Habermasian types of learning are seen as important in TL theory because one of these forms of learning are considered transformative by TL theorists (referred to in this thesis as Kinds of Knowledge, or KoK; Cranton 2006). Of the three learning processes, the term instrumental learning embraces technical knowledge used in analysing, manipulating and controlling the world and solving problems within it. It is task-oriented and factually constructed, aimed at improving performance (Mezirow 2012, cited in Taylor et al. 2012, p.73). The world is viewed from an objective stance in which hypotheses are formulated and tested, diffused from human, subjective interpretation (Cranton 2006).

Communicative learning for Habermas is constructed within the social domain and involves the meaning we make with others. This is not only restricted to understanding what others say and the context in which they say it, but includes hidden assumptions within a dialogue. These assumptions are fuelled by the intent of the speaker and according to Habermas, one should critically reflect on these in order to surface feelings, values and moral issues (Mezirow 2012, cited in Taylor et al. 2012, p.73). According to Cranton (2006), hidden assumptions may lead to distortions when constructing meaning through discourse, and that the intent of the spoken message is altered or converted to suit the assumptions of the received message. These assumptions are pervasive throughout groups and societies and form the foundations of understanding within them, based on shared values and beliefs. A limitation according to Habermas is that social knowledge soon becomes normative and individuals stop critically questioning the assumptions that guide and govern discourse; the result being accumulation of falsified knowledge (Cranton 2006).

The third learning domain is emancipatory learning and has been termed "transformative" in itself (Mezirow 2012, cited in Taylor et al. 2012, p.77). Two questions are why and how instrumental and communicative learning may liberate the learner (Cranton 2006). An outcome of knowledge accumulation in these domains is that learners may question what they have learned and the underpinning assumptions. Consequently they may acquire the knowledge to change their perspectives about themselves and the world, a form of independent or autonomous thinking (Merriam 2004). Should this occur, it is known as emancipatory learning.

Further contributions to TL theory are evident in numerous sources and they extend beyond Kuhn, Freire and Habermas, as acknowledged by authors such as Kitchenham (2008) and Finger and Asun (2001). Finger and Asun (2001) emphasise amongst others, Dewey's anthropology of learning and Blumer's "symbolic interactionism" as key influencers of modern TL theory. Symbolic interactionism involves learning as interaction with and manipulation of symbolic constructs. The ability to attach meaning to symbols through language allows learners to interact socially, thereby creating collaborative learning experiences, fundamental to Dewey's experiential learning. Blumer (1969, cited in Finger and Asun 2001, p. 48) saw three ideas found in current TL theory as extensions of ideas of Dewey: human behaviour is a function of meaning that people attach to experiences; meaning is socially constructed; and through social interaction, meaning is continually changing.

Criticisms of TL theory exist and given the wide range of theoretical underpinnings, this has led to difficulties integrating theory and practice due to the many perspectives taken by practitioners and theoreticians. Taylor and Cranton (2012, p.10) wrote of "growing pains" in understanding what TL is. Among the growing pains are debates relating to: "overlapping theoretical boundaries; fragmentation of TL perspectives rather than striving for unified definitions and understandings; the dualistic and ambiguous nature of the individual-social continuum; stagnation in research and theory building; and issues relating to practical application of the theory" (Taylor and Cranton 2012, p.14). While there are debates, Cranton (2006, p.4) has asserted TL "has not taken place until the learner has acted on the learning" that is, a deep change leads to new behaviour.

TL proponents see as an important underlying premise that the transformation of an individual may be taught and promoted in various academic settings through the role of the educator. However, it is the learner who chooses if and how he wants to engage in the learning process and transformation cannot be accomplished through forceful imposition (King and Wright 2003). This reflects Cranton's (2006) view that the concept of transformation and the related challenging of meaning schemes is a voluntary process or what Knowles (1975, 1980, cited in Cranton 2006) said was a tendency to prefer self-directedness.

2.1.2 TRANSFORMATION, TRANSFORMATIVE LEARNING AND TRANSFORMATIVE EDUCATION

Another area of terminology that is relevant to the current enquiry concerns the distinctions between the concepts of transformation, transformative learning and transformative education. Dirkx (1998) and Stevens-Long et al. (2012) noted there four overlapping streams of thought within TL literature. Stevens-Long et al. pointed out that the term transformative learning is often used to conflate the three distinct, but related notions of transformation, transformative learning and transformative education.

To avoid potential confusion in the current research, the definitions of Stevens-Long et al. (2012) are adopted. First, they view *transformation* as a process of individual rejuvenation (see Generic Glossary). The focus in this definition is the process rather than the outcome, which Yorks and Kasl (2006, p.46) considered to be "a holistic change in how a person both affectively experiences and conceptually frames his or her experience of the world when pursuing learning that is personally developmental, socially controversial, or requires personal or social healing".

The notion of *transformative learning* concerns attainment of transformation "through formal and informal educational programmes" within which cognition, emotions and behaviour are affected as in Yorks and Kasl's (2006) description of the outcomes of transformation (Stevens-Long et al. 2012, p.184). The definition of TL concerns pedagogy and does not mention extra-curricular experiences. Third, *transformative education* relates to the institutional perspective and how programmes fostering transformational curricula are designed, provided and regulated. As in the prior definition, such education is purposeful by design and thus does not mention extra-curricular experiences.

Formalised TL may only have limited success in the classroom, due to the individual's existing experiences inside and outside the classroom or educational programme, the willingness and openness to challenge the validity of those experiences, and the level of trauma, disorientation, dissonance and conflict the learner has experienced (see Chapter 2.3 on triggering incidents) (Torres and Moraes 2006).

However, "Many questions remain unanswered or inadequately understood. How are educators conceptualising the purpose and practice of fostering transformative learning? What are effective practices for promoting transformative learning in formal and informal settings? What is it about transformative learning that is most helpful in informing practice?" (Mezirow et al. 2009, p. xii). Furthermore, the stagnation mentioned earlier has raised other important concerns especially relevant to the current research, namely that: "the relationship between emotions and transformative learning is not yet well understood, and we know little about ... how they foster or inhibit reflection" (Taylor and Cranton 2012, p.13).

The development of TL in theory and practice raises issues that the current research in intended to address. First, according to Peltier et al. (2005; 2006), Taylor (2007) and Brock (2015) quantitative approaches should be used to capture the key functioning of TL theory; and second, according to these authors and Taylor and Cranton (2012, cited in Taylor et al. 2012), research findings should provide recommendations to scholars, practitioners and theorists on further expanding and applying TL theory. In relation to higher education (HE), there are numerous conceptualisations and interpretations of TL as a means of fostering adult learning, which are at least partly due to the diversity of pedagogical philosophies underpinning the theory. Because the current investigation is conducted among students studying towards HE degrees, the role of TL within HE is taken up in the next section.

2.2 TRANSFORMATIVE LEARNING AND HIGHER EDUCATION

In the section above, key terms and influences within TL theory were presented along with areas of concern for future development. As noted above, the origins of TL lie in instructional design for adult education. Since then TL has had frequent application within HE (Kasworm and Bowles 2012). In one publication devoted to TL in practice (Mezirow et al. 2009), a range of applications are reported:

- Arts-based approaches to transformative learning (Butterwick and Lawrence)
- Constructive teaching and learning: collaboration in a sociology classroom (Langan, Sheese and Davidson)
- Engaging in an online context (Dirkx and Smith)

- Fostering transformative learning in leadership development (Donaldson)

- Mentoring (Mandell and Hermann)

- Engaging cultural imagination (Tisdell and Tolliver)

- Promoting dialogic teaching among higher education faculty in South Africa (Gravett and Peterson)

- Transformative palliative care education (MacLeod and Egan)

However, Kasworm and Bowles (2012, p.388) found that meaning created by individuals within an academic term of study is selective and learning for some is instrumentalised, whereas for others it is liberating. In a TL curriculum, it is the learner and her or his experience, the "engagement with unfamiliar people and cultures", focusing holistically on the full range of experience to examine "past assumptions and disruptive experiential events", with the aim of liberating the individual (Kasworm and Bowles 2012, p.391).

In this vein, Kuh (2008) wrote that student learning and development is shaped by a collective of events and experiences inside and outside of the classroom and it can be viewed as a "unifying and expansive framework for higher education"(Kuh 2008, p.399). The aim in this chapter, though, is not to consider TL as a panacea for higher education; rather the intention is to consider implications for TL derived from studies in HE settings.

2.2.1 TRANSFORMATIVE LEARNING AND APPROACHES TO STUDY

TL theory, as already discussed, has its origins in adult learning and resonates with the concepts of Knowles that learning is "self-directed", with every learner having an intrinsic preference or motivation for being self-directed (Knowles 1980, cited in Cranton 2006, p.3). Tait and Entwistle (1996) and Entwistle et al. (2002) state that the type of motivation for studying will determine if a learner uses surface or deep approaches to learning, which as Kuh (2008) notes, is a well-researched area of contemporary HE practice. A surface approach relies on learning facts and reproducing them for assessments; whereas deep learning requires a transformation of information into knowledge that is, the learner creates his own meaning and understanding of information (Marton and Säljö 2005, Kuh 2008). Surface approaches, according to Entwistle et al. (2002), arise out of vocational motivations where learners seek information, facts and skills for future employment. Additionally, some assessments within HE require only surface learning, for example multiple-choice questions which require "the recognition of the answer rather than the construction of a response" (Nicol 2007, p.54).

Deep learning on the other hand occurs when learners take a personal interest in the subject matter, they aspire to the intellectual challenge and they seek deeper meaning in the content. According to Kuh (2011, p.11), this is achieved through learning that "surfaces underlying meaning of the information as well as the content, integrates and synthesises different ideas, discerns patterns in evidence, applies knowledge in different situations and allows views from multiple perspectives". Cumulatively a transformation of the information takes place where learners interact "vigorously and critically on content" (Marton et al. 1984, cited in Dickinson 2002) and individuals themselves may change during the information-transformation process.

Surface and deep are close to Habermas' notions of instrumental and emancipatory learning. In instrumental learning facts tend to be technical and are applied in daily problem solving. Emancipatory learning facilitates the learner in using knowledge to change their worldview and contribute to society. Kember at al. (2000) echo this in their continuum of reflective thinking. At one extreme, students reflect in a habitual manner, where tasks at hand require only minimal cognitive processing (and so surface learning); at the other extreme, learners are required to critically reflect and question the content, process and premises of the information received (so being commensurate with deep learning).

Entwistle et al. (2002) included the importance of emotions in promoting surface and deep learning. Fear of academic failure engenders reactive approaches thereby promoting surface learning; whereas positive learning environments in which students have "freedom in learning" promote deep learning. In a study by Speth et al. (2003), students feeling less anxious and overwhelmed by their studies were found to be deeper learners. Fredrickson (1998) emphasised that positive emotions promote cognition and act as a valuable anti-stress agent against the effect of negative emotions. The impacts of positive and negative emotions on learning are considered more fully in Section 2.6 below.

The purpose of approaches to learning or learning styles according to Keefe (1979, p.4) is to understand how "learners, perceive, interact with and respond to the learning environment" and this is turn is beneficial for "learning and teaching effectiveness" (Zualkernan et al. 2005, p. 1) especially in more diverse, cross-cultural student populations (Hsu 1996, cited in Lashley and Barron 2006, p.553; Charlesworth 2007; Joy and Kolb 2008).

Learning styles are used to assess the experience of students, and how they make sense of course content and the range of learning choices applied to a task (Duff 2004). This has implications for how educational institutions structure course content to meet learning outcomes required by industry (Charlesworth 2007).

Entwistle's (1990) "Approaches and Study Skills Inventory for Students (ASSIST)" offers insights into various forms of learning, including strategic approaches which assess how study is organised (including time management) and study efforts are organised (such as where and when study occurs). Students might be more or less deep and less or more strategic or vice versa. Entwistle's ASSIST is one of many instruments available for measuring learning preferences and styles (Coffield et al. 2004). However, the validity, reliability and applicability of these instruments are contested (Dembo and Howard 2007).

"The current buzzes in further education about 'differentiation' and 'individualised learning' have created perfect conditions for anyone peddling tests purporting to diagnose students' learning styles" (Coffield 2004, cited in Kingston 2004). For Sadler-Smith (2001), much of the research has not considered how quantitative measurement approaches might unravel unresolved questions relating to validity of instruments and resolve disagreement among researchers on how to define, then measure the relevant learning-approach constructs. Sadler-Smith went on to point out that this should contribute to clarifying definitions and how to apply theory.

Coffield et al. (2004) identified 71 approaches-to-learning models and identified three areas of concern. First, the number of models increased due to sub-division of existing models into independent areas of research or there was re-labelling to create pseudo-models tested with inadequate sample sizes. The second concern was in the breadth of disciplines contributing to theory. Scholars from specialisations such as education, management, sociology and psychology among others, promoted research within their specialised fields and hence adopted views consistent with the main tenets of the disciplines. Compounding this was a lack of inter-disciplinary communication and "political ideology" resulting in disparate avenues of thought on identical theories (Coffield et al. 2004, p.1). The third issue concerns the commercialisation of instruments designed to assess approaches, which are often described as inventories. Integration by industry (workplace-training establishments) and educational institutions of inventories created great demand for them, thus reinforcing and escalating their frequency of use, breadth of application and their implicit validity.

The concerns have led to competing viewpoints about the value, purpose and application of learning styles. According to Dembo and Howard (2007, p.107) the result is that: "learning style instruments have not been shown to be valid and reliable, there is no benefit to matching instruction to preferred learning style, and there is no evidence that understanding one's learning style improves learning".

A further factor is that learning styles remain fluid and different learning styles may be used in different circumstances (Caple and Martin 1994, Vermunt 1996, Coffield et al. 2004, Entwistle et al. 2002, Duff 2004). These styles are based on the construction of meaning within the environment in which the learner is emerged and thus it remains an individual endeavour that changes as the environment changes. Barron and Arcodia (2002) argue that the responsibility for learning rests on the "diligence" of the student, which of itself might lead to the adoption of different approaches as the environment changes – even within one institutional setting.

The "individuality" of learning (even as a preference for learning within groups), suggests that parallels exist between learning styles and experiences of personal transformation. Transformation is driven by experiences individuals have and their individual ability to reflect and make sense of these. If learning styles are dynamic, change over time and are personal, then it may be postulated that underlying shifts in cognition and reflection may occur from experiences during the learning process and within the learning environment. Barron and Arcodia (2002) support this notion of dynamic environments and emergent learning styles, in that a learner exposed to new learning environments, may feel culture shock, loneliness and an array of other influences, deterring them from learning deeply. Furthermore as Entwistle (1990) and Duffy and Rimmer (2009) indicate, if fundamental changes in deep learning are evident, it may be indicative of a shift in how students reflect and feel about their studies, suggesting the possibility of synthesising concepts from approaches to learning and transformative learning.

Substantive similarities are found in terminological nuances between learning styles and TL. As in Kolb's "Learning Style Inventory" (LSI) (cited in Coffield et al. 2004, p.61) and Honey and Mumford "Learning Style Questionnaire" (LSQ) (cited in Caple and Martin 1994, p.1), learning starts from an experience and it is a transformation of that experience that leads to an addition to the assimilated knowledge of the learner.

Honey (1984, cited in Caple and Martin 1994, p.18) observed that learning from experience is elemental and occurs in a four-stage process, three of which relate to the experience itself: "having an experience, reviewing the experience and reaching conclusions from the experience". According to Joy and Kolb (2008, p.71), learners may transform the experiences through reflective observation or active experimentation. Similarly, as indicated in Table 2.1a, the catalyst for transformation in TL is an experience or "disorienting dilemma" (Mezirow 1978, cited in Mezirow et al. 2009). An experience in this sense causes a state of psychological tension and individuals become motivated to behave in manners that restore equilibrium. In approaches to learning styles and in TL, experience is central to the learning process.

A second confluence of terminology can be demonstrated with the Learning Style Questionnaire (LSQ), one particular learning inventory (Honey and Mumford 1982, cited in Caple and Martin 1994 and the work of Kolb (1999, cited in Coffield et al. 2004, p.18) on which it is based. Reflection is viewed as fundamental in "searching for meaning in experience" (Boot and Boxer 1980, cited in Caple and Martin 1994, p.18) and Kolb's "diverging and assimilating" style, both include elements of "reflective observation", where learners make meaning and draw conclusions from prior experiences (Coffield at al. 2004, p.61). The levels of reflection in these definitions refer to "watching and observing" only; whereas TL necessitates deeper levels of reflection. TL further proposes that surfacing assumptions underpinning experiences, through a process of critical reflection, will allow learners to become aware of beliefs, values and assumptions that guide the way they make meaning of the world (Cranton 2006). As an indicator of the greater intensity involved in critical reflection in TL, Kreber (2012, cited in Taylor et al. 2012) states that critical reflection involves deep psychological and cultural processes, where learners not only question their world views and assumptions of living in the world, but also identify limiting patterns of thought and behaviours within themselves.

Finally, as for approaches to learning, TL proposes that transformation is a process. The emphasis among proponents of learning styles is that learner progresses through a cycle; whereas in Mezirow's original conception of TL there is linear progression through the 10 steps of Table 2.1a. For Honey and Mumford (1982, cited in Caple and Martin 1994), learning is effective only when a learner has passed through the "cycle in its entirety" (Caple and Martin 1994, p.1); whereas in TL transformation "encompasse(s) the afore-mentioned 10 phases of adult learning" (Kitchenham 2008, p.109).

The LSQ is one inventory among 71 identified by Coffield at al. (2004) and many parallels could be drawn between TL and approaches to learning. The purpose in this section was to demonstrate that learning styles and TL share the notions of transformation, either of information to knowledge, a change in the person, or in both; and the possibility of fundamental change in a learner while simultaneously transforming knowledge. Differences arise in the depth of reflection required and the emphasis placed on surfacing hidden assumptions. TL further questions what qualifies as those learner experiences that foster critical reflection and what is the role of emotional reactions to those experiences during the transformation process.

2.2.2 SOCIAL CONTRIBUTIONS TO TRANSFORMATIVE LEARNING

In TL, significance is placed on the context, environment and social variables that facilitate the process of transformation. At this point it is useful to refer to Lave and Wenger's "communities of practice" to highlight similar developments between learning as a social phenomenon and those factors that act as facilitators of transformation.

Lave and Wenger (1991) proposed that learning is not only a formal engagement it is belonging to or wanting to belong to a group or community and the joint exchange of knowledge and information that fosters learning within that community. According to them, people "learn better in social settings and through social interaction" (Lave and Wenger 1991, cited in Gannon-Leary and Fontainha 2007, p.3). Members of these communities of practice (CoP) share a connection, a sense of belonging and learn from each in an informal manner when working on real-life problems, rather than an institution's formalised learning programmes. According to Brown and Duguid (2002, cited in Gannon-Leary and Fontainha 2007, p.3), individuals seek their identities within these communities and the development of an individual's identity is seen as essential for community development and cultural strengthening within the group.

Such situated learning occurs unintentionally rather than formally, while learners are engaged in activities within a context and culture that supports informal learning (Lave and Wenger 1991). The term legitimate peripheral participation is used where newcomers joining a group move from the periphery of the group (characterised by a lack of skills, knowledge and cultural know-how) to a central position within the group characterised by expert skills, knowledge and cultural competence (Lave and Wenger 1991).

CoP operate predominantly in practice and in workplace settings, which require learning to be "situated" within contexts and cultures allowing members of groups to exchange knowledge freely through informal processes. One problem for HE is that situated learning partly undermines the ability to formally assess individuals' achievement of learning outcomes.

When considering parallels between TL theory and current HE practices, it is further useful to refer to what Mezirow considered the six core elements of TL. These are: "experience, critical reflection, dialogue, holistic orientation, awareness of context and authentic practice" (Taylor 2009, p.4). The last of these has metamorphosed into concentration on "authentic relationships" during teaching and learning for transformation (Taylor 2007, p.179). For example, Cranton, a noted TL researcher, has worked extensively in this area (Cranton 2000; Cranton 2002; Cranton and Roy 2003; Cranton and Carusetta 2004; Cranton 2006). Other notable contributions are Baumgartner (2002), Carter (2002, cited in Brock and Abel 2012), Eisen (2001) and Lyons (2010, cited in Russell 2014).

The core elements are inseparable according to Mezirow (1991), because without an experience there is little to reflect on, and to build authentic practice educators needs to be aware of the contexts of the learners. They involve learners' experiences (Section 2.3 below), how they reflect on those experiences (Section 2.4) and the levels of dialogue they have with relevant people such as fellow students, friends and family who might influence transformative processes (see Section 2.6). The last three core elements (holistic orientation, awareness of context and authentic relationships) are bound to classrooms and offer guiding principles for the educator when fostering TL that is, the intention of the educator is to teach according to TL guidelines to provide a means of transformation. Aspects of these last three core elements appear in the discussions above of learning styles and CoP and in the following sections below.

Holistic orientation refers to educators recognising learners' diverse ways of transforming information to knowledge. This perspective is not constrained by rational processes of learning only, but incorporates the role of affective domains and alternate ways of knowing, which include "affective, intuitive and spiritual ways" of knowing (Vaughn 2016, p. 341). Taylor (1998, cited in Mezirow et al 2009, p.10) took the perspective that "emotions are inherently cognitive".

For Yorks and Kasl (2006, p.46) this means educators should view learners in their "fullness of being: as an affective, intuitive, thinking, physical, spiritual self". An important emphasis in the current study is whether emotions have a role in the stimulation of reflective action following a triggering experience (Mälkki 2010). Emotions in the context of TL are discussed more fully in Section 2.5.

Mezirow's penultimate core element is awareness of context. This refers to the context and situation of a learner during a learning event. Factors to consider relate to group interaction, classroom culture, diversity of student backgrounds, personal agendas involving individuals within the group and the freedoms or constraints placed on reflective dialogue, discourse and communication processes (Taylor 1998, cited in Mezirow et al. 2009).

The last core element concerns building authentic relationships as the essential part of authentic practice. The concept of authenticity in TL is defined by Cranton (2006, p.5) as "establishing meaningful, genuine relationships with students" and the purpose of this within TL is to contribute to building contexts in which transformation in educational settings may unfold. Cranton and Carusetta (2004) proposed a five-step approach to building contexts in which an educator should: 1) have a strong sense of self-awareness, 2) be aware of the needs and interests of learners juxtaposed against those of the educator, 3) allow both students and teachers to communicate openly with each other, 4) be aware of the contribution of the learning context to the learning itself and 5) engage in critical reflection on practice. Kreber at al. (2007, p.25) found that educational literature relates authenticity to "learning and development of teachers and students" and that for students, it should allow them to find a sense of "being". Kasworm (2010, p.156) in a study of adult undergraduate students states that it is crucial for "individual agency" that is, students being able to make conscious choices that contribute to identity formation and sense of "being". Cranton, Carusetta, Brookfield and Tisdell are heavily cited in Kreber et al. (2007, p.26; Kreber 2010) as adopting Jungian approaches of "individuation" to finding "authentic identity" and furthermore developing a spiritual identity (Tisdell 2003, cited in Kreber et al. 2007).

Baxter Magolda (1999, 2001, cited in Kreber at al. 2007) argues that learning is situated within the learner's experience, as in earlier discussion of learning styles and CoP. It remains the responsibility of the student to develop "self-authorship" that is "intellectual, moral, and personal complexity that undergirds their *readiness* [italics added] for coping with the multiple personal, vocational, and civic challenges they encounter after college" (Kreber et al 2007, p.30). Self-authorship has similarities with the notion of "individual agency" (Kasworm 2010, p.156) and *readiness* indicates similarities to Knowles' (1975, 1980 cited in Cranton 2006) concepts of self-directedness. Learners should achieve self-authorship so they can move to a more authentic identity, although learners bring their own motivations and preferences for achieving this (that is, self-directedness). Thus self-authorship and authenticity remains a matter of individual choice, a concept identical to Heidegger's notion of existentialism. See Heidegger (1927/1962, cited in Kreber et al. 2007) and Baxter Magolda (1998, cited in Kreber 2010).

As in the TL literature, these authors agreed that genuine dialogue (one of the six core elements of TL) is in an attempt to build authentic relationships (another core element). Baxter Magolda (1998) suggests that striving for authentic relationships require learners to critically reflect (a third core element) on their experiences and practices (a fourth core element) in an attempt to arrive at self-authorship. Taylor (2007) made the obvious, but important, point that dialogue is essential to the formation and sustaining of relationships, rendering even more important this, the third of Mezirow's core elements. When teaching for transformation, Cranton (2006) saw the establishment of authentic relationships with students as effective in fostering transformative learning, so much so that she advocated lecturers giving up some of the power that exists in the instructor-student relationship. Taylor's (2007) assessment of research (up to 2005) was that equalising power in teaching relationships was found to foster learner autonomy and the development of trusting relationships.

In the discussion of Mezirow's penultimate core element, context, the demographic of culture featured. As this features prominently in research on HE and because around 30 nationalities are represented at the current study site, described in Section 3.4, this factor is considered next.

2.2.3 CULTURE AND LEARNING

Culture is viewed as consisting of symbols, attitudes, beliefs, knowledge items, meaning systems and practices through which an individual interprets experiences and makes meaning of these (Festinger 1957; Tisdell and Tolliver 2003; Mistry and Wu 2010). In the transformative-education context, Vaughn (2016) makes the point that forging authentic relationships is culture dependent, drawing on experiences in Africa. Cranton (2006) cites the example of an Asian instructor in the USA using a more restricted set of dialogues than other staff in attempting to form authentic relationships with students. More broadly, many studies regard an individuals' culture as an inseparable influence on learning in HE. See for example Dunn and Zenhausern (1990), Bruner 1996, Zualkernan et al. (2005), Lashley and Barron (2006), Nield (2007), Joy and Kolb (2008), Wong (2009) and Ke and Xie (2009) who investigated the roles of an individuals' culture on learning; Clothey (2009) studied cultural trends in higher education, whereas Tervalon and Murray-Garcia (1998), Davenport (2000), Zhai and Scheer (2004), Forland (2006), Thom (2006), Charlesworth (2007) and Aquino-Russell and Russell (2009) considered the broader cultural diversity of students.

Transformative learning has underlying constructivist assumptions where individuals interpret their experiences in their own ways and how these individuals see the world stems from perceptions of those experiences (Taylor et al. 2012). The role of individual culture and the institutional environment cannot be ignored when students are studying abroad, as the knowledge gained during their studies is not only a formal and rational process, but is "socially and collaboratively constructed" (Charaniya 2012, cited in Taylor 2012, p.235). Mezirow (2000, cited in Mezirow and Associates 2000, p. 6) confirmed the social nature of transformation as involving a "human reality, which is inter-subjective". Within this context and cultural paradigm, we become the individuals we are, and learning involves making meaning. This is accomplished through interactions and engagement with the environment and other persons (Mezirow 1991).

Nonetheless, to this date little is known about how and why cultural factors might initiate or accompany transformation, and even less so, the depth and longevity of effects on the individual, and how this process influences the way individuals make meaning of their reality and social context. Taylor (2009) confirms that little attention is given in TL literature to the role of social change within the learning process.

Further, little is known about how knowledge is constructed within the realm of the unconscious, how meaning is made through cultural immersion, and how this contributes to critical reflection and identity formation (Tisdell and Tolliver 2003). Wong (2009) reviewed literature on the influence of culture in reducing cognitive dissonance using Brehms' free choice paradigm to investigate how individuals reduce internal tension and disharmony. In one TL study, Intolubbe-Chmil et al. (2012) exposed students to a cross-cultural environment in South Africa, on the basis that the learners must grapple with cultural influences every day, in an attempt to reduce cognitive dissonance or antagonism towards dominant cultures (Tisdell and Tolliver 2003).

It has been stated that as classrooms become more culturally diverse, instructional designers should consider, and teachers should acknowledge, the presence of cultural sensitivity and tension-reducing strategies (Tervalon and Murray-Garcia 1998, Tisdell and Tolliver 2003; Aquino-Russell and Russell 2009). This is especially pertinent to classroom activities that promote group work. Two types of culture-based, tension-reducing strategies were identified by Wong (2009). Independent cultures are more common in Western societies where individuals reduce dissonance based on their self-esteem and self-defining attitude.

However, in interdependent cultures, which are mainly East Asian and outwardly focussed, individuals use tension-reducing strategies that are seen as correct by other individuals from the same culture, despite inner tensions. Aquino-Russell and Russell (2009) identified eight paradoxical experiences lived by students as they endeavour to cope with another culture. Coping relies on "cultural humility", defined as an individual's propensity to self-reflect and be a reflective practitioner while immersed in a different culture (Tervalon and Murray-Garcia 1998).

Consequently, cultural humility can promote reflection and attendant learning. Mistry and Wu (2010) extended this notion by reviewing how children adapt their coping strategies when coming from diverse cultural backgrounds and when culture is an inseparable component of self and identity. For Mistry and Wu (2010), the concept of self and identity is challenged in an international environment, shaped by social groups, yet it represents the core development of the individual. This does not exclude roles for family and community, but serves to highlight the need for an existentialist perspective of the individual's role, ability to make decisions, and critically reflect on learning and the influences on learning.

In particular, Aquino-Russell and Russell (2009) made plain that awareness of racial and ethnic differences may trigger processes of meaning making and thus learning. An example is Brown's (2006) study on transformative andragogy in the learning of educational leaders potentially committed to social justice. It shows that the process of transformation through critical reflection does make individuals more aware of other cultures and does foster an awareness of self within these cultures. However, it is not clear from this research if experience of another culture is an actual trigger for transformation. Also, Brock (2010) investigated immersion in social contexts, using a modified version of King's (1997) Learning Activities Survey. The most commonly experienced precursor to self-reported transformation was critical reflection, followed in order of importance by a disorienting dilemma about social roles (Brock 2010). That is, immersion in a social context may act as a trigger to critical reflection and transformation.

From the above studies, the question remains if being immersed in a culturally diverse environment triggers critical reflection, changes individuals' perspectives and changes behaviour, these being the elements of change Cranton (1992) considered necessary for transformation. Although there is some appreciation of cultural impacts on individuals within the context of socially responsible, formalised and purposeful instructional design, and although the unconscious process of acculturation (which Tisdell and Tolliver (2003) labelled "internalized oppression") is appreciated, the processes underpinning the influence of other cultures on individuals and their ability to critically reflect on themselves and their learning require further research.

The available TL literature does not put this issue into the context of the multicultural H&T environment investigated in the current research, where learning is intensive and student centred over a longer-than-normal academic semester that involves a mix of vocational and academic experiences conducted in a context that differs from students' home cultures. Nicol (2008, p.20) suggests, "Academic structure encourages social bonding which in turn results in a positive backwash effect on academic learning". Learning and context are inseparable for Nicol (2007) who suggested they should be integrated. At the site for the current study (Section 3.4), the population consists of many cultures, learning, living and socialising within two campus buildings separated by a very short distance. That is, at least geographically, learning and context are integrated. Further, at the research site, educational objectives do not include TL.

However, given TL researchers have not investigated such an environment, it seems plausible to endeavour to identify events that might trigger transformation and seek indications of critical reflection occurring. Further, how, dialogue with relevant social actors – fellow students, friends and family – influence transformational processes at the non-TL research site has relevance. Dialogue with fellow students will be frequent, face to face and conducted between parties who understand the context; that with family and friends will be less frequent, mostly internet-based, with family and friends not fully understanding context.

It would seem possible that in the intensive learning context to be researched a number of disorienting dilemmas might arise and potentially promote perspective transformation. This would serve to create a better understanding of what qualifies as disorienting dilemmas. What is known in the TL literature about triggers is considered next.

2.3 TRIGGERING INCIDENTS, BOUNDARY SITUATIONS AND THRESHOLD CONCEPTS

As proposed within the framework of transformative learning, a process of cognitive evolution is commonly preceded by an experience or an event that disconfirms current meaning schemes and which creates a state of internal tension. This has been termed by Mezirow (1978, cited in Mezirow et al. 2009) a "disorienting dilemma" and may be epochal; happening at once, or developmental; ordinary experiences occurring over a protracted period of time. Students studying abroad may experience a range of disorienting dilemmas as they go about vocational and academic learning. There may also be a range of disorienting dilemmas external to learning, which directly influence the way students reflect about themselves and their studies (King and Wright 2003). Whichever events may serve as triggers, there is not yet one universally accepted definition of what a disorienting dilemma or trigger is (Dirkx 1998). This may not be surprising, for as Jester and Hoggan (2009) point out the perception of an external event and comprehension of it as a trigger is personal, so that what is triggering for one person may not be so for another.

The term "trigger" serves to emphasise the role of existential catalysts within the experiential domain: "Anomalies and dilemmas of which old ways of knowing cannot make sense, become catalysts or 'trigger events' that precipitate critical reflection and transformations" (Mezirow 1990, cited in Jarvis and Griffin 2003, p.208). Students might experience one or multiple triggers during a semester of study. The effect may be a challenge to existing meaning schemes, which Meyer et al. (2010) term "troublesome knowledge", meaning hidden, tacit knowledge and prior beliefs about the world, which individuals tend to defend as these previously formed their ways of seeing things:

> The difficulty understanding something [a trigger or bank of them] may leave the learner in a state of "liminality". Within the liminal state an integration of new knowledge occurs which requires a reconfiguration of the learners prior conceptual schema and a letting go of any earlier conceptual stance. This concerns an ontological and epistemological shift. (Meyer et al. 2010, pp. xi)

Cranton's (2006) view was that we rarely question what we know and review this only when we are confronted with new information that contradicts our prior accepted stock of knowledge. It is unclear when shifting awareness occurs and it may only become apparent when the transformation process is complete. That is, when the tenth of Mezirow's 10 steps of reintegrating new perspectives into life and when, to take up a point of Cranton (2006) reported earlier, learners display different behaviour.

Additionally, theories concerning threshold concepts (Meyer et al. 2010), cognitive dissonance (Festinger 1957) and boundary situations (Taylor et al. 2012) resonate with triggering incidents that may catalyse the process of critical reflection and transformation. Meyer et al. (2010) indicate the importance of significant life events that facilitate passing a threshold of accepted knowledge, into a domain of questioning and accepting new ways of knowing:

> A threshold concept is a learning experience, which resembles passing through a portal, from which a new perspective opens up, allowing things formerly not perceived to come into view. It represents a transformed way of understanding, interpreting or viewing something, without which the learner cannot progress, and results in a reformulation of the learner's frame of meaning. (Meyer et al. 2010, p. ix)

In "cognitive dissonance" (Festinger 1957), "people are looking for balance and equilibrium" (Festinger 1957, cited in Al Otaibi 2012, p.607). "Dissonance is a psychological tension with motivation characteristics" and that "dissonance is an emotional state" (Festinger 1957, cited in Al Otaibi 2012, p.608). This dissonant state is not easy to remove and involves a period of painful change (which compares with emotional change TL associates with disorienting dilemmas, see Section 2.5).

The higher is the feeling of pain, the greater is the resistance to change. Self-affirmation theory furthermore suggests that individuals attempt to explain dissonance away and seek positive affirmation to maintain positive views of themselves and the views of them held by others.

Dissonance, emotional and psychological pain, and resistance to change are consistent with the notion that the process of transformation is commonly involuntary. Individuals purposefully seek distance from any stimulus that may have these effects. This is also confirmed in motivational research where "stimulus avoidance" creates a drive away from discomforting experiences (Beard and Raghob 1983). Equilibrium-seeking behaviour occurs where a negative experience in one life domain might produce an imbalance that is restored by positive affirmation in another domain (Heine and Lehman 1997). For a student, the dissonance caused by underperformance in a written assessment may be restored through her or his sense of social interaction and popularity, thus confirming a positive sense of self.

While individuals may react differently to triggers, each must accept the ambiguity and emotional connotations of a trigger before reconstruction of meaning and knowledge commences. As previous studies have shown, isolating and categorising incidents that trigger change can be a challenge due to resistance, self-affirmation, stimulus avoidance, equilibrium seeking and degree of openness to change. Jester and Hoggan (2009) highlight the importance of individual perceptions and constructions of experience when an event becomes a trigger. The nature of them and their impacts remain unexplained, especially in academic settings (King and Wright 2003).

Vermunt and Verloop (1999, p.274) note that dissonance "often occurs when students enter a new type of education, for instance after the transition from secondary to higher education". Academic success or failure and working formally in groups may similarly act as triggers to change of approach to learning. Also, immersion in and exposure to different cultures and social environments may similarly act as triggers (Cranton 2006, Aquino-Russell and Russell 2009, Mistry and Wu 2010). The range of possible triggers, even within a uniform and controlled learning environment may be larger than expected, as factors outside the formal environment may contribute to the process of transformation. Examples might be parental divorce, parents changing employment and death of a loved one. Further Mezirow states that:

> The disorienting dilemma may be evoked by an eye-opening discussion, book,
> poem, or painting or by one's efforts to understand a different culture that challenges
> one's presuppositions. Changing social norms can make it much easier to encounter,
> entertain, and sustain changes in alternative perspectives. (Mezirow 1990, p. 5)

Those studies that have explained the nature of triggers have done so mainly with a qualitative method, aimed at surfacing the deeper meaning of them for individuals. To date, few studies have measured the effects of triggering incidents. A study conducted by King (2000) seems to be the first to classify triggering incidents and their contribution to perspective transformation. The setting was adult learners studying English as a Second Language (ESL).

The sample included 208 learners who completed the Learning Activities Survey (LAS). Drawing on participant self-reports, the aim was to identify triggers that arose outside of the formal classroom setting and to know more about learners' life experiences and contexts. The study confirmed that life changes influenced perspective transformation with impacts on doing ESL. ESL learners self-reported 10 triggers of transformation: immigration (experienced by 33.1% of the sample), relocation (25.2%), change of job (20.1%), marriage (10.8%), death of a loved one (9.4%), loss of job (6.5%), other change (5.8%), divorce/separation (5.0%), birth/adoption of child (2.9%) and retirement (1.4%). Therefore, the notion that students bring a range of experiences, histories and life contexts into the classroom and that these cannot be excluded from the learning environment is supported (Lawler 1991). However, among such an extensive range of self-reported events it is not clear if all, some or individual events trigger perspective transformation (Newman 2012). Jester and Hoggan (2009) concluded this in their research on triggering events. Participants reported events experienced within the last five years and stated their contributions to transformative learning. The researchers found that a confluence of triggers may result in one "teachable moment" and isolating each trigger as a contributor to self-evaluation of values, beliefs and assumptions is challenging.

Another area of concern can be demonstrated with an example from King's (2000) pre-pilot, when a learner readily reported that the death of a loved one many years ago had, and continued to have, a significant impact in her life and educational approach.

This and other self-reports may be consequences of inclinations to provide socially desirable responses, halo effects, tending to agree, acquiescing with implicitly required responses, or otherwise desiring to create a favourable impression (Bagozzi and Yi 1991, Podsakoff et al. 2003, Yüksel 2017) Such inclinations introduce response bias, change the co-variability among triggers given as responses, affect latent constructs found in measurement models, and distort relationships in structural models designed to estimate the impacts of triggers (Bagozzi and Yi 1991, Podsakoff et al. 2003).

Standing aside from responses bias, experience of triggers might be conditioned by "the way a person perceives, understands and constructs their experience from an external event that determines whether or not it becomes a trigger for them" (Jester and Hoggan 2009, p.192). This determination may vary from individual to individual based on their stock of knowledge, wealth of experience, cognitive development, acceptance of life's ambiguities and demographic considerations. Jester and Hoggan (2009) asked respondents to self-report on meaningful life-experiences including: (a) a shift in social roles; (b) a success or failure at work; (c) a traumatic or personal event; (d) immersion in different cultural or international environments; and (e) experience of challenging formal or informal learning environments. Taking a different approach Al Otaibi (2012) used the Big-Five personality factors to highlight how cognitive dissonance relates to personality traits and drew on trait theory to isolate triggers. In this approach the outcome of an experience is not valued for its influence on cognitive and transformational processes, rather the effect of an experience is seen as an inherent element of an individual's traits and personality defined in terms of neuroticism, extroversion, openness, agreeableness and conscientiousness. Al Otaibi (2012) did acknowledge background such as age, gender and culture can influence the relationship of cognitive dissonance to academic achievement. Comprehension of an event as a trigger is considered a complicated concept and is influenced by: oneself, the environment, school and its educational environment, and various psychological factors.

In the studies by King (2000), Jester and Hoggan (2009) and Al Otaibi (2012) there is little amplification of the relative importance and intensity of possible triggers from the learner's perspective. Taylor's (2000) view is that little is known about disorienting dilemmas and why certain events act as triggers and others do not. Overall, King (2005) concluded that there are ranges of experiences within and without the classroom that may trigger critical reflection, that these are unique to the individual, and that the process of transformation is not linear involving only steps from one point to the next in order.

Further, Cheney (2010, p.5) in her review of research from 1999-2009 notes "there is not a single, widely accepted instrument that would allow researchers to more easily compare results across studies". While an important objective is to identify triggers, this is attempted in terms of whether an event stimulates change towards deeper forms of reflection. In the next section, cognitive changes of this type are considered.

2.4 FORMS OF REFLECTION

Learning is a result of making *meaning* of an experience. In TL literature, this is the traditional way of thinking about learning (Cranton 2006). The meaning-making process involves reflection and critical reflection on available prior experiences and surfacing of latent and inert assumptions. At the point of externalisation of these assumptions, they are consciously held ideas and are malleable, as is awareness of the social environment. Cranton (2002, p.65) says "we cannot critically reflect on an assumption until we are aware of it". That is, awareness of assumptions – reflection – leads to questions about them – critical reflection. For Mezirow (1990, p.98), reflection and critical reflection enable "us to correct distortions in our beliefs and errors in our problem-solving", so that learning becomes more "meaningful".

Surfacing of deep-rooted beliefs, values, assumptions and critical reflection on them is often painful and involuntary (Festinger 1957, cited in Al Otaibi 2012). Dirkx et al. (2006, p.128) were of the view that "there exists an inner world with emotional and imaginative dimensions throughout the learning experience that seeks to foster intellectual and cognitive growth". Should there be a trauma or trigger, this inner world may make the surfacing of assumptions and critical reflection painful. However, critical reflection is an inherent part of transformation and forms the basis from which new actions and roles are constructed (Cranton 2006).

Mezirow (1990) drew a distinction between reflection and critical reflection in reframing meaning perspectives. His definitions are founded on Dewey's anthropology of learning, where individuals have experiences within their social environment and either reflect or develop predetermined ways of perceiving, valuing, believing and forming world views (Finger and Asun 2001). That is, "habitual expectations", meaning a range of assumptions, perceptions and constructs are invoked when interpreting new experiences (Hoggan and Cranton 2015, p.9).

Effectively, latent assumptions underpin application of habits of expectation to comparable events. Once interpretation of an event is accomplished, latent assumptions, underlying habits of expectation and the meaning perspective could be retrieved and conceivably amended when making meaning of new experiences.

As mentioned in Section 2.1, Mezirow turned to Habermasian domains of instrumental, communicative and emancipatory learning to define forms of reflection. Instrumental (or technical learning), referred to task-oriented learning, is used to solve simple problems for which solutions are known. Communicative (or practical learning) is devised in social domains, working in groups and sharing different meanings of information. The learning is seen as cumulative and the sum of group knowledge is used to solve problems, typically where the solution is not known. Finally emancipatory learning involves questioning the previous two forms (Cranton 2006). It is introspective, the learner engaging in self-reflection and questioning themselves and the society in which they live. Mezirow (1991) viewed this emancipation as the central outcome of TL.

A distinction between reflection and critical reflection is the following: Reflection entails the assessment and review of assumptions implicit in beliefs, values and world-views and asks *how* and *why* they were obtained. Critical reflection on the other hand tests the validity of assumptions so as to establish if values, beliefs and worldviews are still appropriate (Mezirow 1991). This entails questioning prior learning, established patterns of thought and the way sense is made of the world and ourselves.

Based on this Habermasian view, Mezirow proposed three types of reflection (Cranton 2006; Kitchenham 2008; Mezirow et al. 2009). These were termed "content, process and premise reflection" (Cranton 2006, p.34; Kitchenham 2008, p.109). Content reflection refers to cognitive processes relating to contextual elements of knowledge, and asks for example *what* one does (or did), or *what* a problem might be (Cranton 2006; Kitchenham 2008). That is, content reflection is associated with the facts that one learns. Process reflection concerns the *means* of coming to understand. In asking *how* one came to a conclusion, learners become aware of their historical frames of reference. Finally, critical or premise reflection questions the value of knowledge and its benefits for the learner (Kitchenham 2008).

The influence of Dewey (1933, cited in Kember et al. 2000, p.383) is apparent as premise or critical reflection is regarded as "a deeper, more thoughtful and more profound reflection" that provides "active, persistent and careful consideration of any belief or supposed form of knowledge" (Dewey 1933, cited in Cranton 2006, p.33). The question for critical reflectors is *why* certain knowledge, experience, values and beliefs are important. In this, a deep form of reflection is consciously adopted which is central to emancipation and empowerment (Kreber 2012, cited in Taylor et al. 2012). Although process and content reflection aid the process of transforming a meaning scheme, it is premise reflection that creates depth of thought and meaningfulness of knowledge engaging "learners in seeing themselves and the world in a different way" (Cranton 2006, p.35). Meaningfulness in this sense is a "transformation of meaning perspectives" (Kitchenham 2008, p.112) and results in different ways of thinking and behaving.

According to Cranton (2006), Mezirow disregarded the importance of content and process reflection on TL in favour of greater theoretical differentiation within premise reflection, arguing to divide critical reflection into two forms: objective reframing of concerns involving "critical reflection *of* assumptions" (CRA) concerning problematic experiences (Kreber 2012, cited in Taylor et al. 2012, p.329); and subjective reframing, which concerns "critical self-reflection *on* assumptions" (CSRA)(Kreber 2012, cited in Taylor et al. 2012, p.329), relating to deeper psychological and cultural assumptions that "limit one's experience" (Kreber 2012, cited in Taylor et al. 2012, p.329).

Kember et al. (2000) returned to Mezirow (1991) when designing an instrument to measure levels of reflection. The categories used by Kember et al for their measurement scale were habitual action, understanding, reflection and critical reflection (Kember et al. 2000). Habitual action and understanding were described as "non-reflective action"; while reflection and critical reflection were termed "reflective action". (Kember et al. 2000, p.384) The Kember et al. instrument fused content and process reflection into one scale, reflecting Mezirow abandoning the content-process distinction, to increase the psychometric properties of a previously less robust instrument consisting of six scales. Kember et al. excluded these scale items also because of poor discriminant validity which they argued was due to it sharing properties with affective constructs, leaving four scales to be measured with their instrument.

Habitual action concerns instrumental knowledge, which is used in a non-contemplative manner. Kember et al. (2000) gave the example of riding a bicycle where limited cognitive process is involved. The understanding dimension, also within the non-reflective category, involves use of existing knowledge to complete a task. That knowledge though is not questioned but is applied and remains tied to its meaning scheme.

According to Kember et al. (2000), reflective action, which includes reflection and critical reflection, advances the realisation that experiences may trigger deeper personal scrutiny, described as: "the process of internally examining and exploring an issue of concern, triggered by an experience, which creates and clarifies meaning in terms of self, and which results in a changed conceptual perspective" (Boyd and Fales 1983, cited in Kember et al. 2000, p.385). Cognitive processing is required, whereas in non-reflective action this is limited. Within reflective action, the reflection measure describes an initial examination of existing knowledge and its rigour. The final category in the Kember et al. instrument is critical reflection, synonymous with Mezirow's (1991) conception, where conscious and unconscious beliefs from prior learning are examined critically, as are the consequences for subsequent behaviour. This form of reflection fosters perspective transformation as individuals test the validity of underlying meaning perspectives (Mezirow et al. 2009).

Reflection and critical reflection are cognitive abilities that develop over time and age, and are thus concepts, which are more commonly found, but not exclusively, in adult education (Mezirow 1998, Cranton 2006). Wilson (1996, cited in Merriam 2004) suggests a certain level of cognitive ability and hence level of education is needed before critical reflection and openness to transformation are possible. Within HE settings, an increasing number of programmes aim to promote reflection and critical reflection among those learning at higher levels of study.

Reasons for this growth include the observation that learners who adopt critical-reflection skills appear to become adept at solving complex and messy problems (Kember et al. 2008), but also think and act for themselves and show greater abilities in building relationships with others (King and Wright 2003; Dirkx et al. 2006). Also, Mezirow (1998) thought critical reflection is essential in employment and educators' should make this a priority, so that individuals may liberate themselves from the conditioned thinking of others, function better as citizens and make responsible decisions.

Similarly, Peltier et al. (2005) were concerned that students entering the business world lack the skills of reflective thinking that are necessary to gain valuable insights at work, and may ultimately contribute to effective decision-making. Learners who have skills in self-reflection will also learn to understand the importance and process of self-discovery and within the context of the business environment, may develop themselves into becoming effective leaders within organisations and communities. Furthermore, Wang and King (2008, p.136) state that without critical reflection, "labour is lost". According to them, it is not enough to view the purpose of critical reflection as being able to solve problems, change behaviour and become autonomous. This for them is a narrow view of learning and critical reflection. Rather, learning from one's inner experience has a "sacred" purpose and aids an individual in becoming a "genuine" person (Wang and King 2008, p.136). The general nature of these views, independent of philosophical orientation (Finger and Asun 2001), is that critical reflection is an important developmental process and/or output that is acquired by embracing reflective action. Given the potential developmental benefits for individuals and the potential gains for business, there appears to be a compelling case for HE embracing TL (Kember et al. 2008; Dirkx 2011).

Yet, widespread implementation of TL is associated with loss of meaning and misunderstanding of what it is (Brookfield 1995). In particular, it is not clear how it is interpreted by staff, incorporated within curricular programmes, how it is taught in the classroom, or how learners achieve critical reflection. In addition, few programmes measure if reflective-learning outcomes are attained. Kember et al. (2000) found that little is known about the influence on reflective action of formalised learning badged as observing TL principles; and, where improvements are recorded, if this is attributable to attending such programmes and modules. This is not surprising, as there is a need for reliable measurement tools to validate the extent of critical reflection and the long-term effects on learners (Peltier et al. 2005).

In the H&T Honours Degree at the current study site, learners are required to reflect on assessments undertaken during semester. For this purpose, learners submit reflection reports that account for part of final marks in assessments to encourage reflective action.

Based on anecdotal evidence, gathered in the lead-up to the formation of an aim and objectives, staff frequently asserted that reflection reports did not indicate self-examination, even though students know staff are required to seek "accurate/good or outstanding levels of critical and reflective thinking, and sound evidence of self-improvement" (Internal module descriptors for BSc Leadership and MSc Creative management courses). Deciding if these criteria are met is prone to subjectivity, as it is unclear how staff members interpret levels of reflection and critical reflection. Moreover, in the preliminary conversations with staff, it was reported that at the research site rarely do teachers and learners discuss reflective-action processes. Consequently, it would be of value to investigate more fully the incidence of reflective action at the study site, both to inform teachers and to understand the incidence of reflective action in this type of HE delivery that does not involve teaching of TL principles. At the beginning of this section, the point was made that emotions play a role in fostering intellectual and cognitive growth and that a trauma or disorienting dilemma may make critical reflection painful. This is a theme that did not have such importance in Mezirow's original conception of 10 transformative steps, beyond the influence of affective states in the second step (Table 2.1). However, TL researchers have come to incorporate a greater role for emotions in the transformative process and this is examined in the next section.

2.5 EMOTION AND TRANSFORMATIVE LEARNING

Broadly, two schools of thought about emotions have emerged since the 1970's (Theodosius 2008). The first considers emotions as responses to organic, biological and psychological stimuli, which are prerequisites for survival and manifest themselves as either cognitive-rational behaviour, or innate reflexive action. The second school of thought postulates that emotions are socially constructed through individuals seeking and making meaning within a larger cultural and societal ideology. Depending on viewpoint, differing definitions emerge with the distinctions between them being unclear.

According to Izard (1993) defining emotions is a complex issue, which should be viewed from the experiential domain and their manifestations in behaviour. On this view, emotions impel body and mind to act in certain ways and validate action (Fredrickson 1998; Matthews et al. 2002). Strongman (1987) refers to this as complex subjective and objective action, which is goal oriented and expressive. Emotions relate to being adaptive in life-threatening situations, promoting action for survival that arise from an individual's judgement of an object or external event (examples of which would be triggers) (Arnold 1960, cited in Matthews et al. 2002).

This is supported by Averill (1980, cited in Ekman and Davidson 1994) who argued for the dynamic state of emotions depending on circumstances and their "polythetic" nature, referring to emotional variability between individuals.

Ekman and Davidson (1994) describe emotions as being evolutionary and adaptive, adding that individuals learn to respond to recurring "life-tasks" in an ever more effective manner. They are physiological appraisal systems, which require certain levels of cognition and therefore are not always automatic responses (Ekman and Davidson 1994). Often though, event or trigger-response times are instantaneous, suggesting automated responses that happen unconsciously (Ekman and Davidson 1994; Theodosius 2008). These responses are further regulated by individual personality, family and cultural factors (Ekman and Davidson 1994; Theodosius 2008). Hochschild (2003) ascribed emotions to the senses and states that feelings are an essential ingredient to living in a civilised world and influence the way we see the world. The dynamism of these is reflected in how we interpret life events (such as the triggers envisaged in TL) and that any event can provide multifaceted emotional interpretations. In other words, each emotion has different parts, can be subdivided (Härtel et al. 2005; Ekman 1994, cited in Ekman and Davidson 1994) and can be stimulated "by different types of processes", stimuli or events (Matthews et al. 2002, p.258). Perhaps these multi-faceted aspects of emotions are why definitions diverge but also overlap. However, there is some research on TL and emotions that can be drawn on to inform the current research.

2.5.1 EMOTIONS AND TRANSFORMATIVE LEARNING

Among criticisms of TL, those that are most strongly voiced concern the relevance of rational-and-cognitive perspectives compared with those that are non-rational and emotional. Some authors argue that TL under-emphasises the latter extra-rational perspective (Dirkx et al. 2006; Taylor 2007; Kitchenham 2008; Mälkki 2010). According to Dirkx (cited in Dirkx et al. 2006), the extra-rational approach is closely linked to the unconscious domain, where spirituality and a deeper sense of oneself exist. Although the rational and extra-rational views may be considered complimentary (Dirkx et al. 2006), the affective domain and its relevance, have remained largely unclear and secondary in research on TL (Mälkki 2010).

At the outset, Mezirow (1978) expounded TL as a rational approach to reasoning; more recently others promoted TL as an extra-rational process (Dirkx 2000; Cranton and Roy 2003; Meyer et al. 2010; Dirkx 2011). Only in the second of Mezirow's ten steps are emotions explicitly included, in the form of guilt or shame.

According to Cranton and Roy (2003) and Peltier et al. (2005) an individual undergoing transformation would deal with deep, hidden feelings that are interlocked within her or his meaning schemes and these would be tested in terms of their validity. To put this differently, without surfacing these feelings and grappling with them in a rational manner, the transformation process would be unlikely to occur. Meaning schemes and associated feelings would be "outside of awareness" (consciousness or cognitive accessibility) of the individual (Dirkx et al. 2006, p.124). Only through reflection and critical reflection would they be surfaced and the individual could become aware of the relevant feelings. Hence awareness of meaning schemes and associated feelings could be termed outputs of reflection (Moon 1999). As Taylor et al. (2012, p.566) state: "By recognising the interrelationship of cognition and emotion, we can give greater attention to what is most necessary: ways to facilitate the transformative experience." In a debate with Mezirow, Dirkx asserted that transformative learning is "soul work or inner work" and this "suggests a more integrated and holistic understanding of subjectivity, one that reflects the intellectual, *emotional*, moral and spiritual dimensions" (Dirkx et al. 2006, p.125, italics added). At the conclusion of the debate, Dirkx and Mezirow agreed that the rational and extra-rational viewpoints coexist and are relevant in TL (Dirkx et al. 2006; Kitchenham 2008).

Dirkxs' perspective on transformation centres on the inner world of the individual, with transformation being a constant process, occurring daily albeit unconsciously, in an attempt to understand our state of being in the world (Dirkx et al. 2006). It occurs outside awareness of the subjective self, as opposed to Mezirow's (1978) rational view. Emotions are not surfaced through reflection, but rather they fuel a process that leads to transformation of our "intellectual, emotional, moral and spiritual dimensions (Dirkx et al. 2006, p.125)". This perspective mirrors a Jungian appreciation of the role of the unconscious in shaping reality, and that realities differ according to the symbolic structures and archetypes within the unconscious: "There is no change from darkness to light or from inertia to movement without emotion" (Jung 1959, p.96). In terms of learning, Dirkx saw the role of emotions in the following way:

> Whereas the curricula and instructional processes within higher and adult education have traditionally focused on using the course content to deepen our intellectual or cognitive capacities, consideration of the life of the inner world directs our attention to the imaginative and emotional dimensions of our being, of connecting with and integrating the powerful feelings and images that often arise within the context of our pursuit of intellectual and cognitive growth. (Dirkx et al. 2006, p.128)

For empirical work discussed below, Pekrun et al. (2011), synthesised the rational and extra-rational views of the affective and cognitive domains, seeing both as essential for personality development and educational performance.

Damasio (1999, cited in Mälkki 2010, p.51) confirms the role of emotions as elements of transformation in that emotions "produce a given reaction in a triggering situation". Fredrickson (1998) postulated that a change in behaviour is also partly a result of a change in emotions. Hence, it is possible that emotions might mediate the impact of a disorienting dilemma on cognitive changes, a possibility that is investigated in the current research (see Chapters 3 and 4). For example, Mälkki (2010) wrote about edge emotions, which are unpleasant feelings that occur close to the edge of an individual's comfort zone and which serve to challenge the individual's meaning perspective. By the term comfort zone, Mälkki (2010) meant experiencing comfortable feelings when we are able to interpret situations satisfactorily using our current meaning perspectives. Further Mälkki (2010, p.49), argued for "more understanding concerning the challenges of reflection" through research on "the interconnections between cognition and emotion". The related research area of emotional intelligence (EI), which links intelligence and emotions, is considered next.

2.5.2 EMOTIONAL INTELLIGENCE AND TRANSFORMATIVE LEARNING

Since the 1980's EI has pervaded literature in a range of disciplines including higher education and teaching, learning and assessment strategy (Emmerling and Goleman 2003). Partly this has been ascribed to the limitations of testing for IQ only, as a predictor of academic performance, but also to the applicability of EI as a theory across a range of disciplines (Low 2000; Lord et al. 2002; Nelson et al. 2005). EI and TL share concepts and ideas.

For example:

- emotions impel and accompany action;
- feeling and thinking are different;
- cognition and emotions are inseparable, dynamic, iterative and individual/existential;
- awareness (levels of reflection) and management of emotions lead to self-development (individuation) and social competence;
- management of emotions requires help from others and requires active involvement;
- two types of emotions are identified as important

(Mezirow 1978, 1994b; Dirkx et al. 2006; Mälkki 2010; Cranton 2006; Mezirow et al. 2009; Taylor, Cranton and Associates 2012; Fredrickson 1998; Goleman 1995, 1998; Nelson and Low 1999; Pekrun et al. 2011; Emmerling and Goleman 2003).

The general purpose of TL is to establish relationships between experiences, emotions and cognition and elucidate dependencies between these as a function of self-development and individual transformation. In models of EI, the first step involves consciousness or a minimum level of cognition prior to emotional management. For example, see Salovey and Mayer (1990), Goleman (1995, 1998), Nelson and Low (1999) and Gardner (1999). For Weisenger (1998) "emotional intelligence ... [is] ... the intelligent use of emotions" (cited in Low 2000, p.18). That is, a level of cognition is required to manage emotions, and emotions affect levels of cognition (Hochschild 2003, Theodosius 2008). Furthermore, events can either promote or prevent the occurrence of cognition and emotions, with a resultant change in being, behaving and learning.

Low (2000, p.22) states that emotional information is new knowledge, which can be used to "develop emotional health and achieve higher degrees of excellence in life and work". TL extends this to establish how emotions contribute to not only "higher degrees of excellence in life and work", but also to change of meaning schemes and promotion of individuation. Thus, the TL process emphasises the effect of emotions on learners, the meaning they make of the world around, taking triggers in tandem with the emotions that arise and the possibility of perspective transformation, the ultimate goal of TL (Kitchenham 2008; Finger and Asun 2001). Mezirow (2012, cited in Taylor et al. 2012) acknowledged the contributions of EI when considering reflective discourse and the ability of individuals to manage their emotions. He postulated EI is necessary when seeking common understanding based on an individual's ability to display emotional maturity and manage one's emotions in the social domain.

Another area of similarity of EI with TL is the identification of comfortable and uncomfortable (edge) emotions (Mälkki 2010). As noted above, the latter serve to challenge existing meaning perspectives. Comparably, in EI, a distinction is drawn between positive and negative emotions, with positive emotions being associated with positive outcomes (Lord and Kanfer 2000, Lord et al. 2002). The roles of the types of emotions are considered next.

2.5.3 POSITIVE AND NEGATIVE EMOTIONS

Lord et al. (2002) propose that to increase the welfare of individuals in an organisation, positive emotions should be promoted and negative ones inhibited. However, there are fewer studies of positive than of negative emotions. According to Fredrickson (1998), this has occurred for three reasons. First, it is claimed that one in four emotions is positive, making the negative emotions more frequent and available for measurement (Fredrickson 1998). Second, the magnitude of the effect of negative emotions on behavioural change is often relatively easily identified and quickly apparent (Scherer 1994, cited in Ekman and Davidson 1994). More intense negative emotions promote a shorter behavioural response time than positive emotions. Conversely, positive emotions result in behavioural change over a prolonged period with more variable responses. These are referred to as the latency effect of emotions (Scherer 1994, cited in Ekman and Davidson 1994). Because negative emotions impel the body and mind to act more rapidly than positive emotions, behavioural changes in response to negative emotions are thus easier to capture.

Third, positive emotions are not linked directly to problem solving, in particular those problems linked to survival (Fredrickson 1998). The failure of responding to a negative emotion in a threatening situation may be fatal; whereas a failure in responding to positives situations and life-opportunities may not be as harmful. Individuals may therefore prioritise urgent problem-solving processes rather than those identified with positive emotions.

Nevertheless and similar to Lord et al. (2002), Fredrickson (1998) acknowledged the importance of positive emotions to the survival of individuals. They can serve to promote cognition and act as a valuable anti-stress agent and counter the effect of negative emotions on cognition. Further, positive emotions such as interest and joy promote an individual's "thought-action repertoire" (Fredrickson 1998, p.304), meaning promotion of new and novel cognitive actions (possibly types of reflection) and behavioural patterns for example, making greater efforts in transforming information into knowledge (see Section 2.2.1; Marton and Säljö 2005, Kuh 2008). Isen (1987, p.222) wrote of "an enlarged cognitive context".

Pekrun et al. (2009) were of the view that positive and negative emotions are directly related to academic performance. They found emotions can either activate or deactivate effort directed towards student learning and achievement and that successes and failures during an academic experience may result in substantial emotional experiences.

2.5.4 EMOTIONS IN EDUCATION

Outcome measures of a learning experience until recently focussed on the domains of cognition (academic) and behaviour (action) exclusively, at the expense of affective (emotional) dimensions (Low 2000; Matthews et al. 2002). Low (2000) and Pekrun et al. (2009) conclude that focus on emotions of learners on campus and within classrooms directly contributes to increased academic performance, a sense of well-being, and personal and social development. Schutz and Pekrun (2007) state that measurement of emotions in academic settings is needed and that tools should be developed to measure a range of emotions, the contexts in which these unfold and the resultant coping strategies individuals display.

The majority of empirical studies focus on test anxiety (more than 1,000 according to Pekrun et al. 2009) and the influence of other emotions and settings are still largely unexamined. When considering how emotions affect students' achievement goals and their actual performance, Pekrun et al. (2009) proposed that emotions act as a mediator between goals and performance outcomes. However, they found a lack of research relating achievement emotions to academic performance. This point confirms the value of the current study in terms of investigating reflection together with triggers and emotions.

Another concern is that laboratory based studies rarely reflect context-bound, real-life experiences of students (Schutz and Pekrun 2007). They see value in knowing how to integrate findings from emotion studies into classroom practice, not only to benefit learners' development of cognitive skills and performance, but also to feedback to institutions the importance of emotional processes and how to accommodate them and allow them to facilitate learning.

2.5.5 EMOTION STUDIES IN HOSPITALITY AND TOURISM EDUCATION

Until recently, the study of emotions in hospitality and tourism education was sparse. A search for publications in library and journal databases using key words such as "emotions", "education" and "hospitality and tourism education" confirms the scarcity of publications. Results are summarised in Table 2.5.5 on numbers of research publications relating to emotions.

| Database | Emotions and: | |
	Education	H&T Education
EbscoHost (excluding H&T Complete)	1,540	0
ScienceDirect	492	3
ProQuest Central	1395	0
ProQuest Education Journals	466	0
Emerald	32	0
Sage	200	0
Ingenta	3,118	3
H&T Complete in Ebscohost	-	43

Table 2.5.5: Research reported in major databases on emotions, education and H&T education.

Research relating to emotion and education appear in journals for social sciences, psychology, nursing, psychiatry, organisational studies and education for example teaching, learning and assessment strategies. Searching EbscoHost yielded 1,540 published journal articles on emotions and education, but not a single publication when searching for emotions and H&T education. ScienceDirect features only three articles in the area of H&T education. These were about learning in a three-dimensional context, whale tourism and EI within a sociological context. From ProQuest Central a rapid growth of emotion research after the year 2000 was noted. Prior to this only 95 articles where published. The greatest number of articles is found in Ingenta (3,118), of which those relating to emotions and tourism education are concentrated on heritage, destination image and womanhood. Within these areas, there appears to be an acknowledgement of a role that emotions play as part of activities within each of the fields inquiry. For example, emotion-related studies occur within tourism sub-disciplines such as, adventure education (Passarelli et al. 2010), or are submerged into the vocational environment elucidating concepts such as emotional labour (Chu et al. 2011, Gursoy et al. 2011, Taegoo et al. 2012, Lee and Ok 2012) or emotions as a component of, and in tandem with, service delivery within the H&T context (Mok et al. 2008; Tsai 2009).

Of the few publications on emotions and tourism education, examples of article titles are "Emotional exhaustion and burnout of tourism students" (Uludag and Yaratan 2010), "EI needs of undergraduates in Taiwan" (Min et al. 2011), "Stress and coping strategies of HE lecturers" (Devonport et al. 2008), and "Optimism and life satisfaction of undergraduate students in the H&T learning experience" (Ünüvar et al. 2012). In the final row of the table, it can be seen that, according to EBSCOHost, 43 H&T education articles (gathered into "H&T Complete") relate to emotions. However, it should be noted that almost all of these publications do not concentrate on emotions; rather their emphasis is within broader areas such as stress, forms of tourism, student attitudes, destination management, customer loyalty and the value of tourism.

Overall, the table indicates a relatively unexplored domain within H&T education. However, the literature on TL clearly advocates a role for emotions in stimulating change in forms of personal reflection. In fact even a critic of TL includes affective states as important to "the way we think, and so provides a balance to the way we respond to the world" (Newman 2012, p.51). As will be seen in subsequent chapters, emotions are included in the quantitative models of transformation devised in the current research.

2.6 FACILITATORS OF TRANSFORMATION

From the beginning, essential parts of TL theory are that transformation can be stimulated by triggering incidents or disorienting dilemmas and that being aware of affect, in particular fear, anger, guilt or shame is required (Mezirow 1978, cited in Mezirow et al. 2009). When contextualising a disorienting dilemma, individuals may become aware of certain patterns of thought and question underlying assumptions that have guided their worldview until that point. Becoming aware is often referred to as traumatic, filled with ambiguity, confusion and mixed emotions (Taylor 2007, Mezirow at al. 2009). At this point, an individual may turn to "others" for support during the meaning-making process. "Others" refers to social influences on the periphery of the learning context, such as family and friends; and to those within the learning environment such as educators and fellow students. The roles of these actors are seen as crucial to learning and self-development (Aleman 1997, Baumgartner 2002, Cranton and Carusetta 2004).

Within TL theory, others are thought to be influential via Habermasian communicative learning (King 2000, Cranton 2002, King and Wright 2003, Brookfield 2009, cited in Mezirow at al. 2009). Communicative learning involves understanding *how* learners make meaning socially and *what* they mean; in other words the *process* and *content* of interpersonal knowledge accumulation and dissemination (Cranton 2002, King and Wright 2003, Torres and Moraes 2006, Brookfield 2009, cited in Mezirow at al. 2009). This is juxtaposed against individual, intrapersonal meaning construction, in other words, how learners make themselves understood. Communication commonly serves a distinct purpose and disparity may exist between syntax and underlying sub-text of the message. Communicative learning involves reflecting on and becoming aware of the latent intent of others. This learning approach surfaces the assumptions behind others' words, tests the appropriateness of content, and the authenticity of the person communicating the content.

The importance of communicative learning to transformation is in the construction of experiences through interactions in the social domain. The more traumatic and epochal an experience, the more we rely on support from trusted others to aid us in managing emotions and meaning making (Cranton 2006). Communicative learning allows an individual to arrive at his own best judgement of an experience and this is learnt when individuals gain the competence to reconcile their "values, meanings and feelings" against those of others, through a process of reflective discourse (Mezirow cited in Taylor et al. 2012, p.78). Thus transformation and critical reflection on a trigger is dependent on a process of socialisation and entering into meaningful discussions.

A distinction within TL theory is noticeable in relation to the position and functioning of the social domain and socialisation (King and Wright 2003). Conventionally these were proposed as first a *facilitator* of the TL process, and second as a desired *output* of transformation. Considering the latter first, an *output* of TL involves a change in meaning schemes of individuals who learn to be more open and accepting of other cultural viewpoints (King and Wright 2003). In other words, building socio-cultural skills and accepting alternative societal assumptions, also termed "relational empathy across differences" (Schapiro et al. 2012, p.359). The role of *facilitator* is that trusted actors assist learners to become accepting of other perspectives during a transformative process (Mezirow 1978, cited in Mezirow and Taylor 2009; Baumgartner 2002; King and Wright 2003; Baumgartner 2012, cited in Taylor et al. 2012).

As previously discussed, an imperative of TL is the necessity to build authentic practice as an educator which in turn is dependent on establishing authentic relationships with learners when aspiring to teach for transformation (Cranton and Carusetta 2004; Cranton 2006; Taylor cited in Mezirow et al. 2009). However, this is not the situation at the study site for the current investigation where educators are not striving to teach with an explicit objective being transformation. More generally, the concern in the current research is the influence of other interactions in line with Mezirow's (2012 cited in Taylor et al. 2012, p.76) emphasis on "constructive discourse to use the experience of others". That is, a learner has opportunities to become more accepting of alternative viewpoints and assumptions by engaging critically with others.

In the following section the roles of fellow students, friends and family as facilitators are considered.

2.6.1 FACILITATORS IN TRANSFORMATIVE LEARNING THEORY

Facilitators have contextual and dialogical elements that fuel the process of transformation. Contextual elements refer to place, time and people involved, whereas dialogical elements concern authenticity of linguistic interchange. For example, meaningful dialogue with parents or close friends could influence the way learners' contextualise triggers, emotions, or reflection. For Baumgartner (2002, p.58), interpersonal exchange "fulfils intellectual and affective needs integral to the transformational learning process", illustrating the importance in TL theory of dialogue on the intensity and awareness of triggers, felt emotions and forms of reflection (see also Sections 2.3 to 2.5).

Dialogue influences the relationship between an experience and the ability to critically reflect on it. Taylor (2009, p.9) was of the view that "Dialogue is the essential *medium* through which transformation is promoted and developed" (Taylor 2009, cited in Mezirow at al. 2009, p.9). Further, "without the medium of relationships, critical reflection is impotent and hollow, lacking the genuine discourse necessary for … in-depth reflection" Taylor (2009, p.13). Brookfield (2012 p.133) and Peltier et al. (2006) believe that critical reflection is a socially guided process, where a better understanding of one's own assumptions can only be arrived at iteratively and in association with others' assumptions, acting as "critically reflective mirrors". These mirrors serve to break self-confirmatory ways of thinking and reflect individuals' hidden assumptions against the background of other ways of thinking.

Meaningful discussions with others that elucidate hidden assumptions are characterised as being open, trustful and supportive, and they influence the relationship between an experience and critical reflection on it (Peltier et al. 2006). This is supported by Schapiro et al (2012, p.355) who wrote that dialogue is the "means for personal and social transformation". Therefore transformation does not occur in isolation (King 2000; Baumgartner 2002; Peltier et al. 2006; Parker and Wilding 2012), but rather meaning making is a "social activity" and "cannot be divorced … from social experience" (Kegan 1982, p.19).

Social development is not as well understood as cognitive development, and Parker and Wilding (2012) argued for greater emphasis on the former. Having experienced a success or failure, individuals may endeavour to make meaning of the failure or success, which is seen in TL as a trigger for the transformational process, although there may be a delayed-latency period with the realisation of the importance of the trigger occurring at later steps during the process (Mezirow 1978, cited in Mezirow and Taylor 2009; Taylor 2007, cited in Taylor et al. 2012; Jester and Hoggan 2009). To make meaning, individuals can search for trusted others that is, like-minded people within their reference groups, who are not judgemental and who don't have a political intention (Kegan 1982; Eisen 2001). The intention in dialogue with trusted others is to seek social acceptance, acknowledgement, attempt to make meaning, seek common understanding, and possibly alter underlying habits of mind and beliefs (Mezirow 1991; Eisen 2001; Baumgartner 2002; Nohl 2009; Mezirow 2012, cited in Taylor et al. 2012).

2.6.2 FACILITATORS IN TRANSFORMATIVE EDUCATIONAL CONTEXTS
TL theory originated as a form of instructional design and andragogical technique based on studies concerned with the return of women to colleges and universities after an extended period of absence (Mezirow 1978, Kitchenham 2008). The theory includes the importance and role of social context, when teaching for transformation, as indicated in step number four of Table 2.1a. This step involves "recognition that one's discontent and the process of transformation are shared"; i.e. realising one is not alone in thought or feeling (Mezirow 2012, cited in Taylor et al. 2012, p.86). After a debate with Dirkx, the original ten-step process was extended to include an eleventh that reflected the importance of relationships. It was termed "altering present relationships and forging new relationships"(Kitchenham 2008, p.109).

TL theorists acknowledge immersion into the social domain (or discourse) that allows the transformative process to unfold purposefully, albeit cautiously in an academic setting (Cranton 2002, Baumgartner 2002, Kitchenham 2008). Key elements proposed to facilitate the design of a transformative learning environment in an academic setting are a 1) holistic orientation, 2) an awareness of context and 3) the building of authentic relationships.

That is, recognising the complete individual constructing knowledge in unique ways, being aware of the dynamic and diverse learning environment and as an educator, showing a genuine interest in each individual (Cranton 2002, 2006; Taylor 2009, cited in Mezirow at al. 2009; Taylor et al. 2012). These constituents synergistically promote transformative learning, foster the development of a sense of community, and support the educator in transformative instructional design (Hansman and Wright 2009, cited in Mezirow at al. 2009). They are interrelated. For example, an instructor needs to appreciate the individual learner before one can build a trusting relationship, which can only be achieved in a value and judgment-free setting (Cranton 2002; Peltier et al. 2006). In this way, the learner is allowed to feel comfortable, safe, and feels able to take up the many opportunities offered to communicate with others (King and Heuer 2009, cited in Mezirow at al. 2009; Taylor 2009, cited in Mezirow at al. 2009).

Within education, TL theory is thus purposeful and includes careful design of the classroom setting, group constitution, instructors' role and autonomy in deciding instructional design, academic benchmarks, learning outcomes, and contribution of institutional innovativeness (Stevens-Long et al. 2012). Educators fostering transformation in classrooms are thus designed into transformative education as facilitators (King 2000) and "play a critical role in the learning journey of students" (Parker and Wilding 2012, p.12). Despite this, individual transformations unfold autonomously and unpredictably beyond designs (Jung 1959; Boyd and Fales 1983; Dirkx 2011).

Where transformative education is not purposeful, relevant to academic syllabi or does not conform to an institutions' rules or culture, academics may involuntarily limit opportunities to support students during times of transformation. In these cases the engagement with students is driven by organisational codes of conduct that limit opportunities for authentic relationships. Hence, instructors may be unaware of individual students undergoing transformation. To whom do learners in such institutions turn for support?

Little attention is given to this question or to how individual learners choose reference persons within their social sphere and the depth of discussions they have with them. Parker and Wilding (2012) suggest further exploration and insight is needed. This may be because within TL literature the notion of educators guiding individuals on transformative journeys is dominant and often the role and contribution of other facilitators from an individual's life context is played down.

The student and lecturer relationship is usually thought of as learner and advisor, which "place(s) greater emphasis on academic and career-related guidance" (Warrell and Kawalilak 2011, p.730). This reinforces maintenance of distance and professional behaviour by lecturers towards students, frequently as set down in institutional codes of conduct. These not only regulate the closeness and intimacy of contact between educators and learners, but also reinforce the authority and power relationships between both parties, thus strengthening potential barriers to transformation (Mezirow 2003; Peltier et al. 2006; Johnson 2007, cited in Warrell and Kawalilak 2011). Whereas in larger organisations, there are student counsellors (often with backgrounds in psychology), smaller institutions might not provide these support services. For example, this is the case at SHI, the site of the current research. Thus, at this institution and other similar ones, where intense and competitive learning conditions prevail, learners in need of mentorship and support as a result of disorienting experiences (academic, socio-cultural, familial or personal) are left to rely on their social and personal networks. Individuals seek and choose "others" who are trusted, non-threatening, and provide judgement-free dialogue could understand an individual's disorienting dilemma.

Further studies are needed to (i) explore the role of who transforming individuals consult outside the classroom; and (ii) the roles of informal and formal networks during a process of transformation, as "research is limited in this area" (Taylor 2009, cited in Mezirow at al. 2009, p.9, Parker and Wilding 2012). Kasworm and Bowles (2012, p.393) refer to prior studies suggesting dialogue with "classmates" as potential facilitators for transformation. Furthermore, Parker and Wilding (2012, p.11) reinforce the contribution of parents, family and a wide range of individuals that "mediate" the learning process. King (2000) agrees, urging a clearer understanding of the many dimensions and inter-relationships fuelling transformation. Nonetheless, few studies exist within TL literature beyond King (2000), King and Wright (2003), Brock (2010) and Brock and Abel (2012), which quantifiably assess the role and contribution of friends, family and "classmates" to the process of transformation.

In King's (2000) study of learners of English as a second language, of adult students reporting transformation, 70.5% (n=139) attributed this to support from friends, fellow students, spouses and others. Teachers were given 46.8% (n=139) of the time as facilitators of transformation, although within an academic environment where transformative education was being undertaken, this is to be expected.

Later, in a study concerning Adult Basic Education (ABE), King and Wright (2003) found that of individuals undergoing transformation, 94% (n=17) had changed their ideas about social roles and 89% (n=16) realised they were not alone in the changes they were undergoing. A larger study revealed that of individuals experiencing transformation, 7% (n=9) were affected by talking with others and almost 64% (n=256) realised their discontent was shared (Brock 2010). Furthermore, in this larger study, only one participant acknowledged the importance of becoming accepting and tolerant of "others thoughts and ideas" during the transformation process (Brock 2010, p.127).

According to Brock and Abel (2012, p.5), who studied undergraduate business-school students, transformation is promoted in three ways, one which relates to the influence of "other people". "Other student support" (77%, n = 256) and "classmates support" (58.6%, n = 256) accounted for the greatest influence on learning experiences (Brock and Abel 2012, p.6). Further, of those reporting transformative learning, "another student's" support and "classmate support" contributed to the transformation process (76% and 59.2% respectively), although these were not significant at 5% or better (p=.419 and .474 respectively). The authors ascribe this to the competitive culture that is common in business-school environments. Despite account taken of the contribution from teachers and advisors, the role of friends and family as facilitators during the TL process is not reported. However, reference is made to friends and family when considering whether "life events" function as triggers.

Transformative education stresses the role of educator as facilitating the process, although partial uncertainty exists over the identities and functions of "others". This becomes more important when TL is not planned as a purposeful initiative, as learners, if they are to transform, would do so independently of educators. Although the role of dialogue and social influence is widely acknowledged, quantification of facilitators for transformation beyond those of the educator, remain under-examined.

Where these are recorded as in the studies by King (2000), King and Wright (2003), Peltier et al. (2006); Brock (2010) and Brock and Abel (2012), Newman (2012, p.40) reiterated difficulties relating to self-reports of transformation, stating that learners' subjective "affirmations have no validity". There is debate in this area. On one hand Cranton (2000, cited in Newman 2012, p.40) asserts that scientific measurement is not an appropriate methodology for investigation of dialogue; on the other, according to Newman (2012, p.37) reliance on qualitative measurement and learners' stories "prove nothing".

Overall, as in other areas of TL, further research is needed on facilitators. In the following chapters are reported the design, administration and results obtained with a new instrument that allows further research on facilitators beyond the classroom. A focus of this endeavour is whether meaningful dialogue with fellow students, friends and family can influence the relationships between triggers, emotions and forms of reflection, in line with the assertion of Baumgartner (2002, p.58) that "interaction fulfils intellectual and affective needs integral to the transformational learning process". In particular, the effort is made to assess the moderating role of facilitation as per Baron and Kenny (1986) and Wu and Zumbo (2008).

2.7 CONCLUSIONS

Substantive evidence exists for the adoption of TL as an over-arching theory on which to extract core concepts for the purposes of establishing individual transformation. The parallels between educational paradigms and the foundations and development of TL theory were discussed in Sections 2.1 and 2.2. Despite earlier conceptions by the founding author of TL as a linear-rational process, contemporary contributions acknowledge the non-linear nature of individual transformation and warrant testing of the interrelationships of key TL variables. This may serve to provide an understanding of individual transformation and its impact on study change and how learners reflect on their learning.

The development and application of TL theory in various educational and vocational disciplines has culminated in permutations of how the theory is viewed. As an initial notion, TL theory is both "large", relating to societies and communities, and "small", relating to concern with deeper shifts of underlying beliefs, values and assumptions by individuals (Cranton 2006). This is reflected in definitions posed by Stevens-Long et al. (2012) of *transformation, transformative learning* and *transformative education* (Section 2.1).

Transformation remains an individual initiative, whereas *transformative education* promotes differing views involving stronger organisational, political, ethical and cultural dimensions (Stevens-Long et al. 2012).

Along with authors such as Freire (1970) and Habermas (1981), TL is rooted in critical theory with its contributions to liberating people from accepted and unquestioned enslaving and hegemonic political structures. *Transformation* of the individual though, adopts views from authors such as Jung (1959), Brookfield (1995) and Dirkx (2000), as a long lasting and deep shift in worldview. As Clark (1993, cited in Stevens-Long et al. 2012, p.184) succinctly states: "transformative learning shapes people. They are different afterward, in ways both they and others can recognise".

The large and small views of TL are reinforcing yet demonstrate the different purposes of transformation and TL, and this raises questions about the focus of research into TL theory and the application of it in practice. Cranton (2006, p.10) argued that both viewpoints are essential as they exist in one another, "we become individuals in a society" and that neither perspective dominates. Taylor et al. (2012) argued for a unifying theory where multi-disciplinary approaches meet. On Cranton's view, the realm of transformation is the individual, whose interaction with society has reciprocal effects in that individuals are influenced by society and reciprocally influence it.

A second debate within the field pertains to TL as a programme of purposeful academic and vocational practice, or as an involuntary developmental process. Authors such as Jung (1959), Kegan (1982) and Dirkx (2000) propose that transformation entails a fundamental shift in personality arising out of experiences that move into heightened stages of consciousness. This contrasts with Mezirow's original proposal that TL unfolds rationally. Rather for Dirkx (2000) and those on whom he drew, TL is symbolic and continuous, and individuals attempt to discern themselves from others in a process called individuation. Kegan's (1982) view was that individuals become aware of preceding patterns of thought, which become consciously limiting, and that a move to more satisfactory epistemological modes underpins the process of human development. These authors view TL as an iterative and non-linear process of "becoming aware" and thus epistemic development occurs beyond formal academic programmes.

Rational approaches to transformative education (Stevens-Long et al. 2012) incorporate purposeful instructional design, fostering transformation that addresses competing societal and individual perspectives, and the way individuals learn, make decisions and solve unanticipated problems (Cranton and Carusetta 2004, Cranton 2006, Closs and Antonello 2011). Mezirow et al. (2009) proposed that despite which instructional design is adopted to teach for transformation, an educator should accept the learner as a whole with many learning facets, be aware of the context in which learning takes place, and should strive to build authentic relationships and practices.

Regardless of the stance taken on TL as individual-societal and purposeful-involuntary, core elements persist that are generic to transformation and it is these that will be measured in greater detail in this research. The core concepts according to Taylor et al. (2012) are: an experience or trigger, reflection or the ability to reflect on the trigger, the role of affective state on reflection and the factors that facilitate the process such as meaningful dialogue with fellow students, friends and family.

According to Cranton and Taylor (2012), prior research is isolated, fragmented and does not consider measurement of TL elements in a holistic manner (Cranton and Taylor 2012). According to Newman (2012), prior research attempts to capture transformation through self-reporting of Mezirows' ten steps, and this provides evidence of doubtful validity on how the process unfolds. In the next chapter, the design of a quantitative instrument is described that is intended to gather data on each of triggers, affective states, reflection and the roles of fellow students, friends and family. As such it provides holistic coverage of core elements of TL theory in a holistic manner. Results of applying the instrument and how results conform or contradict TL theory are taken up in subsequent chapters.

CHAPTER 3: METHODOLOGICAL CONSIDERATIONS

In the preceding chapter, an account of the theoretical underpinnings of transformative learning is presented. Central to theory are triggering incidents, emotions, forms of reflection and the facilitating effects of dialogue with fellow students, friends and family. At this point a distinction is appropriate in relation to core elements originally proposed by Taylor (2009). In Section 2.2, Taylor's six core elements are presented, and as explained there, three are pertinent to the method adopted for the current research purposes, as they concern variables that appear in the model of Section 3.6. The idea of a role for emotions – which Taylor et al. (2012) see as interrelated with cognition – is incorporated into the transformative model of Section 3.6. Triggers, forms of reflection, dialogue and emotions are referred to as "central variables" from this point. The three remaining core elements concern recommendations for implementation of transformative learning in a classroom environment (Taylor 2009). As such refinement of these will be informed by the inquiry in this thesis into the interlinkages between the central variables.

As explained in Section 2.3, there is a view among theoreticians that identifying an incident as a trigger may be difficult, if not impossible, because triggers may be unique to individuals, their psychologies and the educational environment. Further, because of differing emotional responses, the impact of a trigger may differ between individuals. But with few exceptions (for example, Moon 1999; Schutz and Pekrun 2007) the central variables of TL and linkages between them have not been examined holistically and a number of authors have been critical of the largely constructivist approaches taken to research in TL (Cranton and Taylor 2012; Merriam and Kim 2012; Newman 2012; Taylor and Snyder 2012). Recently, there have been calls for a greater emphasis on quantitative evidence gathering. Given the pleas to depart from qualitative approaches and the difficulties involved in measuring constructs and their inter-linkages, this chapter is devoted to ways of gathering quantitative information and how it can be used to assess TL.

First, a review of the aims and objectives is undertaken, followed by a critique of existing quantitative efforts in Sections 3.2 and 3.3. The research site for the current investigation is described in Section 3.4 and the case for gathering quantitative data with a survey is made in Section 3.5. Following this, a discussion is undertaken of ontological and epistemological underpinnings and the methods that might be applicable for gathering information in response to the calls for more quantitative approaches.

This is followed by sections covering the TL model to be tested in this investigation and the design of an instrument intended to gather data on the central variables. The last three sections concern data gathering, the attendant ethical considerations and limitations of the approach.

3.1. AIMS, OBJECTIVES AND RESEARCH QUESTIONS

The aim in this research is to appraise relationships between triggering incidents, forms of reflection, and mediators and moderators of them. Underpinning this aim are three overarching research questions: Can a reliable and valid instrument be designed to measure the central variables that is to gather data on triggers, emotions, forms of reflection and "facilitators" of change such as dialogue with fellow students, friends and family? Are there differences in reporting on central variables for important groupings, defined by age, "status" as a new or returning student, gender and culture? Finally, can quantitative evidence gathered with a survey be used to assess the relationships between the central variables?

As indicated in Chapter 2, emotions may mediate the impact of triggers on forms of reflection, while dialogue is hypothesised to moderate the linkages between triggers and forms of reflection, triggers and emotions, and emotions and forms of reflection. In keeping with the transformative-learning literature, the terms "facilitator" and "dialogue" are used in the following sections and chapters to describe the notion of meaningful discussions with relevant social actors. As structural equation modelling is used to explore relationships, the term preferred there – "moderator" – is also used to describe how dialogue with social actors might modify estimated relationships. Further, the TL literature includes the possibility that there is feedback between emotions and forms of reflection. That is, there are reciprocal relationships of the emotions $\rightarrow$ form of reflection and form of reflection $\rightarrow$ emotions as discussed in Section 2.5.1. To realise the research aim of investigating relationships involving central variables, three objectives are pursued:

1. To design, pilot and apply surveys to gather data on variables highlighted in TL theory, including the central variables, before and after embarking on a semester of learning.
2. Extract latent constructs and evaluate their reliability, validity and measurement invariance, in particular, invariance of latent constructs across groups based on age, status, gender and culture.
3. Construct structural equation models for central variables to examine the mediated, moderated and reciprocal relationships shown in Figure 1.2.

The aim and objectives accord with calls in the TL literature (see Sections 2.1 and 3.2) for a quantitative approach to evidence gathering. However, the position of the author is that this is not possible from a purely positivist standpoint, as there are ontological and epistemological considerations, which influence the form and type of research questions that can be investigated. This is the case at the research site, where the students involved live, study, socialise and undertake extra-curricular activities all within the same biotope. This means it is important to review the suitability of existing surveys and existing approaches to TL research. A review of this type is set out in the next two sections.

3.2. WIDESPREAD USAGE OF ONE QUANTITATIVE INSTRUMENT

There have been efforts to build relevant scales, surveys, and open-ended questionnaires (Taylor and Snyder 2012). Although as Merriam and Kim (2012, p58) state: "there are only a few studies of transformative learning that have attempted to measure a change in perspective" that is, a shift to a reflective form of learning.

One questionnaire has been applied widely (for example LaCava 2002 Wansick 2007; Anderson 2009; Hodge 2010; Brock 2010; Brock and Abel 2012; Kumi-Yeboah 2012; Schwartz 2013; Brock 2015*b*). The instrument is the learning activities survey (LAS) of King (1997). It consists of open and closed items with the first ten questions requiring "yes" or "no" answers, by ticking in a box on whether or not respondents had experienced stages identified in Mezirow's TL theory.

Respondents next identify whether certain experiences (that is, triggers) promoted perspective transformation. Third, respondents were asked about aspects of the learning environment and other factors that were important such as internships, assignments, lab classes, personal reflection, another student's support, and personal journals. For this and the previous part of the LAS, respondents were asked to tick boxes if an item applied to them. Finally demographic information was requested. Among those using the LAS, follow-up interviews were usually conducted to enable participants to explain in greater detail those factors promoting perspective transformation.

Two recent contributions by Kumi-Yeboah (2012) and Schwartz (2013) used adaptations of the original LAS for their particular contexts and research questions. In both cases, their survey findings were explored through follow-up interviews. According to Kumi-Yeboah (2012) the LAS has been modified numerous times and applied in diverse settings, thereby increasing its reliability, although he was not convinced on this point as demonstrated below.

Other researchers claim the LAS is valid due to many iterations between pre-pilot and pilot testing, and the consultations held with panels of experts to refine the survey (Schwartz 2013; Kumi-Yeboah 2012; King 1997).

However, Kumi-Yeboah (2012) and Schwartz (2013) made no attempt to assess validity or reliability using their quantitative data, even though Kumi-Yeboah (2012, p.54) concluded that studies using the LAS displayed "inconsistencies of research design [and] problems with reliability and validity". It would therefore seem that at best, studies using the LAS can ensure only face validity (that is, "the suitability of the content of a test or item(s) for an intended purpose as perceived by test takers, users and/or the general public" (Secolsky 1987, p.82)), but do not or cannot draw positive conclusions on external and construct validity (that is, "the extent to which a psychological measure in fact measures the concept it purports to measure" (Brown 2006, p.214)). Therefore the use of the LAS is questionable for the purposes of identifying and establishing relationships between the core elements of TL (Taylor 2012). Despite concerns over reliability and validity, Schwartz (2013) took the view that the LAS could be used to elicit self-reports of the occurrence of transformation within educational settings.

Although Taylor and Snyder (2012) call for the use of more quantitative approaches to measure TL, they caution researchers about potential limitations when designing surveys based on the LAS. In particular, for them validity failures can be traced to the lack of "multiple questions that pertain to the same construct" (Taylor and Snyder 2012, p.48). The LAS captures only dichotomous responses to each of Mezirow's original 10 steps of transformation and therefore is limited in its explanatory power when identifying latent constructs. Further, Taylor and Snyder (point out that the LAS lacks construct validity, "which raises the question of whether inferences can be legitimately made between what is being operationalized in the survey and the theorized psychological constructs associated with transformation" Taylor and Snyder (2012, p.47).

Further, "researchers need to engage in the development of an instrument that is not simply a reconstruction of the terminology found in the theory of transformative learning" (Taylor and Snyder 2012, p.48). In realising the aim of the current research, the intention is the design of such an instrument, testing its reliability, validity and measurement invariance, and if satisfactory, apply quantitative modelling to establish the existence of linkages among TL concepts. This shift in emphasis in TL research and what we might be discovered about TL means that existing quantitative approaches in related fields should be explored.

3.3. FURTHER QUANTITATIVE APPROACHES

Table 3.3a contains a summary of quantitative instruments in the area of transformation. A review by Cheney (2010) covered measurement approaches over the decade 1999-2009. One outcome was to confirm the emphasis in TL on qualitative methods. Less than 14% of reviewed studies (that is, 7 of 51) incorporated quantitative elements. In these, Cheney saw only "indirect" evidence of aspects of the TL process and related cognitive, affective or behavioural changes (Cheney 2010, p.3). This is similar to a finding of Taylor et al. (2012) on the fragmentation of conclusions drawn in empirical studies. As an example, Cheney (2010) noted the inclusion of attitudes and values along with measuring perspective transformation in Cragg et al. (2001), but triggers and the affective domain are excluded. Further, for Cheney (2010) in only one quantitative study – Kember et al. (2000), reviewed in Chapter 2 – was there a satisfactory measure relating to TL and even then not including the affective domain.

Cragg et al. (2001) investigated professional values and perspective transformation among nurses engaged in on-campus education, distance learning or a combination of them. Seventeen statements measured on six-point Likert scales made up the instrument. Overall statements, internal consistency, as measured with Cronbach's α, was 0.75, although subscales were substantially weaker.[1] Cragg et al. (2001) also note the small sample sizes in

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[1] Internal consistency refers to the extent to which a group of survey items (that is, a scale or sub-scale) is free of random error and the items measure the same underlying attribute. Cronbach's α is a commonly used measure of internal consistency, indicating the average correlation among a group of items in a scale or sub-scale. It ranges in value from zero to one, once reverse-coded statements in a survey are re-reversed. Frequently, a value of 0.7 is regarded as an acceptable indicator of internal consistency (Field, 2009). Higher values indicate greater reliability. Values less than 0.7 may be associated with an unreliable measure, although low numbers of items involved in a scale or sub-scale may reduce Cronbach's α, even though the scale has internal consistency (Field, 2009; Pallant, 2016). Values of 0.7 or above suggest that much of the variation in the responses to a group of statements are consistently given, while relatively little of the variation is associated with random response errors.

each study mode (from 15 to 50). Furthermore, a panel of experts could not agree on how to group statements, differing from the groupings preferred by Cragg and colleagues, and researchers who preceded Cragg et al. in the use of the instrument. Consequently, Cragg et al. (2001) urged caution in drawing conclusions and suggested further research is needed.

Similar conclusions emerged in a study by Mallory (2003), who administered Frommelt's scale to assess the influences of palliative education on nurses' attitudes towards care of the dying. No statistically significant findings emerged, perhaps associated with small sample sizes. Two independent evaluators assessed content validity and the conclusion was that a reliable and valid instrument is needed to measure perspective transformation. Goldie et al. (2004, p.943) used the Ethics and Health Care Survey to establish how modern medical curricula, with strong themes of ethics and law, influence "students' potential behaviour when facing ethical dilemmas". The questionnaire was administered to a sample of 501 respondents. Participants were asked nine questions concerning case studies on problem solving and were to respond "yes" or "no" to these questions. Also open-ended questions were provided to allow justification of answers. The authors found that teaching ethics is more effective in small groups, but that further hypothesis testing is needed in different settings to promote generalisability of findings.

Ligon et al. (2009) administered the Older Adult and Aging-Visual Analogue Scales (called At-O-A for Attitudes to Older Adults) firstly to measure changes in gerontology students' attitudes towards older adults and secondly, to establish changes in attitudes towards the ageing process. Both were measured after an introductory class. In 2014, Ligon et al. tested the scales against the Fraboni Scale of Ageism and the Anxiety About Aging Scale for concurrent validity that is "how well a particular test correlates with a previously validated measure" (Shuttleworth 2009). Strong Pearson correlations were found with the At-O-A in a test-retest sequence. Moreover, it was concluded the scale was reliable ($\alpha > 0.75$). As for the scales used by Cragg et al. (2001), Mallory (2003) and Goldie et al. (2004), Cheney (2010) found the At-O-A to indicate only *indirect* evidence of perspective transformation, as the authors did not attempt directly to measure all of the central variables of TL, specifically they did not assess triggers and instead of perspective change they assessed attitudes, so that

perspective transformation could only be inferred. Put another way, many of the instruments reviewed by Cheney were not focused on the central variables of TL.

In another study of perspective transformation within gerontology, Knapp and Stubblefield (2000) assessed the effects of a gerontology course on Palmore's Facts on Aging Quizzes (FAQI and FAQII). The authors note four reasons for the frequent application of these quizzes. Two are their ease of use (25 true/false items) and the long history of prior research using the 25 items; a third appears to be earlier testing for reliability and validity by Duerson et al. (1992), although Knapp and Stubblefield (2000) did not report validity and reliability measures; and fourth, the lack of alternative instruments within gerontology.

An earlier assessment of the FAQI and FAQII by Holtzman and Beck (1979) did raise concerns over the failure to test validity and reliability in the work of their inventor (Palmore 1977, 1980) and in subsequent administrations by other researchers. Palmore (1981) argued that validity is not a consideration as the quizzes are based on "edumetric" measurement rather than psychometric measures and so "are designed to yield measurements that are directly interpretable in terms of specified performance standards", rather than measure comparatively stable psychological traits of individuals against normative groups (Palmore 1981, p. 436). This suggests that again only indirect evidence can be obtained of perspective transformation associated with TL.

The final quantitative research considered by Cheney (2010) was Brown (2005, 2006), who used the Cultural and Educational Issues Survey. This was originally designed by Pettus and Allain (1999) as a two-phased methodology to explore the effects of issues in multicultural education on trainee-teacher attitudes and perceptions. The items in the original survey were designed on theoretical grounds and presented to a panel of four judges to decide inclusion, exclusion or rewording of items prior to administration of the survey and dimension reduction via exploratory factor analysis. The factors extracted lacked reliability. Further, Pettus and Allain (1999) conceded that different judges might reach different conclusions on

the appropriateness of survey items because of subjective influences in the area of multiculturalism. The authors suggested the need for further research and refinement of their instrument and they also cited as problematic sample sizes and whether socially acceptable (Biderman et al. 2011) or "politically correct" responses (Pettus and Allain 1999, p.656) were being provided. The Brown studies also involved only small numbers of respondents and there is the possibility respondents were influenced by their proximity to the instructors on the courses intended to produce TL. Consequently, only limited implications could be drawn, as conceded by the author.

Since the review of Cheney (2010) additional studies relating to transformation have been undertaken, most with an emphasis on aspects of learning environments. For example, Intolubbe-Chmil et al. (2012) assessed levels of transformation using pre- and post-testing of students during international experiential education. The questionnaire consisted of 13 items, measured on four-point Likert scales. Items were developed by faculty and a team of students, partly based on a review of course evaluations. The method included interviews and field observations during a period abroad. In this research only descriptive statistics and matched-pair differences in responses are reported.

No analysis of validity and reliability is provided. Furthermore, as acknowledged by the authors, students self-select onto international programmes, which can bias significance tests and produce distributions of estimates that do not have minimum variance (Ho et al. 2007). The findings of this research indicate that students "developed a greater awareness...of cultural assumptions and prejudices" (Intolubbe-Chmil et al. 2012, p.171). However, the question remains: Is there evidence of indirect perspective transformation? Moreover it should be noted that the 13 survey items did not incorporate any of the core TL elements or the relationships between central variables.

Similarly, in a PhD thesis, Tacey (2011) evaluated the effect of international education on perspective transformation. An initial web-based survey was launched, garnering 74 responses, after which eight interviews were conducted. Responses to the majority of items on this survey were binary and here too no indication is given of validity and reliability when reporting findings.

Tahiri (2010) examined whether the learning environment at a university is conducive to transformative learning. Measurement was made with a survey and semi-structured

interviews. Data were gathered during holidays and in total 20 students and staff responded to the survey. Interviews were held with all respondents to explore reasons for responding either "yes" or "no" to survey questions. The questionnaire contained seven items for students (such as "Are you, as a student, ready for and open to change") and eight items directed to academic staff (for example, "Are you transcendent of your own beliefs and do you accept others' beliefs?"). Again, the survey is made up exclusively of "yes/no" items and reliability and validity are not reported.

Another study with an international-education flavour is that of Ogden (2010). The purpose was to assess the impact of faculty led international travel experiences (so called embedded programmes) on students' views of global citizenship, social responsibility, global competence and global civic engagement. Also, the intention was to measure the impact of embedded programs on academic self-concept and self-efficacy. According to Ogden, TL theory provides a sound conceptual framework on which to assess international experiences of learners in becoming global citizens. The design involved students on an embedded programme and those on courses not containing the embedded element.

Using factor analyses and taking care to assess content and construct validity (relying for the latter on confirmatory factor analysis), constructs of global citizenship and academic development emerged. These two constructs were theorized by Ogden (2010) to have roles in a Transformative Education Abroad Model (TEAM). The findings indicate the potential of international education experiences to transform students into global citizens and autonomous learners. Further, Ogden suggests the possibility that foreign learning experiences may qualify as triggering incidents. However, due to embedded elements typically lasting less than two weeks and students self-selecting onto embedded or other programmes, uncertainty remains as to the impact of foreign learning as a trigger for transformation. In particular, Ogden (2010, p.135) concluded "Overall the findings point to the presence of self-selection in the sample, suggesting that students in embedded courses are coming into these courses with already significantly higher levels of global citizenship". Ogden (2010) suggests that the scales he developed might be applied in a quasi-experimental setting where respondents on embedded courses are matched to respondents on other courses (Ho et al. 2007).

According to Ogden (2010), further research is needed to examine this across semesters of longer duration. The framework of the study is founded in global citizenship and self-

efficacy. As such, Ogden can only explore the central variables of TL *indirectly*, as evidence was not gathered on TL's core concepts. For example, it is not possible to draw implications or conclusions regarding the linkages between triggers, emotions and forms of reflection. However, his suggestion of international-educational experience as a potential trigger is suggestive of one area to be explored in the current investigation.

Table 3.3a indicates the broad usage of the LAS and the usage of instruments from disciplines other than adult education to infer perspective transformation. Within adult and higher education, few surveys were designed specifically for TL; and with one exception, there are no clear indications of construct validity (see definition above in Section 3.2) and factor validity (where "each measurement item correlates strongly with the one construct it is related to, while correlating weakly...with all other constructs" (Gefen and Straub 2005, p.92)). The exception is Ogden's (2010) use of the Global Citizenship and Academic Development Scale. However, even this instrument shares the deficiency of not measuring each central TL variable.

Author, Year	Study discipline	Name of instrument	Method	Inquiry
Anderson, 2009	Adult Education	LAS; Servant Leadership (SL) Questionnaire	Mixed methods	The propensity for a HE institute to develop SL qualities among students.
Brock, 2010; Brock and Abel, 2012	Adult Education	LAS	Mixed methods	Measuring precursor steps to transformation.
Brown 2005, 2006	Pre-service education	Cultural and Educational Issues Survey (Pettus and Allain 1999)	Mixed methods with phase one reporting of 59 Likert-type statements.	Explore effects of alternative pedagogies in developing pre-service educational leaders.
Cragg et al., 2001	Nursing	Professional Values Scale	Quantitative	Levels of perspective transformation of RN-to-BSN[1] nursing graduates through distance education.
Duerson et al., 1992	Gerontology	Facts on Aging Quizzes, FAQI and II	Quantitative	Assess students' misconceptions and knowledge about ageing.
Goldie et al., 2004	Medical Education	The Ethics and Health Care Survey Instrument	Quantitative	Determining the impact of modern medical education on students' ability to deal with ethical dilemmas.
Hodge 2010	Training Research	LAS	Qualitative dimension based on LAS	The role of trainers in the process of VET-oriented transformative learning.
Intolubbe-Chmil et al. 2012	International Education	PCESA[2] coursework guidelines, faculty and student designed instrument using four-point Likert scale.	Mixed methods	The impact of study abroad program on transformative learning experiences.
King 1997	Adult Education	LAS	Mixed methods	Establish learning activities that most impact perspective transformation.
Knapp and Stubblefield 2000	Gerontology	FAQI&II	Quantitative: 25 true/false items each.	Assess students' knowledge and attitudes on ageing.
Kumi-Yeboah 2012	Adult, Higher and International Education	LAS (adapted from King 1997)	Mixed methods	Examining factors that promote transformative learning of international graduate-level learners.
LaCava 2002	Adult Education	LAS	Mixed methods	Influence of internet on perspective transformation of adult ESL learners.

[1] Registered Nurse to Bachelor of Science Nursing

[2] The study abroad programme entitled People, Culture, and the Environment of Southern Africa.

Table 3.3a: Studies of perspective transformation

Author, Year	Study discipline	Name of instrument	Method	Inquiry
Ligon et al. 2009, 2014.	Gerontology	Older Adult and Aging Visual Analogue Scale	Quantitative	Students' attitudes towards older adults and the ageing process.
Mallory, 2003	Nursing	Attitudes toward care of the dying (Frommelt 1991, cited in Mallory 2003)	Quantitative	Impact of palliative education on nurses' attitudes towards care of the dying.
Morris and Faulk, 2007	Nursing	AACN Survey 1998	Qualitative: Open-ended survey questions	Professionalism between nursing students and learning activities that stimulate transformative learning.
Palmore 1977, 1980, 1981	Gerontology	FAQI and FAQII	Quantitative: 25 true/false items each.	Students' perceptions of ageing.
Odgen, 2010	International Education	Global Citizenship and Academic Development Scales	Quantitative	The extent to which embedded international education mediates global citizenship and enhances academic development.
Pettus and Allain 1999	Education	Cultural and Educational Issues Survey	Quantitative	Assessing teachers' attitudes concerning multicultural education issues.
Russell, 2014	Education	SATES[1] (adapted from LAS of King 1997)	Mixed methods	Assessing study abroad student experiences
Sanjay et al. 2008	Gerontology	FAQI	Quantitative: 25 true/false items each.	Evaluate associations between medical student views and experiences prior to medical school that may influence knowledge of geriatrics-related conditions
Schwartz, 2013	Language Education	LAS (adapted from Kumi-Yeboah 2012)	Mixed methods	Factors promoting transformative learning experiences of adult learners of foreign languages
Tacey, 2011	Educational Psychology	Instrument not named	Mixed methods: Dichotomous variables	Influence of international experiential learning on career and educational choices.
Tahiri, 2010	Higher Education	Instrument not named	Mixed methods: Dichotomous variables	Examining conditions that promote transformative learning.
Wansick, 2007	Online Education	LAS	Mixed methods	Establish if online Masters programmes evidence transformative learning.

[1] Study Abroad Transformative Experiences Survey

Table 3.3a (cont.): Studies of perspective transformation

It has been found that there are numerous concerns about the quantitative instruments presented in Table 3.3a. In summary:

- Reliability, construct and factorial validity are suspect or lacking.

- Multiple indicators of underlying constructs are not included.

- Frequently, the language used in instruments is close to the way Mezirow's transformational steps are framed.

- Using tick boxes and "Yes/No" responses to survey questions is suggestive of how to self-report experiences of them.

- Sample sizes are frequently inadequate.

In the rest of this chapter, an account is given of how these deficiencies are handled in the instrument designed to research the aims and objectives of Section 3.1. According to Nelson et al. (1992, cited in Denzin and Lincoln 2005), the context in which the research takes place is inseparable from the research questions. In this sense, when formulating aims and objectives, a consideration of context is needed, as context may inhibit an investigation and so not illuminate the objectives or the aim. Thus, in the section that follows, a description of the research site is provided, before going on to describe the research paradigm and the form of instrument used in the current research.

3.4 THE RESEARCH SITE

The study was conducted at a Swiss Hospitality Institute (SHI) located in a remote village in the German-speaking region of Switzerland. The location fosters an environment where students focus on their studies without many of the distractions common to educational institutions in metropolitan areas. Students reside, attend classes, collaborate on projects and undertake practical and extracurricular duties over a whole semester of study at SHI. A characteristic of the location is that close relationships are forged between students from various cultures and at different levels of study, which is often referred to locally as the "SHI family".

The language of study is English and studies are intensive, in that students undertake in either an 18 or 20-week semester, what is normally spread over two university semesters in the UK, normally of 30 weeks or more. The 18-week semesters run from August to December and the 20-week semester runs from February to June. Programmes are structured so that students take a semester of internship after completing the first undergraduate semester of academic study.

Two internships must be completed before beginning the final, Honours level. Many choose to take up to two more internships before commencing Honours study. Others choose to take two semesters of academic study consecutively. Further, students can take an internship after completing BSc (Hons). Postgraduate students have the right to internships in Switzerland following completion of the single taught semester they undertake. Most students take one or more internships in Switzerland, although internships are often located in Europe, China, Russia, the United Kingdom, the United Arab Emirates or the United States. SHI has an active careers centre that seeks internship opportunities and provides lifelong access to career services for all alumni as they develop their full-time careers. The staff of the careers centre maintains a worldwide network of contacts with hospitality organisations, which are used to match students to internship opportunities. Almost all SHI students locate internships via the careers centre.

In addition to the intensive and accelerated nature of academic study, extracurricular activities absorb large amounts of student time. Students manage their own accommodation within the two campus buildings as hotels, providing a full range of services including housekeeping, food and beverage, via kitchen duties and menu management, and front-office functions. In addition, students maintain teaching facilities, undertake laundry functions, staff the coffee shop, run a bar, serve in the restaurant and maintain the spa and pool.

Furthermore, under the guidance of the events manager, students create, plan, coordinate and deliver over 50 events each semester. Many events are internal and intended only for SHI students such as regular Friday entertainments involving culture-themed evening meals and parties afterwards. Other events are elaborate involving invited dignitaries, visiting academics and local business people. Such events include charity functions, a wedding event, academic conferences and gala events involving ambassadors of the nations from which SHI students come. Thus, students are involved in on-going practical training in hotel operations and events management. However, it should be noted that Honours and Masters students are not required to participate in these activities, but many choose to be involved in some on a voluntary basis.

At SHI, learning is time constrained and student centred. Students are guided towards learning resources by teachers, using them to answer their own queries, prepare for examinations and complete projects. Some projects are taken in groups and others are done individually.

Students are encouraged to "reflect actively" on learning, engaging peers and staff to achieve greater understanding. Lecturers report that the challenges appear to vary with cultural background. This may be more apparent in the intensive environment of study at SHI than elsewhere. Typically, more than 30 nationalities are represented among around 200 students who enrol in each semester.

The academic goal for the largest proportion of students is to graduate from SHI with a BSc (Hons) in International Hospitality Management. The degree is awarded by a partner university in the UK and is subject to UK QAA guidelines and quality benchmarks. Approximately 10% of students in a semester are post-graduate, studying for an MSc, awarded by another UK university. Further, programmes such as Culinary Management and a Postgraduate Degree in Events Management are offered to small numbers of students, accounting for no more than 5% of the total student population.

Transferral out of the learners' known environment, away from family and friends possibly for the first time, the intensive nature of academic activities, for many the initial experiences of operating a hotel-style facility, and immersion in event organisation suggest scope for Mezirowian "disorienting dilemmas". It is proposed in the TL literature that such experiences may have ramifications on how learners reflect on themselves and approach study (King 2000; Brown 2006). This may be the case for students in their earlier or initial semesters of study at SHI. For most undergraduate students the initial SHI experience is at Certificate level. Possibly, undergraduate students may have adjusted to a greater or lesser degree to the intensive learning environment over the following three study semesters at Diploma, Higher Diploma and Honours levels. Postgraduate students at SHI either progress from the undergraduate qualification taken at SHI or enter a programme directly. Masters students write a dissertation over the following two semesters, often while on internship or in longer-term, full-time employment elsewhere in the world.

The SHI research site can be described as a biotope. According to INSPIRE (2011, p.8), biotopes are "spatially delimited by specific ecological conditions, processes, structure, and life support functions that physically support ... [those] that live there". Further, drawing on Dictionary.com (2014), SHI may be characterised as "a portion of a habitat (or learning environment in the current context) characterized by uniformity in climate and distribution of biotic and abiotic components (physical and non-physical resources)" (Dictionary.com 2014).

Learners in the SHI "biotope" may feel isolated or alone, need to form new social, support and learning alliances, adjust to a new teaching and learning environment, adjust to many extracurricular demands and may need to draw on a wide range of new or different coping strategies to those used previously. Certain core TL experiences may manifest themselves explicitly in the biotope, so that these may be measured with an appropriately designed instrument. These are ontological and epistemological notions that will be explored in greater detail in the section that follows.

3.5 AN ONTOLOGICAL AND EPISTEMOLOGICAL PARADIGM FOR RESEARCHING TL

Much of the research into TL has been qualitative. As Merriam and Kim (2012, p.56) write this "is not surprising, given that, as with any new area of investigation, the characteristics and nature of the phenomenon need to be uncovered and described before we can assess the distribution of the phenomenon or test causal relationships". However, TL has been in existence for more than 35 years and Newman's (2012, p.37) severe summation is that qualitative investigations over this period "prove nothing". For Taylor and Cranton (2012, p.12) "much of the research is redundant". Moreover, qualitative approaches have failed to assess TL elements in a holistic manner and Cranton and Taylor (2012, p.12 and p.16) call for "a more unified theory" and "newer perspectives" to inform research designs that are less constructivist. One newer perspective might be a single focus on quantitative research from a post-positivist perspective. In this vein, Schwartz (2013, p.92) argued it is "adequate to employ quantitative method[s] to understand the relationship among variables" within TL.

Earlier, Taylor (1997a, p.43) suggested, "a quantitative approach could lead to greater reliability in the identification of the various components (critical reflection, perspective transformation, etc.) of transformative learning" and in Taylor (2000, p.322) he recognised that quantitative research "offers the potential for greater generalisability and the opportunity to see the relationship of transformative learning and other important variables". However, as noted in the review of studies in Section 3.3, there is interest in survey designs, with there being initial efforts to build relevant scales, surveys, and open-ended questionnaires to study TL (see also Taylor and Snyder 2012). Although caution is urged by Newman (2012, p.40) who pointed out that responses to King's LAS "based on self-assessment … will be subjective" and such "affirmations have no guaranteed validity". Hodgkinson et al. (2009, p.342) similarly took the view that self-reporting instruments are often "miss-specified" and issues pertaining to "underlying factor structures and scale inter-correlations" remain unresolved.

On taking up the recommendation to adopt a quantitative perspective, the part of a research paradigm concerned with how to investigate a research question is set. For Denzin and Lincoln (2005, p.22), paradigms encompass ontological, epistemological and methodological considerations that act as a "set of beliefs that guide action", such as deciding how to formulate and answer research questions. However, while method may be specified, taking a position on ontology and epistemology is not. The situation can be seen using a diagram of Fisher (2010), where on the vertical axis are shown combinations of assumptions about the nature of reality (ontology) with the nature of what we know (epistemology); while on the horizontal axis are represented methodologies, that is the full range of methods of seeking knowledge.
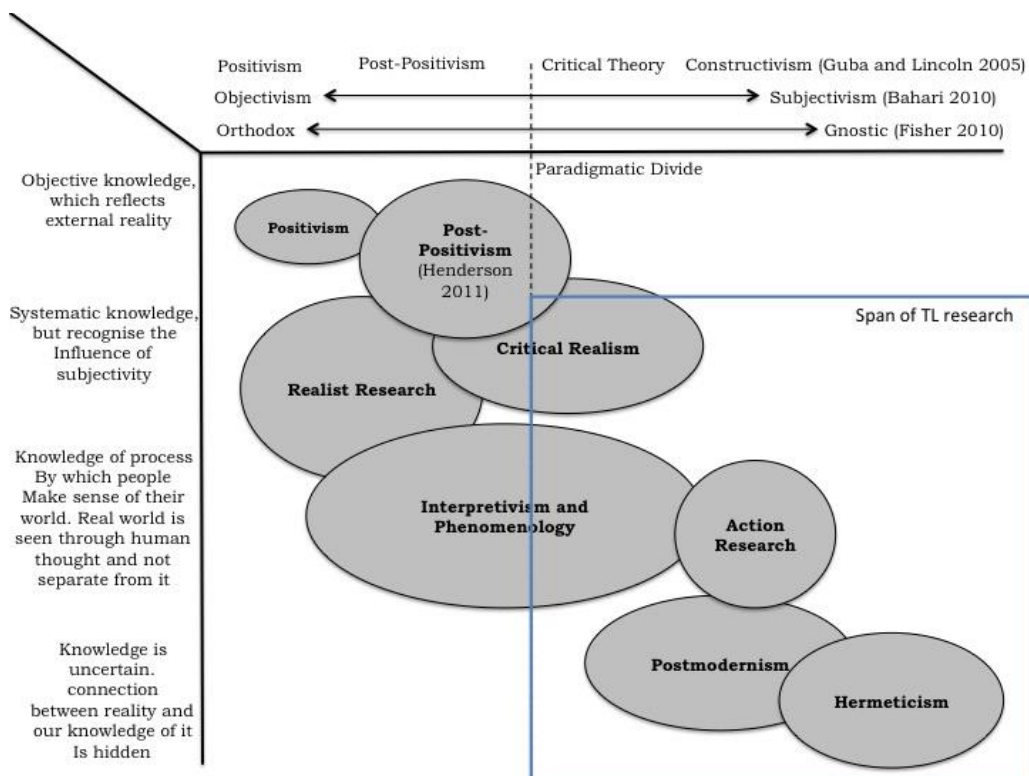
Figure 3.5a: Forms of Research (from Fisher 2010, p.17, expanding the nomenclature used for the methodological axis)

The recommendation that quantitative TL enquiries be undertaken locates the research paradigm broadly to the left of the dashed vertical line shown in Figure 3.5a. This is because quantitative methods are most closely associated with methodologies that are positivistically oriented (Quinlan 2011). Positivists would hold that "an accurate and value-free knowledge of things is possible … and that human beings, their actions and institutions can be studied as objectively as the natural world" (Fisher 2010, p.19).

Further, it is held that "general laws" emerge forming "an open and orthodox body of knowledge" (Fisher 2010, p.19), hence the label adopted by Fisher for the left of the methodological axis. (The label "gnostic" at the right of the spectrum was adopted by Fisher to reflect the emphasis on insight to oneself and others, with subjective processes being involved in gaining insight and that knowledge is hidden and not easily found in an uncertain and irrational world.) More usual terminologies are shown also on the horizontal axis drawing on Guba and Lincoln (2005) and Bahari (2010). Post-positivists share the positivist desire to theorise about the world, seek causality, make predictions, test hypotheses and generalise findings. However, they recognise and come "to terms with the subjective nature of research and the inevitable role of values in it" (Bahari 2010, p.20). In researching TL quantitatively, guidance from the many qualitative studies would suggest that (i) what can be discovered about the central variables of TL, (ii) known about the relationships between them and (iii) generalisation of them will be conditional. Nevertheless, the desire to advance knowledge in these areas led TL researchers to recommend a quantitative approach.

To work towards the attainment of this knowledge in a post-positivist enquiry, ontology and epistemology should be further considered. First, the knowledge to be sought has both implicit and explicit manifestations, represented along the vertical axis in Figure 3.5a around the label "systematic knowledge, but recognise the influence of subjectivity". Other research disciplines acknowledge interrelationships between hidden knowledge and surface manifestations of it. One example is research into the externalisation of implicit knowledge through facial expressions (Ekman and Friesen 2003; Tosey et al. 2005). That is, in the study of physiognomy, implicit knowledge is thought to be partially captured by observing facial expressions. At the research site – the biotope described in Section 3.3 – a similar effort will be made to obtain explicit indications of triggering incidents, emotional reactions and forms of reflection using the instrument described in Section 3.7.

Second, while much effort in TL has been constructivist, the intention is to apply the knowledge discovered to bring about change in individuals, organisations and societies (Cranton and Taylor 2012). As we saw, this led to a demand for alternate approaches to capturing knowledge in a more explicit manner (Taylor 1997a, 2000, 2007).

Within the biotope for the current research, experiences of the TL elements are likely to be similar, widely shared and have a range of identifiable explicit manifestations that can be measured with a suitably constructed instrument.

Third, as epistemologies verge towards the scientific, post-Kuhnian arguments by authors such as Suppe (2000, cited in Alvesson 2009, p.19) concerning the "semantic conception of science", assign an intermediary role to models. Data and theory are not directly compared; rather theories are compared to models, models to empirical data and vice versa. Alvesson (2009, p.22) states:

> "Theories can be adjusted if they do not fit the results of the model, or the model can be adjusted; models can also be revised if they do not correspond to empirical results, and new empirical results can be sought out for further checking if the current ones do not agree with the model".

Overall, in the current TL enquiry:

- Theory and earlier research, much of which is located broadly, but not exclusively, in the bottom two-thirds of Figure 3.5a (blue rectangle) spanning the vertical scale from *systematic knowledge* to *uncertain knowledge* and the horizontal scale from *critical theory to constructivism* (Cranton and Taylor 2012; Merriam and Kim 2012; Taylor and Snyder 2012). Further, it concerns young to middle-aged adults (Taylor and Snyder 2012). It therefore can serve as a pointer to research questions (Section 3.1), model formulation (Section 3.6), and instrument design (Section 3.7).

- Model formulation is rooted in a post-positivist milieu particularly because there are implicit and explicit features of the core TL elements, of which only the latter are measured. Ryan (2006) states a key feature of post-positivism is its unification of theory and practice and mirrors the representational ideology of positivist researchers. Nevertheless, care must be exercised in synthesising findings to inform practice.

- Design of a survey instrument to elicit information from generally young adult students in the biotope must be undertaken being mindful that much earlier quantitative TL research "lacked factorial validity". That is, identification of latent constructs discovered using an instrument that poses multiple questions on the same concepts (see Merriam and Kim 2012, p.48). The instrument should further cover the frequent deficiency in earlier endeavours of ignoring the role of the respondents' demographics such as home cultures (Taylor and Snyder 2012).

- Model testing will be via the positivist element within post-positivism, which "tries to link variables, tries to test theories or hypotheses and tries to predict" (Ryan 2006, p.21). That is, for the explicit knowledge elicited with the survey instrument, positivist statistical testing is used in the current research.

For example, statistical techniques are applied to assess factorial validity and the impact of demographic characteristics on the central variables, the relationships between them, and being able to generalise findings across demographic groups. On the evaluation of reliability and validity, the preferred method employs confirmatory factor analysis to assess composite reliability and discriminant and convergent validity (Anderson and Gerbing 1988; Fabrigar et al. 1999; Braun et al. 2012).

Positivism and post-positivism lie adjacent to each other in the figure, because post-positivism extends the more limited positivist position to incorporate constructivist assumptions accepting individuals as co-constructing their knowledge of reality (Ryan 2006). Proponents of post-positivism, such as Toulmin (1953) and Hanson (1958) believe that underlying law-like schemes (such as gathering data quantitatively and deducing results) can explain observed reality, yet knowing that is not all there is (cited in Alvesson 2009). Consequently, the post-positivist researcher seeks to reach beneath the explicit reality to comprehend implicit, deeper patterns or structures. According to Ryan (2006) the starting point for a post-positivist enquiry is asking *research questions* and doing so is guided by theory. The raft of research on TL is largely focused on understanding underlying structures. However, the aim in the current research is to reflect on underlying structures having investigated their surface manifestations.

According to Lobato (2008) theory development is essential in post-positivism, through the application of the scientific method (positivist contributions) and through theory verification (constructivist perspectives). On the positivist contribution:

> "Post-positivists still see bias-free inquiry as a goal and the scientific method as a crucial tool for eliminating the influence of bias from observation to the extent possible. The scientific method imposes standards of control that reduce the influence of the researcher's values and biases on the process of observation and interpretation enhancing the objectivity of the research" (Lobato 2008).

On the constructivist contribution, scholars reject:

> "the notion of the total confirmation of a theory because we are always observing only a small part of the world and hence can never know if the theory holds in every observable instance … a theorist should actively look for facts that are inconsistent with the proposed theory" (Lobato 2008).

Henderson (2011) highlights the potential use of mixed methods, although this is not mandatory in a post-positivist endeavour. Future constructivist efforts might be informed by the findings within this thesis that are based on inferential statistical testing of the patterns of responses to the instrument and the statistical testing of hypotheses (Sections 3.6, 3.7; Easterby-Smith et al. 2002). Although co-constructed knowledge has largely dominated TL, methodological gaps do exist and, as discussed earlier, these led to calls for more sophisticated survey designs and statistical testing. One desired outcome is greater certainty about reliability, validity and the scope for generalisation, these being issues of concern to researchers when reviewing earlier investigations.

Based on the initial research questions (Section 3.1) and guided by the literature on the central variables, a model is hypothesised within which to test the incidence of transformation and its impact on learner approaches to reflection. The formulation of the model draws on prior constructivist and quantitative research endeavours. In the next section, model design and hypothesis formulation are discussed.

3.6 THEORETICAL FRAMEWORK AND HYPOTHESES

A theoretical framework for the current research is given in Figure 1.2 and re-produced below in Figure 3.6. It includes four of the central variables in transformation theory discussed in Chapter 2. These are denoted as *g1*, *g2*, *g3 and g4*, with *g0* indicating demographic information on age, status, gender and culture. Further, the figure includes relationships between central variables considered by transformation theorists.
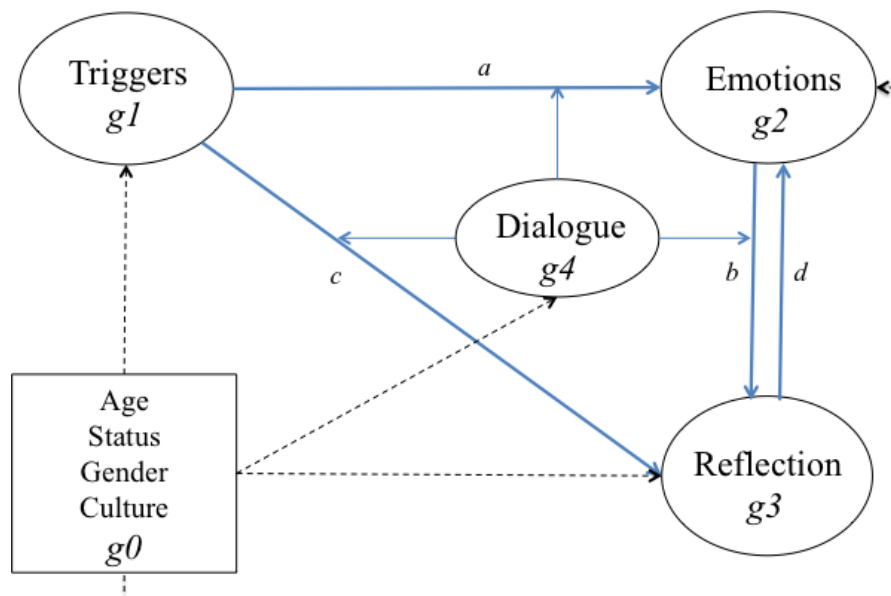
Figure 3.6 A transformational-learning model

In particular:

- from the earliest manifestations of theory, occurrences of disorienting dilemmas or triggers ($g1$) are seen as independent variables that precede transformation, influencing the forms of reflection ($g3$) that individuals adopt (Mezirow 1978; Section 2.3). Hence in the figure, an arrow (path c) is shown connecting $g1$ and $g3$;

- a mediated process involving linkages from triggers to emotions ($g1$ to $g2$) and onto reflection ($g2$ to $g3$) stylises the line of thinking that transformation is not a linear process involving only a direct path from trigger to reflection (King 2005), but that emotions play an important role (following paths a then b) (Mezirow 1994; Moon 1999; Dirkx et al. 2006; Taylor 2007; Kitchenham 2008; Mälkki 2010; Section 2.5);

- feedback between cognitive and affective domains (Cranton and Roy 2003; Peltier et al. 2005; Section 2.4) is encapsulated by the reciprocal or reversed linkages between forms of reflection and emotions ($g2$ to $g3$ and $g3$ to $g2$; paths b and d). "By recognising the interrelationship of cognition and emotion, we can give greater attention to what is most necessary: ways to facilitate the transformative experience" (Taylor et al. 2012, p.566);

- theorists have proposed roles for demographic variables ($g0$). Mezirow (1990), Cranton (2006), Aquino-Russell and Russell (2009), Jester and Hoggan (2009) and Mistry and Wu (2010) suggest immersion in other cultures may act as a trigger with significant effects on cognition; Mezirow (1998), Merriam (2004) and Cranton (2006) see cognitive ability and hence reflection as reliant on age; Brock (2010) perceived differences by gender on importance of triggers, experience with emotions and forms of reflection; King (2000) finds individuals' characteristics are related to the choice of persons with whom to enter into dialogue.

- for this study at SHI, data are gathered from students regardless of the level at which they study and status as either new to the institution or returning for another semester of study. Arguably these account for part of the variation in individual's experiences on $g1$ to $g4$ over a semester at SHI and so they are included in $g0$;

- moderators of the relationships between central variables that arise from dialogue with social actors are shown as arrows from $g4$ onto each of $g1$ to $g3$ in Figure 3.6). Taylor (2009, p.8) proposes dialogue as a "medium", although it is unclear how this occurs. Therefore in Figure 3.6 moderators are included, rather than "presuming that [facilitators] transmit some of the causal effects of prior variables [triggers] onto subsequent variables [emotion and reflection]" (Kline 2011, p.106). This choice is consistent with the views of Baumgartner (2002) on interactions in transformation.

It would be possible to test for mediating effects of facilitators, but there seems to be no basis in previous research for doing so at this time.

Using the framework of Figure 3.6, the objectives of this research are pursued by investigating the hypotheses of the following subsections with the methods outlined in each.

3.6.1 A RELIABLE AND VALID INSTRUMENT

Based on calls for measuring transformation with a reliable and valid instrument, the following hypothesis is posed first:

> H_{1a}: *Information gathered with the instrument described in Section 3.7 provides reliable and valid information on triggers, emotions, reflection and dialogue with social actors.*

This hypothesis will be tested by asking students to respond to banks of multiple survey items on each of triggers, emotions, reflection and facilitators. Next parallel analysis (PA) will be applied to decide how many latent constructs to extract, applying principal components analysis (PCA) and confirmatory factor analysis (CFA) to the gathered data. Also the inter-correlations, cross-loadings, reliability and validity of the factor structures are investigated (Brown 2006).

When performing PCA, it is common to rely on scree plots or the eigenvalue-one criterion (Brown 2006; Field 2009) to decide how many components to extract. Frequently, the first of these might not uniquely estimate the number and the second may overestimate the number, so that component structures in which "minor components appear to be major" are constructed (Fabrigar et al., 1999, p.278). The first of these has the additional problem that misreading the number may lead to extraction of too few components, but other criteria used to assess the effectiveness of PCA, for example the percentage of variance explained, usually indicates that the PCA has not performed well. Alternatively, a researcher might decide arbitrarily how many components to seek with PCA; but doing so might introduce researcher bias. To avoid these issues, Horn's parallel analysis (PA) (Hayton et al. 2004, Dinno 2009) is used, as it considered the most accurate approach (Basto and Pereira 2012, Fabrigar et al. 1999, Schmitt 2011).

Once the number of components has been determined, then in line with generally agreed rules an item is omitted from forming a component if:

- its communality is not at least 0.5;
- its loading onto one component is not at least 0.5;
- it has cross-loadings onto two or more components that exceed 0.4; and
- there are differences in its loadings of less than 0.2 (Fabrigar et al. 1999; Harrington 2009; Field 2009).

Thereafter, varimax rotation is applied (Field 2009). It is common practice in a range of disciplines to rely on PCA as an indicator or validity (Matheson et al. 2014). However, as Braun et al. (2012, p.4) point out, CFA compared to PCA provides a "strong" approach to validity. Further, with CFA the correlations between latent constructs can be measured; co-variation of error terms in the estimation process can be obtained; the statistical significance of factor influences on observed survey items can be tested, including the relevance of cross-loadings onto observed items most closely associated with other factors; indicators of reliability can be derived; and convergent and discriminant validity can be assessed, where respectively these are "the extent to which responses from alternative measurements of the same construct share variance" and "the degree to which two measures designed to measure similar, but conceptually different constructs are related" (Slavec and Drnovšek 2012, p.62). If reliable and valid factors emerge from the investigation of H_{1a}, then it becomes realistic to seek variations across groups of students by examining the next hypothesis:

> H_{1b}: *Factors identified for triggers, emotions, reflection and dialogue are invariant across groups based on age, status as new or returning student, gender and culture.*

Investigation of this hypothesis will provide evidence on the effects of student characteristics on central variables. Further, there is the possibility of determining if multiple items and latent factors measure consistently or invariantly across categories of respondents. To do this, CFA is extended to include covariates using either multi-group CFA (MGCFA) or MIMIC (a mnemonic for Multiple Indicator Multiple Causes) approaches to estimating the effects of background covariates on latent factors (Brown 2006). MGCFA estimation can be problematic when the numbers of individuals with each value of a background characteristic, such as culture, are small. This is because the multi-group approach uses multiple variance matrices to estimate sub-samples based on incidence of the characteristic.

MIMIC on the other hand involves only one covariance matrix and can cope with smaller sample sizes for a dummy variable associated with a student characteristic (for example, being from a Confucian heritage culture or not). Moreover only differences in observed variable intercepts and factor mean scores can be detected across groups defined by such dummy variables (Brown 2006). Nevertheless, in this case a view can be formed on whether the instrument on average provides equivalent measurements of underlying latent constructs across the different groups that make up the heterogeneous SHI population. When multi-group estimation is appropriate, all aspects of invariance can be investigated, that is invariance of factor means, loadings, intercepts, variances, covariances, and error variances.

Hypotheses H_{1a} and H_{1b} concern the structure of latent constructs underlying the central variables $g1$ to $g4$ in Figure 3.6 and the influence of student characteristics ($g0$) on them. In the next subsection, hypotheses on the relationships between $g0$ to $g4$ are formulated and the means of assessing them set out.

3.6.2 RELATIONSHIPS BETWEEN CENTRAL VARIABLES

Null hypotheses for the relationships or linkages between the central variables in Figure 3.6 can be written as follows:

> H_{2a}: *Triggers (that is disorienting dilemmas) that occur have no influence on emotions experienced or forms of reflection adopted (path a and c).*
>
> H_{2b}: *Emotions do not mediate the relationship between triggers and reflection (path a and b).*
>
> H_{2c}: *Dialogue with social actors does not moderate the relationships in the model of Figure 3.6 during a semester at SHI.*

The system of equations specified in Figure 3.6 can be estimated with a structural equation model (SEM), in which there may be interaction effects modifying the influences of the central variables and the possibility of direct and indirect effects of triggers on forms of reflection. These can be handled straightforwardly using standard forms of SEM estimation (Brown 2006; Kline 2011). However, the possibility of reciprocal linkages between emotions and reflection adds a complication that requires a two-stage analysis. In the first stage, each of the reciprocal linkages is ignored in turn and the remaining relationships in Figure 3.6 are estimated; in the second stage, the reciprocal linkages in Figure 3.6 are estimated jointly.

Including both reciprocal linkages produces a non-recursive structural equation model (SEM), in which the errors of estimation for emotions and reflection are correlated, violating one assumption of estimation procedures, and the entire system of equations may not be identified (Kline 2011) That is, each of the unknowns in a SEM cannot be written in terms of the available data on variances and covariances (Kline 2011).

The first-stage analysis of including the reciprocal linkages separately will provide an indication of the strength of each relationship in the reciprocal pair. If feedback is substantial, then for cross-sectional data gathered at one point in time at SHI, in stage 2 instrumental variables are required (Kline 2011). To provide a range of possible instruments, additional information was gathered on self-efficacy and kinds of knowledge (KoK, Section 2.1; Cranton 2006; Astin et al. 2007). These variables or possibly some of the other central variables might serve as instruments (variables that correlate with an independent variable of interest, for example a form of reflection that might be proxied by say self-efficacy, but which does not correlate significantly with the outcome of emotional response). For example, if it transpires that triggers do not influence reflection but directly affect emotions, then triggers could serve as instruments in the estimation of emotions in the reciprocal system (Kirby and Bollen 2009; Kenny 2012).

Instrumental-variable estimation is considered in Chapter 4, where the influences of a range of variables on emotions and reflection are clarified. On the other hand, as discussed in the next two sections of this chapter, it was possible to gather data from SHI students on the central variables before, as well as after, arriving for a semester of study. It is therefore viable to take another approach to estimating possible feedback between emotion and reflection. As data were gathered on only two occasions, the version of this alternative approach is known as autoregressive, cross-lagged estimation (Hancock and Mueller 2006; Kline 2011). Using the instrumental-variables or autoregressive approach, an attempt will be made to test the hypothesis that:

> H_{2d}: *Forms of reflection and emotions are not reciprocally related (path b and d).*

The evidence for this and the other hypotheses of this section is presented in Chapter 4. Next, the construction of the survey instrument is described.

3.7 DESIGN AND DEVELOPMENT OF THE INSTRUMENT

A feature of the research is the instrument designed to gather data on the variables of interest to TL theorists. It is called the Transformative Instrument Student Survey (TISS). To obtain a large number of responses for the analysis of the hypotheses in the previous section, responses to the instrument were sought from students in each of three semesters, these being the first and second semester in 2012 and first semester of 2013. The length of the TISS and administering it three times led to an information source that was of the order of a "big data" set. These are typically very large and "offer data and insights that could not be obtained in other ways" (Parks 2014, p. 355). The data collected went beyond the aims of this research, allowing for future exploration of variables and conjectures in the area of research.

Students were asked to complete the TISS on two occasions during a semester. The first administration was scheduled for week 3. Week 1 is an orientation week, when the regular pattern of classes and extracurricular duties is not followed, so when they first did the TISS they had just two weeks experience of the routine of their current study and extracurricular activities, although it can be reasonably said respondents were three weeks into establishing the patterns of their arrangements. At this first administration, students were asked to report on their experiences or developments in relation to the central transformational variables prior to the commencement of the semester. Also, in week 3, they reported the emotions they felt in relation to their current studies. Second, in week 17, while immersed in the current routine of their lives and three weeks from the end of semester, students did the TISS again reporting on the central variables, however this time for the current semester.

The reason for two administrations is that the first completion of the TISS establishes values for the central variables before commencing current studies. This information is required for one approach to investigating potential non-recursive feedbacks between emotions and reflection. The second administration provides data with which to estimate the model set out in Figure 3.6, except for the reciprocal linkages. In both administrations, students were asked to respond to a common bank of statements, which are summarised in Section 3.71 below, in Table 3.7a. The entire questionnaires for the two administrations are included as Appendices 1 and 2.

Researchers are often left with two options when developing surveys and survey items; either design and validate new survey items, or employ existing survey material, provided it is appropriate for the context (Braun et al. 2012). For the purpose of this inquiry, an integration of both approaches was adopted. In terms of new survey items, attention is drawn to rows 2 to 4 and 7 of Table 3.7a. Twelve items each on potential triggers and possible emotions were devised by the author and included in the TISS.

In terms of using existing survey material, sources were either previous studies specifically of TL or second, specialised fields beyond TL with the provision that these had been shown to be reliable and valid. In both cases, statements were adapted as required to suit the research context. An example of the first is drawing items regarding likely triggers from the LAS designed by King (2007) specifically to investigate TL; an example of the second is adopting statements from the instrument of Pekrun et al. (2011) on the role of emotions in student learning. The example of using material from King (2007) is indicated in row 2 of Table 3.7a and statements on emotions drawn from Pekrun et al. (2011) are indicated in rows 4, 6, 7 and 10 of the table. Each questionnaire includes eleven sections. A description follows of each, commencing with the central TL variables.

3.7.1 TRIGGERS

The construction of trigger items for Section TI A of the instrument can be seen to draw on other earlier research in addition to King (2000). Of the 26 items on likely triggers, the twelve indicated in Table 3.7b as sourced from the SHI context, are those devised by the author following his reading of earlier research, his knowledge of the learning environment and preliminary discussions with academic staff and students at SHI.

Triggers one to three and 16 to 18 originate from earlier research by Jester and Hoggan (2009) on characteristics of triggering incidents as precursors to transformation. Other items used by them, such as "engaged in critical dialogue with others" and "engaged in reflective introspection" are included in Sections TI B and TI D of the TISS on facilitators and reflection. An amendment to the wording of trigger two and three was necessary as Jester and Hoggan originally formulated this as "a success or failure at work". This item is divided, capturing success and failure as separate dimensions. Similarly, as learners are not engaged in remunerated work, these statements are rephrased for application within the SHI academic setting and they thus include reference to "academic work".

Measurement items	Figure 3.6 notation	Survey Section	Description	Source
Characteristics	*g0*		Age, status, gender and culture	
Triggers	*g1*	TI[2] A	26 items rating the importance of triggering incidents on five-point Likert scales	CSBV[1] Survey 2007; King 2000; Jester and Hoggan 2009; Duffy, Houston and Rimmer 2012.
Facilitators	*g4*	TI B	Ten items measuring facilitators of transformation via five-point Likert scales	Cranton 2006; Mezirow and Taylor 2009; Jester and Hoggan 2009; Closs and Antonello 2011
Emotions relating to triggers	*g1-g2*	TI C	20 emotions relating to triggers measured with dichotomous responses	AEQ[1]; Coy 2012.
Critical reflection on triggers	*g1-g3*	TI D	Four items assessing critical reflection, measured using five-point Likert scales	CRQ[1]
Emotions	*g2*	PS A	Eight items concerning emotions towards studying via five-point Likert scales	AEQ[1]
Emotions	*g2*	PS B	20 emotions on study using dichotomous variables	AEQ[1]; Coy 2012.
Forms of reflection	*g3*	PS C	16 items in four groups assessing current use of habitual action, understanding, reflection and critical reflection measured via five-point Likert scales.	CRQ[1]
Kinds of knowledge	n/a	AT A to AT I	Nine short sections examining content, process and premise reflection of instrumental, communicative and emancipatory learning respectively using five-point Likert scales	Habermas 1981; Cranton 2006.
Emotions relating to current studies	*g2*	SN	Eight items on emotions towards current studies using five-point Likert scales	AEQ[1]
Self-efficacy	n/a	T	18 items of self-efficacy via five-point Likert scales	CSBV[1]

[1] College Students' Beliefs and Values (CSBV: Astin et al. 2007); Achievement Emotions Questionnaire (AEQ: Pekrun et al. 2011); Critical Reflection Questionnaire (CRQ: Kember et al. 2000).

[2] TI is shorthand for triggering incident; PS is shorthand for previous studies; AT is shorthand for action and thinking; SN is shorthand for study now; and T is shorthand for traits

Table 3.7a: Instrument design

Nr	Trigger	Source
1	A major change in my social role or status	Jester and Hoggan 2009
2	An important success in my academic work	Jester and Hoggan 2009
3	An important failure in my academic work	Jester and Hoggan 2009
4	A success related to my duties	SHI context
5	A failure related to my duties	SHI context
6	A success related to a job opportunity	SHI context
7	A failure related to a job opportunity	SHI context
8	A success related to a promotion	SHI context
9	A failure related to a promotion	SHI context
10	A success related to a pay rise	SHI context
11	A failure related to a pay rise	SHI context
12	A success related to planning a school meeting or social gathering	SHI context
13	A failure related to planning a school meeting or social gathering	SHI context
14	A success related to taking part in an event	SHI context
15	A failure related to taking part in an event	SHI context
16	A traumatic or catastrophic personal happening	Jester and Hoggan 2009
17	The influence on me of different cultures	Jester and Hoggan 2009
18	A change through living in an international environment	Jester and Hoggan 2009
19	A romantic relationship	CSBV 2007
20	A personal injury or serious illness	CSBV 2007
21	A parental divorce or separation	CSBV 2007; King 2000
22	A death of a close friend or member of family	CSBV 2007; King 2000
23	A conversion to another religion	CSBV 2007
24	A change in personal financial status	King 2000
25	A change in employment of one (or both) of my parents	King 2000
26	A change in financial status of one (or both) of my parents	King 2000

Table 3.7b: Section TI A of the TISS

Triggers four to 15 similarly separate experiences into successes and failures. Low (2000) amongst others, acknowledges that successes and failures have dissimilar effects on student learning (Hattie and Timperley 2007; Kitching et al. 2009; Pekrun et al. 2009). Furthermore, Kuh (2008, p.13) stated that "student development is a cumulative process shaped by many events and experiences, inside and outside the classroom". In accordance with Kuh and Section 2.2 on TL within higher education, these items concern triggers based on student responsibilities within the SHI context.

The TISS statements on outcomes relating to academic work, duties, school meetings, social gatherings and events were all framed to capture students' feelings about success or failure in activities that occurred on campus at SHI. TISS items on job opportunities, promotions and pay relate to the environment beyond SHI, but frequently would concern vocational or internship appointments arranged while on campus. For students who were seeking internships (that is their job opportunities), the notions of promotion refers to attaining desirable positions such as preferring front-office duties to rooms maintenance, or attaining internship roles with greater levels of responsibility. Similarly, pay rises for these students refer to having internship opportunities with higher remuneration than available in other positions, or are increases to what they received previously. Other students may well respond to the TISS items from the perspective of locating full-time posts from which to build careers. Their points of comparison on promotion and pay would likely be with outcomes achieved while on earlier internships. Insight to the forms of response to these items on job opportunities, promotion and pay, were obtained during the pilot stage, and in the preliminary discussions mentioned above.

Next, triggers 19 to 23 were extracted from the "College Students' Beliefs and Values Follow-Up Survey" (CSBV, Astin et al. 2007), designed to assess belief and value changes in students' lives at US colleges. Although specifically designed for the US context, they have wider application (Matheson et al. 2014). The five items (A romantic relationship, A personal injury or serious illness, A parental divorce or separation, A death of a close friend or member of family, A conversion to another religion) were included in the TISS because they seemed relevant to students joining the international and multicultural environment of SHI away from their normal social and family circles. Statements such as "joined a social fraternity or sorority" were however thought to be irrelevant for students at the research site.

Also, triggers 21 and 22 in Table 3.7b were identified as relevant in King's (2000) study of adults learning English as a second language. In this study, respondents reported divorce/separation and death of a loved one as important life changes that contributed to transformation. King's 139 respondents further indicated that immigration and move ranked highest. Because King's study was of learners of a second language among immigrants to New York, the statements on immigration and moving were not used in the same form in the TISS. Rather, it was decided that statements 17 and 18 captured the notions of relocation in more appropriate forms for students at SHI.

Finally, triggers T24 to T26 were extracted from King's (2000, p.82) findings, related to change in a job and loss of a job. These items were relevant to 26.7% of her participants and it was thought possible these might affect students at SHI in earlier spells of work or internships. During the preliminary discussions, the importance of parents' jobs and financial positions were mentioned in sustaining support for students' study. Students further reported on their own financial contributions towards their studies, which often were accumulated during internships. It thus seems plausible to investigate the nature of personal and parental changes related to financial and job situations as triggers for transformation.

3.7.2 EMOTIONS

The sections in the TISS dealing with emotions are predominantly based on the work of Pekrun et al. (2009, 2010, 2011) using material from the Achievement Emotions Questionnaire (AEQ, Pekrun et al. 2011), which was devised to measure positive and negative emotions in academic situations (Pekrun et al. 2010). Pekrun has published extensively in this area since 1985 in relation to emotions and education (Pekrun 1985, Jerusalem and Pekrun 1999, Stöber and Pekrun 2004, Schutz and Pekrun 2007, Schutz and Pekrun 2010, Pekrun et al 2011, Linnenbrink-Garcia and Pekrun 2011, Pekrun and Linnenbrink-Garcia in-press, Pekrun 2014).

AEQ elements were considered appropriate for the TISS as there is empirical evidence of the instrument measuring positive and negative emotions in a reliable and valid manner, although issues with poor fit to the data were evident (Pekrun et al. 2011). Furthermore, as presented in the theoretical framework (Section 2.5.3), numerous authors have proposed that emotions directly influence reflection (Isen 1987; Scherer 1994 in Ekman and Davidson 1994, Fredrickson 1998; Lord et al. 2002; Pekrun et al. 2009).

The AEQ consists of three sections each testing emotions experienced in three learning circumstances, namely class-related emotions, learning-related emotions and test emotions (Sections 2.5.2 to 2.5.5; Schutz and Pekrun 2007, Pekrun et al. 2011). Eight items on five-point Likert scales capture positive and negative activating and deactivating emotions (enjoyment, hope, pride, anger, anxiety, shame, hopelessness, boredom) in the three learning circumstances. Positive-activating emotions (enjoyment, hope, pride) are thought to result in both intrinsic and extrinsic motivations that promote alterations in learning approaches.

Conversely, negative-deactivating emotions (hopelessness and boredom) are thought to result in reduced intrinsic and extrinsic motivation, thus negatively influencing information absorption, or even completely impeding the learning process. The negative emotions anger, anxiety and shame are posited to reduce intrinsic motivation, but strongly affect extrinsic motivation, thereby promoting strategic learning in an attempt to avoid failure (Duffy et al. 2012). The eight statements on learning-related circumstances adopted for the TISS are given in Table 3.7c.

The reasons for not including statements relating to class and test circumstances are that first respondents were immersed in a biotope with all of their day-to-day class, learning, assessment and living arrangements occurring in the same environment, suggesting that overall attitudes and emotions towards learning as part of the whole of life are most relevant. Second not including items on class and test emotions offered a means of reducing the length of the instrument. As goals are to establish the mediating role of emotions between triggers and reflection, and to examine the reciprocal relationships between emotions and reflection, learning-related emotions appeared to be the most suitable to include in the TISS.

I enjoy acquiring new knowledge
I have an optimistic view toward studying
I'm proud of my capacity
Studying makes me irritated
I get tense and nervous while studying
I feel ashamed that I can't absorb the simplest of details
I feel hopeless when I think about studying
The material bores me

Table 3.7c: The Achievement Emotions Questionnaire (AEQ: Pekrun et al. 2011)

As part of one strategy for estimating reciprocal relationships, the eight Pekrun statements are incorporated into the TISS, when it is first administered in week 3, to gather information on emotions associated with study both:

(I)   before the current semester (PS A), using the preamble: Now to change direction, think about your *previous studies* (PS). Please rate yourself on the following statements.

(II)   and in Section SN on study now, students are asked, with the preamble: "Think about *how you study now*. Please rate yourself on the following statements".

At the second administration in week 17, students respond to the Pekrun statements again in relation to their current studies (in Section SN A), so providing an indication of change over the intervening 14 weeks.

After consultation with academic colleagues at SHI and reading a dissertation on learning at SHI (Coy 2012), it was decided to add to the material gathered on emotions. The intention was to examine the relevance of other emotions to disorienting dilemmas and learning at SHI, so offering an avenue for extending the range of statements on emotions. Pekrun reinforces this, arguing for the inclusion by educators of a "broad variety of emotions" (Pekrun et al. 2011, p.46).

Consequently, in Sections TI C and PS B, summarised in Table 3.7a, students were asked to respond to 20 single words describing emotions they may have felt in association with their studies and when experiencing triggers. Included among the 20 single words are eight describing the emotions used by Pekrun and colleagues. The additional words describing emotions were fun, happiness, fulfilment, neutrality, positive, frustration, satisfaction, worried, upset, sad, unfair and disappointment.

3.7.3 REFLECTION

Sections of the instrument concerning reflection are based on the Critical Reflection Questionnaire (CRQ) by Kember et al. (2000). The CRQ consists of four scales measuring habitual action, understanding, reflection and critical reflection as discussed in Section 2.4. Each scale comprises four statements with five Likert responses (see Table 3.7d). Although relatively recent, the CRQ was shown to be a reliable and valid instrument. The development of the scale drew extensively on concepts from Mezirow (1981) and is consistent with the theoretical framework discussed in Sections 2.1 and 3.6. Kember et al. excluded the affective domain, despite their acknowledgment of its importance in developing reflective thinking. One aspect of this decision concerned brevity; the other was that they wanted to concentrate with their instrument on assessing whether students engage in reflective thinking and the extent of this.

Habitual Action
When I am working on some activities, I can do them without thinking about what I am doing
When learning the class did things so many times that I started doing them without thinking about it
As long as I can remember hand-out material for examinations, I do not have to think too much
If I follow what the lecturer says, I do not have to think too much in my studies

Understanding
My previous studies required me to understand concepts taught by the lecturer or teacher
To pass previous courses I needed to understand the content
I needed to understand the material taught by the lecturer or teacher in order to perform practical task
In previous courses I had to continually think about the material being taught

Reflection
I sometimes questioned the way others did something and tried to think of a better way
I liked to think over what I was doing and consider alternative ways of doing it
I often reflected on my actions to see whether I could have improved on what I did
I often re-appraised my experience so I could learn from it and improve for my next assessment

Critical Reflection
As a result of my last course I have changed the way I look at myself
My last course has challenged some of my firmly held ideas
As a result of my last course I have changed my normal way of doing things
During the last course I discovered faults in what I had previously believed to be right

Table 3.7d: The Critical Reflection Questionnaire (CRQ: Kember et al. 2000)

The CRQ was separately incorporated into the TISS with the intention of measuring levels of reflection separately from emotions and to assess the theoretical possibilities in TL concerning mediated and feedback linkages involving triggers, emotions and reflection. In Section TI D four critical reflection statements are included on the effect of triggers. This was done to check if triggers directly affect changes in critical reflection, which is considered to be central feature of transformation (Closs and Antonello 2011). In Section SR, students were asked to respond to all 16 statements in the CRQ on habitual action, understanding, reflection and critical reflection in both the first and second administration periods. Changes in forms of reflection during a semester of study are needed as part of one strategy for testing the reciprocal relations in Figure 3.6..

3.7.4 FACILITATING TRANSFORMATION

Variables that facilitate the process of transformation are discussed in Section 2.6 and represented as construct *g4* in Figure 3.6. Mezirow (1978, cited in Mezirow and Taylor 2009), Baumgartner (2002), King and Wright (2003) and Baumgartner (2012, cited in Taylor 2012) collectively argue for the role of trusting others in facilitating transformation. These include family, parents and friends and are seen as crucial to learning and self-development (Baumgartner 2002, Cranton and Carusetta 2004).

Essential to transformation are meaningful discussions and realising one is not alone in thought or feeling (Mezirow 2012, cited in Taylor 2012). Section TI B of the TISS is about possible facilitators of the effects of triggers. The statements are presented in Table 3.7e. Seven statements (those numbered one and three to eight) are extracted from Jester and Hoggan (2009). The second statement includes the spiritual dimension ("The triggering incident was spiritual") as it is postulated by Dirkx et al. (2006, p.125) to form the "soul work or inner work" of transformation. Similarly the CSBV (College Students' Beliefs and Values survey, Astin et al. 2007) is based on the premise that spirituality is relevant to higher education study. It is therefore conceivable that spiritual dimensions facilitate transformation.

The final two items in Section TI B are related to problem solving. According to Close and Antonello (2011), aptitude in problem solving is a function and apprehendible output of transformation and this has only rarely been tested. They argue for the importance of these skills for learners and reinforce the necessity of problem-based learning within educational programmes. Close and Antonello (2011) build on Mezirow's content, process and premise reflection (Section 2.4) and acknowledge the contribution of forms of reflection to improved problem-solving skills as indicators of transformation. It thus seemed plausible to test problem-solving statements as facilitators of the transformational process in Section TI B.

1	I realized that I had to think about things differently
2	The triggering incident was spiritual
3	I have thought about this triggering incident more than once since it happened
4	I have spoken to my friends about this triggering incident
5	I have spoken to my family about this triggering incident
6	I have spoken to my fellow students about this triggering incident
7	The discussions I had with friends, family and/or fellow students were meaningful
8	I am not alone in my thinking and my feelings
9	I am more aware of the importance of being able to solve problems
10	Going through this important triggering incident has given me the skills to solve problems

Table 3.7e: Section TI B in the TISS: Facilitators of the effects of triggers

3.7.5 KINDS OF KNOWLEDGE (KOK) AND SELF-EFFICACY

In the final sections of the instrument, students were asked to respond to statements concerning Habermasian kinds of knowledge (AT A to AT I, see Section 2.4) and self-efficacy (T)(Habermas 1981). Survey items for the first of these are drawn from Cranton (2006), who along with Kitchenham (2008) acknowledged that Mezirow did not consider kinds of knowledge (KoK) to be central in revisions of his theory, preferring to emphasise critical reflection (see Table 3.7e). However, Cranton (2006) reports feedback from students on KoK to be very helpful in practice. Given this, it was decided to gather information that might inform practice and instructional design, but might also contribute additional insight on how students' learning had evolved. KoK along with information on self-efficacy, are also candidates for potential instruments when estimating reciprocal relationships between emotions and reflection.

In Table 3.7f the nine KoK initially proposed by Cranton (2006, p.37) are indicated. These formed a framework around which items in Section AT A to AT I were constructed. Based on content, process and premise reflection, the author devised nine sets of reflective statements to include. These are summarised in Table 3.7g below. Under each of the nine reflective questions, further scale items were designed to measure each form of reflection and knowledge. One statement from each section is shown in Table 3.7h. The full range of statements is presented on the fourth page of the TISS in Appendix 1.

Reflection	Kinds of knowledge (KoK)		
	Instrumental	Communicative	Emancipatory
Content	What are the facts?	What do others say about this issue?	What are my assumptions?
Process	How do I know this is true?	How did I integrate others points of view?	How do I know my assumptions are valid?
Premise	Why is this knowledge important to me?	Why should I believe in this conclusion?	Why should I revise or not my perspective?

Table 3.7f: Kinds of knowledge (KoK) according to Cranton (2006, p.37)

Section	Questions for kinds of knowledge (KoK)
AT A	What were the facts?
AT B	How do I know the facts were true?
AT C	Why were the facts important to me?
AT D	What did others say about the course and/or the facts?
AT E	How did I integrate other points of view?
AT F	Why should I believe in this conclusion?
AT G	What were my assumptions (about successfully completing the course)?
AT H	How do I know my assumptions are valid?
AT I	Should I change my assumptions, they way I think and the way I do things?

Table 3.7g: Reflection questions for kinds of knowledge (KoK)

AT A	"I preferred learning the important facts in my last course"
AT B	"I questioned if the facts were true"
AT C	"I needed the facts for an examination or to use in an essay"
AT D	"I believed others to know more than me"
AT E	" I listened to what other students told me"
AT F	"I assumed other students had more knowledge than me"
AT G	"I was realistic about what I can achieve"
AT H	"I know things are true because I have experienced them"
AT I	"If I don't change myself, I might fail my studies".

Table 3.7h: Example statements on kinds of knowledge (KoK)

Finally, statements on self-efficacy (T) were drawn from the CSBV (Astin et al. 2007) and are shown in Table 3.7i. Like KoK, this group is an additional element that does not lie among the central variables for this investigation. Also like KoK, the 18 statements were included to provide data on possible instrumental variables that might be used in the analysis of reciprocal linkages.

Traits	
Academic ability	Self-confidence (intellectual)
Cooperativeness	Self-confidence (social)
Creativity	Self-understanding
Drive to achieve	Understanding of others
Kindness	Reading and Writing ability in English
Leadership ability	Teamwork
Mathematical ability	Interpersonal skills
Physical health	Optimism
Public speaking ability	Popularity

Table 3.7i: TISS Section T: Traits and self-efficacy

In the next section the process of data gathering with the TISS is reviewed.

3.8. DATA COLLECTION AND SAMPLE

Prior to administration, a pilot study was conducted with eight students at the research site testing for respondent understanding of statements, ambiguity of items, clarity, instrument layout and completion times. The average completion time was 22 minutes and minor changes were made to the layout and formulation of two items following review of responses and comments from members of the pilot group.

To investigate the possibility of feedback or reciprocal linkages between affective states and forms of reflection, as considered in Section 2.5.1 of the literature review, data were required from students on two occasions. To gather two waves of data, the survey was administered to students in Week 3 and Week 17 of semester. To ensure matching of students' two completions of the five-page instrument, a cover page was included on which students were asked to write their names and levels of study. This information did not appear on any other page of the survey and once completed by students, these cover pages were not seen by the author.

After obtaining the written permission of the academic dean (Appendix 3) and with the cooperation of class teachers, the author met students either as a class was finishing, or immediately afterwards. The author gave students a short description of what was involved and asked for their cooperation in completing the survey.

The surveys were then distributed by a "survey gatherer", who was either the class teacher or a student in a supervisory role[2] within SHI. Completed surveys were gathered by the survey gatherer who assisted further by writing a code for each respondent, supplemented with an abbreviation for "new" or "returning", on the survey. Front pages were detached and passed to the administration manager (AM[3]). The remaining pages were given to the author for coding purposes. At the second administration in each semester, a survey gatherer distributed questionnaires and gathered completed surveys. The survey gatherer wrote the unique identifier for each student on the surveys, subsequently removing front pages and passing them to the AM.

At the conclusion of this two-stage administration the master list of codes and students' names was deposited with the initial director of studies, who retains them on a password protected computer. Both the director of studies and the AM checked whether students had completed the survey more than once across semesters. Where this was the case the later surveys were removed.

After each wave of collection, data were cleaned, coded and stored in comma delimited Excel files that could be imported to SPSS and R modules. A summary of the sampling strategy and responses is given in Table 3.8a.

The process used to gather data ensured the author did not know who had completed the survey on either occasion, so ensuring student anonymity and confidentiality throughout the data analysis. In sampling terms, the approach to gathering data was non-random and purposive. The approach was non-random because survey gatherers visited classes and gathered responses for as many students as chose to complete the instrument, rather than possible participants being chosen randomly from a list of all enrolled students. The approach was purposive because the researcher took the view that data were required on central variables from students at all levels of study and that this could be gained by visiting classrooms.

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[2] Students with a supervisory role on the "Manager in Training" programme focussing on management skills needed within the hospitality industry. They have a function regarding the daily operations of the institute, learning transferable skills across departments. These students are independent and removed from formal academic courses and thus independent of the author and his research endeavours.

[3] The Administration Manager refers to the individual in the administrative offices who is responsible for the institute's organisational and administrative activities, such as accounting. The role is removed from any academic influence and is also independent of the author.

From student administration, it was initially determined that		
total enrolments over the three semesters		425 [1]
enrolled in successive semesters	33	
Population of interest		392
Respondents to the TISS in Wave 1 (Week 3)		
Semester 1, Second semester 2011, commencing August	175	
Semester 2, First semester 2012, commencing January	118	
Semester 3, Second semester 2012, commencing August (New entrants to SHI only)	89	
Total		*382*
Respondents to the TISS in Wave 2 (Week 17)		
Semester 1, Second semester 2011, commencing August	153	
Semester 2, First semester 2012, commencing January	117	
Semester 3, Second semester 2012, commencing August (New entrants to SHI only)	63	
Total		*333* [2]

[1] Two people on class lists did not arrive for their studies

[2] In fact 334 responded in Wave 2. However, one person completed only one TISS item in Wave 2 and was omitted from the ensuing analysis.

Table 3.8a Sampling strategy and respondents

According to Trochim (2006) "we sample with a *purpose* in mind. We usually would have one or more specific predefined groups we are seeking", as stated in objective two in this thesis on invariance of reporting to the central variables based on age, gender, new and returning and culture. It was found, after gathering data in second semester of 2011 (commencing in August) and first semester of 2012 (commencing in January), that new students (that is, first-time entrants to Certificate and Masters levels) were under-represented among those who had completed the TISS twice. Hence, in second semester of 2012, the further purposive step of administering the survey to new entrants only was taken. This proved to be successful, for as reported below in Section 4.1, the sample proportions of new and returning students matched the proportions observed in the population.

3.9. SCOPE AND LIMITATIONS OF THE METHOD

This study extends TL research. The existing body of research and theory was described by Taylor and Cranton (2012, p.14) as in "stagnation". In the current research the focus is to reduce the "fragmentation of TL perspectives", by concentrating on variables perceived to be central to the transformational process (Taylor and Cranton 2012, p.14).

This is accomplished by engaging in "the development of an instrument that is not simply a reconstruction of the terminology found in the theory of transformative learning" (Taylor and Cranton 2012 cited in Taylor 2012, p.14).

The new instrument is composed of either new survey items or employs existing survey material, much of it from other areas that facilitate measurement of central TL variables in a reliable and valid manner. The results of the current research may be of interest to journal publishers, statisticians, researchers, institutions, educators and learners, not only to extend developments in TL theory, but also establish an analytical platform that expands research in the field (including the additional purpose of post-positivism to extend quantitative research; Section 3.5; Ryan 2006). Additionally, an underlying motivation of the research is to promote new applications of TL in educational and vocational settings.

As set out earlier in this chapter, quantitative measurement of a predominantly constructivist theory poses a challenge in testing hypotheses. For example, consider the 26 items on triggers included in the instrument as set out in Section 3.7.1. These 26 items were taken from one existing TL instrument or were newly devised by the author. In the current research the intention is to assess hypothesis H_{1a} on the reliability and validity of this collection of potential triggers. In estimating the overall model of Figure 3.6 and testing H_{1a}, specification error may occur where some of the variance in the data may be explained by omitted items . This is a frequent source of debate in statistical literature (Kline 2011). In the current example, the debate centres on whether 26 triggers encapsulate a representative and substantial proportion of student experiences at the research site. Although the roles of the 26 triggers may be accurately assessed in the current research, a wider range of triggers might in fact be required. Consequently, a longer or different list of potential triggers might be included in extensions of this study and in applications in other research contexts. Similarly, other banks of statements are measured drawing on existing instruments and/or survey items devised by the author and these formulations may limit the capacity to obtain reliable and valid measurements.

However, by using the measurement items in the TISS, a start is made on specifying a holistic instrument for the observation of all of the variables considered to be central to transformation, at least in the context of SHI, with many measurement items being applicable across research sites.

Further, as mentioned in Section 3.6.2 (on relationships between central variables), the TISS captures forms of reflection in a historical manner at time one.

Students are asked to respond to reflection items about prior studies. It is plausible at this time point that students have not adjusted their forms of reflection during the first wave of data collection in week three. This essentially means that forms of reflection prior to arriving for the current semester, equate to forms of reflection at the outset of the semester.

Braun et al. (2012) state difficulties in accurate measurement of retrospective items, due to changes in competencies. In other words, current competencies are used to measure historic items, thereby biasing the ability to report on these historic items. Although the historic reflective items raise questions as to their validity, the inclusion was warranted for two reasons. First, changes in reporting on forms of reflection during a semester are to be estimated via hypothesis H_{2d}, providing insight to whether individuals are aware of and report differences in reflection. Second, when measuring reciprocal effects between emotions and reflection, following the practice in longitudinal and event-history research the historic nature of these statements allow accurate estimation of autoregressive, cross-lagged effects in a longitudinal panel model (Wong and Law 1999, Lynn 2009).

Further considerations in longitudinal modelling are their rapidly increasing complexity and difficulty in measurement, especially where missing values occur over time (Maruyama 1998, cited in Kline 2011). Also, measurements of cross-lagged effects over time favour operating effects (changes in variance and covariance between time periods) at a group level and therefore are limited in their power to explain changes at the individual level. This may cause incompatibility between data collection methods and hypotheses, although this is not relevant to the hypotheses devised for the current research.

Nevertheless, it indicates a limitation in that even though signals emerge that could guide further constructivist enquiry into TL, deeper understanding of individual perspectives are not obtained. In the current research, an attempt is made to estimate a feedback loop using longitudinal data, even though differing theoretical positions on TL support alternate notions on relationships between central variables (see rational and extra-rational approaches to TL, Section 2.5.1, Dirkx et al. 2006; Taylor 2007; Kitchenham 2008; Mälkki 2010). Thus, the measurement of this feedback loop as an example may generate a subsequent need for further estimation, which lies beyond the scope of this research inquiry.

Finally, generalisability issues may arise due to non-random sampling. Nelson et al. (1992, cited in Denzin and Lincoln 2005) state that the context in which the research takes place is inseparable from the research questions asked. Questions for this research are to an extent based in the context of the research site at SHI. They therefore may not reflect the situation in other higher educational settings in metropolitan areas with larger student numbers and less intense living and studying arrangements.

Despite rigour in data analysis, generalisability to other contexts may remain limited, although the findings should encourage interest and further application to alternative sectors such as publically funded educational institutions. To minimise issues of generalisability, a precaution is taken. An estimation of measurement invariance as stated in hypothesis H_{1b} allows testing of responses across groups (age, status as new or returning, gender and culture), thereby informing generalizability and what changes might be required to modify the TISS for use elsewhere (Brown 2006). In this sense, the nature of the SHI research site may be uncommon among higher educational institutions, but the instrument might be amended for different contexts and the results of the analysis would be interpretable in these other contexts.

3.10 ETHICAL CONSIDERATIONS

Conditions within educational research are often more prone to ethical constraints than those found in natural and behavioural sciences (Newby 2010). With research involving human participants, consideration of potential harms or intrusions and the appropriate management of sensitive information needs careful consideration throughout the entire research process (Newby 2010, Quinlan 2011). Adhering to ethical guidelines provided by the institution, respondents were invited to participate in the research, providing full anonymity, confidentiality and the possibility of withdrawing from the research at any stage during data collection, without knowledge of this by the researcher.

This is especially relevant in educational research where learners may feel infringed upon by power relations or have an unwarranted assumption of rewards for participation (Quinlan 2011). Prior to data collection, information was supplied to aid transparency, secure confidentiality and obtain oral consent.

Further ethical considerations include the influences of the researcher on validity during data collection. Researchers should avoid imparting personal views or otherwise influencing participants, thereby compromising the truthfulness, robustness and meaningfulness of data (Fisher 2010, Quinlan 2011). As in Section 3.8 above, after seeking oral consent the researcher was distant from participants during data collection.

During the process of research design, the "code of practice" supplied by Queen Margaret University, Edinburgh served as guide in adhering to prescribed ethical regulations. Additionally, this process was reviewed by the Research Ethics Panel and approval granted.

The approval process reviewed ethical considerations consonant with the "code of practice" on population and sample parameters, questionnaire design, timeframe and method of data collection, and data storage.

Final ethical considerations concern the analysis and representation of data. Methods of ethical analyses relate to "support of hypothesis, unexpected findings, relating results to previous studies, and reflection on implications for future research" (Kline 2011, p.6). Accordingly, these "are all matters of judgement" (Kline 2011). To reduce the extent of judgement bias in the analysis and reporting of findings, the guidelines for reporting of results are followed and presented openly, honestly and transparently in the chapters and supporting materials that follow according to guidelines set by Brown (2006) and Kline (2011).

3.11 SUMMARY

It has been said that TL theory-building has stagnated and with this, the diversity of research endeavours in the field (Taylor 2012). In the current study, an appraisal is undertaken of the relationships between central variables in the transformational process. The central variables are triggering incidents, emotions, reflection and facilitators. Quantitative methods are used to develop formulations of TL and test theory proposed by the founding author (Mezirow 1978) and subsequent critics (Cranton 2002, Dirkx et al. 2006, Newman 2012).

A post-positivist stance is adopted, while the dominant approach in TL has been constructivist, with this leading to calls for alternative methods of enquiry, survey design and statistical testing. That is, a gap in the literature is covered with the current research. The positivist lens within a post-positivist paradigm is proposed for obtaining greater reliability, validity and scope for generalisation, these being areas criticised in earlier investigations and critiques.

An instrument called the Transformative Incident Student Survey (TISS) was designed to gather data on the central variables. Further, the effects of age, gender, culture and status on transformation can be assessed. Also, relationships or linkages between central variables will be investigated via structural equation modelling.

During instrument design, findings from prior empirical research in TL, other research areas o and observations of the author at SHI informed the construction of the TISS. It is intended that findings will contribute to new understandings and formulations of TL.

The next chapter contains an account of the analysis of TISS data to investigate the hypotheses of Section 3.6. This entails an analysis of latent factors, followed by multi-group measurements based on age, status, gender and culture. Subsequently, testing of relationships between central variables, including mediated and moderated pathways, precede an analysis of reciprocal relationships between forms of reflection and emotion.

CHAPTER 4: FINDINGS

This chapter is structured as follows.

- First, the backgrounds of wave-2 respondents are compared with the characteristics of the enrolled population.

- Second, four sections are devoted to wave-2 measurement of a central variable (that is, one of triggers (g1), emotions (g2), forms of reflection (g3) and facilitators (g4) as in Figure 3.6). In each section, four things are reported: descriptive statistics, principal components analysis (PCA) and/or confirmatory factor analysis (CFA) and multiple-group CFAs (MGCFAs). PCA and CFA are ways of finding and confirming the existence of latent constructs underpinning survey responses. MGCFA provides an assessment of invariance of survey responses across groups based on age, status, gender and culture (g0). PCA, CFA and MGCFA are described in Section 4.2 where triggers are considered. In Sections 4.3 to 4.5, less detail is provided, but PCA, CFA and MGCFA tables corresponding to those in Section 4.2 are given in appendices (Appendix 6 to 8).

- Third, in Section 4.6 and 4.7 hypotheses concerning mediation and moderation of relationships between latent constructs are tested. That is, answers are sought to questions concerning the impacts of triggers and emotions on forms of reflection, whether triggers act directly on reflection, whether emotions mediate the impact of triggers and whether dialogue with social actors moderates these influences.

- Finally, the possibility of reciprocal linkages or feedback between forms of reflection and emotions is considered. As noted in the previous chapter two approaches are possible. One involves the use of instrumental variables and the other involves analysis of cross-lagged responses over the semester. The approach used and its theoretical justification is reported in Section 4.8.

Mediation, moderation and reciprocal linkages involve structural equation models (SEMs) that link the latent constructs identified in the second part of this chapter. For these four analyses the following software was used: Microsoft Excel, SPSS vs. 20 and the R packages Amelia version 1.7.4 (for imputation of missing values), polycor 0.7-8 (to facilitate presentation of polychoric correlation matrices), psych 1.5.8 (to obtain the number and structures of factors), lavaan 0.5-20 (for CFA and SEM), indprod, probe2WayMC and probe3WayMC 0.4-11 from the semTools package to analyse moderating influences within SEMs and semPlot 1.0.1 for visualisation of results. In the next section, the first of these four steps is reported, namely the composition of the sample and how it compares with the population being studied.

4.1 THE SHI SAMPLE

The TISS was administered to students in first semester of 2011 and both semesters of 2012. The third administration was only for students enrolling at SHI for the first time, to ensure that new students were adequately represented in the analysis. As can be seen in Table 4.1a, the combined enrolment for the three semesters was 425, and 33 respondents did the TISS twice. These second returns of the TISS were removed from the analysis. They all occurred in the first semester of 2012 and were from students who enrolled at SHI in each of second semester 2011 and first semester of 2012 semesters.

There was attrition between waves. At the bottom of Table 4.1a it can be seen that 382 surveys were returned at wave 1 (week 3 of semester), when the intention was to gather data relating to learning and other events *prior* to commencement of the semester. In the second wave (administered in week 17) only 334 were returned. It will be recalled that this administration was to gather information on learning and events *during* the current semester. One student in wave 2 responded to only one TISS item and was omitted from the sample. That is, 333 wave-2 surveys were used, corresponding to 78.4% of the total enrolment.

Total enrolment		425
Did TISS in more than one semester	-33	
Number of respondents		392
Respondents in Wave 1 (Week 3)		
Semester 1	175	
Semester 2	118	
Semester 3	89	
Total in Wave 1		*382*
Respondents in Wave 2 (Week 17)		
Semester 1	153	
Semester 2	117	
Semester 3	63	
Total in Wave 2		*333*

Table 4.1a Summary of responses

The characteristics of the 333 wave-2 respondents are given in Table 4.1b, where 57.1% of respondents are seen to be women. This is less than two percentage points different to the percentage of females in the population (55.4).

Nearly three quarters of the population (73.5%) are 22 or younger. The percentage of respondents in this age band is 73.9. This can be seen by adding the percentages in the age bands 18-20 and 21-22 in Table 4.1b. The representative nature of the sample is seen also in relation to nationality. The table contains percentages for six groups of nationalities (aggregated following Gupta et al. 2002), for which there is close agreement between the sample and population.

	Responded in Wave 2	Responded in Wave 1
Female	57.1	55.4
Age		
18 to 20	47.8	48.4
21-22	26.1	25.1
23-25	17.7	18.1
Over 25	8.4	8.4
Mean	*21.4*	*21.3*
Std dev.	*2.8*	*2.8*
Nationality		
Mainland Chinese	18.0	17.1
Indian and Sri Lankan	13.5	14.3
Asian [1]	34.2	35.0
Eastern European [2]	18.6	17.6
Western European [3]	11.1	11.1
Other [4]	4.5	5.1
Level of study		
Certificate	22.2	24.5
MiT	3.0	3.1
Diploma	21.0	19.1
Higher Diploma	14.7	14.5
Degree	20.4	20.2
Postgraduate	12.0	11.0
Masters	6.6	7.4
Returning students	52.0	52.0
Sample size	*333*	*382*

[1] *'Hong Kong, Indonesia, South Korea, Malaysia, Singapore, Thailand, Taiwan, Vietnam and Japan;* [2]*Bulgaria, Belarus, Kazakhstan, Latvia, Lithuania, Romania, Russia, Ukraine;* [3]*Switzerland, Germany, Greece, Hungary, Netherlands, Portugal, Turkey, United Kingdom;* [4]*Australia, USA, Mauritius, South Africa, Brazil, Ecuador (Classification according to Gupta et al., 2002).*

Table 4.1b Respondent characteristics in percentages

At the bottom of Table 4.1b, it can be seen that 52.0% of the population and the sample were returning students, the same figure as the sample. That is, they had been enrolled at SHI in a previous semester. Generally smaller numbers of new students enrolled in the first two semesters of data collection and it was decided to collect data in a third semester from those students enrolled at SHI for the first time. Taking this step meant later comparison of invariance across new and returning students was possible. Also shown in the table are levels of study. Again, the proportions in the sample and the population are close. However, Certificate students are a little under-represented in the sample (22.2% compared with 24.5%); and Diploma students are over-represented in the sample (21.0% compared with 19.1%). However, these differences are small and over all of the characteristics summarised in Table 4.1b, there is reasonably close agreement between the sample and population.

The sample of 333 is used exclusively in all but the assessment of hypotheses H_{2d}, where data are required from both survey waves to test for reciprocal linkages between forms of reflection and emotions. Because 10 students completed the TISS in wave 2 but not wave 1, only 323 cases or 76.0% of the population were available in wave 1. A comparable table to 4.1b for this smaller sample is given in Appendix 4.

Next, attention is turned to each of the central variables, beginning with TISS responses on triggers in wave 2. That is, latent factors are extracted and then tested for reliability, validity and measurement invariance as in hypothesis H_{1a} and H_{1b}. Comparable material is presented in each of the next four sections, one for each central variable.

4.2 TRIGGERS (CENTRAL VARIABLE G1)

4.2.1 DESCRIPTIVE STATISTICS
At wave 2, the preamble in the TISS on triggers was:

> The following indicate a number of triggering incidents (TIs) that you personally may have experienced *DURING* this semester. Triggering incidents are any important moments, experiences or "vivid happenings" in your life.
>
> Please think back and indicate the importance of each using the scale below (Circle <u>one</u>).

Students were asked to respond using the five-point Likert scale: 5: definitely agree; 4: agree somewhat; 3: only to be used if a definite answer is not possible; 2: somewhat disagree; and 1: definitely disagree. The trigger statements are listed in Table 4.2.1a in descending order of mean scores. Nine items, six of which relate to successes, rank above 3.0, the mid-point of the scale, while those relating to failures or negative experiences are below the mid-point.

The standard deviations vary from 0.89 to 1.48 and tend to increase as mean scores decrease. This can be seen in the correlation coefficient of -0.589 between the two columns in the table, suggesting a negative relationship. The general point is that a high mean score for a trigger statement is not commensurate with greater variation (measured by the standard deviation) in students' responses on that statement. A statement with a high mean is the fourth one listed in Table 4.2.1a. For this trigger (*an important success in academic work*), 90.7% of respondents gave the neutral response through to definitely agree, with 50.2% responding agree somewhat. On the other hand, 84.7% of responses to the second-last trigger in the table (*a change in employment of one (or both) of my parents*) are clustered in the range definitely disagree to neutral, with 54.4% responding definitely disagree. For a statement in mid-table (*a romantic relationship*), the responses are spread reasonably uniformly over the whole range of the Likert scale.

Where data are clustered heavily or alternatively only lightly around the mean, further analysis is required of data distribution and whether the assumption of normality that underpins many methods of carrying out CFA is warranted (Field, 2009). A suggested strict limit for approximate data normality is that skewness and kurtosis should fall into the range between -2 and +2 (Trochim and Donnelly 2006, Field, 2009, George and Mallery, 2010, Gravetter and Wallnau 2014). For the trigger statements skewness ranged from -1.14 to 1.31, and kurtosis estimates were from -1.34 to 1.15 causing little concern that trigger responses were so severely non-normally distributed as to invalidate the normality assumption, or introduce inflated likelihood of Type I errors by assuming normality for CFA estimations. According to Babakus et al. and Olsson et al., normal test theory states if data is based on at least five response items and is normally distributed approximately, Type I error rates are not unduly influenced (see Appendix A5.1 for full descriptive statistics on trigger items)(Babakus et al.1987 and Olsson et al. 1979, 1985, 1992, cited in Hoyle 2012, p.497). The majority of negative skewness (higher means) may be attributable to item wording as "successes" are rated more positively and conversely, positive skewness (lower means) to "failures" and negative personal experiences.

In a study by Ferrer and Song (2012) two latent constructs were found in factor analysis of skewed data, bearing out their suspicion that more than one latent dimension explained multiple survey responses concerning positive and negative items (see also "systematic measurement bias", Millsap 2011, p.43). As will be seen below, two factors emerge from PCA and CFA analysis of statements intended to measure the importance of triggering events.

Code	Trigger	Mean	Standard deviation
T18	A change through living in an international environment	3.940	0.977
T14	A success related to taking part in an event	3.919	1.007
T6	A success related to a job opportunity	3.810	1.088
T2	An important success in my academic work	3.727	0.892
T4	A success related to my duties	3.658	0.939
T12	A success related to planning a school meeting or social gathering	3.628	0.941
T1	A major change in my social role or status	3.592	0.992
T17	The influence on me of different cultures	3.577	1.097
T8	A success related to a promotion	3.183	1.061
T10	A success related to a pay rise	2.982	1.138
T24	A change in personal financial status	2.907	1.378
T19	A romantic relationship	2.844	1.427
T16	A traumatic or catastrophic personal happening	2.751	1.205
T3	An important failure in my academic work	2.514	1.186
T11	A failure related to a pay rise	2.456	1.093
T7	A failure related to a job opportunity	2.453	1.216
T9	A failure related to a promotion	2.393	1.026
T5	A failure related to my duties	2.369	1.097
T26	A change in financial status of one (or both) of my parents	2.336	1.374
T13	A failure related to planning a school meeting or social gathering	2.321	1.085
T15	A failure related to taking part in an event	2.144	1.040
T23	A conversion to another religion	2.114	1.330
T20	A personal injury or serious illness	2.096	1.201
T22	A death of a close friend or member of family	2.051	1.485
T25	A change in employment of one (or both) of my parents	1.976	1.251
T21	A parental divorce or separation	1.778	1.158
	n = 333		

Table 4.2.1a Wave 2 summary statistics for triggers

The approximate normality of observed responses to TISS trigger statements suggest that maximum likelihood estimation (MLE) might be used for CFA, although parameter estimates are likely to be reduced relative to the actual values (Finney and DiStefano 2006). Another issue is that TISS responses to statements about emotions do not all meet the criteria for approximate normality, so that an approach other than MLE should be taken to CFA, MGCFA and modelling of linkages between central variables. To ensure consistency, one approach is adopted for all of the central variables. This is the approach known as <u>W</u>eighted <u>L</u>east <u>S</u>quares with <u>M</u>ean and <u>V</u>ariance adjustments applied to the overall Chi-square indicator of model fit (robust DWLS, Kline 2011; Finney and DiStefano 2006; Rosseel 2015). It explicitly accounts for the categorical nature of TISS responses; it adjusts for non-normality; it is known to perform accurately when data are non-normal; and extremely large sample sizes are *not* required (Finney and DiStefano 2006; Bovaird and Koziol 2012). Thus, where data are categorical, robust DWLS is more appropriate than MLE (Muthén 1997, cited in Hoyle 2012, p.173). Within the robust DWLS approach use is made of polychoric correlations for underpinning continuous and normally distributed latent variables that explain the categorical responses for the central variables.

These polychoric correlations can also be used in MLE as a correction for non-normality (Bollen 1989 cited in Bollen and Curran 2006; Fox 2006). Appendix A5.2 shows estimations involving MLE uncorrected for potential non-normality, MLE involving polychoric correlations and robust DWLS. A comparison across methods indicates that for mild non-normality of trigger responses estimations are comparable across methods. Where there is a somewhat larger departure, as arises among emotions measured with the TISS, it is again the case that results across estimation methods are comparable (see Section 4.3). Nevertheless, because robust DWLS explicitly accounts for the categorical nature of responses to the TISS, that approach is adopted as estimation method throughout.

4.2.2 LATENT CONSTRUCTS

In the case of central variables such as forms of reflection and emotions, guidance on latent factors to confirm with CFA is given by the authors of the instruments that were adopted for the TISS. In particular, these are Kember et al. (2000) and Pekrun et al. (2011). However, in the case of triggers, no such guidance exists. Thus, to obtain an initial structure, PCA was performed, after which CFA via robust DWLS was applied.

This approach is commonly adopted, as according to Brown (2006) and Gerard and Johnson (2015), PCA is widely conducted prior to factor analysis to *reduce dimensionality* that is, to eliminate some of the statements in a survey and group the others in ways that accounts for as much variation in the data as possible.

The need to have many measured items in the TISS arises from two sources. First, as post-positivists would maintain, all observation is fallible and error prone (Trochim, 2006a). Due to this fallibility, post-positivists seek multiple measurements or observations, especially of hidden or latent variables, such as the central variables of the current research. Second, observations of latent constructs are laden with individual interpretations and biases that are derived from individual expectation, experience, perception, culture and other demographic factors. This means there will be diversity in responses to TISS statements on which triggers are important, which emotions are registered, what thinking processes are applied, and with whom and in what ways individuals discuss important events. That is, it is likely each respondent constructs her or his own rating of statements in the TISS. As such, different biases and errors will arise across TISS respondents. It therefore is essential to triangulate using all respondent experiences to try to attain a better, albeit imperfect, understanding of the reality of student life at SHI.

Principal components analysis (PCA) is one way of using all of the data to identify important sources of variation across respondents on statements that are associated with a central variable. This is usually impossible to do by eye, so a technique such as PCA is used. The result is a smaller collection of statements gathered into components or factors that are strongly inter-correlated and account for most of the variation in responses. This is done by seeking first a group of statements (that is, a component or factor) that explains the greatest amount of variability across an entire collection of statements. In the case of triggers, it can be seen in Table 4.2.2a that the six statements labelled *failure* account for 31.9 per cent of the variance in trigger responses. A second component is then extracted, *personal*, accounting for 23.1 of the variance across item responses. As mentioned earlier, parallel analysis (PA) was used to decide how many components to seek. In the case of triggers, the optimal number or components was two and Table 4.2.2a supports the conclusion that the 26 trigger items in the TISS be reduced to a collection of 10 partitioned into a two-component structure.

The correlations between failure-linked items are greater than 0.4 with two exceptions which are 0.31 and 0.39; also, those between personal-linked items are greater than 0.4 with one exception which is 0.38; and the cross-correlations between failure-linked and personal-linked items are greater than 0.2 with two exceptions which are 0.18 and 0.19. However, correlations between other measured items are much lower in general, indicating that there is little correlation of these statements with failure and personal triggers and with other statements on triggers, but also there is little correlation between ostensibly related statements, such as those involving successes. That is, these omitted statements contribute little to the overall variation in the data on triggers. In particular, correlations among statements omitted in the PCA are not substantial, indicating that there is little in common among respondents as they react to success and other omitted statements. In turn, this means that the notion of triangulating across all respondent experiences does not reveal a better understanding of this part of student life at SHI. Other approaches should be considered to understand the lack of common variation in omitted trigger statements. This would be particularly helpful in the case of successes.

The actual PCA analysis of triggers proceeded iteratively from an initial run with all 26 triggers included. From this the component structure was refined by dropping triggers if too little of the variation in responses were explained. This was done by removing only one trigger per iteration. Finally, a structure was reached in which communalities exceeded 0.45, with 10 triggers retained in two components. As indicated earlier, parallel analysis (PA) was used to decide how many components to extract. PA is widely regarded as providing the most accurate assessment of numbers of components (Fabrigar et al.1999; Schmitt 2011; Basto and Pereira 2012). When exploring structure among central variables, PCA with varimax rotation was employed (Brown 2006).

The final PCA is reported in Table 4.2.2a. At the top of the table, the given diagnostics satisfy benchmarks (Field 2009). In the lower part of the table, sampling adequacy, communalities and loadings are shown. Individual sampling adequacies are greater than 0.75, with all but one being 0.80 or greater. This indicates a strong possibility that latent constructs explain responses to the trigger statements in the table and that proceeding to factor analysis is appropriate (Field 2009). One component consists of statements relating to failures experienced by respondents during the semester. It is therefore given the name *Failure*. The other consists of issues affecting individuals or their families. It is given the name *Personal*.

The component structure in Table 4.2.2a further meets benchmarks on average communalities, the number of triggers greater than three in each component (known as over-determination) and the magnitudes of loadings (Fabrigar et al. 1999). Inspection of the polychoric correlations in Figure 4.2.2a for the 10 triggers also indicates the possibility of two latent constructs. The two boxes (drawn with black lines) within the figure indicate that the highest correlations in general occur between triggers within each component (Polychoric correlations for all 26 triggers are presented in Appendix A5.3). Overall, there are clear indications from the PCA results in Table 4.2.2a and Figure 4.2.2a that the 26 trigger statements can be reduced to two constructs.

The Cronbach α values reported in Table 4.2.2a suggest that the collections of survey statements assigned to each construct reliably measure the underlying construct, as this measure of internally consistency returns values greater than 0.8 (Pallant, 2016). For a group of survey statements assigned to a component or factor, Cronbach's alpha is calculated as

$$\alpha = \frac{N\bar{c}}{\bar{v} + (N-1)\bar{c}}$$

where for the sample of respondents, $\bar{v}$ denotes the average variance of each item; $\bar{c}$ denotes the average covariance between pairs of items in the construct; and N is the number of items assigned to a construct. A normalised form (Bentler, 2009; Revelle & Zinbarg, 2009) of this is

$$\alpha = \frac{N\bar{r}}{1 + (N-1)\bar{r}}$$

where $\bar{r}$ is the average correlation between pairs of statements assigned to a construct. From these two expressions for Cronbach's α, it can be seen that this index is the ratio of the covariation of survey responses in the numerator as a proportion of the total variation in them, the denominator, which is never less than the numerator. Consequently, Cronbach's α will be zero if the items are not correlated that is, do not covary at all. It can be no larger than one, which might occur when the items in a construct have very high covariances and the number of items is very large (in fact, approaches infinity).

The sensitivity of Cronbach's α to N, the number of items, can be seen in the alternative equation (Field, 2009)

$$\alpha = \frac{N^2\bar{c}}{\sum v_{item}^2 + \sum Cov_{item}}$$

where the denominator is now the sum of all item variances and covariances; the numerator continues to employ the average covariance among items, but now multiplied by the square of the number of items. As the number of items increases, α will become greater, independent of just how related the included items are, that is just how consistently they measure the same attribute.

In the case of the PCA results for triggers in Table 4.2.2a, the *failure* component consists of six items, which is generally regarded as being too few items to artificially raise the value of Cronbach's α (Pallant, 2016). Conversely, finding α values greater than 0.8 for *failure* and for the four-item *personal* construct is suggestive of the two groups of measured items consistently measuring the same attributes. This is further supported by the incidences of item correlations of 0.4 and above in the boxes in Figure 4.2.2a (Field, 2009; Pallant, 2016).

An established alternative to using α when there are few items in a construct, is to inspect inter-item correlations. Inter-item correlations falling in the range 0.30 to 0.49 are taken as indicating good reliability (Coertjens, et al., 2013). Values in the range 0.5 to 0.79 are indicative of strong associations between items and consistent measurement of attributes. While consideration of inter-item correlations is not required in the case of triggers, this does become necessary in the analysis of two other central variables, namely the positive affective construct (Table 4.3.2a and Figure 4.3.2a) and a problem-solving factor (Table 4.5.2a and Figure 4.5.2a). In the first case, inter-item correlations are suggestive of good internal consistency; while in the second case, under-determination of the construct (meaning less than three survey items being associated with the component) means that problem solving should be dropped as facilitators that aided respondents in dealing with triggers and attendant emotions. These cases are discussed further in later sections of this chapter.

In the next stage of the analysis, CFA was performed to seek confirmation of a latent structure based on the PCA results.

		Sampling adequacy	Communality	C1	C2	Cronbach's α
	Determinant	0.007				
	KMO overall sampling adequacy	0.862				
	Root mean square residuals	0.055				
	Total variance explained	55.0%				
	n	333				
Trigger		**Sampling adequacy**	**Communality**	**C1**	**C2**	**Cronbach's α**
Failure	T3A2: Academic work	0.896	0.447	**0.634**		
	T5A2: Duties	0.899	0.517	**0.687**		
	T7A2: Job opportunity	0.917	0.576	**0.733**		0.858
	T9A2: Obtaining a promotion	0.836	0.547	**0.714**		
	T11A2: Gaining a pay rise	0.814	0.447	**0.626**		
	T13A2: School meeting or social gathering	0.914	0.488	**0.669**		
Personal	T21A2: A parental divorce or separation	0.880	0.605	0.462	**0.626**	
	T22A2: A death of a close friend or family member	0.912	0.419	0.367	**0.533**	0.844
	T25A2: A change in employment of one (or both) parents	0.795	0.869		**0.891**	
	T26A2: A change in financial status of one (or both) parents	0.764	0.583		**0.759**	
	Average communality			0.504	0.619	
	Variance explained (%)			31.9	23.1	

Table 4.2.2a PCA for triggers in wave 2
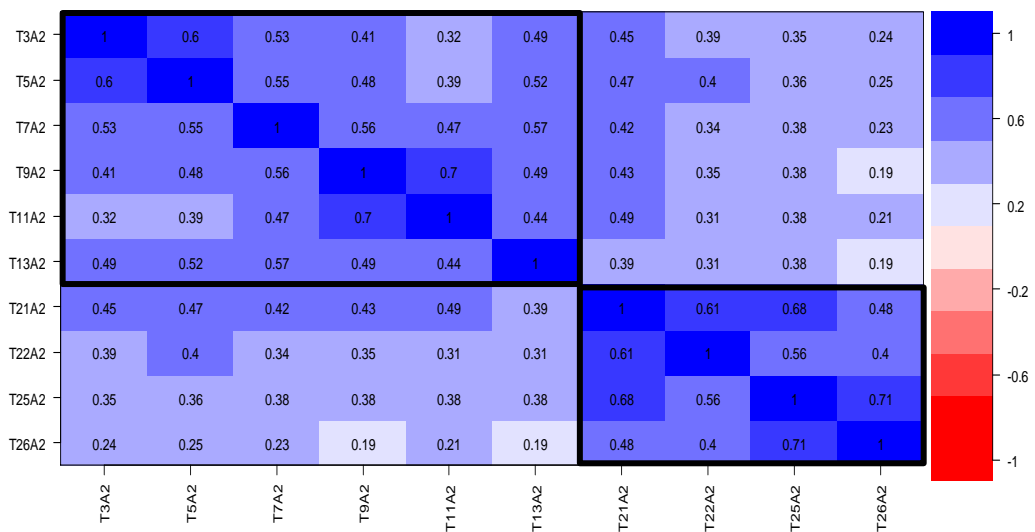
Note: the item codes are those used in the table above augmented with the characters "A2" indicating responses in the second wave.

Figure 4.2.2a Polychoric correlations for triggers

PCA indicated that the 26 trigger dimensions could be reduced to 10 aggregated into two components, accounting for 55% of the variation among items. With CFA, the component structure can be tested as latent constructs, the significance of loadings can be assessed, between-factor variance can be measured, and error correlations and cross-loadings involving measured items can be explored. A number of authors make the point that PCA followed by CFA provides a "strong" approach to validity (Braun et al. 2012; Matheson et al. 2014), which later in this section is augmented with assessments of discriminant validity, that is "the degree to which two measures designed to measure similar, but conceptually different constructs are related", and convergent validity, that is "the extent to which responses from alternative measurements of the same construct share variance" (Slavec and Drnovšek 2012, p.62).

Running CFA for the PCA structure yielded significant loadings (at better than 1%) for each item. However, diagnostic benchmarks on goodness of fit were not satisfied. Hence modification indices (MI, Kline 2011) were explored to find additional loadings that would improve the diagnostics. Overall, three error correlations were added to the CFA. These led to a collection of diagnostics recommended by Hu and Bentler (1999), given at the top of Table 4.2.2b, attaining acceptable values.

As frequently happens in CFA and SEM, the Chi-sq statistic is significant at 5% or better. This occurs because the statistic increases in value as sample size increases (Brown 2006). However, in the CFA for triggers, the significance level is near the limit of the range and the other diagnostics indicate good fit.

Diagnostic	Benchmark	Value
Chi-square		45.3
Degrees of freedom		31
p value of Chi-sq	> 0.05	0.047
RMSEA	< 0.06	0.037
p value RMSEA ≤ 0.05	> 0.50	0.810
Tucker-Lewis index (TLI)	≥ 0.95	0.992
Bentler CFI	≥ 0.95	0.994
SRMR	< 0.08	0.031
n		333
Factor	**Item**	**Standardised values**
Failure	T3	0.662** [1]
	T5	0.713**
	T7	0.777**
	T9	0.680**
	T11	0.607**
	T13	0.712**
Personal	T21	0.894**
	T22	0.720**
	T25	0.766**
	T26	0.503**
Factor correlation	Failure with Personal	0.695**
Error correlations		
	T3 with T5	0.247**
	T9 with T11	0.501**
	T25 with T26	0.583**

[1] ** denotes significant at better than 1%

Table 4.2.2b: CFA for wave 2 triggers

The two factors have loadings onto each trigger item that are positive, 0.5 or greater, are significantly different to zero at better than 1%, and the constructs of *Failure* and *Personal* have Cronbach αs that exceed 0.80 (see Table 4.2.2a). These features of the CFA together with the goodness-of-fit statistics suggests the constructs from PCA form a latent structure that account for the responses to TISS statements on triggers.

As indicated above, three correlated errors were included in the CFA reported in Table 4.2.2b to produce goodness-of-fit diagnostics that met accepted benchmarks. Each of these is explicable in the sense that the pairs of triggers involved are related. The first T3A2 and T5A2 refer to failures in academic work and duties in the management of SHI's facilities and extracurricular events. It is conceivable that in a small, close-knit community, where individuals live, work and study seven days a week, failures in any of SHI's activities reflects badly on individuals. The association between failures on promotion (T9A2) and pay (T11A2), as discussed in Section 3.7.1, refer to either seeking different internship appointments than those held previously or for graduating students refer to initial full-time employment as careers have begun. Also, this association is likely to be the case for students seeking to enter the labour market full-time and comparisons are made with previous positions, whether internships or positions held before attending SHI. The third error correlation is between changing parental employment (T25A2) and financial status (T26A2), which for many would be closely aligned.

Kline (2011) explains such error correlations as indicating unmeasured variables. In the case of T9A2 with T11A2 and T25A2 with T26A2, the unmeasured variables clearly relate to career development and parental considerations respectively. In the case of the other error correlation, between academic and duty failures, these relate to on-campus and more or less immediate occurrences. The unmeasured variable may be to do with intelligence, energy, effort or commitment in an attempt by learners to become autonomous and self-directed (Mezirow 1978; Cranton 1994).

The correlation between the two factors in Table 4.2.2b is 0.70. While relatively high, this is not a matter of concern generally, as Brown (2006, p.131) states "a factor correlation that exceeds 0.80 or 0.85 is often used as the criterion to define poor discriminant validity". Anderson and Gerbing (1988) recommend discriminant validity be checked by testing whether factors might actually be one. This is done by re-running the CFA with the correlation restricted to one and conducting a Chi-sq test to compare the restricted and unrestricted model. When this was done the restricted model was found to have Chi-sq = 201.0 and, as can be seen in Table 4.2.2b, the unrestricted model has Chi-sq = 45.3. Consequently the difference in Chi-sq values is 155.7 with a single degree of freedom (being the difference in degrees of freedom for the restricted and unrestricted models). The probability of Chi-sq = 155.7 with one degree of freedom is 0.000, indicating that the restricted model provides a much poorer fit to the data than the unconstrained model.

On this basis, it can be concluded that the factors do discriminate (Anderson and Gerbing 1988; Matheson et al. 2014).

An assessment of both discriminant and convergent validity is possible by calculating composite reliability (CR) and average variance extracted (AVE). Composite reliability is an indicator of the impact of error in measured items on how reliable a latent construct is (Fornell and Larcker 1981). Raykov and Grayson (2003, p.143) note that "high [composite] reliability is a necessary condition for high validity". The benchmark for acceptable composite reliability is that CR exceeds 0.70. In Table 4.2.2c, it can be seen that both the *Failure* and *Personal* factors have this property.

	CR	AVE	Shared variance
Failure	0.848	0.485	0.483
Personal	0.820	0.540	

Table 4.2.2c Convergent and discriminant validity for the latent factors of Table 4.2.2b

AVE is a measure of the average variation in measured items that is explained by a factor (Farrell 2010; Fornell and Larcker 1981). If AVE is 0.50 or greater, then at least 50% of measured variance is captured. This is the case for *Personal* (shown as 0.54 in Table 4.2.2c), but not for *Failure* (0.48). However, because AVE is a stricter index than CR, Fornell and Larcker (1981, p.46) recommend that "on the basis of CR alone, the researcher may conclude that the convergent validity of the construct is adequate, even though more than 50% of the variance is due to error". This view was re-stated by Malhotra and Dash (2011). For each trigger construct, CR exceeds AVE and the CR values are much greater than the benchmark of 0.70. The recommended test for discrimination using AVE (Fornell and Larcker 1981) is that AVE should exceed the variance shared between factors, given by the square of the factor correlation in Table 4.2.2b. Thus, for the trigger constructs, shared variance is 0.483. AVE for *Personal* exceeds this, as does AVE for *Failure* but only just.

However, overall, a number of indications of validity have been assembled for the triggers CFA. First, there is the point of Braun et al. (2012) that applying PCA together with CFA provides strong evidence. Second, the fact that the correlation between factors is less than 0.80 indicates discriminant validity. Third, there is evidence of convergent validity in the magnitudes of the CR values.

Fourth, while *Personal* clearly satisfies the criterion on AVE for discriminant validity, however, in the case of *Failure* the criterion is not met, but not by a great margin. However, all of the evidence provides comfort that acceptable discriminant and convergent validity is displayed by the trigger constructs. The CFA of Table 4.2.2b is shown in diagrammatic format in Figure 4.2.2b.
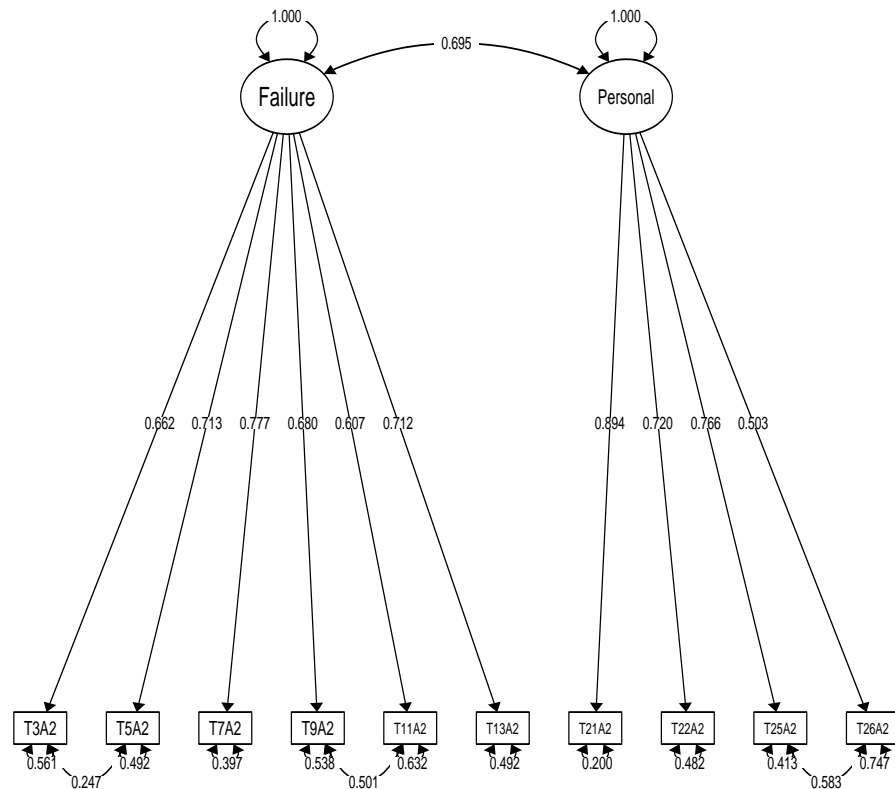
Figure 4.2.2b Triggers measurement model obtained with robust DWLS estimation

4.2.3 INVARIANCE FOR TRIGGERS

The CFA of Table 4.2.2b was constructed on the assumption that the population of interest responded uniformly to TISS items regardless of whether individuals belonged to different groups within the population. However, it is not known if measurements of central variables are uniform across individuals' characteristics. This is addressed for four of the five variables summarised in Section 4.1. These "variables of interest" are age, status (that is being a new or returning student, which was found not to correlate significantly with age in the SHI sample), gender and nationality.

The SHI sample was not of sufficient size to support invariance testing for the fifth, level of study (Brown 2006). The literature on transformative learning suggests that central variables may not be invariant across some variables of interest. For example, forms of reflection may differ by age (Merriam 2004). However, by testing for invariance, it will become apparent whether constructs conform to theoretical expectations and which of the four background variables should be included as controls when estimating the model of Figure 3.6 (Vandenberg and Lance 2000).

For the sample of TISS respondents, invariance can be assessed using multiple-group CFA (MGCFA). MGCFA has the advantage over the alternative MIMIC approach (see Section 3.6) of being able to assess more forms of invariance (for example invariance of responses to measured survey items and also latent constructs) (Brown 2006). The benefit comes at the cost of running CFA for each group within a variable of interest. For example, if interest is in gender, then two covariance matrices are required, meaning the sample is divided into two for multi-group comparisons. Further, the samples of males and females, for example, should be equal because having unequal-size groups can distort tests of significance. Sub-groups after reducing to equal sizes, should be of the order of at least 120, for MGCFA (Brown 2006). As seen below, with one exception, samples of equal size are closer to or exceed 150 cases. Even in the exceptional case, the samples for MGCFA are greater than 120. To obtain groups of equal size, cases to delete were selected at random from the larger group.

In MGCFA, the first step is to check if the CFA confirmed earlier for all respondents applies across each variable of interest, for example gender, even though parameters (such as loadings) may differ between females and males (Brown 2006). This is known as *configural invariance*. If the factor structures differ, it would not be appropriate to test for more stringent forms of invariance (such as equal loadings across groups). To test this, the same model is specified to apply to each group, but without cross-group constraints on model parameters. That is: for each group the same numbers of factors should apply; for each group, the collections of measured survey statements that load on the factors should be identical; but in the groups parameter values (such as loadings) may not be equal necessarily. Thus, while parameters may not be equal, configural invariance means *factor structures* are the same across groups. Configural invariance for trigger constructs is reported in Tables 4.2.3a and b.

In the first of these tables, an indication of configural invariance by age, status and gender is obtained after aggregating ages into one of two categories, "Under 21" and "21 and over". MGCFA for the two groups can be performed on samples of size 159. Group sizes for status and gender MGCFAs are 160 and 143. For the second of the tables, an attempt was made to group respondent nationalities to attain sufficient sized sub-groups. This was done by drawing on the classifications of Gupta et al. (2002) and Nguyen et al. (2006) to map respondents to either Confucian or Other cultures, allowing equal-sized sub-groups of size 122.

In Tables 4.2.3a and b, fit statistics attain or exceed benchmarks, and loadings and factor correlations are significant at 1% or better. The greatest departure is that only one error correlation loses significance (*T3 with T5* in Table 4.2.3b). Overall there is support for configural invariance with respect to each of age, status, gender and culture. Consequently, it makes sense to proceed to assess more restrictive forms of invariance. A summary is provided in Table 4.2.3c. Ticks are shown in the first row, consistent with the findings (Tables 4.2.3a and b) that the same dimensional structure applies across each variable of interest. Following are rows for increasingly strict invariance for measured items, then forms of invariance relating to the latent constructs. The statistics underpinning the summary Table 4.2.3c are given in Appendices A5.41.a to A5.4.2h.

Once configural invariance is established, it is meaningful to investigate more restrictive invariance forms (Brown 2006). Some methodologists argue that researchers could start with a strict form of invariance – see below – and having evaluated that, relax restrictions in the next test. Following Brown (2006), this approach is rejected here because: identifying sources of invariance in restrictive forms of invariance can be difficult when information is not available from less-restrictive forms; and the test of a more-restrictive form often depends on the assumption that less-restrictive invariance applies.

Diagnostic	Under 21	21 & over	New	Returning	Female	Male
Chi-square	40.1	21.7	51.4	28.7	34.9	27.5
Degrees of freedom	31	31	31	31	31	31
p value of Chi-sq	0.128	0.891	0.012	0.585	0.285	0.647
RMSEA	0.043	0.000	0.064	0.000	0.030	0.000
p value RMSEA ≤ 0.05	0.591	0.992	0.211	0.932	0.740	0.936
Tucker-Lewis index	0.954	1.04	0.917	1.01	0.975	1.02
Bentler CFI	0.968	1.00	0.943	1.00	0.973	1.00
SRMR	0.047	0.026	0.048	0.035	0.041	0.036
n	159	159	160	160	143	143
Factor	**Standardised estimates**					
Failure						
T3: academic work	0.551**	0.673**	0.577**	0.692**	0.620**	0.570**
T5: duties	0.742**	0.643**	0.804**	0.570**	0.718**	0.591**
T7: job opportunity	0.678**	0.750**	0.693**	0.742**	0.752**	0.684**
T9: promotion	0.557**	0.711**	0.631**	0.602**	0.634**	0.599**
T11: pay rise	0.520**	0.606**	0.608**	0.527**	0.492**	0.689**
T13: school meeting or social gathering	0.644**	0.662**	0.618**	0.710**	0.706**	0.603**
Personal						
T21: parental divorce or separation	0.858**	0.762**	0.848**	0.729**	0.724**	0.909**
T22: a death of a friend or family member	0.649**	0.574**	0.656**	0.560**	0.729**	0.499**
T25: change in parental employment	0.668**	0.729**	0.795**	0.619**	0.776**	0.668**
T26: change in parental financial position	0.353**	0.529**	0.529**	0.418**	0.533**	0.406**
Factor correlation						
Failure with Personal	0.630**	0.697**	0.690**	0.662**	0.652**	0.640**
Error correlations						
T3 with T5	0.229†	0.169	0.212†	0.186	0.202	0.229*
T9 with T11	0.461**	0.428**	0.474**	0.422**	0.373*	0.447**
T25 with T26	0.517**	0.360*	0.442**	0.438**	0.282†	0.472**

** (*,†) denotes significance at one (five, 10) per cent or better

Table 4.2.3a: CFA models for groups based on age, status and gender

	Confucian	Other
Chi-square	36.9	38.7
Degrees of freedom	31	31
p value of Chi-sq	0.212	0.160
RMSEA	0.040	0.045
p value RMSEA ≤ 0.05	0.606	0.535
Tucker-Lewis index	0.990	0.989
Bentler CFI	0.993	0.993
SRMR	0.046	0.050
n	122	122
Factor	**Standardised estimates**	
Failure		
T3: academic work	0.544**	0.778**
T5: duties	0.710**	0.701**
T7: job opportunity	0.688**	0.710**
T9: promotion	0.730**	0.622**
T11: pay rise	0.605**	0.621**
T13: school meeting or social gathering	0.800**	0.668**
Personal		
T21: parental divorce or separation	0.794**	0.981**
T22: a death of a friend or family member	0.840**	0.665**
T25: change in parental employment	0.708**	0.794**
T26: change in parental financial position	0.518**	0.453**
Factor correlation		
Failure with Personal	0.559**	0.786**
Error correlations		
T3 with T5	0.253*	0.164
T9 with T11	0.396**	0.642**
T25 with T26	0.512**	0.601*

** (*,†) denotes significance at one (five, 10) per cent or better

Table 4.2.3.b: CFA models for groups based on culture

	Age		Status		Gender		Culture	
	Failure	Personal	Failure	Personal	Failure	Personal	Failure	Personal
Measured items								
Configural	✓	✓	✓	✓	✓	✓	✓	✓
Weak (loadings equal)	✓	✓	✓	✓	T11	✓	✓	✓
Strong (loadings & intercepts equal)	✓	✓	T13	✓	✓	✓	T3;T5	T25
Strict (loadings, intercepts & residuals equal)	✓	✓	✓	T25	T9; T13	✓	T5;T13	✓
Latent constructs								
Equal variances	✓	✓	✓	✓	✓	✓	*X*	✓
Equal covariance		✓		✓		✓		✓
Equal means	✓	✓	✓	✓	✓	✓	*X*	*X*

Table 4.2.3c Summary of invariance testing for triggers

The next least-restrictive form is *weak invariance* in which factor loadings are constrained to be equal across groups for which the CFAs are configurally invariant. As Blankson and McArdle (2013) point out, configural and weak invariance relate to covariances among measured survey items. In addition to equal loadings, *strong invariance* requires measured-item intercepts to be equal across groups. The two requirements are demonstrated in the following diagrams, which represent the relation estimated between a measured item and the factor with which it is identified in a CFA.
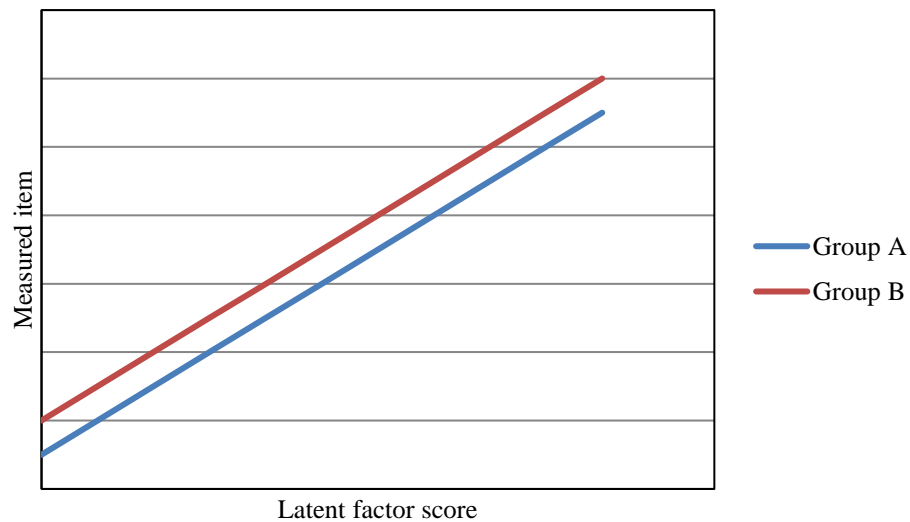
Figure 4.2.3a A measured item with equal loadings, that is equal slopes, in two groups
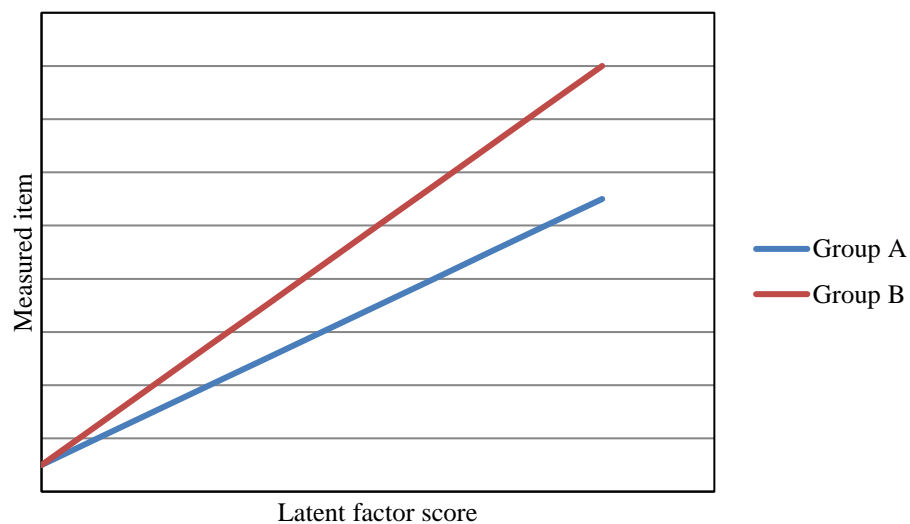
Figure 4.2.3b A measured item with unequal loadings, but equal intercepts

A fourth form of measured-item invariance is *strict invariance*, in which loadings, intercepts and residuals of measured items are constrained to be equal. Strong and strict invariance are conditions on both the means and covariances of measured variables (Blankson and McArdle 2013). If all four forms of invariance are satisfied, then across groups the measured survey items are constant across groups of respondents and there can be confidence that survey responses are reliable. Having weak invariance implies that survey statements mean the same thing across groups of respondents. Strong invariance indicates that there are no systematic differences in responses by members in one group compared with another. Strict invariance means that sums of measured survey scores associated with a factor are on average the same for respondents in different groups (Brown 2006). This is because the variation in responses to a survey statement is resolved in CFA to an estimated part and a residual part, which, are equal across groups when there is strict invariance. This property is desirable when examining whether an instrument is reliable across groups of survey respondents. For this reason, strict invariance is reported in the following tables.

Forms of invariance across all measured items may not be attained in practice; that is, not every measured item satisfies the required constancy across groups. However, it is possible to relax the condition of constancy for some measured items, identifying these using modification indices. In such cases, the form of invariance is preceded with the descriptor *partial*. Further, if for one form of invariance the conclusion is partial invariance, then testing for more-restrictive forms can be no more than partial. For example, if one or more loadings for survey statements vary across groups, then only partial weak invariance can be concluded and a test for strong invariance can only apply to measured items which had weak invariance (Brown 2006; Kline 2011).

In Table 4.2.3c above, it can be seen that responses to the TISS on triggers are strictly invariant across age bands. However, for the other variables of interest, there are instances of measured items that do not meet the criteria for strict invariance. These are indicated by the appearance of one or more trigger codes in a row of the table. For example, the statement T11 (*failure related to pay rise*) does not have equal loadings for women and men, indicating that males and females report differently on pay rises. In practice, when cross-group variation is suggested in an invariance test, modification indices were inspected to see which constraints to relax (Beaujean 2014). In the case of gender, the indication was to relax invariance of loadings on TISS statement T11.

Similarly, in Table 4.2.3c strong invariance by status is partial, as the *Failure* factor does not have equal intercepts for T13 (*failure related to a school meeting or social gathering*) across new and returning students. Also, measured items T3 (*academic failure*), T5 (*failure in duties*) and T25 (*change in parental employment)* do not have equal intercepts with respect to culture. Strict invariance is compromised further as two items from the *Failure* factor do not have equal residuals (T5: *failure in duties* T13: *failure related to a school meeting or social gathering*) and for the *Personal* factor, are not equal across the status for T25 (*change in parental employment)*.

While strict invariance indicates survey reliability, it is not a pre-requisite for testing invariance of *latent-construct* variances, covariances and means (also termed structural invariance; Brown 2006). However, if cross-group factor loadings are equal then it is reasonable to assess whether each latent factor has comparable variance within each group. That is, weak invariance provides a basis for deciding to assess equality of factor loadings. Further, if factor variance and loadings are invariant, then it is reasonable to check if the factor's covariation with other factors does not vary across groups. Finally, if the loadings, variance and covariances are invariant, an investigation is warranted of whether the factor's mean does not vary across groups.

Equality of latent-factor variances reflects the tendency of respondents in different groups to draw on comparable sets of values of the latent constructs in responding to survey statements. Invariant latent covariance indicates that factors are neither more nor less strongly related in one group compared with other groups. If a factor's mean is invariant then, across groups, average factor scores do not differ. If all three conditions are met then the latent factors have comparable influence across groups (Brown 2006; Kline 2011). By looking at the ticks in the final rows of Table 4.2.3c, it can be concluded that the latent triggers *Failure* and *Personal* in the CFA of Table 4.2.2b are not uniformly influential across the four variables describing respondent characteristics. This is discussed in greater detail in the next chapter.

4.3 EMOTIONS (CENTRAL VARIABLE G2)

4.3.1 DESCRIPTIVE STATISTICS

At wave 2, the preamble used in the TISS with statements adopted from Pekrun et al. (2009) was:

> Now to change direction, think about how you studied. Please rate yourself on the following statements …

Participants were asked to respond using the five-point Likert scale set out in the previous section on triggers. The Pekrun et al. statements were drawn from their AEQ and amended for the SHI context. The statements refer to both positive and negative or activating and deactivating emotions as discussed in Section 3.7.2. In Table 4.3.1a, means for each item are arranged in descending order.

Code	Emotion	Mean	Standard deviation
P1	I enjoyed acquiring new knowledge	4.306	0.781
P2	I had an optimistic view toward studying	3.958	0.901
P3	I was proud of my capacity	3.589	1.059
P5	I got tense and nervous while studying	2.976	1.234
P6	I felt ashamed that I can't absorb the simplest of details	2.727	1.340
P4	Studying made me irritated	2.718	1.094
P8	The material bored me	2.640	1.155
P7	I felt hopeless when I thought about studying	2.228	1.152
n = 333			

Table 4.3.1a Wave 2 summary statistics for emotion

The three positive emotions are clustered at the top of the table. The mean scores for positive emotions are above 3.5; while means over negative emotional statements are less than three. The difference between the lowest average for a positive statement (P3) and the highest mean for a negative statement (P5) is 0.613. The other differences between successive rows in the table are smaller than this. For example, the next biggest difference is 0.412 between P8 and P7. Standard deviations for positive emotions are smaller than for negative emotions, although after the first two statements in Table 4.3.1a, values of this statistic are clustered in the range 1.059 to 1.340. As was found for triggers, the means and standard deviations of measured emotion items are negatively correlated, with coefficient -0.822. For the first statement in the table, P1, 89.2% or responses either agree somewhat or definitely agree. On the other hand, for P6, responses are uniformly spread across all statements other than definitely agree.

Skewness and kurtosis for the emotions statements do not all fall in the range -2.0 to 2.0, as discussed in the previous section. In particular, kurtosis for P1 is 2.913. While some commentators suggest that kurtosis might be tolerated up to seven when using MLE (Hancock and Liu 2012), this is not the course taken here. Thus, as discussed in the previous section, robust DWLS is used for all estimations. Further details on skewness and kurtosis among the emotions statements are given in Appendix A6.1. That appendix also summarises responses to the 20 words describing emotions (Appendix A6.2). These were included in the TISS as a possible alternative to the Pekrun et al. (2009) statements. However, they were not required for the analyses reported in this and subsequent sections.

4.3.2 LATENT CONSTRUCTS

In handling responses to emotions statements on the TISS, guidance was sought in the work of Pekrun (Pekrun 1992; Pekrun et al. 2002; Pekrun et al. 2004; Pekrun 2006; Pekrun et al. 2009; Pekrun et al. 2010; Pekrun et al. 2011). The guidance is that two factors should be sought. On this, at SHI (Figure 4.3.2a) the polychoric correlations have similarities with those obtained by Pekrun et al. (2011, p.43):

> "the positive emotions enjoyment, hope, and pride correlated positively …
> Similarly, there were positive correlations between the negative emotions
> anger, anxiety, shame, hopelessness, and boredom. The correlations between
> these positive emotions, on the one hand, and negative emotions, on the
> other hand, were moderately negative"

These features can be seen in Figure 4.3.2a for SHI. Pekrun and his colleagues (2011, p.43) concluded "that the emotion constructs measured by the AEQ are clearly separable". On this basis, CFA with a two-factor structure was examined with robust DWLS estimation. The results are shown in Table 4.3.2a.

The measurement model for emotions in the next table (Table 4.3.2a) satisfies benchmarks on goodness of fit, other than Chi-sq, which is known to be sensitive to sample size. Loadings, the factor correlation and error correlations (all of which involve "shame") are significantly different to zero at better than 1%. However, the Cronbach α for *Positive emotions* is less than the generally accepted benchmark of 0.7. This is not surprising as only three items are included in the construct and it is well known that this measure of internal consistency increases with numbers of items (Cortina 1993).

In fact, for small numbers of items, it is better to inspect inter-item correlations (Coertjens et al. 2013, Cortina 1993). In the SHI data, for the three positive emotion statements, inter-item correlations are around 0.5, suggesting good reliability. Further, as can be seen in Table 4.3.2b, composite reliability for both latent emotions exceeds the benchmark of 0.7.

	P1A2	P2A2	P3A2	P4A2	P5A2	P6A2	P7A2	P8A2
P1A2	1	0.62	0.42	-0.27	-0.22	-0.21	-0.37	-0.31
P2A2	0.62	1	0.57	-0.45	-0.34	-0.34	-0.39	-0.34
P3A2	0.42	0.57	1	-0.26	-0.26	-0.44	-0.34	-0.29
P4A2	-0.27	-0.45	-0.26	1	0.48	0.27	0.44	0.43
P5A2	-0.22	-0.34	-0.26	0.48	1	0.5	0.5	0.34
P6A2	-0.21	-0.34	-0.44	0.27	0.5	1	0.65	0.31
P7A2	-0.37	-0.39	-0.34	0.44	0.5	0.65	1	0.39
P8A2	-0.31	-0.34	-0.29	0.43	0.34	0.31	0.39	1
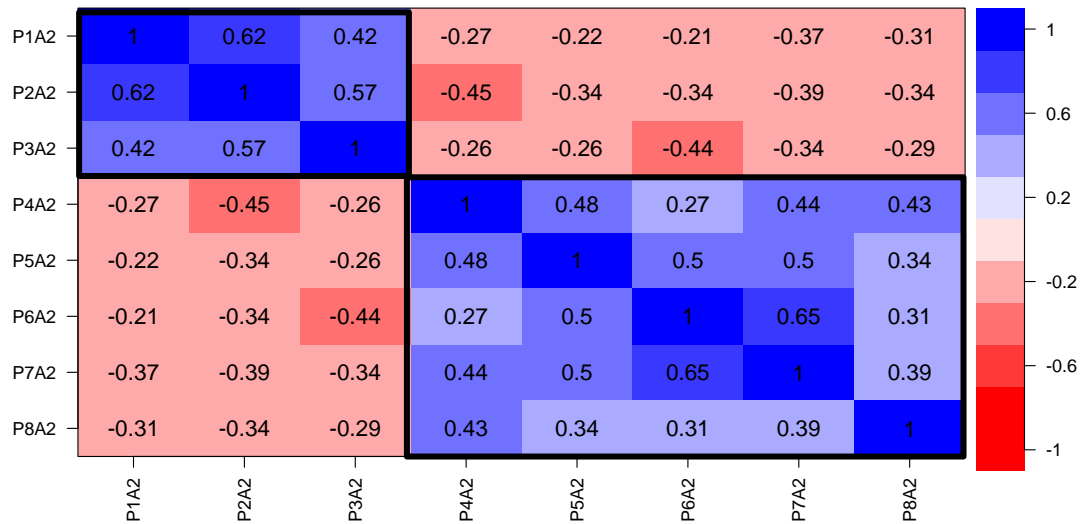
Note: the item codes are those used in tables augmented with the characters "A2" indicating responses in the second wave.

Figure 4.3.2a Polychoric correlations for emotions

The values for AVE shown in Table 4.3.2b exceed shared variance, so discriminant validity is verified on this basis (see the previous section) for both latent constructs. Also, AVE exceeds 0.50 for *positive emotions*, so confirming convergent validity on this means of assessment. However, this is not the case for *negative emotions*. However, CR for this construct is greater than 0.7 and exceeds the AVE, so on this basis, the construct is concluded to display convergent validity.

As in the previous section, the Anderson and Gerbing (1988) test for discriminant validity was performed. The difference in Chi-sq values for the constrained and unconstrained version of the model was 113.6 with one degree of freedom. Consequently, it can be concluded that the measures discriminate sufficiently between similar, but different, latent factors. Overall evidence exists of "positive" and "negative" scale items measuring traits consistently and that these constructs are measured reliably by the observed variables.

As for triggers, the emotions measurement model is presented diagrammatically in the final figure of this sub-section.

Diagnostic	Values
Chi-Square	30.1
Degrees of Freedom	16
Probability of Chi-Sq	0.017
RMSEA	0.052
p-value RMSEA $<= 0.05$	0.426
Tucker-Lewis Index (TLI)	0.984
Bentler CFI	0.991
SRMR	0.033
n	333

Factor	Standardised estimates	Cronbach's α
Positive emotions		
P1: enjoyment	0.682**	
P2: hope	0.897**	0.655
P3: pride	0.642**	
Negative emotions		
P4: anger	0.689**	
P5: anxiety	0.681**	
P6: shame	0.642**	0.791
P7: hopelessness	0.709**	
P8: boredom	0.572**	
Factor correlation		
Positive with negative	-0.637**	
Error correlations		
Pride with shame	-0.308**	
Anger with shame	-0.306**	
Hopelessness with shame	0.351**	

** Parameters all significant at 1% or better.

Table: 4.3.2a CFA for wave 2 emotions

	CR	AVE	Shared variance
Positive emotions	0.789	0.561	0.406
Negative emotions	0.793	0.436	

Table: 4.3.2b Convergent and discriminant validity for the latent emotions of Table 4.3.2a
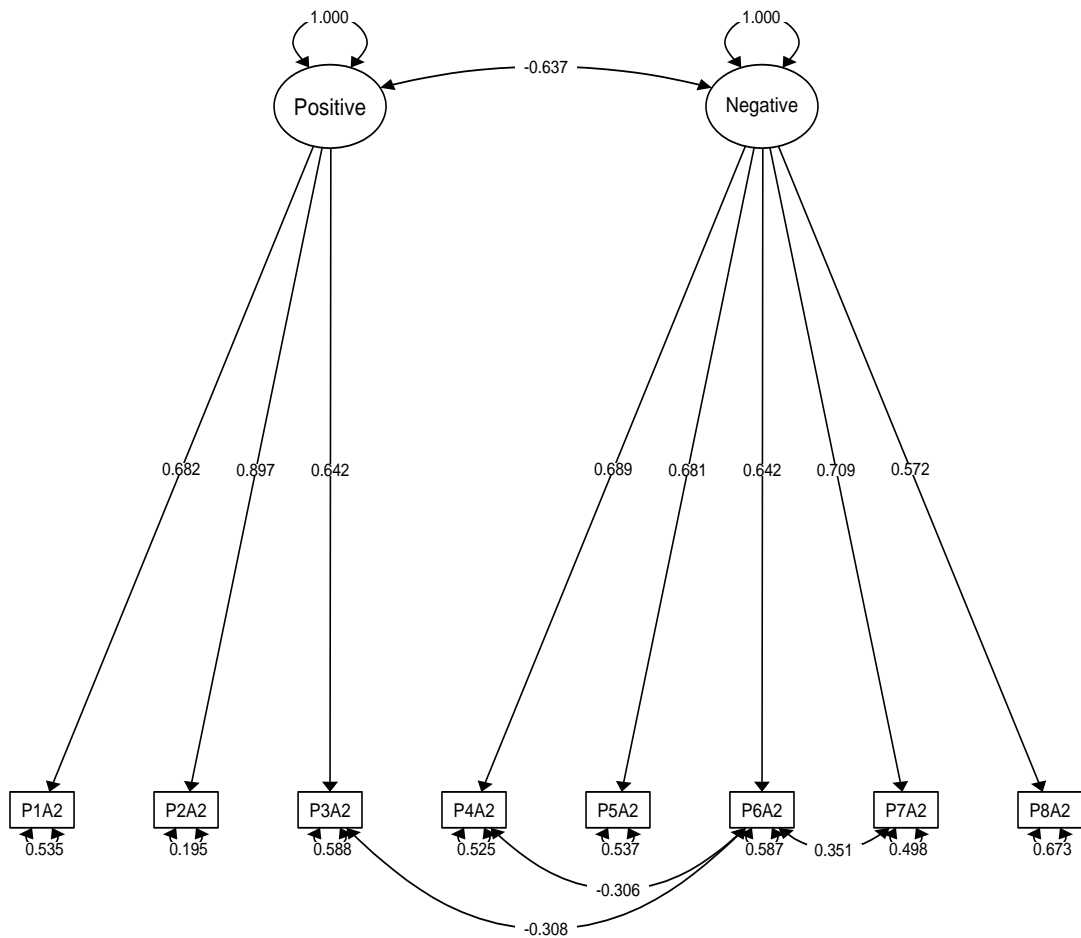
Figure 4.3.2b Emotions measurement model obtained with robust DWLS estimation

4.3.3 INVARIANCE FOR EMOTIONS

Invariance testing as described in Section 4.3.2 was performed for emotions. As for triggers this is done using information on respondents' age, status, gender and cultural background. The results are summarised in Table 4.3.3a and the underpinning MGCFAs are reported in Appendix A6.3a to g). It can be seen in the first row of Table 4.3.3a that there is configural invariance across the four background variables, as indicated by the presence of ticks.

	Age		Status		Gender		Culture	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Measured items								
Configural	✓	✓	✓	✓	✓	✓	✓	✓
Weak (loadings equal)	✓	✓	P3	P8	✓	✓	P3	✓
Strong (loadings & intercepts equal)	✓	✓	✓	✓	✓	✓	✓	✓
Strict (loadings, intercepts & residuals equal)	✓	✓	✓	✓	✓	✓	P2	P4
Latent constructs								
Equal variances	✓	✓	*X*	✓	✓	*X*	✓	*X*
Equal covariance		✓		✓		✓		*X*
Equal means	✓	✓	*X*	*X*	✓	✓	*X*	*X*

Table 4.3.3a Summary of invariance testing for emotions

There is partial weak invariance with respect to status due to differences in responses to statements P3 (*I was proud of my capacity*) and P8 (*the material bored me*) and across culture to P3(*I was proud of my capacity*). For the other background characteristics, strong measurement invariance was found. Moreover, age and gender display strict measurement invariance for emotional items on the TISS. Culture fails strict-invariance testing as items P2 (*I have an optimistic view towards studying*) and P4 (*Studying made me irritated*) do not have comparable residuals in the measurement models for this background characteristic. As for triggers, age meets the requirements for all forms of invariance on emotions. However, there are failures on latent-construct invariance for status, gender and culture – indicated by crosses in the bottom of Table 4.3.3a. This is different to the findings on latent-construct invariance for triggers.

4.4 FORMS OF REFLECTION (CENTRAL VARIABLE G3)

4.4.1 DESCRIPTIVE STATISTICS
At wave 2, the preamble used in the TISS with Kember et al's (2000) forms-of-reflection statements was:

> Please indicate your level of agreement with statements about your actions
> and thinking towards your *STUDIES DURING THIS SEMESTER*.

Responses were elicited using the same five-point Likert scales as were used for triggers and emotions. All 16 statement of Kember et al. were included in the TISS, with four items for each of habitual action (HA), understanding (U), reflection (R) and critical reflection (CR). Average scores and standard deviations are shown in Table 4.4.1a ranked from largest to smallest on mean score for each form of reflection.

For the 16 statements sample variance was 0.048 and sample SD is 0.219[4] meaning average variance explained by four factors is fairly low and data points do not vary far from their mean (Kerns 2010). Overall mean scores and SD (denoted $\bar{x}$ and σ) for each form of reflection compared to Kember et al. (2000, see Table 6, p.392) were higher on U ($\bar{x}$ =16.12, σ =3.42) and CR ($\bar{x}$ =14.22, σ =4.29), lower on HA ($\bar{x}$ =12.18, σ =4.72) and similar on R ($\bar{x}$ =16.02, σ =3.3). This suggests that HA may under-represent the variance in observed data. Further validity testing was conducted in the sections that follow to establish if this holds true.

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[4] Average sample variance was calculated as $S^2 = \sum SD^2/(n-1)$

All four forms of reflection showed negative skewness (ranging from -0.010 to -1.130) with only one item H4 being positively skewed (0.096). Similarly, kurtosis estimates were between -0.020 and 1.530 indicating slight mesokurtic distribution across all items thereby causing little concern that the data are non-normally distributed (see Appendix A7.1 for descriptive statistics). Skewness and kurtosis for the forms-of-reflection statements fall within the range -2.0 to 2.0 (Appendix A7.1), unlike one emotional statement in the preceding sub-section.

All mean scores except for statement HA4 are greater than 3.0, the mid- or neutral-point of the response range. Mean scores tend to be closer to or above four for understanding and reflection items than for habitual action or critical reflection. That is, respondents were more likely to definitely agree or somewhat agree that they used understanding and reflection approaches than habitual action or critical reflection. However, standard deviations are greater than one for habitual action and critical reflection; whereas for the other forms, standard deviations are less than one. That is, overall, respondents were less likely to report using habitual action and critical reflection, but there were greater spreads of responses on these forms of reflection compared with understanding and reflection. On the basis of mean scores, least used was habitual action.

4.4.2 LATENT CONSTRUCTS

Based on the guidance in the results of Kember et al. (2000), four latent factors were expected to emerge for forms of reflection. Results for a four-factor CFA are shown in Table4.4.2a. Goodness-of-fit diagnostics are good and loadings for all four factors are significantly different to zero at better than 1%. However, inspection of polychoric correlations, shown in Figure 4.4.2a, suggests that the habitual-action items may be dislocated or distinct from the statements on understanding, reflection and critical reflection. Pairs of habitual-action items are moderately correlated but there are only weak correlations across the pairs (as in the top left box in the figure), Further, these statements do not correlate very closely with the other measured items, although those other items correlate more closely with each other, as can be seen in the darker blue area in the bottom right of the figure. These features of habitual action may underpin the poor values for composite reliability, average variance extracted and shared variance that are given in Table 4.4.2b for this form of reflection. They suggest that habitual action, described by Kember et al. (2000, p.383) as performing an activity "with little conscious thought", may be common in the SHI context, thereby sub-optimally contributing to variance in observed data.

Code	Form of Reflection	Mean	Standard deviation
HA2	When learning the class did things so many times that I started doing them without thinking about it	3.183	1.089
HA1	When working on some activities, I can do them without thinking about what I am doing	3.108	1.237
HA3	As long as I can remember hand-out material for examinations, I do not have to think much	3.009	1.173
HA4	If I follow what the lecturer says, I do not have to think too much in my studies	2.877	1.220
U2	To pass my courses I needed to understand the content	4.231	0.838
U1	My studies required me to understand concepts taught by the lecturer or teacher	4.189	0.739
U3	I needed to understand the material taught by the lecturer or teacher in order to perform practical tasks	4.054	0.866
U4	In courses I had to continually think about the material being taught	3.652	0.965
R2	I liked to think over what I was doing and consider alternative ways of doing it	4.027	0.804
R1	I sometimes questioned the way others did something and tried to think of a better way	4.018	0.821
R3	I often reflected on my actions to see whether I could have improved on what I did	3.988	0.821
R4	I often re-appraised my experience to learn from it and improve for my next assessment	3.982	0.864
CR1	As a result of my last course I have changed the way I look at myself	3.796	1.081
CR2	My last course has challenged some of my firmly held ideas	3.511	1.031
CR4	During the last course I discovered faults in what I had previously believed to be right	3.480	1.034
CR3	As a result of my last course I have changed my normal way of doing things	3.426	1.145

n = 333

Table 4.4.1a Wave 2 summary statistics for forms of reflection

Diagnostic	Four factor CFA	Three factor CFA
Chi-Square	151.1	90.4
Degrees of Freedom	92	48
Probability of Chi-Sq	0.000	0.000
RMSEA	0.044	0.052
p-value RMSEA <= 0.05	0.777	0.414
Tucker-Lewis Index (TLI)	0.972	0.975
Bentler CFI	0.979	0.982
SRMR	0.043	0.038
n	333	333

Factor	Standardised estimates		Cronbach's α
Habitual action			
H1	0.471**		
H2	0.565**		0.785
H3	0.601**		
H4	0.507**		
Understanding			
U1	0.816**	0.818**	
U2	0.697**	0.702**	0.863
U3	0.674**	0.665**	
U4	0.615**	0.613**	
Reflection			
R1	0.639**	0.640**	
R2	0.744**	0.744**	0.862
R3	0.734**	0.730**	
R4	0.691**	0.697**	
Critical reflection			
CR1	0.828**	0.822**	
CR2	0.674**	0.683**	0.863
CR3	0.673**	0.668**	
CR4	0.776**	0.779**	
Factor correlations			
Habitual action with			
understanding	0.368**		
reflection	0.242**		
critical reflection	0.260**		
Understanding with			
reflection	0.641**	0.641**	
critical reflection	0.524**	0.525**	
Reflection with			
critical reflection	0.500**	0.500**	

** Parameters are significant at 1% or better.

Table 4.4.2a Standardised CFA loadings for wave 2 forms of reflection

	Standardised estimates		Cronbach's α
Error correlations			
H1 with H2	0.457**		
CR1 with CR4	-0.536**	-0.523**	
H1 with U2	-0.330**		
U3 with U4	0.279**	0.287**	
R3 with R4	0.317**	0.314**	
H3 with H4	0.310*		

**(*) Parameters are significant at 1% (5%) or better.

Table 4.4.2a (cont.) Standardised CFA loadings for wave 2 forms of reflection
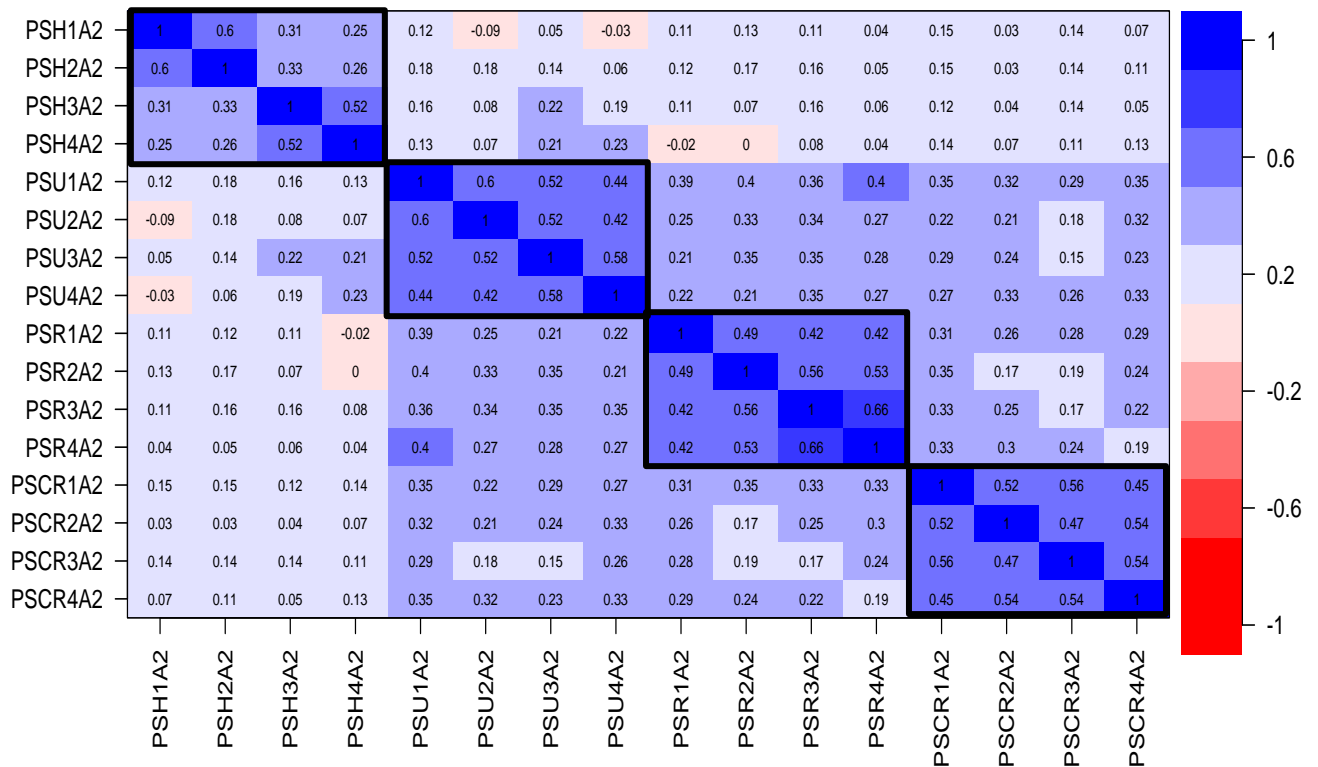
Figure 4.4.2a Polychoric correlations for forms of reflection

On the basis of the evidence from Figure 4.4.2a and Table 4.4.2b, it was decided to omit habitual action from the analysis and proceed with a three-factor solution, for which the measurement model and results on construct validity are given in Tables 4.4.2a and b.

In the first of these tables, it can be seen that three fewer error correlations (which involve habitual-action statements) are required to produce the goodness-of-fit diagnostics for the three-factor solution. None of the retained error correlations occur across latent factors. In Table 4.4.2b, AVE for habitual action does not exceed the shared variance, leading to the conclusion that habitual action does not have discriminant validity. Also, as it CR and AVE in the table are so small, it is concluded the construct does not have convergent validity. On the other hand, in the lower part of Table 4.4.2b, the values of CR, AVE and shared variance are such that it can be concluded the retained factors are construct valid that is, display both convergent and discriminant validity.

	CR	AVE	Shared variance
Habitual Action	0.617	0.289	0.135
Understanding	0.795	0.496	0.411
Reflection	0.795	0.494	0.411
Critical Reflection	0.828	0.549	0.275
Understanding	0.795	0.494	0.411
Reflection	0.795	0.495	0.411
Critical Reflection	0.829	0.548	0.276

Table: 4.4.2b Convergent and discriminant validity for three and four latent forms of reflection of Table 4.4.2a

Understanding and reflection factors have the highest covariance in Table 4.4.2a. This may be theoretically plausible as understanding is referred to as using thought during action or while performing tasks, while reflection is considered to be a process of appraising that which has been learnt (Kember et al. 2000). In this sense and within the research context, reflection may be stimulated by attempting to understand experiences.

The four factor model was tested further for DV whereby factors were constrained to 1 (Anderson and Gerbing 1988). Results indicated that the x^2 of the constrained model ($x^2/df = 5.959$) is larger than the unconstrained MODEL 2 ($x^2/df = 1.641$) and, according to Anderson and Gerbing (1988), DV between factors is attained. The items on the habitual action factor though did not converge during this test and indicated non-significant loadings. As proposed by Sharif (2013), although variables correlate to a factor, the item variance is explained by factors beyond those specified in the model and therefore habitual action did not explain the variance in the four statements well. Therefore, variance is explained by an underlying factor not captured by the model.

Building on the Kember et al (2000) scale, a similar result was found by Peltier et al (2006) who could not find support for the HA factor amongst students in terms of its contribution to learning.

The final three factor model, which excluded HA based on reliability and validity testing above is represented in Figure 4.4.2b.

Minor differences are presented in this research concerning forms of reflection in comparison to the original scale findings (see Kember et al. 2000, pp.386-392). A comparison of results is presented in Appendix A7.2. In this appendix, values were rounded to two decimal places to aid comparison with Kember's results. The current model exhibits a lower Chi-sq/df ratio with larger CFI than the original scale, indicating better model fit (Original model: *Chi-sq=179, df=100, CFI=0.903* opposed to TISS model: *Chi-sq =151, df=92, CFI= 0.979)* (Kember et al. 2000). Further, factor reliability and parameter estimates are higher with lower error variances when compared to the original scale. Additionally, in the Kember model only four factor covariances are reported. The inclusion of variances in the four factor model between HA and U and HA and R positively impacted the overall Chi-sq/df ratio and fit indices. Overall, the model presented here tends to outperform the original Kember model in terms of estimates and fit diagnostics, except for the failures noted above for HA factor during the test for discriminant validity.
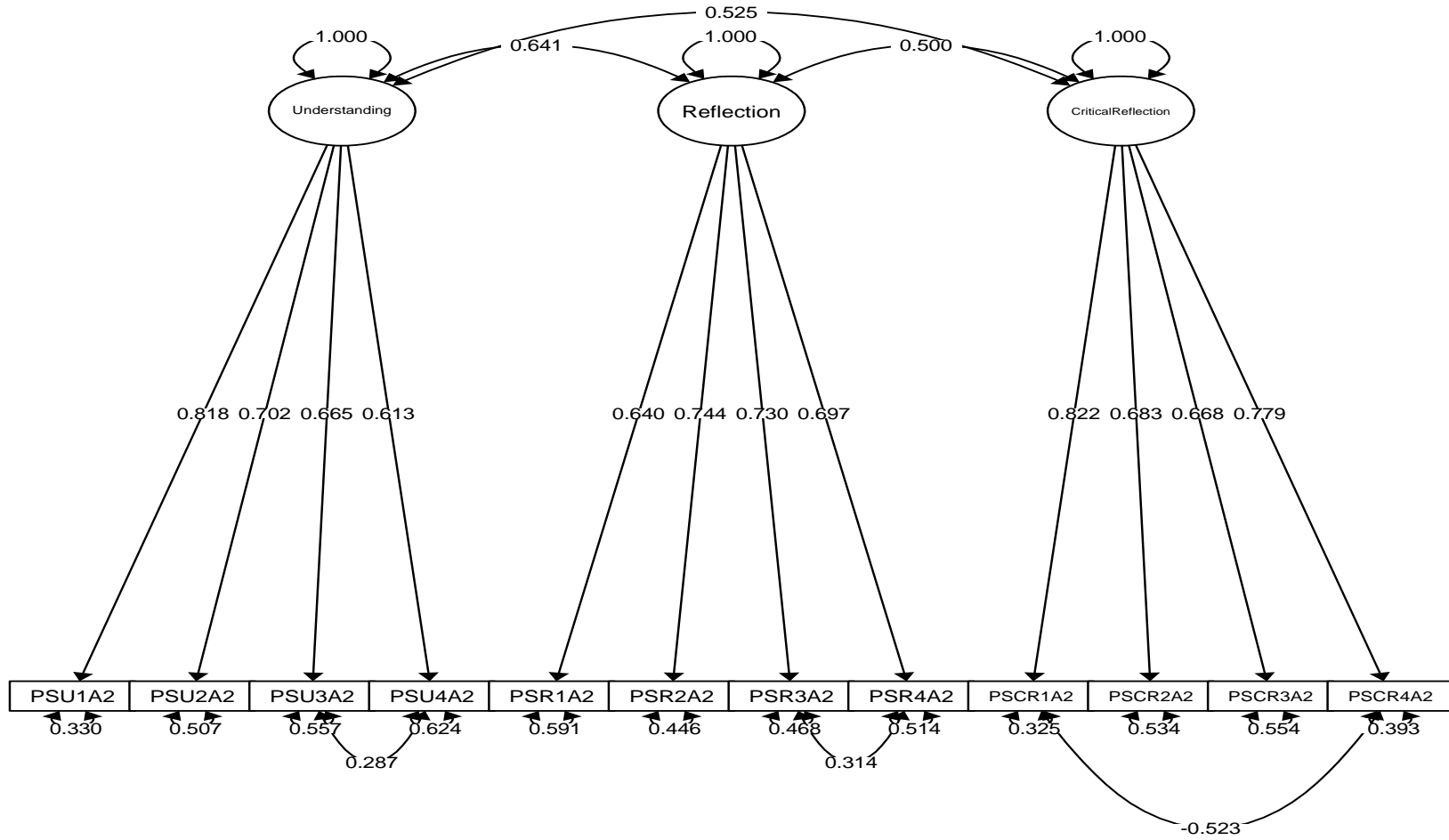
Figure 4.4.2b Forms-of-reflection measurement model obtained with robust DWLS estimation

4.4.3. INVARIANCE ACROSS FORMS OF REFLECTION

Invariance testing as described in Section 4.3.2 on triggers was performed for forms of reflection using respondents' age, status, gender and cultural background. The results are summarised in Tables 4.4.3a and 4.4.3b and the underpinning MGCFAs for each form of reflection are reported in Appendix A7.3.

Configural invariance was achieved for all forms of reflection across each of the variables of interest. Further, weak invariance was observed for groups based on age and status. However, differences in loadings appeared for understanding by gender in response to U4 (*I had to continually think about the material being taught*) and across cultures to U2 (*To pass previous courses I needed to understand the content*). Thus, only partial weak invariance was attained. Further, differences across cultures were found for the reflection statements R3 (*I often reflected on my actions to see whether I could have improved on what I did)* and R4 (*I re-appraised my experience so I could learn from it and improve for my next assessment).* Strong invariance was attained for all forms of reflection across gender and age, although in relation to understanding, the gender result is partial due to the finding that the loadings of U4 were different when testing weak invariance. There is only partial strong invariance for status and culture due to intercepts being unequal for U3 (*I needed to understand the material taught by the lecturer in order to perform a practical task)* and culture on U4. Also, intercepts differ for CR4 (*I discovered faults in what I had previously believed to be right*) across status groups.

Strict invariance is at best partial, except for understanding across age groups, and for reflection and critical reflection with respect to gender. Lack of equality for error terms associated with three understanding items were found, as was the case also for all four reflection items and two critical reflection errors.

All forms of structural invariance were achieved for reflection with respect to gender. With the exception of equal means across age and status, overall latent invariance was established for reflection. With respect to age, critical reflection did not display equal variances but critical reflection did with respect to status groups. Reflection performed poorly on structural invariance to cultural group, although understanding and critical reflection was invariant on each latent criteria. Overall, understanding attained structural invariance on all demographic groupings. Critical reflection attained invariance across status, gender and culture. Reflection contributed to the biggest portion of latent non-invariance across groups.

	Age			**Status**		
	Understanding	Reflection	Critical reflection	Understanding	Reflection	Critical reflection
Measured items						
Configural	✓	✓	✓	✓	✓	✓
Weak (loadings equal)	✓	✓	✓	✓	✓	✓
Strong (loadings & intercepts equal)	✓	✓	✓	U3	✓	CR4
Strict (loadings, intercepts & residuals equal)	✓	R1	CR1	U3	R4	✓
Latent constructs						
Equal variances	✓	✓	*X*	✓	✓	✓
Equal covariance [1]						
Equal means	✓	*X*	✓	✓	*X*	✓

[1] Covariance testing was not done for forms of reflection, because of difficulty in interpretation (Brown 2006; Kline 2011). For three or more factors, invariance for each measured form and for equal construct variances and means is most easily interpreted by doing the testing on each factor separately.

Table 4.4.3a Summary of invariance testing for forms of reflection (age and status)

	Gender			**Culture**		
	Understanding	Reflection	Critical reflection	Understanding	Reflection	Critical reflection
Measured items						
Configural	✓	✓	✓	✓	✓	✓
Weak (loadings equal)	U4	✓	✓	U2	R3; R4	✓
Strong (loadings & intercepts equal)	✓	✓	✓	U4	✓	✓
Strict (loadings, intercepts & residuals equal)	U1; U2	✓	✓	U1; U2; U3	R1;R2	CR2
Latent constructs						
Equal variances	✓	✓	✓	✓	*X*	✓
Equal covariance [1]						
Equal means	✓	✓	✓	✓	*X*	✓

[1] Covariance testing was not done for forms of reflection, because of difficulty in interpretation (Brown 2006; Kline 2011). For three or more factors, invariance for each measured form and for equal construct variances and means is most easily interpreted by doing the testing on each factor separately.

Table 4.4.3b Summary of invariance testing for forms of reflection (gender and culture)

4.5 FACILITATORS AND SOCIAL ACTORS (CENTRAL VARIABLE G4)

4.5.1 DESCRIPTIVE STATISTICS

For the TISS, a number of statements were devised to assess features that might facilitate how respondents dealt with triggers and their emotional responses, and which might moderate the impacts of these on forms of reflection (see Sections 2.6 and 3.7.4). As for other central variables, these were scored using five-point Likert scales, ranging from "definitely disagree" (1) to "definitely agree"(5). In Table 4.5.1a the majority of mean values for these TISS statements are above the mid-point of three, indicating that respondents tended to respond one of "only to be used if a definite answer is not possible", "agree somewhat" or "definitely agree". Exceptions were the statements on *spirituality* and *students*, which have mean scores under three. The responses to these statements had skewness and kurtosis values (given in Appendix A8.1) that fall between -2.0 and 2.0, suggesting little deviation from normality (Trochim and Donnelly 2006; Field 2009; George and Mallery 2010; Gravetter and Wallnau 2014). As mean values fall, going from the first to the last row of the table, standard deviations tend to become larger, suggesting dispersion of responses on Likert scales, although this does not occur uniformly from top to bottom of Table 4.5.1a.

Code	Facilitators	Mean	Standard deviation
Think	I realised I had to think about things differently	4.042	0.936
Probsol	I am more aware of being able to solve problems	4.030	0.864
Probskill	Going through this incident gave me problem-solving skill	3.721	1.049
Notalone	I am not alone in my thinking and my feelings	3.589	1.235
Discuss	Meaningful discussions with friends, family and students	3.544	1.082
Thought	I have thought about this triggering incident more than once	3.399	1.125
Friends	I spoke to my friends about this triggering incident	3.297	1.217
Family	I spoke to my family about this triggering incident	3.186	1.347
Spirit	The triggering incident was spiritual	2.847	1.148
Students	I spoke to fellow students about this triggering incident	2.757	1.275
n = 333			

Table 4.5.1a Wave 2 summary statistics for facilitators

4.5.2 LATENT CONSTRUCTS

There is little guidance in the TL literature as to how facilitator statements in Table 4.5.1a coded as *think*, *not alone*, *thought* and *spirit*, might associate with latent constructs. This lack of guidance is a consequence of them being drawn from a number of sources (Sections 2.6.1 and 2.6.2). However, TL researchers have written about dialogue with fellow students, friends and family. Consequently, it might be thought that the statements on these interactions are associated with one latent construct. Similarly, given the common theme to statements on problem solving, these might be associated with a single latent construct. To an extent these features of responses can be seen in the polychoric correlations in Figure 4.5.2a, where there appears to be two regions of generally high correlations spanning the diagonal of the matrix that are outlined in black.
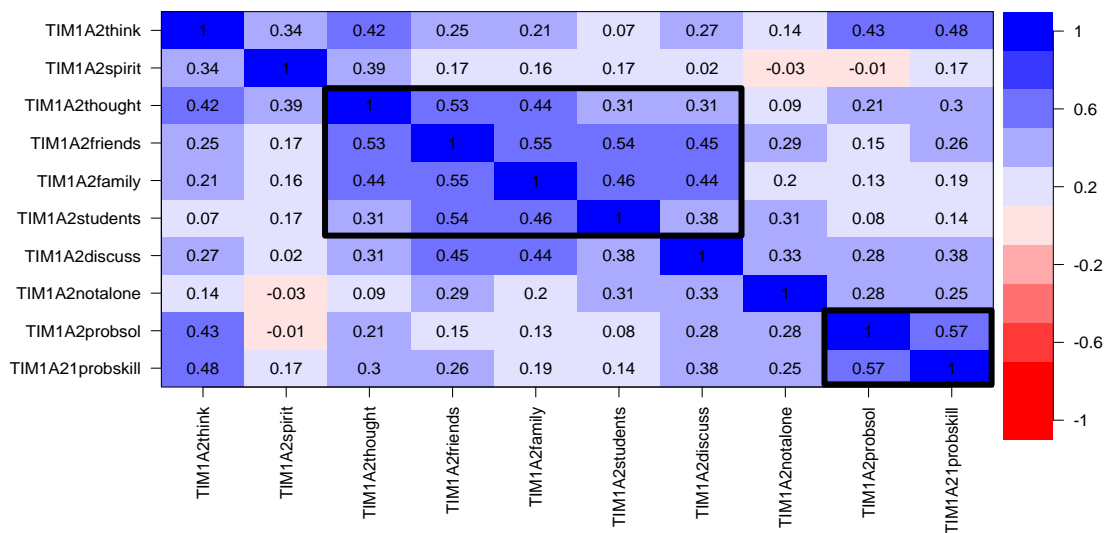
Figure 4.5.2a Polychoric correlations for facilitators

The predominance of low correlations in the other parts of the matrix possibly indicate issues misinterpretations by respondents. This may be due to the way items were expressed as a mix of self-rated competencies, such as the spiritual change experienced with a trigger, or process-related statements such as thinking often about a trigger, or having meaningful discussions with people about triggering incidents. However, using these polychoric correlations, the PCA in Table 4.5.2a was obtained. In the PCA, five survey items were removed as they did not meet minimum requirements for inclusion, notably that loadings were less than 0.5 or there were differences in loadings less than 0.2. Items remaining were assigned to one of two components, with one concerning discussions with friends, family and fellow students, and the other associated with problem-solving ability and skills.

Trigger		Sampling adequacy	Communality	C1	C2	Cronbach's α
	Determinant	0.294				
	KMO overall sampling adequacy	0.657				
	Root mean square residuals	0.112				
	Total variance explained	72.3%				
	n	333				
Sharing/Dialogue	Friends	0.682	0.726	**0.835**		
	Family	0.735	0.657	**0.804**		0.763
	Students	0.726	0.663	**0.814**		
Problem solving						
	Probsol	0.549	0.791		**0.889**	0.565
	Probskill	0.575	0.778		**0.869**	
	Average communality			0.682	0.785	
	Variance explained (%)			40.6	31.7	

Table 4.5.2a PCA for facilitators in wave 2

While the loadings for items onto components exceed 0.8 and over 70% of variation in responses is explained, there are poor outcomes in other parts of Table 4.5.2a. First, the *Problem solving* component is under-determined. That is, it has loadings from fewer than three survey statements. This is an issue because more accurate outcomes are obtained when each component is associated with at least three measured survey items (Fabrigar et al. 1999; Brown 2006). Further, there should be few components in a structure that is under-determined (Field 2009), which is the case as, not only is *Problem solving* under-determined, it accounts for half of the extracted components.

A second cause for concern is that the individual sampling adequacies for *Problem solving* are low. For two measured items, this reflects a part of the correlation between them that is common to just them and is not shared with other items. If this shared, unique variance is large enough, it may indicate the existence of an unidentified underlying construct. Kaiser (1974) described individual KMOs less than 0.60 and greater than 0.50 as unacceptable, while not precluding their use for construct extraction. More recently, it has been recognised that measured items with individual sampling adequacies above 0.60 are more reliable when extracting components from a correlation matrix (Dimitrov 2012). The sampling adequacies for the *Problem solving* items in the PCA of Table 4.5.2a are thus not accepted.

Third, the root mean square residual exceeds 0.10, suggesting that a number of the errors between observed and estimated correlations (corrected for degrees of freedom) are larger than might be tolerated. Ideally, many fewer than half of these errors should be 0.05 or above (Field 2009). The value of 0.126 suggests many are.

Fourth, internal consistency of *Problem solving* as measured by Cronbach's α is well below the benchmark of 0.70. Moreover, the value of 0.565 is less than a lower benchmark of 0.60 sometimes considered in the literature (Haddad et al. 2015).

Overall, the four reasons suggest omitting the two-item component from the investigation of facilitators and concentrating solely on the *Sharing* factor (this is dialogue with social actors facilitating the transformational process, see Chapter 2.6). Further support was gathered when attempting to run MGCFAs. It turned out for the grouping variables of interest (age, status, gender and culture) Heywood cases arose when estimating the initial stage of configural-invariance CFAs.

That is, loadings close to or greater than 1.0 were found for one or other of the loadings of *Problem solving* onto *probsol* and *probskill*. Given this additional evidence, the construct *Problem solving* was eliminated from the analysis.

The remaining one-factor, three item system is just identified. This is indicated by the degrees of freedom being zero in the CFA in Table 4.5.2b for *Sharing* (dialogue with others facilitating the transformation process; see Chapter 2.6). This means there are as many unknowns (three loadings and three error variances) to be found as there are knowns (three variances and three covariances for the three measured items). CFA parameters for a just-identified system will exactly replicate the known matrix of variances and covariances. Consequently, goodness-of-fit diagnostics and the Chi-sq have ideal values.

Diagnostic	Benchmark	Value
Chi-square		0.000
Degrees of freedom		0
p value of Chi-sq	> 0.05	-
RMSEA	< 0.06	0.000
p value RMSEA ≤ 0.05	> 0.50	1.000
Tucker-Lewis index (TLI)	≥ 0.95	1.000
Bentler CFI	≥ 0.95	1.000
SRMR	< 0.08	0.000
n		333

Factor	Item	Standardised values
Sharing	Friends	0.760**
	Family	0.628**
	Students	0.634**

** *denotes significant at better than 1%*

Table 4.5.2b Standardised CFA loadings for wave 2 sharing

CR and AVE values are given in the next table. AVE does not exceed 0.5, but CR exceeds 0.70, so it can be concluded *Sharing* has both forms of validity (Fornell and Larcker 1981; Malhotra and Dash 2011). The CFA is presented diagrammatically in Figure 4.5.2a.

	CR	AVE
Sharing	0.715	0.458

Table: 4.5.2c Convergent and discriminant validity for sharing
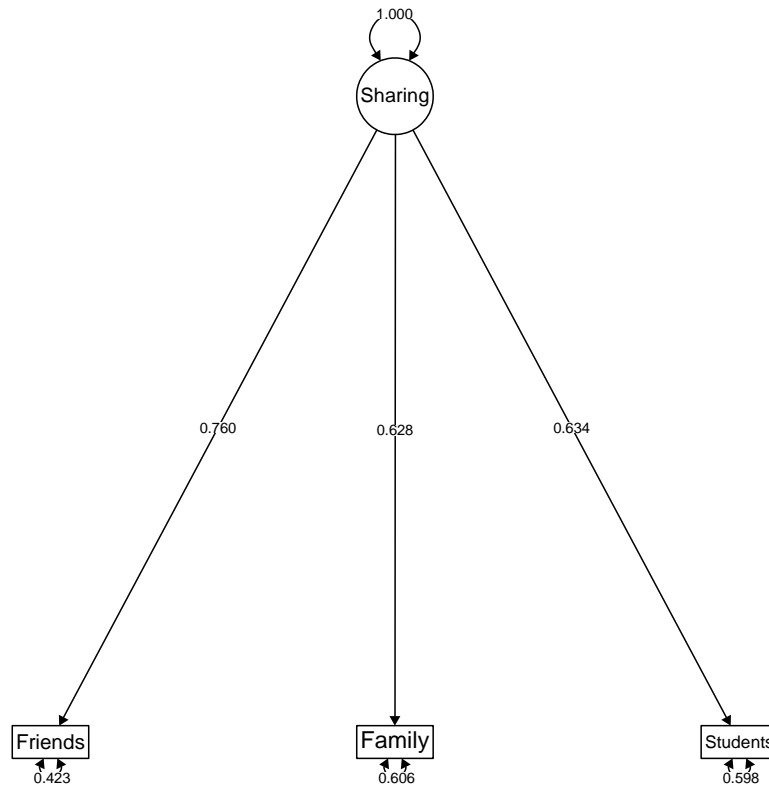
Figure 4.5.2b The measurement model for sharing

4.5.3 INVARIANCE ACROSS SOCIAL ACTORS

Invariance testing as described in Section 4.2.3 for triggers was performed for the *sharing* factor. As for triggers this is done using information on respondents' age, status, gender and cultural background. The results are summarised in Table 4.5.3a and the underpinning MGCFAs are reported in Appendix A8.2. Across all four variables of interest there is measurement invariance, except for differences in student intercepts in the case of status. With the exception of culture, there is latent-construct invariance of each type.

To summarise the results of Sections 4.2 to 4.5, the analysis led to:

1. two triggering constructs,
2. two affective factors;
3. three forms of reflection and
4. one factor for dialogue with social actors.

Also, in relation to hypothesis H_{1a} reliability and validity were confirmed. In the course of compiling Sections 4.2 to 4.5, evidence on measurement invariance for H_{1b} was provided. However, measurement and structural invariance were not supported for all of age, status, gender and culture. The results of these sections are considered again in the next chapter.

	Age	Status	Gender	Culture
Measured items				
Configural	✓	✓	✓	✓
Weak (loadings equal)	✓	✓	✓	✓
Strong (loadings & intercepts equal)	✓	Students	✓	✓
Strict (loadings, intercepts & residuals equal)	✓	✓	✓	✓
Latent constructs				
Equal variances	✓	✓	✓	*X*
Equal covariance [1]				
Equal means	✓	✓	✓	✓

[1] No covariances are involved in the one-factor social model.

Table 4.5.3a Summary of invariance testing for Sharing

4.6 MEDIATED AND DIRECT EFFECTS OF TRIGGERS ON FORMS OF REFLECTION

In this and the next section, the third stage of the analysis is reported in which Hypotheses H_{2a} *and* H_{2b} concerning indirect and direct effects of triggers on forms of reflection are tested. That is, the coefficients *a*, *b* and *c* in Figure 4.6a are considered for combinations of triggers, emotions and the three forms of reflection understanding, reflection and critical reflection that were shown in Section 4 to be reliable and valid. Twelve combinations are possible and the SEMs for their estimations are summarised in Table 4.6a.

The diagrams in Table 4.6a are versions of Figure 4.6a. These are rotated through 90° for purposes of representation for all direct and indirect linkages. Each provides a summary of SEM results for the coefficients *a*, *b* and *c*. For example, the second row in the table is for the estimation of the indirect pathway from the failure trigger to reflection via positive emotions. Two arrows are shown indicating that *a* and *b* were found to be nonzero. The signs of the coefficients are indicated by the "-" and "+" signs attached to the arrows. These signs indicate that if failure is more intensively experienced then positive affective state is eroded and reflection is used less intensively. That is, there is an indirect effect in which the experience of failure deflates positive emotions and reflection (Baron and Kenny 1986; MacKinnon et al. 2007). There is no arrow flowing directly from failure to reflection.

This is because the SEM for failure, positive emotions and reflection did not support the possibility of *c* being nonzero.
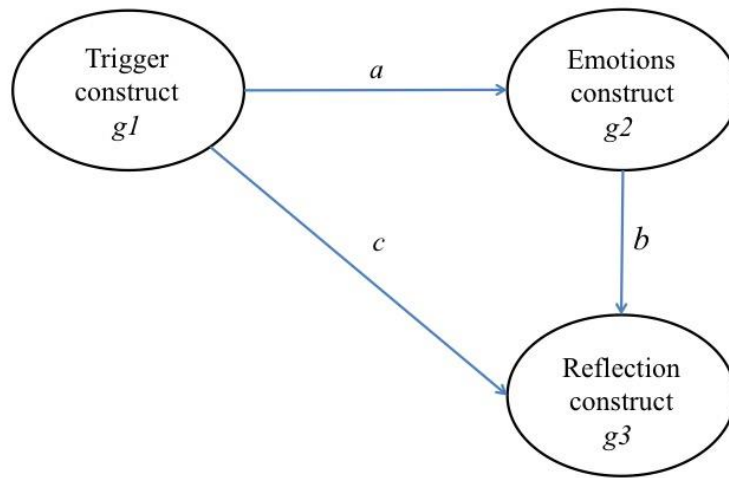
Figure 4.6a Mediating and direct effects between central variables

Underpinning the interpretations of each diagram in Table 4.6a below, is the point that if the unobserved trigger construct is more intensively experienced then responses to each measured item are increased. This occurs because the loadings of the trigger onto the items it influences are positive (see Table 4.2.2b). Further, the statistical estimates *a*, *b* and *c* are to be "interpreted just as 4.8" (Kline 2011, p.103). Thus, if the coefficient *a* for the linkage from a trigger to affective state is negative, the affective state is depressed, which would be reflected in lower TISS scores on measured items for that affective state, among individuals who experience the trigger more intensively than other respondents. On the other hand, if *b* is positive, which means a reduction in affective state translates to less intensive use of a form of reflection.
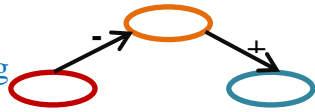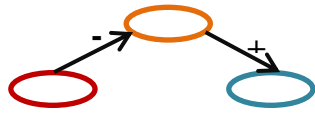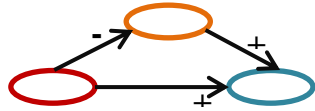
	Trigger	Emotion	Thinking		Direct effect	Indirect effect [1]
1	Failure	Positive	Understanding		No effect detected (N/E)	-0.108[†][2]
2			Reflection		N/E	-0.225*
3			Critical reflection		0.214**	-0.162**[3]
4		Negative	Understanding		N/E	N/E
5			Reflection		N/E	-0.150**

Table 4.6a Summary of relationships between latent constructs

	Trigger	Emotion	Thinking		Direct &/or indirect effects	Direct effect	Indirect effect [1]
6	Failure	Negative	Critical reflection		Neither	N/E	N/E
7	Parents & personal	Positive	Understanding		Neither	N/E	N/E
8			Reflection		Direct	-0.188*	N/E
9			Critical reflection		Direct	0.165*	N/E
10		Negative	Understanding		Neither	N/E	N/E

Table 4.6a Summary of relationships between latent constructs
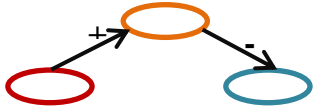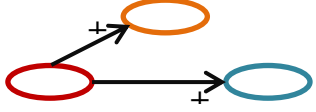
	Trigger	Emotion	Thinking		Direct &/or indirect effects	Direct effect	Indirect effect [1]
11	Parents & personal	Negative	Reflection		Indirect	N/E	-0.103*
12			Critical reflection		Direct	0.208*	N/E

Table 4.6a Summary of relationships between latent constructs

[1] Where indirect effects were detected, these are computed as the products of the regression coefficients for the linkages from a trigger to an affective state and from the affective state to the form of reflection. The calculations of indirect effects are reported in greater detail in the remainder of this sub-section (Section 4.6).

[2] As an example of the procedure employed to estimate indirect effects, in this case the three equations were estimated:

$$Positive = a \times Failure$$

$$Understanding = b \times Positive$$

$$Understanding = c \times Failure$$

The standardised lavaan software options were used and intercept terms were normalised to zero. From the first two equations, the impact of *Failure* on *Understanding* mediated by *Positive* affective state is found by substituting the second equation into the first to obtain

$$Understanding = a \times b \times Positive$$

Diagrammatically the system of equations is represented as:
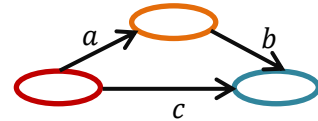
The indirect effect in this example is $a \times b = -0.253 \times 0.425 = -0.108$, as shown in the first row of the table. Further detail is given below. The direct effect c did not have an associated p value of 0.10 or lower and so is not shown in the first row of the table.

[3] The total effect of mediated and direct effects is the difference between the regression coefficients. That is, the total effect is $0.214 - 0.162 = 0.052$. As noted in the text preceding Figure 4.6d, the associated p value obtained from bootstrapping is 0.508, suggesting little evidence that the total effect is different to zero. Thus, while the direct and mediated effects are larger and statistically significant, the overall impact of failure on critical reflection is negligible.

Overall, from the diagrams in Table 4.6a, it can be seen that

- failure influences understanding, reflection and critical reflection; and
- personal concerns influence only reflection and critical reflection.

Some of these influences are direct, some are indirect and in the case of failure, positive emotions and critical reflection both forms of influence operate. Thus:

- The only *direct* effect of failure occurs for critical reflection;
- Personal *directly* influences both reflection and critical reflection;
- Failure has *indirect* effects on each of understanding, reflection and critical reflection via *positive* emotions;
- Failure has an *indirect* effect on reflection via *negative* emotions;
- Personal does not have an *indirect* influence on understanding, reflection and critical reflection via *positive* emotions; and
- Personal *indirectly* influences reflection via *negative* emotions only.

These influences are analysed further via the following diagrams, which include diagnostics for model fit and coefficient values. To estimate the strength of mediated effects, the product $a \times b$ was used (MacKinnon et al. 2007). Bootstrapping is popularly employed to generate standard errors and p values for $a \times b$ (MacKinnon et al. 2007; Hancock and Liu 2012; Finney and DiStefano 2006). It is used because no assumptions are made about the distribution of $a \times b$. Bootstrapping, which for this research is based on loadings and coefficient estimates obtained with robust DWLS, tends to produce larger standard errors and therefore larger probability values than is found with other estimation techniques (such as robust DWLS). Also, goodness-of-fit indicators may be improved, particularly in the cases of RMSEA, TLI and CFI (Finney and DiStefano 2006).

In the case of failure, positive emotions and understanding, estimations are reported in Appendix A9.1a. This example demonstrates that both robust-DWLS and bootstrapped results were considered before deciding to set a linkage to zero. In the appendix, the p values for the coefficient c are large under robust DWLS and bootstrapping. Consequently, there is little or no evidence to reject the hypothesis that the direct effect is zero. Hence, the estimates given in the last pair of columns in the appendix are relied on in the analysis of mediation involving failure, positive emotions and understanding. It can be seen that constraining c to be zero has little effect on the estimated values of a and b.

Often, p values less than or equal to 0.01 are taken as "strong" evidence against the null hypothesis that a coefficient is zero; p values greater than 0.01 but no larger than 0.05 are considered "moderate" evidence; p values greater than 0.05 but no greater than 0.10 are taken as "weak" evidence; and p values exceeding 0.10 constitute "little" or "no" evidence (Chance and Rossman 2006). Use of these terms and cut-off values seems reasonable given the sample size of 333 for this research. However, there is some variation in practice, as can be seen in the terms and cut-offs considered by Scott (2005) and Gelman (2013).

In Figure 4.6b below, greater detail of the results are shown for estimating linkages in the case of failure, positive emotions and understanding. As indicated in Table 4.6a, the coefficient c is taken to be zero, as it had p value of 0.151 (see Appendix A10.1.1) in robust DWLS and 0.184 in bootstrapping[5]. By contrast, the mediating influence $a \times b$ is estimated to be $-0.253 \times 0.425 = -0.108$. Bootstrapping led to the conclusion of strong evidence that a and b are nonzero as their p values are 0.007 and 0.000 (as indicated in Figure 4.6b by **). The bootstrapped probability of their product being nonzero is $p = 0.056$ (indicated in the figure by †), providing weak evidence of an indirect impact.
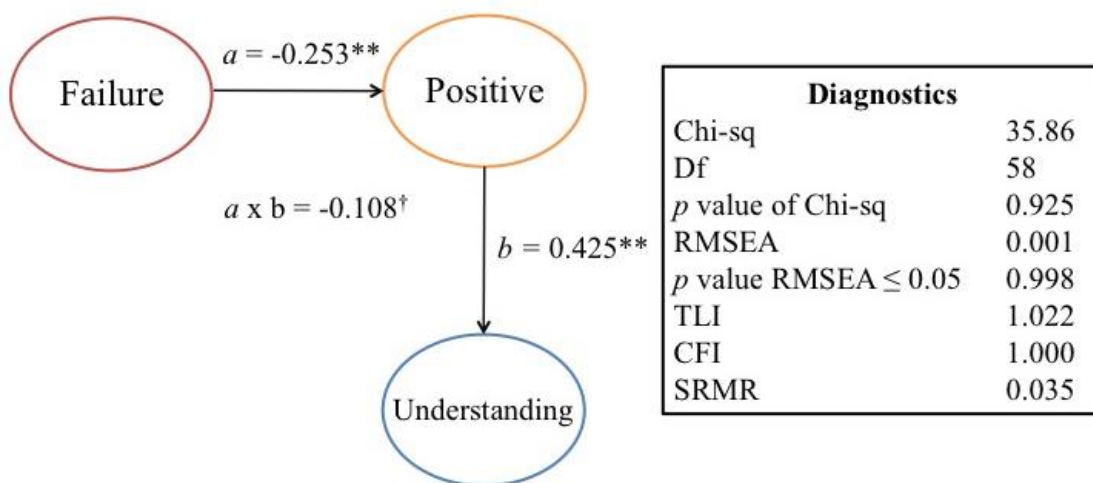
** (†) denotes strong (weak) evidence that is a p value of 0.01 or less (greater than 0.05 and less than 0.10)

Figure 4.6b Mediation for failure, positive emotions and understanding

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[5] Latent Variables: Estimate Std.Err Z-value P(>|z|) Std.lv Std.all
Understanding ~
Failure (C) 0.037 0.028 1.329 **0.184** 0.050 0.050

Standardised estimates, which are reported here, are free of measurement scales and as such provide indications of effect sizes. Commonly applied criteria are those of Cohen (1988) for correlations in which standardised values with magnitudes less than 0.10 are considered "small"; those approaching 0.30 are "moderate"; and standardised values exceeding 0.50 are taken to be indicators of "large" effects (Cohen 1988; Field 2009, p. 57). Kenny (2016) recently pointed out that for mediation analyses, which in the context of Baron and Kenny (1986) are measured as the products of estimated coefficients, the cut-offs for small, moderate and large should be the squares of the Cohen recommendations. That is, a mediated pathway has a small effect if the magnitude of the product is 0.01, a moderate effect if the product of coefficients is around 0.09 and the effect should be considered large if the product of coefficients is greater than 0.25. In the case of the mediation of Figure 4.6b, the linkages involved in the mediation consist of one small effect (the coefficient -0.253) and one medium effect (0.425) based on Cohen's original recommendations. However, the product of these was given above as -0.108, which corresponds to a medium effect in Kenny's revision of the criteria for mediation analysis.

As there was no evidence of a direct effect, it is concluded:

- there is weak evidence that the effect of failure on understanding is *fully* mediated by positive emotions (MacKinnon et al. 2007); and
- this effect is medium and negative, indicating that an increasing sense of failure depresses positive affective state and so reduces the use of non-reflective understanding.

The accompanying diagnostics suggest the model fits the TISS data well.

The model with understanding replaced by reflection, but the same trigger and affective state, is represented in Figure 4.6c. The diagnostics again suggest good fit. As for the preceding case, the coefficient c for the direct linkage between failure and reflection is concluded to be zero. The mediated influence $a \times b = -0.289 \times 0.780 = -0.225$, with probability (based on bootstrapped standard errors) of $p = 0.035$. Hence there is moderate evidence that the influence of failure is fully mediated by positive emotions. As for understanding, failure is seen to depress a form of reflection via its influence on positive affective state, with the effect being small.
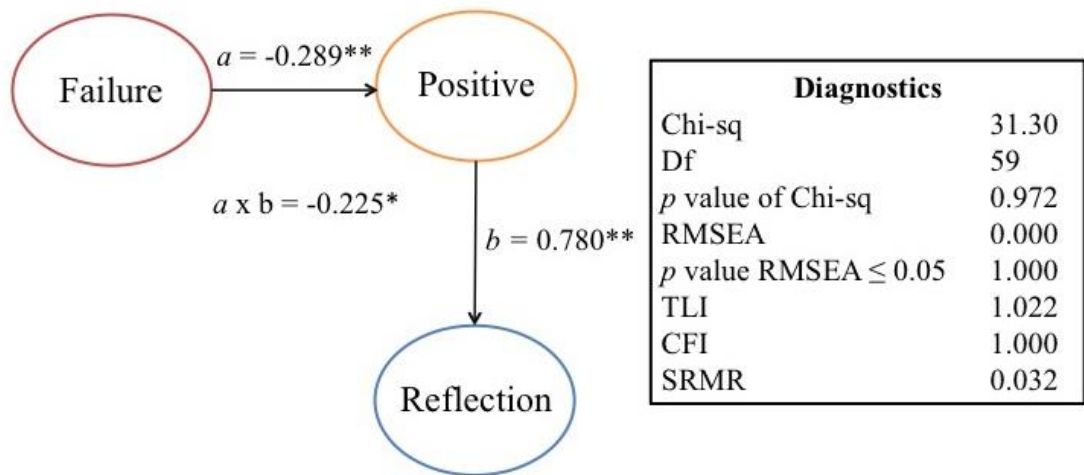
Figure 4.6c Mediation for failure, positive emotions and reflection
** (*) denotes strong (moderate) evidence that is a *p* value of 0.01 or less (greater than 0.01 and no greater than 0.05)

The diagnostics for the mediation model in Figure 4.6d also suggest good fit. However, there is a departure from full mediation in that both direct and indirect effects are retained. The direct effect of failure on critical reflection is small, as the standardised coefficient *c* is 0.214. However, the bootstrapped *p* value is 0.006, indicating strong evidence for the existence of the small effect. The mediated influence $a \times b = -0.285 \times 0.567 = -0.162$ has probability (based on bootstrapped standard errors) of $p = 0.009$. That is there is strong evidence of a mediated effect also. Hence the influence of failure is seen to consist of two effects, a small direct effect and a moderate-sized indirect effect, but they have opposite signs. The overall effect of failure on critical reflection in the presence of mediation by positive emotions is $0.214 – 0.162 = 0.052$. On the basis of bootstrapped standard errors, the *p* value for this overall effect is 0.508. That is, while overall there is little evidence of any effect of failure on critical reflection, there is evidence of the existence of two countervailing influences.
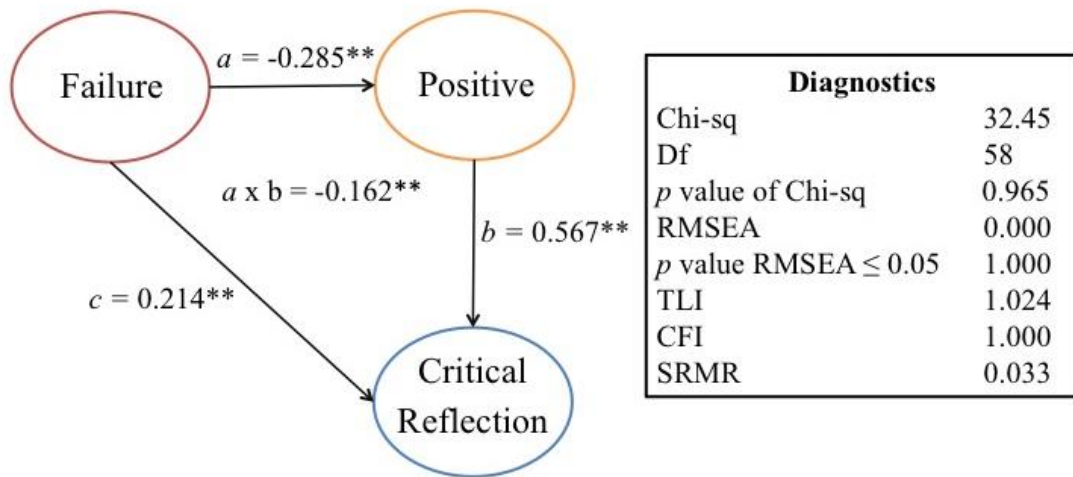
Figure 4.6d Meditation for failure, positive emotions and critical reflection
**denotes strong evidence that is a *p* value of 0.01 or less

Thus, the three mediation models involving failure and positive affective state demonstrate that:

- the effect of failure on positive emotions is negative;

- positive emotions mediate the influence of a triggering construct on each of three forms of reflections, providing evidence to reject hypothesis H_{2b} which states that *emotions do not mediate the relationship between triggers and reflection during a semester at SHI* and

- in the case of critical reflection there is a direct effect, which counteracts the mediated effect.

As can be seen in Table 4.6a, remaining are two mediational models in which the mediator is negative affect. One of these models involves the failure construct as shown in Figure 4.6e. The coefficients *a* and *b* have opposite signs, both have bootstrapped *p* values of 0.000 and the influence of failure is fully mediated by negative emotions. The effect is small as the product of coefficients is $a \times b = 0.468 \times -0.320 = -0.150$, although the bootstrapped *p* is 0.010 suggesting the mediated effect, although small, is not so small as to be zero. In this mediation model the impact on reflection is negative as was the case in the model involving positive emotions with failure and reflection (*a* x *b* = -0.225). This point is taken up again in the discussion of Chapter 5.
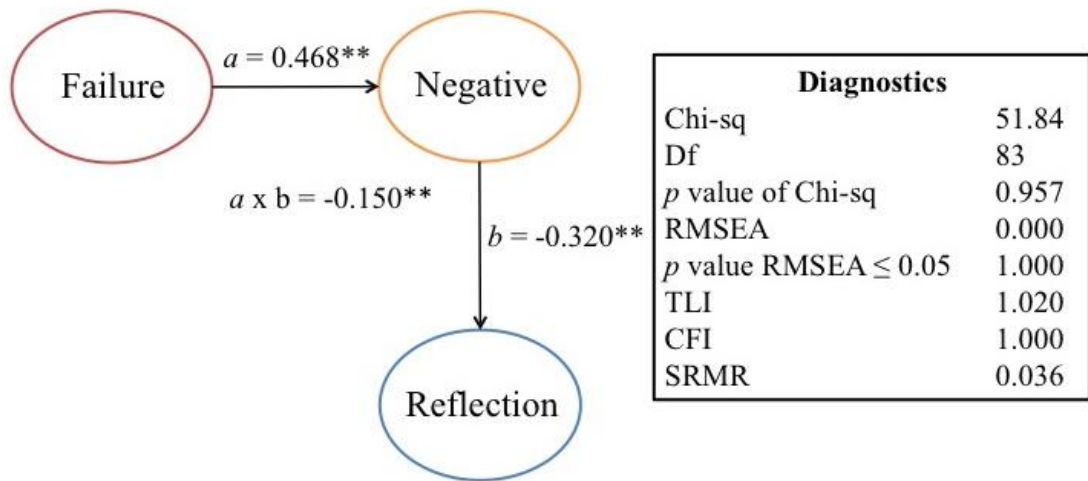
Figure 4.6e Mediation for failure, negative emotions and reflection
** denotes strong evidence that is a *p* value of 0.01 or less

The final mediation model is shown in Figure 4.6f, where the difference from the previous model is that failure is replaced by the personal construct. As for each of the earlier mediations, the diagnostics are indicative of good fit. The influence of the triggering construct is fully mediated by negative affective state, where *a* and *b* in Figure 4.6f have bootstrapped *p* values of 0.000 and 0.001. The mediated effect is given by $a \times b = 0.356 \times -0.289 = -0.103$ and the bootstrapped *p* value is 0.011. Thus, there is moderate evidence of a personal influence on reflection that is transmitted via negative affective state.
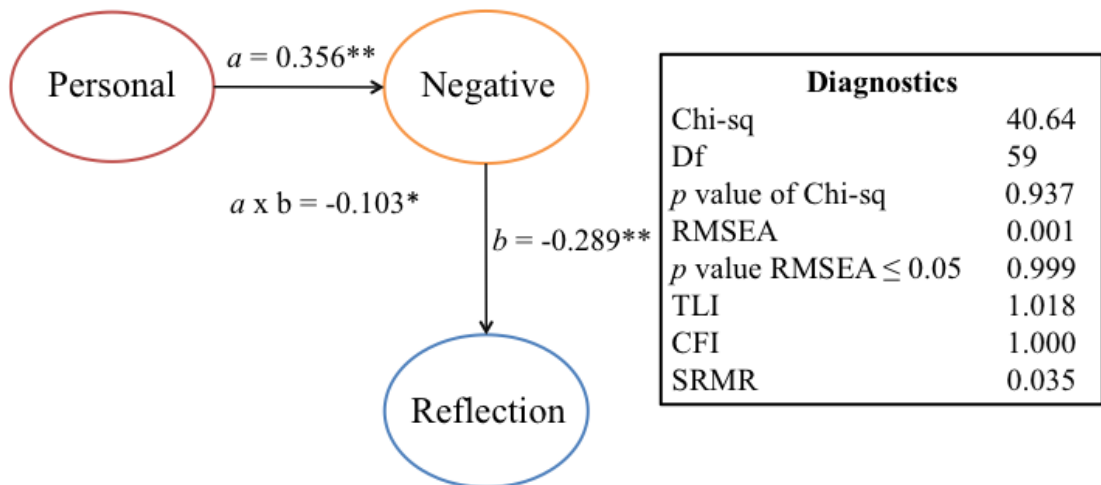
Figure 4.6f Mediation for personal, negative emotions and reflection
** (*) denotes strong (moderate) evidence that is a *p* value of 0.01 or less (greater than 0.01 and no greater than 0.05)

The main concerns in this section are five models where the influence of a triggering incident is mediated by emotional state. There is evidence of both mediated and direct effects of triggers on forms of reflections. For failure there are four pathways mediated by emotions and one for personal. On the other hand, there is one direct pathway for failure and three direct for personal. Furthermore, three of the four mediated pathways for failure are via positive emotions. For personal, the mediated pathway is via negative emotions. Thus, evidence is provided for mediating pathways, so rejecting hypothesis H_{2a} and H_{2b}.

In the next section, the influences of inter-personal interactions on both direct and mediated effects of the form considered in hypothesis H_{2c}. One direct effect was discussed in this section (see Figure 4.6d), because it occurred together with a mediated influence. However, as can be seen in the summary of Table 4.6a, there are three other cases of direct effects that arise independently of mediated pathways. Moderation of these by dialogue with social actors is considered also in the next section.

4.7 DIALOGUE WITH STUDENTS, FRIENDS AND FAMILY

TL theoreticians have raised the possibility that dialogue with social actors may alter the relationships that exist between triggers, emotions and forms of reflection (Aleman 1997; King 2000; Baumgartner 2002; Cranton 2002; King and Wright 2003; Cranton and Carusetta 2004). That is, TL researchers drew attention to questions related to "moderation, or the changing of a relationship as a function of some moderating influence" (Little et al. 2007, p.216). Cranton (2006) specifically drew attention to the moderating influences of dialogue with friends, family and fellow students. In the current research, interest is focused on how experiencing a trigger, denoted *T (or g1 in Figure 4.6a)*, or an emotional state, denoted *E (g2)*, is modified by dialogue. Three types of relationships considered in the previous section may be subject to modification. These are the linkages from:

1. *T (g1)* to *E(g2)*
2. *T (g1)* to a FoR *(g3)*; and
3. *E (g2)* to a FoR *(g3)*.

Each linkage may be affected differently by dialogue with students, friends and family. Given this possibility, the three forms of dialogue should be considered for each of the three linkages, making $3 \times 3 = 9$ combinations.

However, two triggering constructs, three forms of reflections and two affective states have been identified, so that there are 12 different linkages and a total of $12 \times 3 = 36$ possible combinations of linkages and dialogue types to consider. But the relevant hypothesis to be investigated in this section is

>H_{2c}: *Dialogue with social actors does not moderate the relationships in the model of Figure 3.6 during a semester at SHI.*

That is, the investigation concerns moderation of direct and/or mediated influences. Eight are reported in Table 4.6a. To do this requires the formation of interaction terms between the latent factors T, E and FoR, and a measure of dialogue.

It will be recalled from Section 4.5 that a factor named *sharing* was identified. It loaded in CFA onto three TISS statements:

>*I have spoken to my fellow students about this triggering incident*
>*I have spoken to my friends about this triggering incident*
>*I have spoken to my family about this triggering incident.*

A fourth concerning the meaningfulness of dialogue was earlier rejected in a PCA (see section 4.5.2). As for many other TISS statements, respondents indicated levels of agreement using the five-point Likert scale definitely agree, agree somewhat, only to be used if a definite answer is not possible, somewhat disagree and definitely disagree. From each statement, a dummy or dichotomous variable was constructed. For example, the dichotomous variable for friends was constructed to have value one if respondents definitely agreed or agreed somewhat that they spoke to friends, and to have value zero for any of the other Likert-scale responses (termed "Not definite dialogue"). Dichotomous variables for dialogue with family and students were defined in the same way, so that if one of the variables has value one, this is referred to as *having dialogue* with one of the social actors. If the value is zero, it is referred to in the following as *not having dialogue* with one of the social actors.

From these dummy measures, product indicators were formed. For example, for failure and dialogue with friends, product indicators are formed by multiplying each of the six items associated with failure by the dummy variable for friends. As another example, there are three product indicators for positive emotions and dialogue with a social actor because there are three items associated with the latent construct.

The measured items associated with latent constructs were mean centred. This was done to reduce collinearity between the indicator products and the latent factors (Little et al. 2007; Pornprasertmanit et al. 2016). This can have substantial impacts on estimated coefficients and standard errors. Mean centring appears to remove or reduce unwanted collinearity, although some of the estimations reported in this section may be influenced by it. If it had not, it is likely there would be instances of unusually high standard errors or there would be substantial changes in coefficients compared with running SEMs that do not include indicator products.

For dialogue with fellow students, moderating effects are shown in the next table for full mediation of failure on reflection by positive emotions (that is the second model in Table 4.6a). Table 4.7a is a summary of running both the SEM for mediation with indicator products included for moderation. Unstandardised coefficients are reported in the table because these convey more clearly the substantive meaning of the differences between indicator product effects (Brown 2006). In the table, *a* and *b* are given as -0.210 being the coefficient for Failure → Positive, and 0.571 being the coefficient for Positive → Reflection. (For comparison with Figure 4.6c, the standardised coefficients are -0.289 and 0.780, also with *p* values of 0.000. That is, the introduction of moderation reduces coefficient values, but does not change the strength of the evidence that coefficients are significantly different to zero.)

SEM results		Coefficient	*p* value
Failure → Positive (*a*)		-0.210**	0.000
Indicator products for dialogue			
	Intercept	0.214**	0.002
	Slope	0.052	0.585
Not definite dialogue			
	Intercept	4.76**	0.000
	Slope	-0.210**	0.000
Definite dialogue			
	Intercept	4.98**	0.000
	Slope	-0.210**	0.000
Positive → Reflection (*b*)		0.571**	0.000
Indicator products for dialogue			
	Intercept	0.011	0.823
	Slope	0.270*	0.015
Not definite dialogue			
	Intercept	1.56**	0.000
	Slope	0.571**	0.000
Definite dialogue			
	Intercept	1.56**	0.000
	Slope	0.841**	0.000

** (*) denotes significance at one (five) per cent or better.
Table 4.7a Sharing with students: influences on positive emotions and reflection

The indicator-product terms introduce two effects into the estimation of each linkage. These are the "intercept" and the "slope". The intercept indicates the unique effect associated with dialogue that is not affected by interactions with a latent variable. For example, the intercept for the path from failure onto positive assesses the impact of dialogue on positive emotions independent of the value taken by failure. In table 4.7a, this is shown as 4.76 for not having dialogue with fellow students and 4.98 for having dialogue. The slope for each form of dialogue is -0.210. The overall effects are demonstrated in Figure 4.7a, where the lines describing the relationships between failure and positive emotions slope downwards from left to right. That is, as failure is experienced more intensely, positive affective state declines. Also, the predicted line for having dialogue is above that for not having dialogue. That is, dialogue with fellow students does improve positive affective state relative to respondents who did not definitely report dialogue, although the difference is not great.

to differ with *p* values less than 0.05.
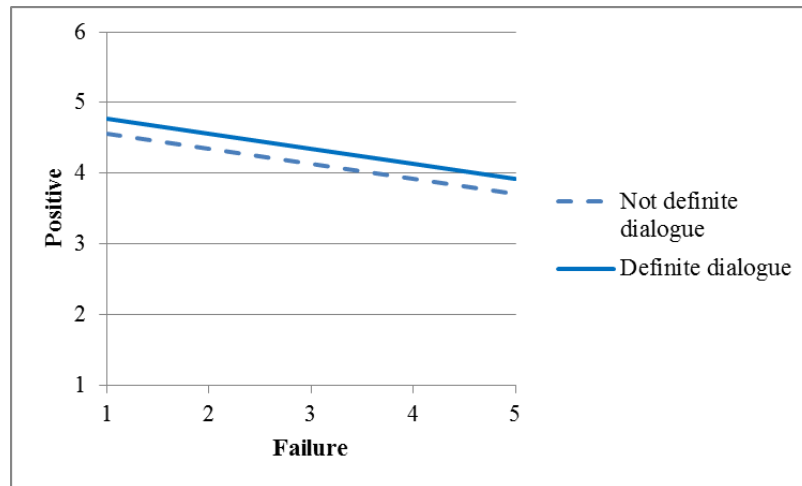
Figure 4.7a: The influence on positive affective state of dialogue with fellow students

In the case of the estimation for Failure onto Positive the SEM regression coefficients are shown in Table 4.7b as having *p* values that are 0.024 or smaller. In addition to these values, Wald tests were conducted to detect whether the intercepts and slopes differed across the forms of student dialogue. Coefficients and *p* values are shown in the lower portion of Table 4.7a. The intercept for having dialogue with fellow students is reported as being the same as for not having dialogue. This is because the preceding indicator-product intercept is not significantly different to zero at five per cent or better. That is, because the estimate did not have *p* values of 0.05 or less, it was not included in the determination of the intercept for the two forms of dialogue. To support this decision, Wald tests were conducted to see whether the intercepts differed if the non-significant term was included. No evidence was found to suggest that the intercepts differed.

SEM results	Dialogue with friends		Dialogue with family	
	Coefficient	*p* value	Coefficient	*p* value
Failure → Positive (*a*)	-0.213**	0.000	-0.224**	0.000
Indicator products				
Intercept	0.115	0.080	0.147*	0.024
Slope	0.002	0.985	0.286**	0.004
Not definite dialogue				
Intercept	4.78**	0.000	4.80**	0.000
Slope	-0.213**	0.000	-0.224**	0.000
Definite dialogue				
Intercept	4.78**	0.000	4.94**	0.000
Slope	-0.213**	0.000	0.062	0.000
Positive → Reflection (*b*)	0.550**	0.000	0.559**	0.000
Indicator products				
Intercept	0.092	0.040	0.066	0.146
Slope	0.094*	0.352	-0.016	0.875
Not definite dialogue				
Intercept	1.60**	0.000	1.58**	0.000
Slope	0.550**	0.000	0.559**	0.000
Definite dialogue				
Intercept	1.69**	0.000	1.58**	0.000
Slope	0.550**	0.000	0.559**	0.000

** (*) denotes significance at one (five) per cent or better.

Table 4.7b Sharing with friends and family: influences on positive emotions and reflection

The lines representing the impact of dialogue on reflection are shown in Figure 4.7b. The lines slope upward indicating that, regardless of form of student dialogue, increasing positive affective state is associated with increased reflection. However, reflection is stimulated more by dialogue with fellow students, as the line for this case slopes up more steeply than for not having dialogue with these social actors.

One further feature of the estimated effects of dialogue can be seen in Figure 4.7b, where the predicted effects on reflection attain values out of the range one to five for definite dialogue. That is, "definitely agreeing" with the statement about dialogue was coded for CFA and SEM as the value 5, yet inclusion of moderating influences caused extrapolation beyond that upper limit. This may arise because the relationships between student dialogue, emotions and reflection are nonlinear in that the impact of dialogue on affective state dissipates at more intense levels. If so a nonlinear modelling approach would be required to correct for the occurrence of out-of-range predicted values. It is also possible that the out-of-range estimates arise due to remaining collinearity among the many indicator products that are included in the construction of interactions between latent factors and forms of dialogue.

However, in the current case the extent of out-of-range extrapolation appears to be mild. Also in a Wald test (Field et al. 2012; Pornprasertmanit 2016), the predicted value of reflection at the most extreme rating of positive affective state was not different to five for those reporting student dialogue.
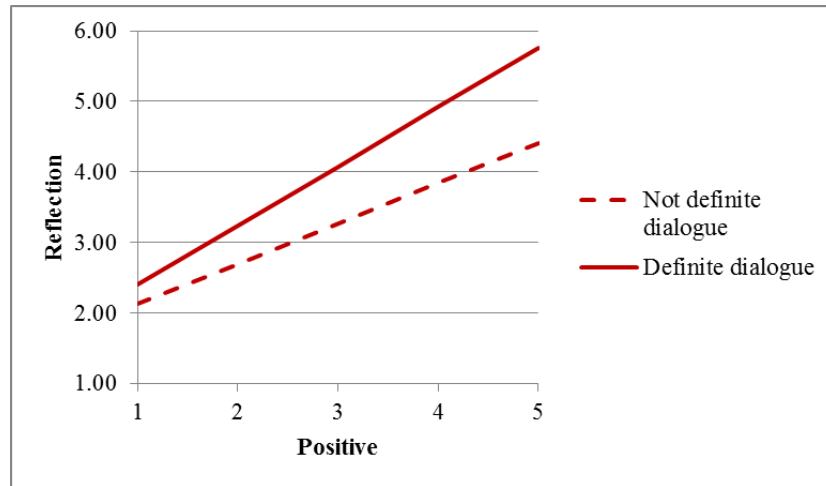
Figure 4.7b: The influence on reflection of dialogue with fellow students

Overall, having dialogue with students is associated with improved positive affective state and with greater reliance on reflection compared with the outcomes for respondents who did not report definite student dialogue. Next, the moderating influences of dialogue with friends and family are reported for the same situation involving failure, reflection and positive emotions. The estimation results for both forms of dialogue are given in Table 4.7b and the linear relationships are displayed in Figures 4.7c and d. To construct the figures, as was the case for dialogue involving students, indicator products that do not have p values of 0.05 or less are ignored when forming estimates of intercepts and slopes for the two forms of dialogue.

Compared with the previous situation involving dialogue with students, the outcomes for positive emotions and reflection differ. For the current form of dialogue, as can be seen in the left-hand panel of Figure 4.7c, there are no differences in positive affective state depending on having or not having dialogue. Thus, the lines for having and not having dialogue are identical. Nevertheless, as was the case for dialogue with students (Figure 4.7a), rating failure more highly is associated with declining positive emotional state. Also, as was the case for definite dialogue with students, reflection is encouraged by positive emotions (see the second panel of Figure 4.7c).

The difference attributable to definite dialogue with friends is apparently small and a Wald test for the difference in intercepts does not suggest the intercepts are statistically different.
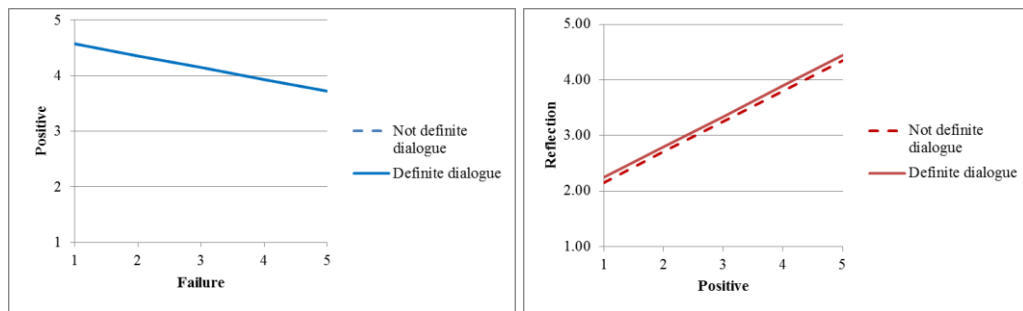
Figure 4.7c:The influences of failure and dialogue with friends on positive emotions and reflection

The estimated intercepts and slopes for forms of dialogue with family are given in the final two columns of Table 4.7b and the relationships are demonstrated in Figure 4.7d. The moderated effects differ from those found above for both students and friends. In particular, as can be seen in the left-hand panel of Figure 4.7d, definite dialogue with parents maintains positive emotions around the maximum rating, while those not in definite communication with family experience declining positive affective state as the experience of failure is rated more highly. Despite this, not having definite communication with family apparently facilitates reflection, which can be seen in the right-hand panel where the lines are identical.
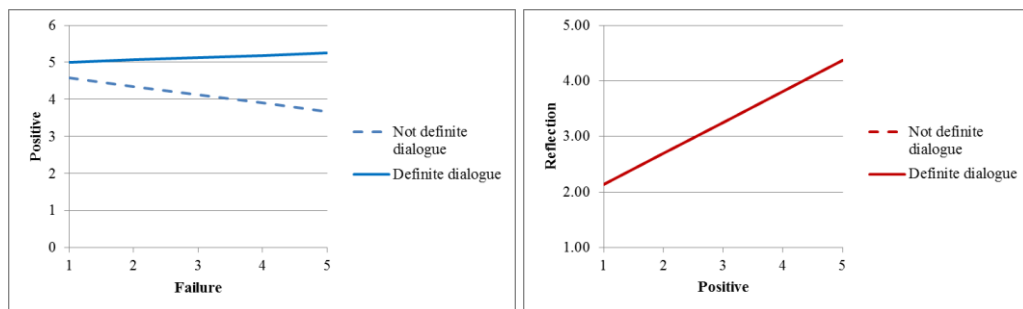
Figure 4.7d: The influences of failure and dialogue with family on positive emotions and reflection

In the report of moderation by dialogue with students, it was seen that the estimated values for reflection were out of range. Another case of this occurs in Figure 4.7d for the relationship between failure and positive emotions where the predicted values of positive affective state exceed the maximum allowable value of five. As for the previous case of this, it is possible that the linkage between failure and positive emotions is nonlinear.

That is, it may be the case that the relationships between family dialogue, failure and emotions are nonlinear in that the impact of dialogue on affective state dissipates at more intense levels of failure. However, in the current case the extent of out-of-range extrapolation appears to be mild. Also, in a Wald test, the predicted value of emotional state at the most extreme rating of failure was not different to five for those reporting definite family dialogue.

Figures 4.7a to d provide evidence on Hypothesis H_{2c} in the case of full mediation of the impact of failure on reflection by positive emotions. Definitely engaging in dialogue with fellow students was seen to provide somewhat improved positive affective state (compared with no definite dialogue with students) when dealing with failure and in facilitating greater use of reflection. However, while definite dialogue with family maintained positive emotional state, dialogue with family and with friends had no impact on reflective thinking when confronted with failure. This means that evidence of an impact on reflective thinking and so support for rejecting Hypothesis H_{2c} was found at SHI only in the case of definite dialogue with fellow students. Evidence is presented next for an impact of social actors in the other cases of direct or mediated effects. First, for purposes of comparison, diagrams are presented for the mediated impact of failure on reflective thinking by negative emotions.

4.7.1 FAILURE, NEGATIVE EMOTIONS AND REFLECTION

Over the three pairs of diagrams in Figures 4.7.1a to c in the following pages, there is evidence of a slight increase in reflective thinking as a consequence of definite dialogue with social actors. However, when the impact of negative affective state is considered (see the right panels in the three figures), there is a greater tendency to reflective thinking across the ratings of negative emotions compared with the previous diagrams for positive emotional states. This can be seen by noting that lines in the previous right-hand panels begin closer to the horizontal axis and grow towards the values attained in the current right-hand panels when negative affective state is rated as five. Another feature of the current right-hand panels is that definite dialogue with any of the social actors does not markedly alter negative emotional state, compared with not reporting definite dialogue.

Figure 4.7.1a The influences of dialogue with students
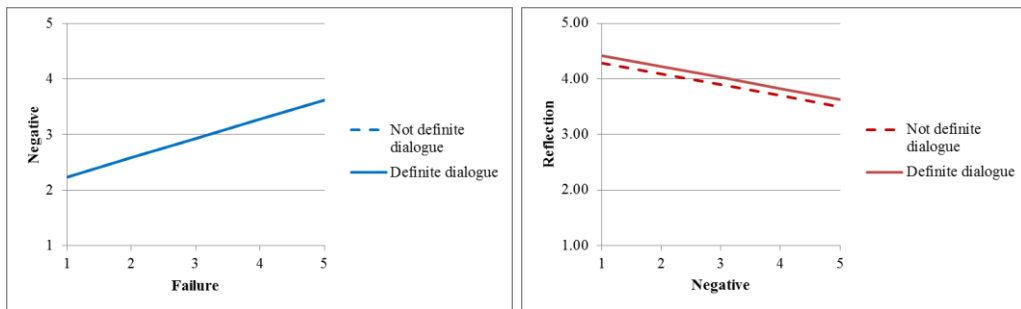
Figure 4.7.1b The influences of dialogue with friends
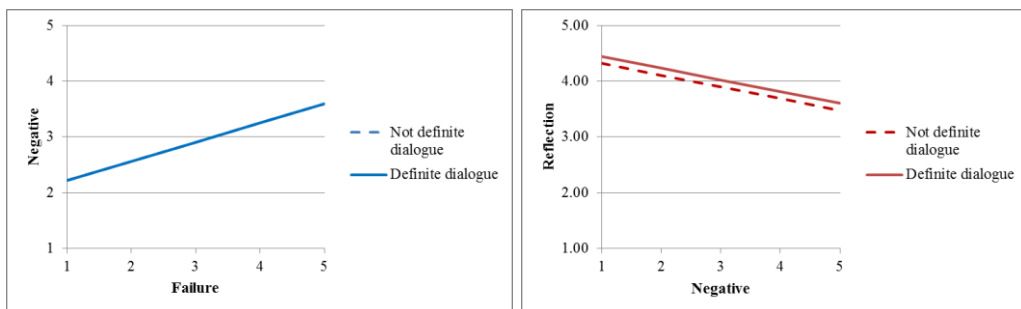
Figure 4.7.1c The influences of dialogue with family

Looking at the panels on the left, even when failure is felt most acutely (that is, the rating of it is five), negative emotional state is not rated at the maximum possible value. Thus, overall, there is little evidence against H_{2c}, that is dialogue with social actors has little affect on reflective practice when failure occurs and the mediating influence of negative affective state is considered. However, as noted at the outset of this sub-section, negative emotions are more generally associated with heightened reflection.

Another occurrence of full mediation of reflective outcome is the model involving the personal trigger and negative emotions in row 11 of Table 4.6a. This is considered in the next sub-section.

4.7.2 THE PERSONAL TRIGGER, NEGATIVE EMOTIONS AND REFLECTION

In the right-hand panels of the three pairs of diagrams in Figures 4.7.2a to c, there are slight increases in reflective thinking as a consequence of definite dialogue with social actors. Looking at the left-hand panels of the figures, it can be seen that:

1. Definite dialogue with friends and family does not ameliorate negative emotional state when confronted with personal triggers as the estimated lines overlap.
2. The absence of dialogue with students has only a minor effect on negative affective state.

Compared with the left-hand panels in the previous sub-section, negative emotional states in response to personal triggers are little more intensely experienced for lower ratings of the trigger than in the case of failures (as there are slightly higher intercepts). Further, the impacts do not increase so much when the personal trigger is felt more intensely (because the current slopes are not so steep).Overall, the final point to make on this configuration of trigger, emotions and form of reflection is that:

3. The evidence against H_{2c} on dialogue influencing reflection, as for the previous sub-section, is slight.

Figure 4.7.2a The influences of dialogue with students
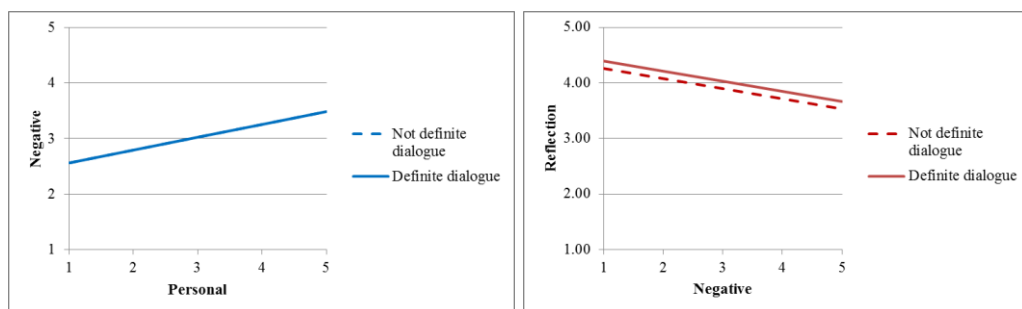
Figure 4.7.2b The influences of dialogue with friends
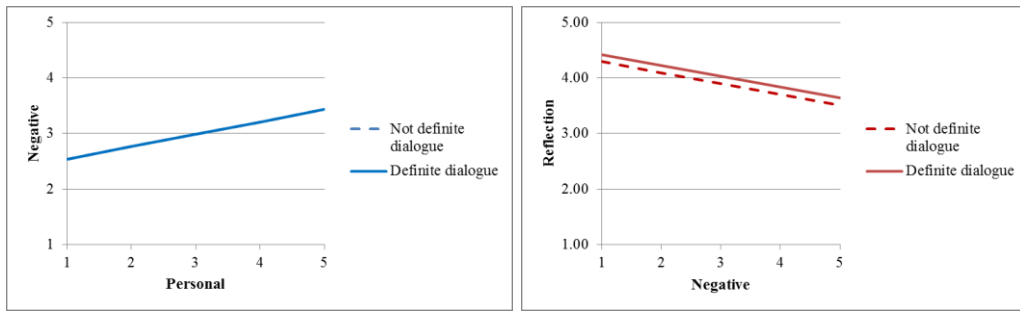
Figure 4.7.2c The influences of dialogue with family

There is one further case of full mediation of the impact of a trigger, which can be seen in row 1 of Table 4.6a. It involves a mediated impact on understanding and is considered next.

4.7.3 FAILURE, POSITIVE EMOTIONS AND UNDERSTANDING

The three pairs of diagrams in Figures 4.7.3a to c are similar to those in the previous parts of this section, except that the form of reflection is now understanding rather than reflection. However, the trigger is failure and the emotive state is positive. The diagrams in this situation indicate that:

1. Definite dialogue with family can be seen in the left-hand panel of Figure 4.7.3c to maintain positive emotions around the maximum rating; while those in not-definite communication with family experience declining positive affective state as the experience of failure is rated more highly.

2. In the other two left-hand panels of the figures in this sub-section, definite dialogue with students and friends does not substantially influence positive emotional state when confronted with failures, as the estimated lines are either close or overlap.

3. In the right-hand panel of Figure 4.7.3a, definite dialogue with students results in values for understanding that are out of range and exceed the maximum value of five. By comparison, not-definite dialogue with students is not so sensitive to rating of positive emotional state as the line for this case has flatter slope.

4. In the right-hand panels for the other figures in this sub-section, both forms of dialogue (that is, with friends and family) do not facilitate greater understanding, as the estimated lines are either close or overlap.

5. The evidence against H_{2c} on dialogue influencing understanding, as for the previous sub-section, is slight. But as noted in Point 1, definite dialogue with family improved emotional state.
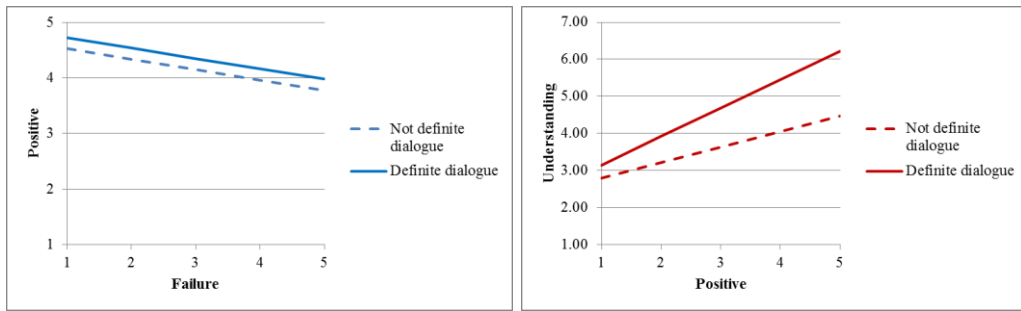
Figure 4.7.3a The influences of dialogue with students
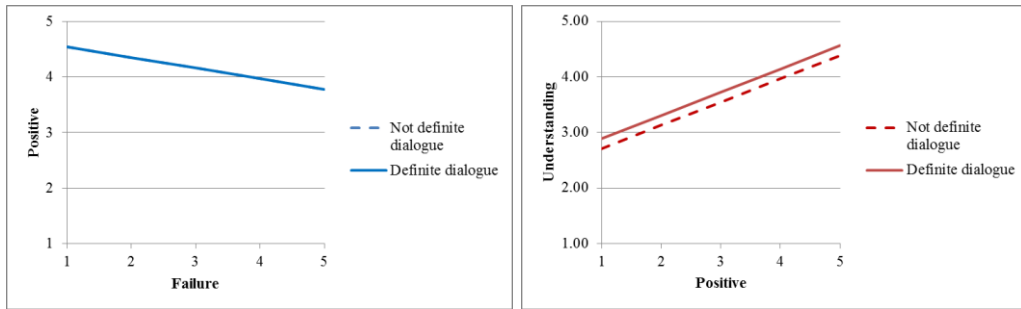
Figure 4.7.3b The influences of dialogue with friends
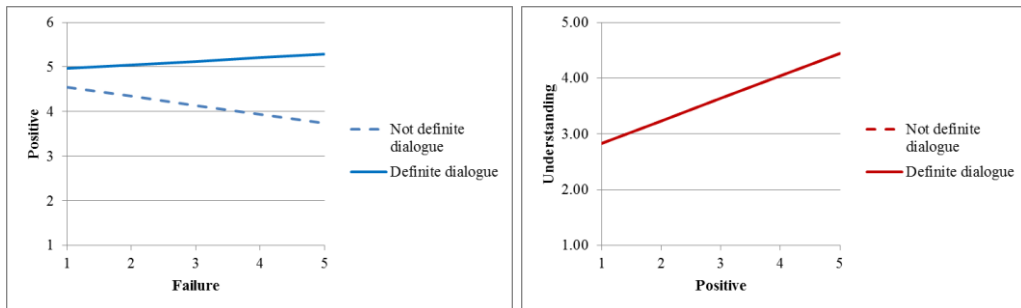
Figure 4.7.3c The influences of dialogue with family

Two occurrences of both fully mediated and direct linkages from triggers onto reflective outcome are seen in row 3 and row 12 of Table 4.6a. Hence, three diagrams for each of the social actors are required. These are considered in the next two sub-sections (4.7.4 and 4.7.5).

4.7.4 FAILURE, POSITIVE EMOTIONS AND CRITICAL REFLECTION

In the next three figures, the influence of social actors are presented on both mediated and direct links between triggers, emotions and critical reflection as shown in model 3 of Table 4.6a. From these diagrams it can be seen that:

1. In the top left-hand panel of Figure 4.7.4c, definite dialogue with family acts to maintain positive emotions around the maximum rating of five; while those in not-definite communication with family experience declining positive affective state as the experience of failure is rated more highly.

2. In the top left-hand panels of Figures 4.7.4a and b, definite dialogue with students and friends appears not to substantially influence positive emotional state when confronted with failures, as the estimated lines are either close or overlap.

3. Returning to Figure 4.7.4c, and looking at the top right and bottom left panels, it can be seen that definite dialogue with family suppresses critical reflection compared those who do not report definite dialogue, no matter what the level of affective state or the reported impact of failure.

4. In the comparable panels of Figure 4.7.4a, definite dialogue with students is associated with greater critical reflection, no matter what the level of affective state or reported impact of failure.

5. The previous two points suggest that definite dialogue with family has an important and depressing effect on critical reflection, while definite communication with fellow students has the reverse impact.

6. Looking across each panel of each figure, the lines tend to have common positive or negative slopes, with the exception of dialogue with family. As in other figures however, in this case there is a mild tendency for out-of-range values. Nevertheless, slopes and intercepts do vary substantially. For example, compare the slopes and intercepts in Figure 4.7.4c for family. Similar variations in slopes and intercepts can be seen in Sub-section 4.7.3c and in the narrative at the beginning of this section for the relationships between failure, positive emotions and understanding and for failure, positive and reflection.

7. There is evidence in the cases of dialogue with family and students to reject hypothesis H_{2c}. However, talking to friends in fact provides little or no evidence to reject H_{2c}, but rather that either definite or not-definite dialogue with friends sustains affective state and critical reflection broadly around the levels attained with the upper lines in the diagrams for family and students. While earlier figures have similar neutrality of effect of friends, this is the first case in which no difference has been detected for the two types of dialogue.
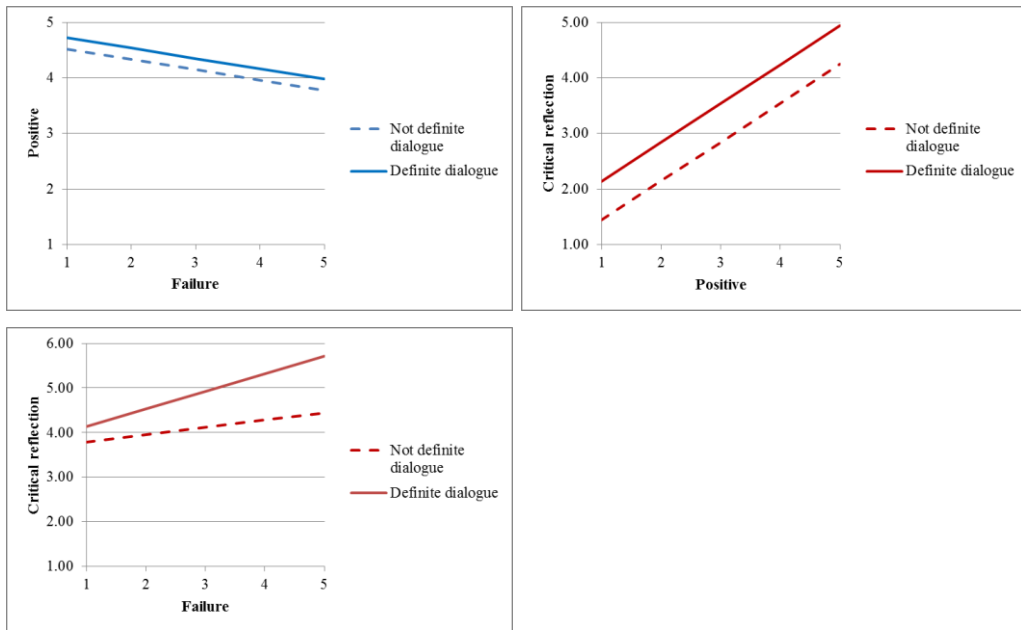
Figure 4.7.4a The influences of dialogue with fellow students
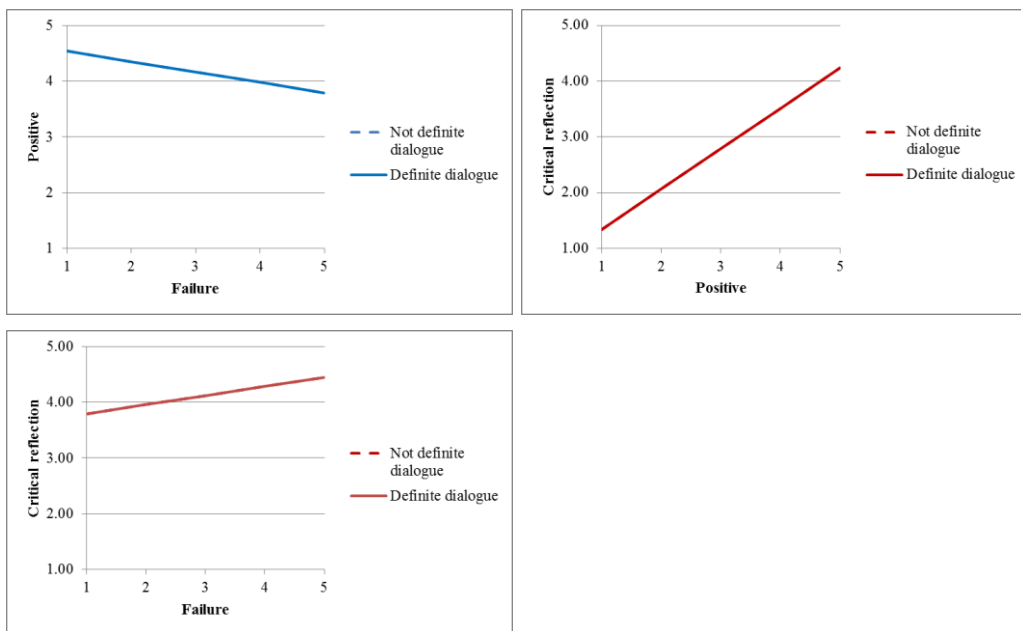
Figure 4.7.4b The influences of dialogue with friends
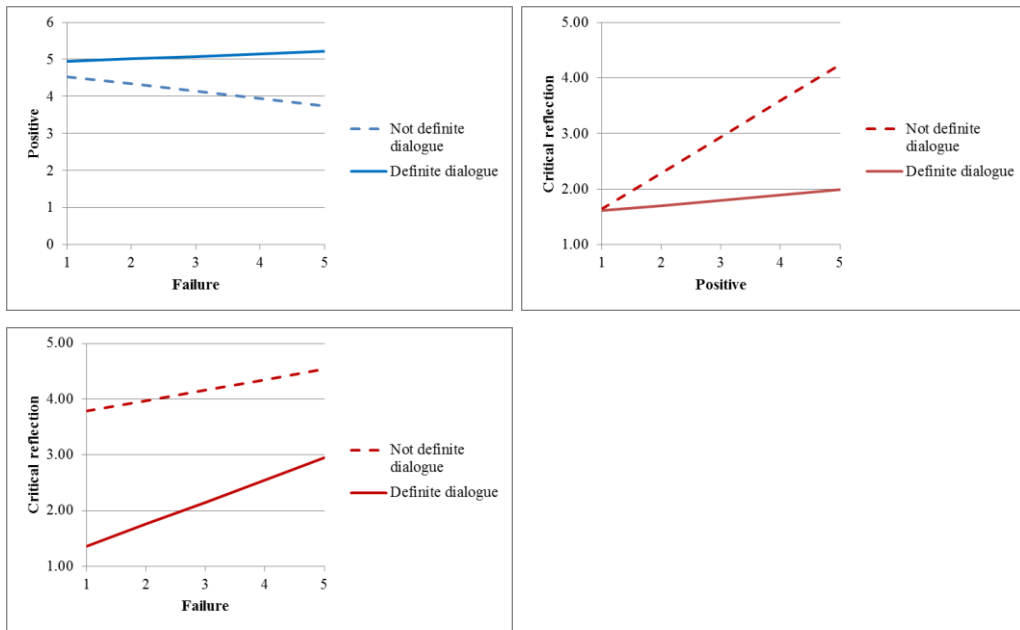
Figure 4.7.4c The influences of dialogue with family

4.7.5 *The personal trigger, negative emotions and critical reflection*

As in the section above, the influence of social actors are presented on both mediated and direct links between triggers, emotions and a form of reflection, only this time for model 12 of Table 4.6a. The decision to do this is motivated by the earlier findings that under DWLs the link between the emotional state (in this case negative emotions) and form of reflection (critical reflection) was not significantly different to zero. However, using bootstrapping the linkage had a low *p* value. Given this ambiguity, it was decided to test for a possible impact of dialogue on all three arms of the relationships between a personal trigger, negative emotions and critical reflection. Overall, it can be concluded that:

1. Definite dialogue with family (see Figure 4.7.5c) has a positive impact on critical reflection at any levels of affective state and impact of the trigger, compared with those who do not report definite communication. It should also be noted that out-of-range extrapolation occurs in the case of definite dialogue with family. It should also be noted (in the top left panel of Figure 4.7.5c) that definite dialogue with family does not change negative affective state compared with other respondents.

2. On the other hand, in Figures 4.7.5 a and b, responses to affective state and impact of trigger are relatively slight in the case of students and for friends there are no discernible differences. Although definite dialogue with students can depress negative emotions, relative those respondents whose communication with fellow students was not-definite. Further, definite-student dialogue with students has a small positive influence on critical reflection. These effects are not significantly different to zero.

3. That is, there is evidence to reject H_{2c} for dialogue with family only. Further, by comparing the figures in this sub-section with those in the previous sub-section, it appears that dialogue can have substantial impacts in the cases of the relationships between failure and critical reflection and between a personal trigger and this form of reflection. These effects emerged when considering the mediating influences of different affective states.
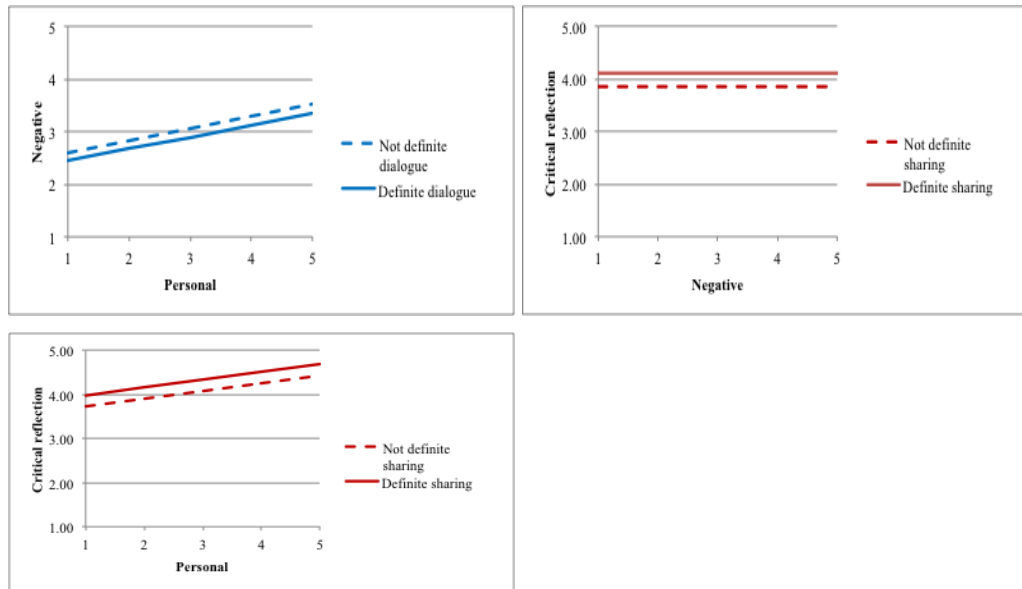
Figure 4.7.5a The influences of dialogue with fellow students
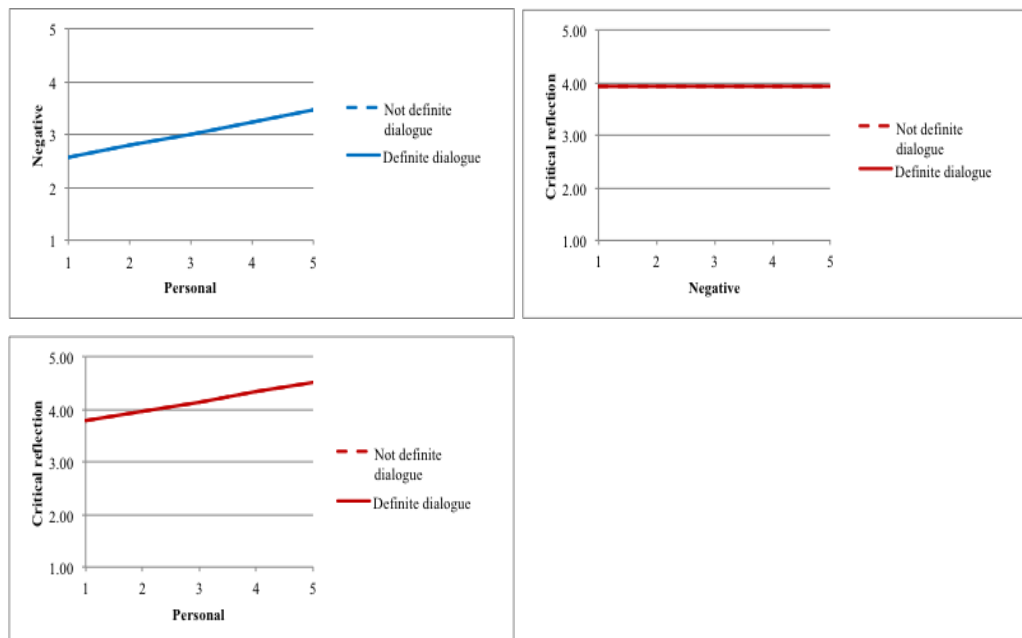
Figure 4.7.5b The influences of dialogue with friends
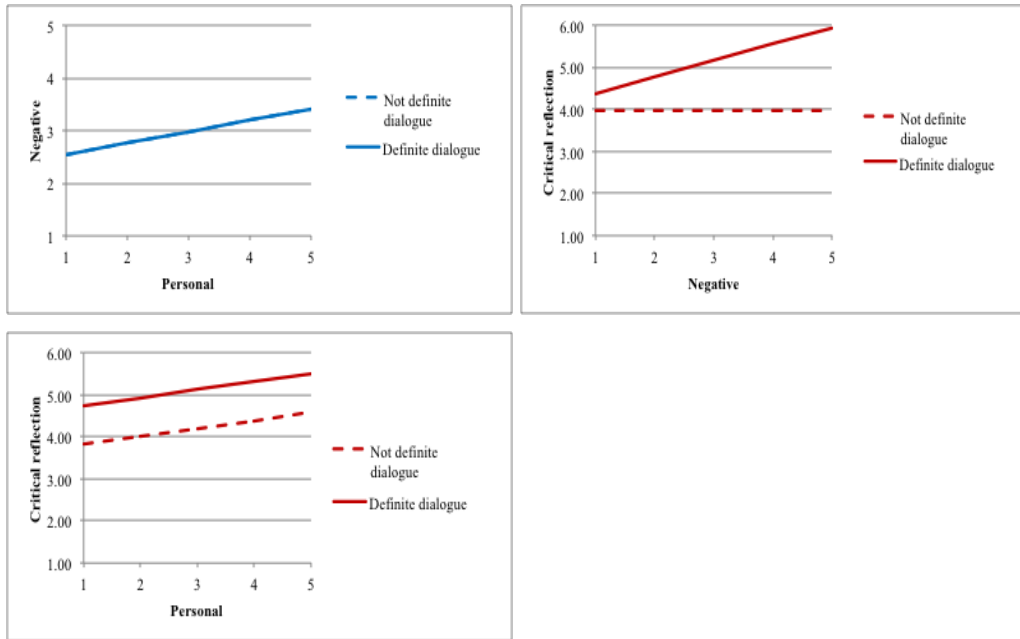
Figure 4.7.5c The influences of dialogue with family

In the next two sub-sections, the impacts of dialogue in rows 8 and 9 of Table 4.6a are considered. In these cases, mediated influences were not found, but significant direct effects were. While there is no mediated pathway, there are nevertheless two linkages for which to consider impacts on form of reflection, namely one from an emotion and one from a trigger. Hence pairs of diagrams for each social actor are required.

4.7.6 DIRECT EFFECTS OF PERSONAL AND POSITIVE ON REFLECTION

On the left-hand sides of Figures 4.7.6b and c, dialogue with friends and family maintain levels of reflection as personal triggers are rated more highly. Additionally, definite dialogue with these social actors only slightly ameliorates reflection (see the right-hand panels) as positive affective state increases, indicated by estimated lines that are either close. Only Figure 4.7.6a provides evidence to reject H_{2c}:

1. In the left-hand panel, definite dialogue with students about personal triggers is associated with maintenance of reflection at around the maximum rating no matter how intensely a personal trigger is felt.

2. In the right-hand panel of Figure 4.7.6a, definite dialogue with students is associated with greater reflection as positive emotional state is rated more highly, compared with not-definite student communication.

3. In both panels of Figure 4.7.6a, there is evidence of out-of-range values. These extrapolations are not as severe as shown for some forms of dialogue in some earlier sections.
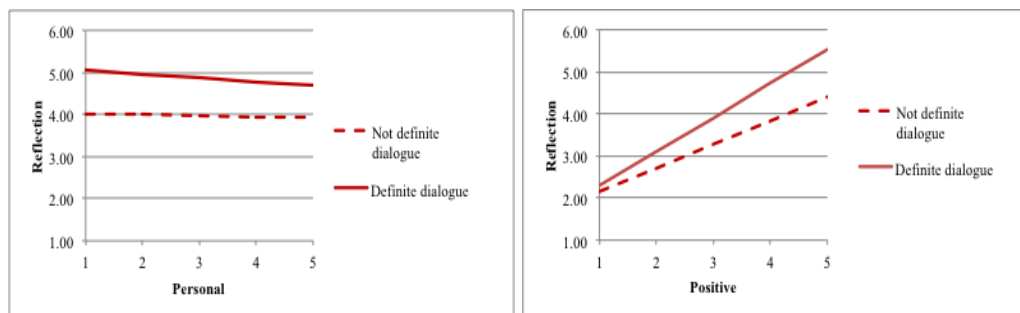
Figure 4.7.6a The influences of dialogue with fellow students
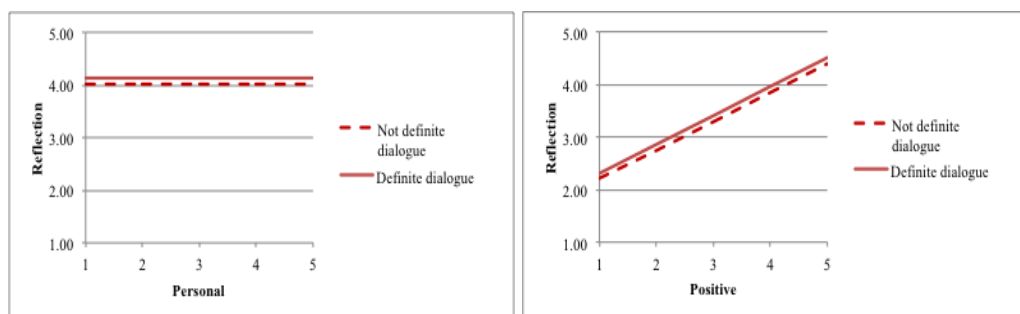
Figure 4.7.6b The influences of dialogue with friends
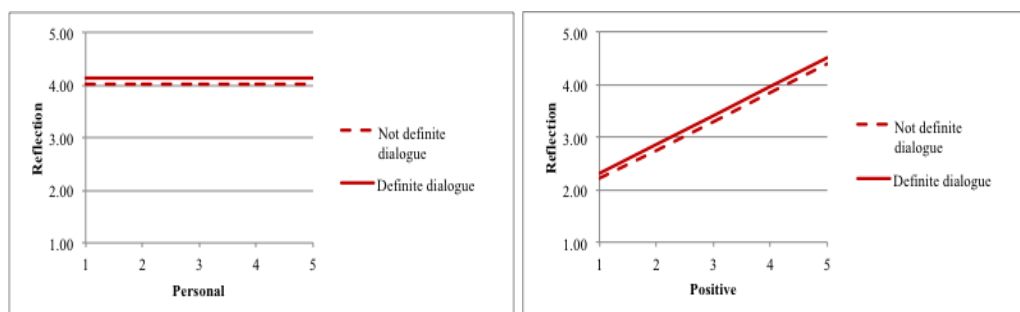
Figure 4.7.6c The influences of dialogue with family

4.7.7 DIRECT EFFECTS OF PERSONAL AND POSITIVE ON CRITICAL REFLECTION

In the left-hand panels of Figures 4.7.7a and b, dialogue with students and with friends has no impact on critical reflection for personal triggers, but overall critical reflection is seen to grow with the rating of the personal trigger. In the right-hand panels of these figures, definite dialogue further does not modify the relationships between emotional state and critical reflection. Only Figure 4.7.7c provides evidence to reject H_{2c}:

1. In the left-hand panel, definite dialogue with family about personal triggers suppresses critical reflection. Moreover, critical reflection among those who do not report definite dialogue with family is much greater at any level of the personal trigger.

2. In the right-hand panel, definite dialogue with family is again seen to be associated with suppressed critical reflection no matter the rating of positive emotional state. Moreover, relative to those who do not report definite dialogue, critical reflection is most suppressed at higher ratings of positive affective state.
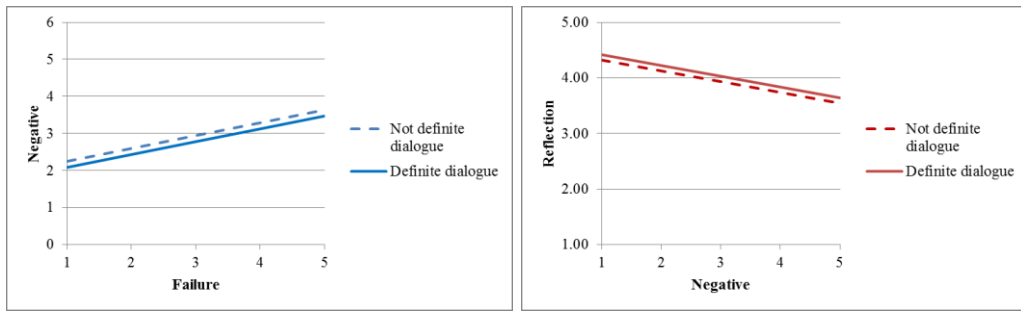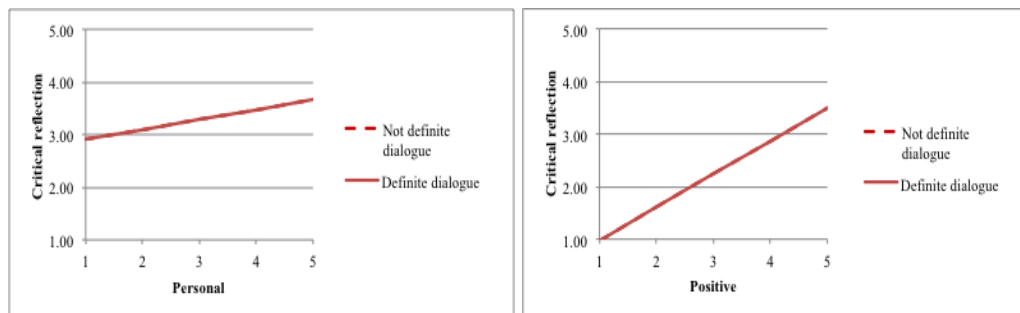

Figure 4.7.7a The influences of dialogue with fellow students
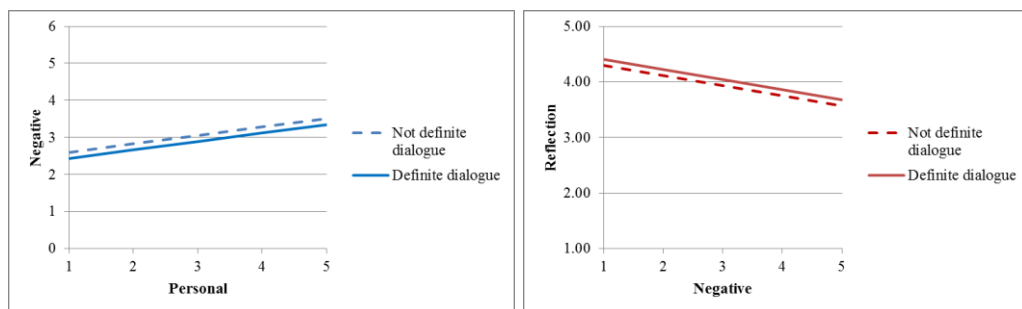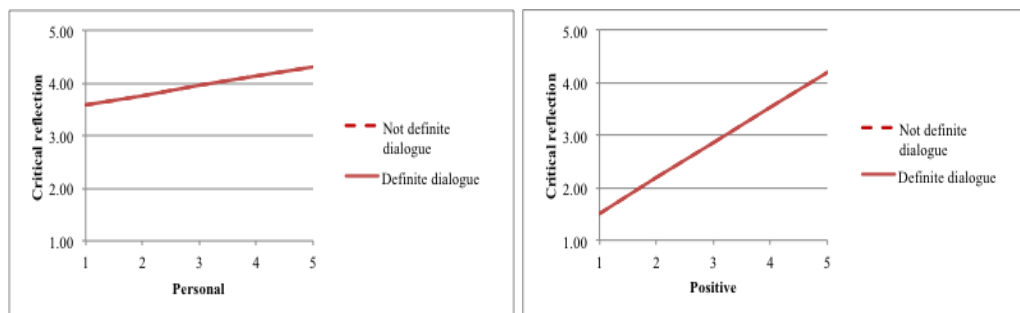

Figure 4.7.7b The influences of dialogue with friends
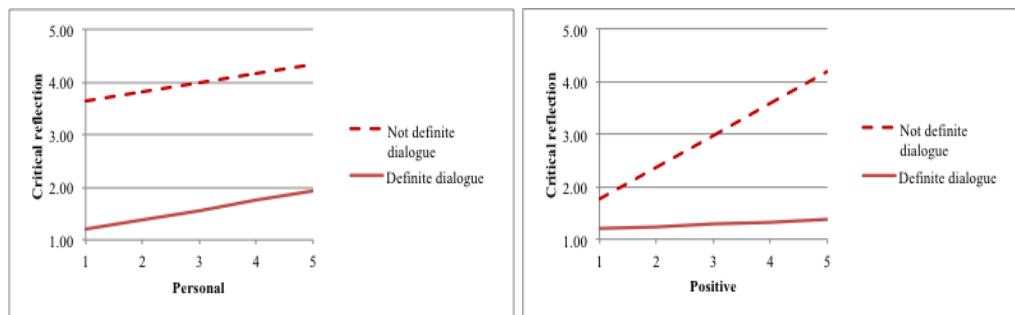
Figure 4.7.7c The influences of dialogue with family

In Figure 4.7.7c, evidence is provided that social actors moderate the relationships between central variables. Hence, hypothesis H_{2c} is rejected in this case.

4.8 THE POSSIBILITY OF RECIPROCAL RELATIONSHIPS BETWEEN FORMS OF REFLECTION AND AFFECTIVE STATE

In Section 2.5.2 on emotions within transformative learning, it was affirmed that little is In Section 2.5.2 on emotions within transformative learning, it was affirmed that little is known about time lags and reciprocal relations between emotions and forms of reflection. This is also referred to as the latency or response time of emotions (Scherer 1994, cited in Ekman and Davidson 1994). Mälkki (2010, p.49) argued for "more understanding concerning the interconnections between cognition and emotion". Furthermore, "by recognising the interrelationship of cognition and emotion, we can give greater attention to what is most necessary: ways to facilitate the transformative experience" (Taylor 2012, p.566). As discussed in Section 3.6, to provide a means of investigating the time dependence of relationships between central variables, data on two additional types were gathered, so providing for candidate instrumental variables and providing information on longitudinal variation in central variables. The purpose was to permit examination of H_{2d}: Forms of reflection and emotions are not reciprocally related.

A full investigation of reciprocal or feedback relationships using the additional data would extend this thesis substantially. Consequently, as was the intention in deciding to gather additional data, the purpose is to establish the possibility of reciprocity, so providing a basis for two directions in future research. First, if there are reciprocal relationships the insights into mediation and moderation provided in this thesis would require re-consideration in subsequent analyses. This is because the presence of feedback is associated with correlated errors between central variables and, depending on the strength of feedback, would lead to modifications of estimated linkages and their significance.

Second, a finding of possible reciprocity would confirm a theoretical consideration of TL researchers as in the quotes from Mälkki and Taylor above, and provide a basis for further theoretical developments involving feedback. Given this preliminary focus, the results reported here are confined to those where evidence to reject H_{2d} was found.

The results of the autoregressive, cross-lagged SEM are given in Table 4.8a and the regression results are presented in Figure 4.8a. This model replicates the approach illustrated in Figure 2 of Wong and Law (1999, p.75).

At the head of Table 4.8a are shown benchmarks for goodness of fit from Lance et al. (2006) for SEMs. These are substantially the same as for CFAs, with the exception that CFI and TLI values can be as low as 0.90. Thus, while some of the benchmarks are met, as happens in SEMs with large numbers of variables, the Chi-sq value is large and the corresponding p value is small. The RMSEA exceeds the upper bound of 0.06, but is not excessively greater. Overall, the fit of this model is moderate or "adequate" (Lance et al. 2006, p.203), highlighting the difference from earlier SEMs for mediation and moderation where the more stringent benchmarks applied to CFAs were exceeded. That is, the earlier SEMs for mediation and moderation qualify as "good" fits to the data (Lance et al. 2006, p.203). Further, all loadings coefficients and correlations shown in the table have p values less than 0.05. The annotation Time 0 in Table 4.8a refers to variables measured in the first administration of the TISS (Week 3); the annotation Time 1 refers to data gathered in the second administration (Week 17).

Diagnostic	Benchmark	Values	
Chi-Square		601.34	
Degrees of Freedom		243	
p value Chi-Sq	≥ 0.05	0.000	
RMSEA	0.06	0.068	
p-value RMSEA $<= 0.05$	0.000	0.000	
CFI	≥ 0.90	0.928	
TLI	≥ 0.90	0.918	
SRMR	0.08	0.076	
n	333	333	
Time 0	**Standardised estimates**	**Time 1**	**Standardised estimates**
Failure (F_0)			
T3A0	0.730**		
T5A0	0.793**		
T7A0	0.814**		
T9A0	0.773**		
T11A0	0.778**		
T13A0	0.679**		
Personal (PP_0)			
T21A0	0.819**		
T22A0	0.656**		
T25A0	0.748**		
T26A0	0.652**		
Reflection (R_0)		Reflection (R_1)	
PSR1A0	0.561**	PSR1A2	0.576**
PSR2A0	0.737**	PSR2A2	0.717**
PSR3A0	0.805**	PSR3A2	0.787**
PSR4A0	0.672**	PSR4A2	0.810**
Positive emotions (P_0)		Positive emotions (P_1)	
P1A0	0.784**	P1A2	0.773**
P2A0	0.826**	P2A2	0.825**
P3A0	0.583**	P3A2	0.628**
Error correlations			
PSR1A0 $\leftrightarrow$ PSR2A0		0.372**	
Regressions			R^2
$F_0 \rightarrow R_0$		-0.250**	0.063
$PP_0 \rightarrow P_0$		-0.160*	0.025
$R_0 \rightarrow R_1$		0.536**	0.287
$P_0 \rightarrow R_1$		0.415**	0.172
$P_0 \rightarrow P_1$		0.533**	0.284
$R_0 \rightarrow P_1$		0.380**	0.144
Factor correlations			
$F_0 \leftrightarrow PP_0$		0.533**	
$R_1 \leftrightarrow P_1$		0.571**	

**(*) denotes significant at better than one (five) per cent

Table 4.8a Estimating reciprocal relationships between reflection and positive emotions

In Figure 4.8a, the leftmost part of the regression system involves measurements at time 0 of latent variables included in the estimations to "isolate putative causes from extraneous influences on the outcomes through those causes" (Hoyle 2012, p.138).
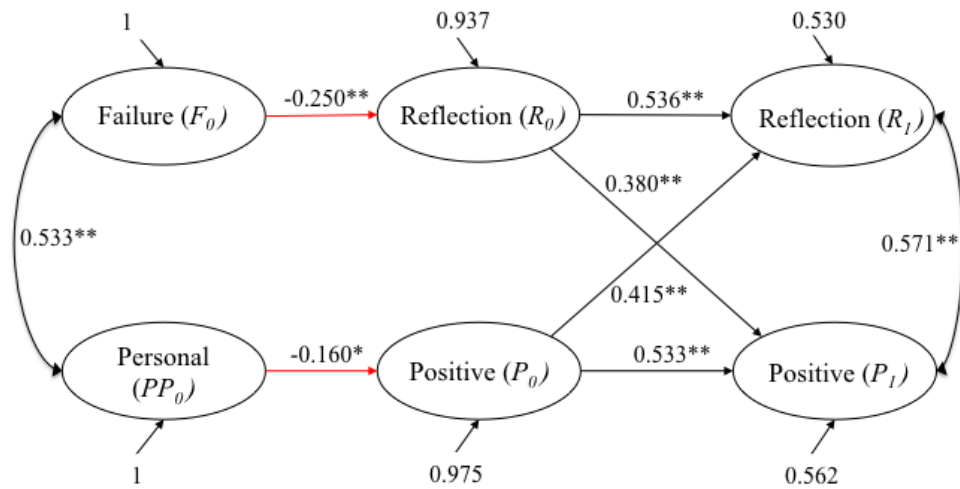
Figure 4.8a Cross-lagged, autoregressive estimations for reciprocal relationships between reflection and positive emotions

Their inclusion was based on the observations in time 2 (annotated as P_1 and R_1 in Figure 4.8a) that the personal trigger was not directly related to positive emotions and the failure trigger was not directly related to reflection. To an extent, the variables PP_0 and F_0 have the characteristics of instrumental variables, although no compelling theoretical argument is made for this here.

Rather, they are needed for model identification (so that a model solution can be found) and as just noted their use is based on empirical observations. The existence of a reciprocal relationship between a form of reflection and an affective state is gauged from the rightmost part of the model. Similarly, other parameters and paths in Figure 4.8a are required, but are not central to the substantive relationships involving reflection and emotions that are the subject of Hypothesis H_{2d} (Hoyle, 2012). These non-substantive features are the variances of variables and covariances between them, obtained from the measured data, so that they are regarded as determined outside the model under examination (that is, they are exogenous). The part of the cross-lagged, autoregressive model used to test the hypothesis is given in the

right-hand part of Figure 4.8a, which, using the notation given in the figure, represents the system of equations

$$R_1 = 0.536R_0 + 0.415P_0$$
$$P_1 = 0.533P_0 + 0.380R_0$$

That is, reflection and positive affective state in time 1 are influenced positively by the states of these variables at the preceding measurement in time 0.

First, the paths from a construct at time 0 to its like counterpart at time 2 (as measured by the regression coefficients 0.536 and 0.533 for the influences of R_0 on R_1 and P_0 on P_1) are known as stability paths. Their function is "to reveal the degree to which there is change in the latent variables from assessment A [time 0] to assessment B [time 1]" (Hoyle 2012, p.140). The stability paths in Figure 4.8a have regression coefficients that are greater than 0.5 and are approximately equal. From these observations, it can be concluded that time 0 constructs influence their time 1 counterparts, but do not account for all of the variation in them.

The cross-lagged paths (as measured by the regression coefficients 0.415 and 0.380 for influences of P_0 on R_1 and R_0 on P_1) have coefficients greater than 0.3 and the p values are less than 0.01. That is, there is evidence of cross-lagged effects between the conceptually different latent constructs and therefore evidence of a reciprocal relationship between reflection and positive emotions (Wong and Law 1999).

In only one other case was evidence found of this reciprocity. That was for reflection again, but in combination with negative emotions. However, the cross-lagged influences between reflection and negative emotions had small coefficients (-0.124; -0.161) and the p values were 0.055 and 0.011 respectively, suggesting at best moderate to weak evidence of reciprocity between a form of reflection and affective state (remember that p values greater than 0.01 but no larger than 0.05 are considered "moderate" evidence; p values greater than 0.05 but no greater than 0.10 are taken as "weak" evidence; Gelman 2013, p.70). Representation of the above is seen in Figure 4.8b.

In conclusion, there is evidence of feedback in the case reported in the table and figures of this section. That evidence is conditional on accepting the model of Table 4.8a, where the benchmark on fit for the RMSEA was not satisfied, others such as the SRMR being near the

acceptable limit and no theoretical argument was made for the use of variables PP_0 and F_0 as instrumental variables.

This latter point is regarded as important in selecting instruments, which "should be specified a priori based on sound theories" (Wong and Law 1999, p.72). In the case reported here, reliance was not on theory but on empirical conclusions that might be different in other data sets.

Overall there is evidence to suggest that reciprocity between one form of reflection and affective state should be investigated empirically more extensively after an appropriate theoretical analysis of the form of model to be used. In this sense there is evidence to reject H_{2d}, but only in relation to reflection.
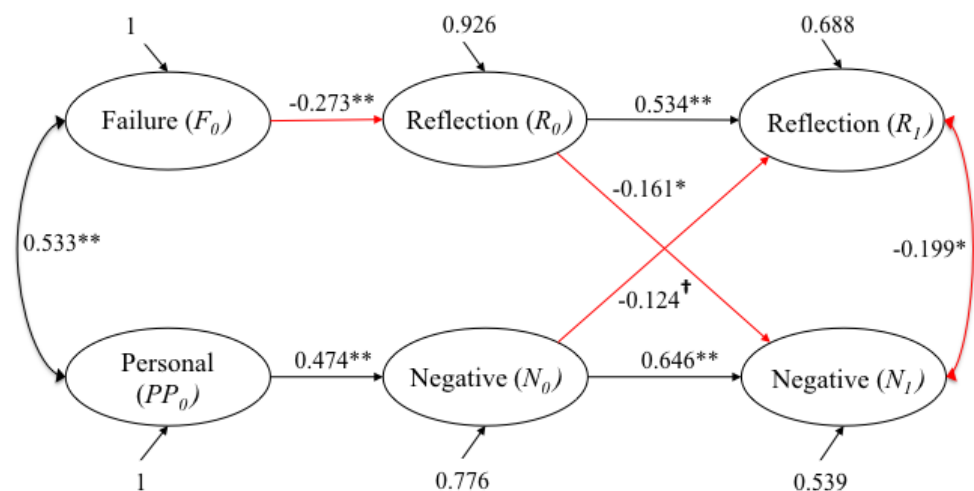
**(*, †) denotes significant at better than one (five, ten) per cent

Figure 4.8b Cross-lagged, autoregressive estimations for reciprocal relationships between reflection and negative emotions

4.9 SUMMARY

The six hypothesis tested in this chapter are:

H_{1a} (Sections 4.2.2; 4.3.2; 4.4.2; 4.5.2): Information gathered with the instrument described in Section 3.7 provides reliable and valid information on triggers, emotions, reflection and dialogue with social actors.

H_{1b} (Sections 4.2.3; 4.3.3; 4.4.3; 4.5.3): Factors identified for triggers, emotions, reflection and dialogue are invariant across groups based on age, status as new or returning student, gender and culture.

H_{2a} (Sections 4.6): Triggers (that is, disorienting dilemmas) that occur have no influence on emotions experienced or forms of reflection adopted (*path a* and *c* in Figure 3.6).

H2b (Sections 4.6): Emotions do not mediate the relationship between triggers and reflection (*path a* and *b*).

H2c (Sections 4.7): Dialogue with social does not moderate the relationships in the model of Figure 3.6 during a semester at SHI.

H2d (Sections 4.8): Forms of reflection and emotions are not reciprocally related (*path b and d*).

Hypothesis *H1a* was not rejected, meaning that evidence of latent constructs being reliable and valid was found. However, hypothesis *H1b* for some of the demographic variables used to assess measurement and construct invariance was rejected. This means that reliable and valid factors were located using the information from the TISS, while invariance across all cases was not established. There is sufficient evidence of invariance to suggest the latent constructs be used to assess the remaining hypotheses. This is discussed further in the next chapter. Hypotheses *H2a* to *H2d* refer to the nomological network between central variables. The relationships highlighted here are debated by TL theorists and the evidence in this chapter provides support for both mediated and direct pathways between triggers and forms of reflection (depending on which trigger, which form of reflection and which mediating emotion). Further, some evidence was found for the moderating role of social actors particularly fellow students and family, and of reciprocal relationships (that is, feedback) between one form of reflection and the two affective states. Overall results in this chapter confirm the positions of some transformative theorists and reject others. The implications for TL theory are discussed in the next chapter.

CHAPTER 5: DISCUSSION

In the preceding chapter findings were reported on the six hypotheses H_{1a} to H_{2d} proposed in Chapter 3.6 and summarised in Section 4.9. These were formulated from the objectives given in Sections 1.2 and 3.1. In the current chapter, the findings on hypotheses are discussed in relation to current TL literature and in relation to the research context that was referred to as a "biotope" in Section 3.4. First, in Section 5.1, hypotheses H_{1a} and H_{1b} are evaluated. These relate to the existence of latent factors, their reliability, validity and the invariance of TISS responses across age, status, gender and culture. Second, in Section 5.2, hypotheses H_{2a}, H_{2b} and H_{2c} on mediated and moderated relationships are put into the context of existing TL literature. Finally, the possibility of feedback between emotions and FoRs (hypothesis H_{2d}) is considered in Section 5.3.

5.1 CENTRAL VARIABLES OF TRANSFORMATION

Discussions in the following subsections address the hypotheses:

H_{1a}: *Information gathered with the instrument described in Section 3.7 provides reliable and valid information on triggers, emotions, reflection and dialogue with social actors; and*

H_{1b}: *Factors identified for triggers, emotions, reflection and dialogue are invariant across groups based on age, status as new or returning student, gender and culture.*

The first subsection of this section elaborates findings on triggers, and for three reasons is longer compared with the discussions of the other "central variables" (emotions, forms of reflection and facilitators). First, triggers are specified in model 1.2 and Section 3.6 as initiators of transformation, meaning they are of crucial importance in TL. Second, in the current literature, little is understood about whether a disorienting dilemma qualifies as a disorienting dilemma that can induce change in ways of thinking. Third, a number of additions have been made in this thesis to lists of potential triggers considered by other researchers (King 1997, 2000; Brock 2010; Kumi-Yeboah 2012; Schwartz 2013).

In the next subsection, potential triggers, their reliability, validity and invariance are discussed in the context of the SHI biotope and suggestions are made on developing how to capture triggers via surveys in similar studies on transformation.

5.1.1 TRIGGERING INCIDENTS

The PCA and CFA analyses of potential triggers returned two latent factors named "failure" and "personal" indicating the events influenced by these constructs. Notably, the many success items in the TISS did not emerge as being associated with a coherent latent construct. This is related to the relatively small inter-correlations between success items and with other potential triggers, and with the observation (from the summary statistics of Section 4.2.1) that most respondents "agreed" or "strongly agreed" with statements on successes, international environment, cultural influences and changing social roles. Due to the comparatively low correlations, the majority of variation in all of the trigger data was thus not explained by these items. The issue of potential triggers not appearing in the CFA measurement model is taken up in the final chapter, where directions for further research are considered.

It was found that the latent constructs had construct validity. That is, benchmarks on reliability and validity were met (Section 4.2.2). Moreover, even though the factors were correlated (with correlation equal to 0.695), this does not threaten validity, in particular discriminant validity, as a much larger factor correlation would be required (Kenny 2016).

The emergence of failures and personal factors indicate that "student development is a cumulative process shaped by many events and experiences, inside and outside the classroom" (Kuh 2008, p.13). The failure construct at SHI relates to academic outcome and two forms of experiences beyond the classroom. One of these forms consists of the on-campus activities of duties and planning social events; and the other consists of work undertaken off campus (either periods of internship or permanent employment, as described in Section 3.7.1). Thus, three of the six statements influenced by the failure construct refer to the biotope and the other three relate to off-biotope activities. Further, the personal factor refers to life events that arise within families and respondents' network of friends. Therefore Kuh's point is verified.

Johansson and Felten (2014, p.30) consider failures to be "unnerving" and challenge the identities of those who experience them. Students do not only reflect on "what they are doing or feeling in an experience", but also question "who they are" (Johansson and Felten 2014, p.60).

It is probably the case that the magnitude of the challenge depends on the form of the failure. For example, failing in a school event that involved other students might not be as challenging as not attaining a desired internship or vice versa.

Further, in the busy SHI biotope, with its accelerated learning and many extracurricular activities, some failures may be balanced or overshadowed by outcomes in other areas of life. As an example, some respondents might give greater weight to academic outcomes than to extracurricular activities on campus. Further, internships and career opportunities are held in high regard as these provide industry experience and good earnings, particularly for internships in Switzerland that can provide savings to fund the next level of study or provide financial reserves before returning to their home countries (Kulkarni 2015). Further, internships are a mandatory prerequisite to passing undergraduate and sub-degree courses. Consequently, academic and/or vocational failure may well pose higher levels of challenge to an individual's identity in the sense of Johansson and Felten (2014).

The personal construct predominantly relates to issues within the family. These items related to situations beyond the learners' control (called "life changes" by King 2000, p.82 and "life events" by Brock 2010, p.7) such as changes in employment and financial status of parents, their separation or divorce, and death within the family or of a friend. These findings are similar to findings by King (2000, p.82) on "prior experience and life context" and some of which arise in later research also (for example Brock 2010). The approach in the current research is different to the approaches of these authors. In particular it does not use self-reports of transformation nor does it employ simple Yes/No responses, issues that have been criticised in TL circles (see Section 2.6.2). Thus, a contribution of this current research is to confirm findings relating to personal experiences that have long been postulated by TL researchers, but who called for reliable and valid quantitative research on such issues (see Section 3.5).

Together, the latent factors indicate that potential triggers arise throughout the whole period of the learning experience and take in areas of concern beyond the learning environment (King 2000; Dirkx et al. 2006; Yorks and Kasl 2006). This supports the notion that one should view learners in their "fullness of being" (Yorks and Kasl 2006, p.46), striving for authentic relationships with students (Cranton 2002; Section 2.2 above) and promoting TL in and beyond the classroom. One possibility is that the full range of failures and personal experiences be used to provide educators with a holistic orientation to learners' contexts (Section 2.2 above). Furthermore, although the measurement of triggers with the TISS led to reliable and valid constructs, it remains uncertain to what extent triggers can, or should be, alleviated as they are part of life's experiences (Johansson and Felten 2014).

Part of the answer may lie in the moderating effect of dialogue with friends, family and other students in facilitating the process of transformation. This is considered in the next section.

Given the originality of the TISS, the next step was to determine if reported triggers differed between groups (Peltier et al. 2006; Taylor and Snyder 2012; Brock 2015*a*). Merriam (2004) states that the ability to contextualise triggers may be dependent on age, whereas it is proposed that status as new or returning student may influence student perceptions of what triggers are and what they are not. Furthermore, Brock (2010) perceived differences by gender in the importance of triggers and Mezirow (1990), Cranton (2006), Nguyen et al. (2006), Aquino-Russell and Russell (2009), Jester and Hoggan (2009), Mistry and Wu (2010) and Taylor and Snyder (2012) suggest cultural influences exist when internalising experiences. Accordingly, latent factors and responses to trigger items were assessed for variations across groups based on age, gender, status and culture.

Results for invariance tests across the four grouping variables are summarised in Table 4.2.3c. For the age groups under 21 and 21 and over, invariance was found at the level of individual TISS items and the level of the latent constructs. That is, respondents in the two age bands were found to: (i) report similarly on the TISS trigger statements and (ii) have comparable underpinning latent constructs that explain item responses. Within TL literature, Mezirow (1998), Merriam (2004) and Cranton (2006) have suggested that transformation is a function of cognitive development and age. However, the current findings do not support this. That may be because the two age bands are populated mainly by students who are within a few years of each other in terms of age, as only 8.4% of respondents were older than 25. For such a tight and relatively young range of ages, cognitive differences may not be so great.

Furthermore, TL theory was devised initially in relation to adult education and more specifically according to Taylor and Snyder (2012) it falls within the domain of middle-aged adults. Yet there is little reference in the literature to the ages that are specifically associated with the transformational process (see for example Merriam 2004; Cranton 2006, Brock 2015). On the other hand, evidence has been found at SHI that the TISS has the desirable property of age invariance in item and latent responses. That is, the age groups respond equivalently to test items and these responses are underpinned by equivalent latent constructs.

Two slight digressions from model invariance are seen in groups related to status as a new or returning student. Only partial strong invariance is achieved for failure when status is considered. That is, status-based responses to items on failure are weakly invariant (meaning TISS responses vary in the same way to changes in the underlying factors) but strong invariance is not attained in responses to all failure items (because on average there are TISS differences that are not associated with variations in the underlying factors across new and returning students). This departure concerns only the statement "A failure related to a school meeting or social gathering". Possibly new students were planning events and meetings for the first time, whereas returning students had more experience of events and were clearer that events are not formally assessed (in the sense that marks in academic modules all contribute to decisions on progress to the next level of study) Consequently, returning students may understandably have a different perspective on such failures.

By contrast, the personal factor was found to have strong invariance. However it did not meet all of the requirements for strict invariance. To be strictly invariant the conditions for strong invariance must be satisfied and in addition, the unexplained parts of item responses should be equal. This is not observed in the case of the statement "A change in parental employment", where the error was found to be larger on average for returning students. That is, the influence of parental employment is invariantly measured for new students, whereas for returning students parental finance and employment may be associated with an omitted cause, or unobserved variable. One omitted cause could be associated with internships, with each returning student having done one or two and potentially becoming more independent of parental financial situations and employment. Interns in Switzerland have high earnings compared to internships taken elsewhere, so that for some returning students independence from parents may be more rapid. In other research on SHI students, Hrankai (2014) and Kulkarni (2015) found evidence of internships inducing SHI students to become independent. Taken together, the high earnings and greater maturity may erode the importance of parental support for returning students. This would be reflected in greater variation in responses to the statement about changed parental employment by returning students, underlining the importance of unobserved outcomes on salaries associated with internships. As in the case of strong noninvariance of a failure item with respect to status, the reasons for there being strict noninvariance of a personal item are again understandable in terms of *expected* differences between the groups.

By gender, all forms of invariance in Table 4.2.3c are satisfied for statements influenced by the personal factor. However, item invariance by gender is problematic in the case of failure. Even weak invariance (that is, females and males being equally affected by the latent factor) is not the case for the statement "failure related to a pay rise", with males being more sensitive (that is, having a larger loading for this item) than females (see Table A5.4.2d in the volume of supporting materials). From this, it would seem males are more concerned with financial earnings and failing to achieve higher pay. In support of this, Hrankai (2014) found that SHI males were more performance oriented. Further, on the evidence of Hrankai (2014) and other research (such as Hayes 1986, in Giles and Rea 1999) women often choose careers where they are likely to be paid less than men. It may therefore follow that when responding to the TISS in an academic setting, females give higher ratings than males to socially relevant items, as was the case in a study by Shroyer et al. (1995, cited in Weber and Custer 2005, p.55) where females were more concerned with social conditions. Females further tend to prefer collaborative approaches in both work and study environments (Weber and Custer 2005). These observations are consistent with females having less sensitivity to pay than males, so that males would see failure on pay as more serious than females. This suggests that wider socio-economic concerns are exerting influences in regard to gender differences and almost any survey instrument would be likely to demonstrate noninvariance regarding pay.

Difference in gender responses to two failures, namely school meetings or social gatherings and work-related promotions account for strict noninvariance of responses between females and males. The first of these relate to social conditions and collaborative arrangements, which it was observed in the previous paragraph, women are more likely to rate highly. This might account for women having smaller unexplained components for responses to that item (Table A5.4.2d). Further, as already noted females may prefer social or caring aspects of employment over reward, with the TISS thus more accurately eliciting what may be more uniform female responses on promotion. Attitudes among males on the matter of promotion may be less uniformly reflected in the SHI sample and/or the TISS is simply a less accurate means of measuring male ratings of promotion. See areas for further research in the next chapter.

Cultural variations were studied in terms of a comparison between Confucian Heritage Culture (CHC) and a group consisting of all other cultures. Noninvariance was much more problematic for culture than for other grouping variables.

Weak invariance was attained, so that the two cultural groups had the same loadings for both failure and personal items. That is, the TISS elicited responses that related in the same ways to the underlying factors. However, strong and strict measured-item invariance along with structural invariance of factor variances and means were not observed (Table 4.2.3c). Item-based noninvariance is observed in relation to three failure statements. That is, there are differences that arise in half of the TISS items affected by the failure construct. Further, one personal statement affected by the underlying personal construct is problematic. These differences occur in intercepts of failure items related to "academic failure" and "failure in duties", and the personal factor related to "change in parental employment". Also, error terms differed across the groups for failure in planning a school meeting or social gathering. In the first two failure items, CHC groups rated these as more important triggers than did the other cultures. Conversely, other students on average rated "change in parental employment" higher than CHC's.

The differences in CHC reporting of issues regarding parents may be because "The father is the leader in the CHC family" (Nguyen et al. 2006, p.6). As Tran (2013) points out, CHC children are taught to respect their elders and especially their parents. This may influence how students report employment issues among parents, because in their responses CHC students would not want to appear disrespectful of familial ties. Another reason may concern the knowledge students have of employment matters concerning their parents. In the hierarchy that operates within most CHC families, parents may not report employment concerns to their children so as to preserve authority and "face" (Tran 2013, p.58). Conversely, other cultures are seen as individualistic where informal ties exist between family members and individuals are expected to look after themselves (Nguyen et al. 2006; Wong 2009). Respondents from these non-CHC cultures may have more knowledge about family matters and thus are able to respond to these TISS items more accurately.

To understand noninvariance of failures relating to academic studies, duties, school meetings or social gatherings, other aspects of CHC culture should be considered. According to Nguyen et al. (2006, p.6) CHC learners "prefer to work individually among ... [other] ... CHC learners to ensure greater control over the outcomes of their learning". This suggests that for CHC students, performance is likely the responsibility of the learner and explains why on average CHC students might rate "academic failure" or "failure in duties" as important.

Further, CHC learners may view instructors as having unquestionable wisdom and previously, they may have been most familiar with classroom learning directed at remembering the teacher's material (Tran 2013), rather than the Westernised style of interactive and participative teaching at SHI. This may translate to a difference between CHC and other students that is present no matter the extent to which they report failure. That is, the intercepts in the linear relationships between academic or duty failures and the underlying latent construct are greater for CHC students than for other students. Further, maintaining face, both personal and teachers, is an important consideration for CHC cultures (Nguyen et al. 2006; Tran 2013). This may heighten the differences in responses to any items on failure, but might have particularly reinforcing effects in the case of academic study and extracurricular duties that are overseen by lecturers and involve numerous interactions with fellow students. The uniformity of approaches among CHC students would further explain the smaller error terms and accuracy in the TISS measurement of the item related to a failure in planning a school meeting or social gathering as presented in Tables 4.2.3c and A5.4.2h.

As explained in Section 4.2.3, when measurement invariance is not achieved in less stringent forms of cross-group testing (such as weak item invariance), this may pose difficulties in assessing similarities between underlying constructs across groups (Brown 2006). In the case of culture, the failure construct was non-invariant in both its variance and means. This is a direct consequence of the differences noted already at the item level, where factor means and variances were fixed for the purposes of testing item invariance. When testing structural invariance, factor means and variances are separately freed and item loadings are fixed to ensure model identification. When this is done, unsurprisingly, given the range of failure items that are non-invariant to culture, factor means and/or variances are not equal for the failure construct. In the case of the personal factor, the finding of unequal structural means may be driven by a composite effect of cultural differences on parental changes in employment along with different attitudes to failure, given the correlation of 0.695 between the latent constructs. However, this is speculative and may be only one of a range of composite effects that impact differences between cultural groups. Like Byrne and Watkins (2003, p.155), it seems that the current results underscore "previous caveats regarding interpretation of instrument equivalence; they add also to the growing body of scepticism that queries whether measuring instruments can ever be totally equivalent when used in cross-cultural comparison"

Byrne and Watkins (2003) found that an instrument, which yields well-fitting factor structures for cultural groups studied separately, may result in measurement noninvariance in the combined analysis of responses from two cultural groups. As a next step, the TISS might be applied in culturally homogenous groups. Certainly, its invariance by age and the explicable departures from invariance (most being unrelated to the research site) in relation to status and gender would suggest that the TISS is of value as a measure of potential triggers across groups based on each of age, status and gender.

However, much has been written at a theoretical level in the TL literature about experience of different cultures being a trigger for transformation (Barron and Arcodia 2002; Tisdell and Tolliver 2003; Brown 2006; Cranton 2006; Peltier et al. 2006; Campbell and Uys 2007, cited in Gannon-Eary and Fontainha 2007; Aquino-Russell and Russell 2009; Jester and Hoggan 2009; Mistry and Wu 2010; Al Otabi 2012; Brock 2015*a*). It would seem therefore that the application of the TISS or a related instrument in culturally homogenous groups will be an important step in understanding the role of culture and gaining insight into just what triggers transformation. For these reasons, the use of the TISS with different cultural groups is an area for further research.

One possible method of dealing with cultural departures from invariance is to construct dichotomous variables for different cultural groups and include them as explanators in the mediated and moderated models presented in Section 4.6. Duffy et al. (2016) have done this in the investigation of responses to another survey instrument applied at SHI. They found that dichotomous variables for culture had significant impacts and that after controlling for these, findings were consistent with investigations in other environments.

Overall, the TISS provides insights on the range of triggers experienced among learners within and outside the classroom (both on- and off campus) that may catalyse transformation. Differences are evidenced between age, status, gender and culture on how failures and personal experiences are interpreted and reported differently within an intensive learning environment. These findings support the notion that learners should be considered in their "fullness of being" (Yorks and Kasl 2006, p.46) and that educators must realise that numerous catalysts for transformation occur outside their areas of influence. In this sense, educators should have increased awareness and understanding of the range of potential triggers and how this may influence their endeavours to promote transformation in an educational setting.

This subsection sheds light on the contribution stated in objectives one and two proposed in Sections 1.2 and 3.1. These concerned the possibility of designing an instrument and gathering data on triggers in a reliable and valid manner that were invariant across groups. The TISS extends prior research not only in the range of triggers captured, but also in establishing reliability, validity and the likely invariance of responses to such an instrument. Consequently, there is encouragement in this work to pursue similar approaches via surveys in other studies of transformation and triggers.

5.1.2 POSITIVE AND NEGATIVE EMOTIONS

The PCA and CFA analyses of emotions returned two latent factors named "positive" and "negative". Notably, respondents tended to "agree" or "strongly agree" with positive emotions and "disagree" with statements concerning negative emotions. According to Johansson and Felten (2014, p.59), this may be explained by a natural tendency "to avoid negative emotions". A further reason was proposed by Isen (1987, p.222) that positive emotions "enlarge cognitive contexts", therefore promoting the ability of recall and cognitive effect. That is, it is easier to recall positive emotions than negative ones, which additionally contribute more to an individual's well-being (Fredrickson 1998; Lord et al. 2002). All statements showed the expected inter-correlations although (in the sense of the scoring of responses from 5 for Definitely agree to 1 for Definitely disagree) lower average responses and greater variation were evident in the "negative construct". As noted in Section 4.3.2, emotions were not defined by Pekrun et al. (2011) as opposing, rather positive and negative emotions were seen as belonging to different categories. These were defined in their previous exploratory studies as "major emotion categories" and could be defined in terms of their valence (Pekrun et al. 2011, p.38). That is, positive and negative emotions are easily distinguishable as being different although not necessarily opposite (for example enjoyment vs. anxiety). The positive construct loaded onto statements about enjoyment, hope and pride; whereas the negative factor captured anger, anxiety, shame, hopelessness and boredom.

It was found that the two latent factors had construct validity. That is, benchmarks on reliability, convergent validity and discriminant validity were met (Section 4.3.2). Moreover, even though the factors were correlated (with correlation equal to -0.637), this does not threaten validity, in particular discriminant validity, as a much larger factor correlation would be required (Kenny 2016).

Pekrun et al. recommended the inclusion of a "broader variety of emotions" (Pekrun et al. 2011, p.46), but emphasised the one-factor model emerging from responses to their AEQ survey demonstrated poor goodness of fit. Therefore an alternative way of eliciting emotions was sought that extended the range of eight emotions in the AEQ. In the TISS a bank of Yes/No statements was included using the eight emotions from Pekrun and 12 additional emotion items. Similar average responses were found on statements of feeling "positive", "fun", "enjoyment" and "satisfaction", with these being the highest rated emotions (see Table A6.2 in the volume of supporting materials). Also, negative emotions such as "shame", sadness, hopelessness" and "anger" showed lowest average responses. TISS respondents therefore consistently discerned between the influence of positive and negative emotions on both the AEQ and the 20 Yes/No items while learning at SHI. Although similar average responses were attained between both AEQ Likert statements and the 20 Yes/No items, as just reported, robust reliability and validity of two latent constructs was provided via the eight AEQ items. This scale was therefore used to further analyse the relationship between emotions, triggers and forms of reflection in the sections that follow.

Results of invariance tests involving the emotions constructs are summarised in Table 4.3.3a. Across the two age groups, the influences of positive and negative emotions were identically reported. Low (2000, p.10) concluded that learning to use the "emotional-system" as a range of coping techniques is independent of age. As in the triggers section above, this may be a consequence of how groups are defined in the MGCFA underpinning the current findings as under 21 or 21 and over, or the fact that deviations in age are not large. Nevertheless it is clear that emotions are indeed reported similarly across the range of respondent ages at SHI.

For status, there is only weak measured-item invariance. This is because new students rated pride in their capacities higher than did returning students and because returning students rated boredom with materials more highly than did new students. Further, on average, returning students scored higher on "the material bored me". Possibly, disappointment among returning students with internships and with the nature of the hospitality industry may underpin the difference in loadings by status (Kulkarni 2015). This disappointment may translate into heightened negative emotions when returning for a further semester of study, which as a result induces boredom. Also, boredom may be related to a personal trait (Pekrun et al. 2009) rather than an academic influence or even may arise from mismanagement of one's emotions (Low 2000).

On the other hand, new students take pride in coping while studying in a foreign country filled with new academic and societal impressions, which their returning counterparts no longer feel or sense so strongly.

Emotions were invariant by gender, except for the greater error variance among males when responding to statements about negative emotions. That is, less measurement error is associated with female ratings of negative affective state. However, this is a departure from the finding of King (1997, 2000), Pekrun et al. (2009) and Brock (2010, 2012) that no significant differences of emotions exist across gender. King and Brock were using the LAS instrument that previously had been criticised as unreliable and invalid (see Section 3.2) and they were not engaged in assessments of measurement invariance using latent constructs. Pekrun and colleagues were the source of the statements employed in the current research, but as indicated above there were goodness-of-fit issues in their application of the statements to psychology undergraduates in Canada.

As for the preceding discussion of triggers, the greatest deviation from invariance occurred for culture. In summary Table 4.3.3a item invariance for the positive emotions is partial weak because the loadings for other cultures onto the statement "I'm proud of my capacity" are greater than for CHC respondents. Measured items associated with the factors have residuals for other cultures, which are greater on the TISS statements "Studying makes me irritated" and "I have an optimistic view towards studying". These lower residuals suggest that the instrument does better at measuring some statements for CHCs than for the other cluster. This may be due to respondents from other cultures having divergent interpretations of some TISS statements. This is a feasible explanation, as the other cultural group consists of 27 different nationalities, whereas the CHC cluster consists of seven nationalities among which Chinese students dominate.

Except for equal variances across cultures for the positive construct, there is total noninvariance at the structural level for latent emotions. These findings might reflect the point made by Scollon et al. (2004) that regulation of positive and negative emotions are in part culturally determined. Further, among Asian groups there may be less distinction between positive and negative emotions. That is they value positive and negative emotions more equally than other cultures (Scollon et al. 2004). This is borne out by the lower magnitude of covariance between positive and negative emotions for CHCs.

Overall, as for triggers, there are major noninvariance issues for emotions with respect to culture. As indicated above some of this might be resolved in further studies where more homogenous cultural groups are defined and analysed separately as per Byrne and Watkins (2003) and the discussion above of cultural noninvariance of triggers. Further, the noninvariance of emotions would indicate the need to use dichotomous variables for cultural groups in subsequent structural modelling. Also, the failure of weak invariance (meaning at least one pair of loadings by culture differ) and the failure of strict invariance on the basis of errors being unequal are consistent with the previous findings on triggers that there is no structural invariance of emotion factors with respect to cultures. As for triggers, instrument noninvariance adds again to the body of evidence suggesting that invariance is unattainable in cross-cultural comparisons (Byrne and Watkins 2003).

This subsection sheds light on the contributions stated in objectives one and two proposed in Sections 1.2 and 3.1. These concerned the possibility of designing an instrument and gathering data on emotions in a reliable and valid manner that were invariant across groups. The TISS extends prior research in establishing reliability, validity and the likely invariance of responses to such an instrument. Consequently, there is encouragement in this work to pursue similar approaches via surveys in other studies of transformation and emotions. Moreover, there is encouragement to study the relationship between triggers and emotions that arise using TISS responses and the underlying latent factors.

5.1.3 UNDERSTANDING, REFLECTION AND CRITICAL REFLECTION

Following Kember et al. (2000), four forms of reflection (FoR) are considered. These are habitual action, understanding, reflection and critical reflection. The 16 FoR items in Section 3.7.3 were based on the CRQ scale designed by Kember et al. (2000). Habitual action is defined as undertaking activities without thinking. Understanding uses knowledge during activities although this knowledge is not appraised. Reflection involves students critiquing existing knowledge and the process of knowledge accumulation in order to form new appreciations and interpretations of that knowledge. Critical reflection however "involves becoming aware of *why* we perceive, think, feel or act as we do" thus bringing about a lasting change in meaning perspectives (Mezirow 1991, p. 108).

With one exception, average scores for the FoR statements given in Table 4.4.1a, lie between 3.4 and 4.3, suggesting that on average respondents varied in their ratings between the neutral and strongly agree categories.

The exceptional statement concerns habitual action, namely "If I follow what the lecturer says, I do not have to think too much in my studies". In fact mean scores on each habitual-action item are below the smallest average among the other FoR statements, suggesting in general a greater propensity to disagree or strongly disagree with the habitual-action items than with other FoR statements. This may be because habitual action is easily and frequently achievable by learners than other FoR (Cranton 2006). It might be due to this study taking place among full-time learners who have moved forward in their cognitive processes to the point, as indicated below, habitual action is not practiced within this intensive learning context. The finding in this research of lowest average scores for habitual action is consistent with the results of Kember et al.'s and Peltier et al.'s studies. At SHI (Section 4.4.2) all FoR are interrelated. Understanding was most strongly related to reflection and critical reflection with a moderate link between reflection and critical reflection. Notably, only low correlations existed between habitual action and the remaining FoR constructs (see Table 4.4.2a). These patterns of responses are reflected in the work of Kember et al. and Peltier et al.

On the basis of low inter-correlations and failure of habitual action to meet convergent or discriminant validity criteria, this factor was omitted from further analyses (Table 4.4.2b). Building on the Kember et al. (2000) scale, a similar result was found by Peltier et al. (2006) who could not find support for the habitual action factor amongst students in terms of its contribution to learning. Responses amongst students to habitual action was either due to ambiguous formulation of the statements; or from a theoretical stance, habitual action, which is performing an activity "with little conscious thought" like "riding a bicycle" (Kember et al. 2000, p.383) is not practiced within these contexts. This may be conceivable where students are learning new skills such as planning and executing events, service learning in the restaurant, or through academic content and assignments, where continual thought is needed in an intensive learning environment. These grounds provide further reason to omit habitual action from the further analyses of transformation and FoR.

The PCA and CFA analysis for FoR's indicated superior diagnostics and fit compared with the CRQ administered by Kember et al. (2000), as shown in Table A7.1b in the volume of supporting materials. It was found that the three latent factors of understanding, reflection and critical reflection had construct validity. That is, benchmarks on reliability, convergent validity and discriminant validity were met (Table 4.4.2b).

Moreover, even though the factors were correlated (with correlations equal to 0.500, 0.525 and 0.641), this does not threaten discriminant validity, as a much larger factor correlations would be required (Kenny 2016).

Results of invariance tests involving the three FoR constructs are summarised in Table 4.4.3a and 4.4.3b. Across the two age groups, only minor differences were apparent. Under 21 or 21-and-over groups reported similar levels of understanding although in the latter group only partial strict invariance is attained for reflection. This is because less measurement error is associated with older group's rating of reflection. Critical reflection by age was interpreted slightly differently between age groups and again partial strict invariance was attained, as less measurement error is associated with the older group's rating on the critical reflection construct. Partial agreement with Mezirow (1998), Merriam (2004) and Cranton (2006) is found, who state that reflection and critical reflection are cognitive abilities that develop with age, and are thus concepts, which are more commonly found in adult education. Only 8% or 28 respondents were over 25 clearly indicating that Mezirow's benchmark of possessing reflective capacity at age 30 may be slightly misconceived. Conceding that these results depend on how respondents are grouped in the MGCFA, underpinning the current findings, there is evidence that learners may reflect or start to reflect and critically reflect although to slightly different intensities, from the ages of 18 onwards in the SHI biotope.

Noninvariance was found at the structural level for latent reflection and critical reflection. This is borne out in the group of students age 21 and over rating reflection on average higher than those under 21. Additionally, respondents who were 21 and over were responsible for almost twice as much variation in the critical reflection latent construct than for those less than 21 years of age. This means only partial agreement can be found with the statements from Mezirow (1998), Merriam (2004) and Cranton (2006) and as above, evidence is provided of both age groups reporting reflection and critical reflection in this research context, although to varying degree.

Partial strong and strict invariance was attained for new and returning students on the item "*I needed to understand the material in order to perform practical tasks*", because the intercepts in the linear relationships between the underlying latent construct for understanding is greater for new students than for returning students. Also, less measurement error is associated with the new group's rating of understanding.

Similarly, for the new group there is less error measurement for reflection item "*I re-appraise my experience to learn from it and improve...*". Therefore the TISS more accurately measures the re-appraisal of experience among new students than those returning to SHI. Only partial strong invariance was attained on critical reflection, where the intercepts in the linear relationships between the underlying latent construct for critical reflection is a little greater for new students than for returning students. While this indicates difference by status, it does suggest the TISS accurately captures the impact of status on critical reflection among returning students.

No differences exist between females and males on reflection or critical reflection. These findings reflect those by King (2000, 2007) and Brock (2010). However, there are differences in terms of understanding. Partial weak and strict invariance was attained on the latent understanding construct indicating that males use knowledge during activities although fail to appraise this knowledge. Less measurement error is associated with female ratings of understanding concepts and content of materials taught in class, while males indicate higher error when measuring *"I had to continually think about material being taught"*.

As for the preceding discussions, the greatest deviation from invariance occurred for culture. Partial weak invariance was attained where, compared with other cultures, CHC loadings were greater on understanding, smaller on reflection and identical on critical reflection. Additionally, intercepts in the linear relationships between "*continually thinking about materials taught*" and the underlying latent construct are greater for CHC students than for other students. All measurement errors on items were smaller in the case of CHC's except for one Understanding item, namely "*I needed to understand the material in order to perform practical tasks*". It appears that other cultures report more accurately their application of understanding of materials to practical tasks. Culture has long been viewed as a lens, consisting of symbols, attitudes, beliefs, knowledge items, meaning systems and practices, through which an individual interprets experiences and makes meaning of these (Festinger 1957; Tisdell and Tolliver 2003; Mistry and Wu 2010).

Total non-invariance at the structural level of the latent Reflection construct indicates that CHC's use their stock of knowledge to understand what is learnt at the SHI and prefer not to question or find alternate ways of using this knowledge when compared to other cultures.

Park's study (2002, cited in Nguyen et al. 2006) showed that CHC's preferred individual work and control over their performance, thus showing preferences for detail and precision in their learning. They did not prefer learning that was based on group work or collaborative efforts (Nguyen et al. 2006). These findings suggest that CHC's understand content and attempt to apply this during practical tasks and when completing assignments. More than other cultures, they strive to avoid uncertainty in their learning and deliver what is *expected* in assignments (Nguyen et al. 2006). Similarly and in support of Nguyen, less re-appraisal, questioning or reformulation of knowledge was evident in this group at the SHI.

The three factor reflection model shows not only that FoR can be captured by an instrument at SHI, additionally evidence is provided of the ability of students who differ by age band, status, gender and culture to understand, reflect and critically reflect on their studies and themselves. Statements with high factor loadings such as "I have challenged my firmly held beliefs", "I have changed the way I look at myself", "I have changed my normal ways of doing things" and "I discovered faults in what I believed to be right" attest to the ability of individuals to scrutinise their own assumptions and beliefs independently and bring about changes in their actions and thinking, delivering evidence for the process of transformation (Mezirow 1991; Merriam 2004; Cranton 2006; Hoggan and Cranton 2015). In terms of Jung (1959), Cranton (2006), Brock et al. (2012) and Dirkx (2012), learners in the SHI biotope can transform and become increasingly conscious of themselves and the world around them, seeking alternate ways of knowing in an independent manner.

Overall, there are major noninvariance issues in FoR with respect to culture. Some of these might be resolved in other studies where more homogenous cultural groups are defined and analysed separately as recommended by Byrne and Watkins (2003). Further, the noninvariance of FoR would suggest the need to use dichotomous variables for cultural groups in subsequent structural modelling. As for the other central variables discussed above, instrument noninvariance adds again to the body of evidence suggesting that invariance is unattainable in cross-cultural comparisons (Byrne and Watkins 2003).

This subsection sheds light on the contributions stated in objectives one and two proposed in Sections 1.2 and 3.1 concerning the possibility of designing an instrument and gathering data on FoR in a reliable and valid manner that are invariant across groups. Consequently, there is encouragement in this work to pursue similar approaches via surveys in other studies of transformation and FoR.

Also, an alternative methodology is provided that is consistent with calls from Cranton (2000, cited in Newman 2012), Dirkx et al. (2006), Newman (2012), Taylor (2000, 2007), Behnke et al. (2014) and Stone and Duffy (2015). Consequently, the current research provides an impetus to study further the relationships between triggers, emotions and FoR using the TISS framework.

5.1.4 FACILITATORS OF TRANSFORMATION

The facilitating role of sharing and communicating with others is crucial to learning and self-development (Aleman 1997, Baumgartner 2002, Cranton and Carusetta 2004) and involves understanding *how* learners make meaning between each other and *what* they mean (King 2000; Cranton 2002; King and Wright 2003; Torres and Moraes 2006; Brookfield in Mezirow at al. 2009). The TISS included questions related to how and with whom the experiences of triggers, emotions and FoR are shared. Cranton (2006) argues that the central tenants of TL are reflecting on experience and entering into dialogue to contextualise experience. Taylor states: "Dialogue is the essential *medium* through which transformation is promoted and developed" (Taylor 2009, cited in Mezirow et al. 2009, p.9).

The PCA and CFA analysis on facilitators returned two latent factors named "problem-solving" and "sharing" with friends, family and fellow students. As demonstrated in Section 4.5.2, two items that loaded onto one latent "problem-solving" factor were subsequently removed on grounds of under-determination. The sharing construct indicates that learners share issues with like-minded reference groups and parents (Kegan 1982; Eisen 2001). Recall that the majority of triggers related to on-campus failures and issues relating to changes in parental circumstances.

Notably, respondents tended to "agree" or "strongly agree" with statements concerning "I realised I had to think about things differently" and two problem solving statements, however inter-correlations between all ten statements were small and the greatest variation was attained by three items on the "sharing construct" (Section 4.5.1). Additionally and unlike the under-determined "problem-solving" factor all benchmarks on reliability and validity were met and the "sharing" factor attained convergent and discriminant validity (Section 4.5.2) (Kenny 2016).

Results of invariance tests involving the latent sharing factor (in Section 4.5.2 and Figure 4.5.2a), indicated across-group exchanges with friends, family and parents were invariant for two of the four grouping variables. For age groups, measurement and structural invariance was attained, indicating the similarity of responses of sharing with social actors as equally important at both item and latent construct level. Sharing with social actors was invariant by gender at both measurement and structural level, indicating the similar importance to females and males of sharing with social actors at both item and construct level. Thus, it is concluded there is little or no difference by gender on involvement with the social actors.

For status, there is only partial strong invariance indicating that the intercepts in the linear relationships between sharing with students and the underlying latent construct are greater for new students than returning students. That is, students new to SHI tended to engage more with other students than those returning to continue their studies. This may be because new students are adapting to the new environment, experiencing cultural differences, loneliness or an array of other influences (Barron and Arcodia 2002). On the other hand, returning students are acquainted already with the environment and many fellow students, either from prior semesters of study, through sharing internships or through online social networks, which generation Y students like those at SHI are known to use extensively (Kulkarni 2015). With the number of returning students outnumbering those that are new, the adjustment for new students may be more intense, especially when away from friends and family, possibly for the first time.

As for the preceding discussions of triggers, emotions and FoR, there is noninvariance of item responses to sharing statements across cultural groups. At the structural level, higher factor variances are accounted for by "other" cultures compared with the CHC group, in that CHC variance was smaller. In the earlier discussion of triggers and the hierarchical nature of social dynamics within the CHC group, it was noted that learners with CHC backgrounds are taught to respect their parents and tend to be less individualistic than non-CHC cultures (Nguyen et al. 2006; Wong 2009; Tran (2013). As a CHC learner this could indicate a greater sense of selectivity among social actors when seeking dialogue about triggers, emotions and FoR. Furthermore as quoted elsewhere, CHC learners "prefer to work among...[other]...CHC learners to ensure greater control over the outcomes of their learning" (Nguyen et al. 2006, p.6). This suggests that stronger ties and greater exchanges occur among fellow CHC learners than between CHC and non-CHC groups.

One implication of the findings on culture reflects the point of with Taylor (2009, cited in Mezirow et al. 2009) and Parker and Wilding (2012). They called for further studies to explore the role of informal and formal networks during the transformation process, as "research is limited in this area" (Taylor 2009, cited in Mezirow et al. 2009, p.9). The current findings indicated important roles for sharing with friends, family and fellow students throughout the process of transformation. Further research might attempt to uncover under what criteria each social actor is consulted, what the form of interactions are and in the case of friends and students, how are they identified or even defined as suitable by respondents (such as being a like-minded student) and if further, a broader range of familial actors beyond parents should be considered. In general, quantitative research could extend the TISS to explore those social actors most relevant in terms of deep and meaningful conversations and extend the range of social actors beyond those considered in the analyses of Section 4.7.

Overall, there are noninvariance issues in reporting on social actors with respect to culture. This noninvariance would suggest the use of dichotomous variables for cultural groups in subsequent structural modelling. As for the other central variables, instrument noninvariance adds to existing evidence suggesting that invariance is unattainable in cross-cultural comparisons (Byrne and Watkins 2003). However, as this an initial study of its type in TL, introducing dichotomous variables is not undertaken.

This subsection sheds light on the contributions stated in objectives one and two (Sections 1.2 and 3.1) concerning the possibility of gathering reliable and valid data on facilitators that were invariant across groups. Consequently, there is encouragement to pursue similar approaches via surveys in other studies of factors that facilitate transformation. Further, there is encouragement to study the relationship between facilitators and the other central variables, as is discussed next, where the relationships between triggers, emotions and FoRs are discussed and how they are moderated by sharing with social actors.

5.2 MEDIATING AND MODERATING ROLES OF CENTRAL VARIABLES

Figure 5.2a reintroduces the model of transformation proposed in Sections 1.2 and 3.6. This model includes the system of mediated, direct and moderated inter-linkages between central tenants synthesised from current debates in TL literature (Mezirow 1978; Dirkx 2000; King and Wright 2003; King 2005; Dirkx et al. 2006; Cranton 2006; Kitchenham 2008: Mezirow and Taylor 2009; Brock 2010; Newman 2012; Taylor and Cranton 2012).
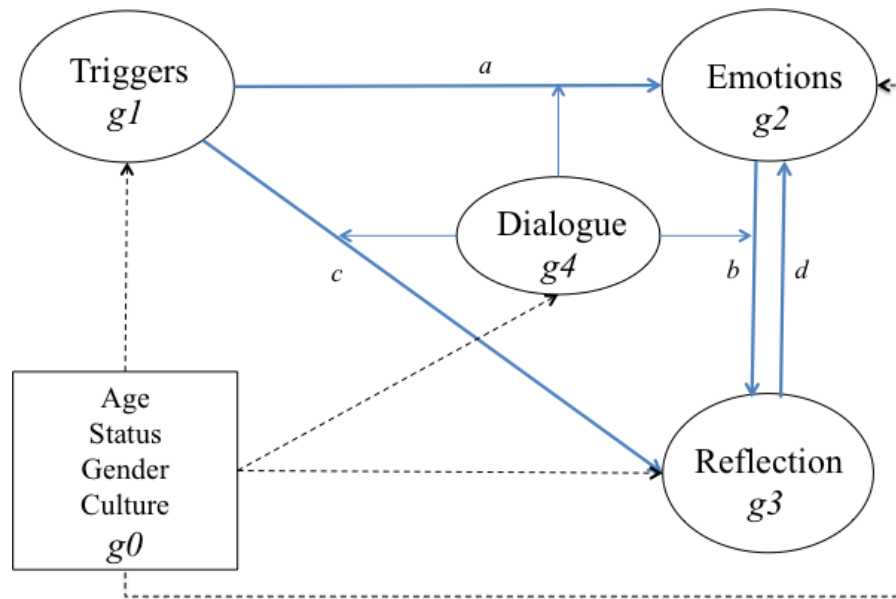
Figure 5.2a Central variables of a transformative model

Discussions in the following subsections are specifically directed at the hypotheses formulated in Section 3.6.1 and presented as paths above; namely:

- *H_{2a}: Triggers (that is disorienting dilemmas) that occur over a semester at SHI have no influence on emotions experienced or forms of reflection adopted (path a and c);*

- *H_{2b}: Emotions do not mediate the relationship between triggers and reflection during a semester at SHI (path a and b); and*

- *H_{2c}: Dialogue with social actors does not moderate the relationships in the model of Figure 3.6 (Figure 5.2a here) during a semester at SHI.*

Evidence was provided in Chapter 4 to reject each hypothesis. Dirkx calls for a "more integrated and holistic understanding of subjectivity, one that reflects intellectual and emotional...dimensions" (Dirkx et al. 2006, p.125). Furthermore, Taylor and Laros (2014, p.143) state that emotions are often "downplayed" within TL theory.

In the spirit of H_{2b} and debates in TL (Mezirow 1994; Moon 1999; King 2005; Dirkx et al. 2006; Taylor 2007; Kitchenham 2008; Mälkki 2010); the discussion in this section is concentrated on those combinations of trigger, emotional state and FoR where mediated pathways were observed. These results are given above in Section 4.6 as Figures 4.6b to f. Before considering the implications of mediation more closely, there are situations in which a trigger either:

1. directly influences affective state but appears not to affect FoR, as in rows 4, 6 and 10 of Table 4.6a

2. there is an emotional impact on FoR, but this appear to be isolated from a potential trigger, as in row 7 of Table 4.6a;

3. there appear to be both affective and trigger effects onto FoRs that arise independently of each other, as in rows 8 and 9 of Table 4.6a; or

4. there is a direct effect of a trigger onto emotive state and onto FoR, as in row 12 of Table 4.6a, but there is little support for a mediated pathway.

The situations summarised in points 2, 3 and 4 arise for the personal factor and two of the three situations in point 1 arise in association with the failure trigger, while all three are associated with negative emotions. Why there is a concentration of outcomes in association with particular triggers might be a matter for further investigation. Another interesting occurrence of like effects is the positive influences flowing directly to critical reflection from each of the failure and personal triggers. On the other hand, personal triggers have a negative direct effect on reflection. These results, along with the other forms of influence in the four situations above and the mediated effects elsewhere in Table 4.6a, suggest the diagrams are complicated and the debate among educationalists justified. Nevertheless, from the results of Section 4.6, it can be said that both direct and mediated effects of triggers on FoR can be measured; and, there are situations in which triggers might or might not have an affective impact and might or might not have direct effects on FoRs.

5.2.1 MEDIATING IMPACT OF TRIGGERS ON FORMS OF REFLECTION

Returning to situations in which mediated effects are present, a stylised summary is presented in Figures 5.2b. In each panel, the statistical evidence in support of linkages indicated by arrows is strong in the sense that estimated coefficients have p values of 01 or less. Arrows in red represent negative coefficients. The thickness of lines provides a guide to effect size, that is, line thicknesses provide a guide to how substantial the effect is of one construct on another.

For example, the thin red between failure and positive in the left panel of Figure 5.2b indicates a "small" negative effect in the sense of an estimated coefficient less than 0.1 (Cohen 1988; Field 2009, p.57); while the thickest line (from positive to reflection) indicates a "strong" effect, as the underlying coefficient is greater than 0.5 (Cohen 1988). On Kenny's (2016) criteria for effect size in mediation models the indirect path from failure to critical reflection is of moderate size (see Section 4.6).
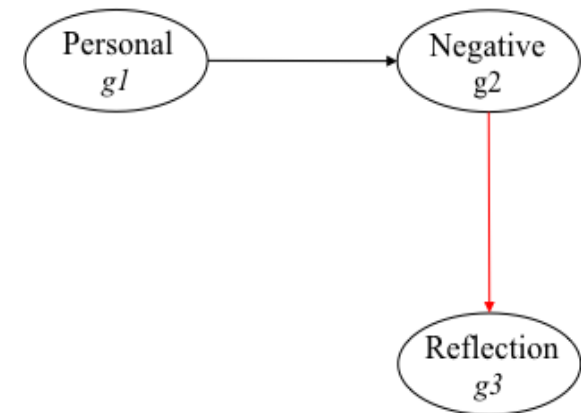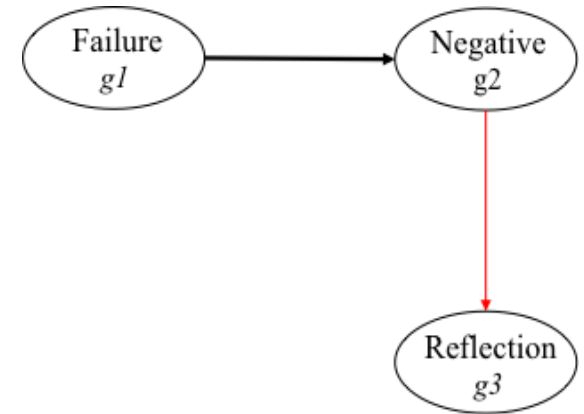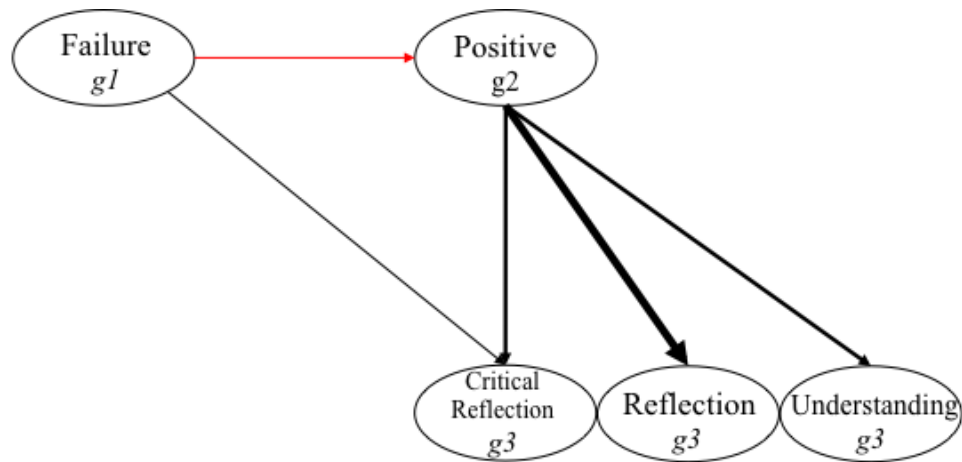
Effect sizes*

→ Negative
→ Small (0.10)**
⟹ Medium (0.30)**
⟹ Large (0.50) **

* The arrows denote linkages for which there is strong evidence, as *p* values for each are 0.01 or less
** Effect size according to Cohen (1988) and Field (2009)

Figure 5.2b Mediated pathways for triggers, emotions and FoR

The left hand panel of the figure includes a "triangle" of the form shown in Figure 5.2a in that a trigger (failure) was found to directly affect a FoR (critical reflection) and to have an indirect or mediated effect on the FoR via emotions (positive affective state). Because the mediated effect is negative and the direct effect is positive, the overall effect on critical reflection is slight. The statistical evidence of Section 4.6 supports only this one triangular form for the two latent trigger constructs of failure and personal. As shown in the right hand panel of Figure 5.2b, the other paths of influence for triggers are via emotions. Moreover, taking the products of coefficients as a measure of mediation (Baron and Kenny 1986), medium effect sizes for the mediated influences of triggers via emotions are obtained using the benchmarks proposed by Kenny (2016). This is not to say the effects on individuals may be more substantial, but rather that on average across the SHI sample mediated effects are medium.

In Figure 5.2a, there are mediated effects of failure on each of understanding, reflection and critical reflection all via positive affective state. However, in the top right hand panel, only reflection is negatively affected by change in negative affective state as a consequence of a failure. The other incidence of mediation is for the effect of the personal trigger onto reflection via negative affective state (bottom right panel). In this case, the arrows represent large effects on Kenny's criteria and the mediated effect is again medium. The mediated effect of a personal trigger has the same effect as was found for the mediation of the impact of failure onto the same FoR by the same emotions.

There is little in the TL literature against which to assess the direct and mediated effects of triggers on FoRs and some authors argue that TL theory under-emphasises the role of emotions (Dirkx et al. 2006; Taylor 2007; Kitchenham 2008; Mälkki 2010). Dirkx et al. (2006, 2012) argued for a "holistic understanding" of emotions and intellectual activities "as dimensions of our being in the world". The results on direct and indirect linkages lend some support to the notion that a holistic understanding of emotions and intellectual activities in the form of FoRs can be important. However, in some situations, in the face of life events, intellectual activity would appear to occur independently of emotions. The findings in the current research do underscore views from Scherer (1994, cited in Ekman and Davidson 1994) and Fredrickson (1998) that negative emotions do not promote reflective behaviour and that FoRs are strongly influenced by positive emotions.

However, new contributions from this research to the TL debates are that: emotions may mediate the effects of a trigger on FoR or the influences might be independent of affective states; failure does depress positive emotions (and can have knock-on effects for FoRs); both failure and personal triggers intensify negative affective states (and can have knock-on effects for reflection); it appears that depressed positive emotions at least partly cancel the direct influence of failure on critical reflection; and the influences of failure and personal triggers on reflection differ from the influences on critical reflection.

While the impacts on emotions are seen as inextricably intertwined with the relationships between triggers and FoR (Damasio 1999, cited in Mälkki 2010; Peltier et al. 2005), it can be argued that the roles of facilitators, in particular dialogue with relevant social actors, are part of the transformative process. This is underscored as one of Taylors' core elements to transformation namely: "engaging in dialogue with others" (Taylor 2009, p.7; Taylor and Laros 2014) and what Johansson and Felten (2014, p.15) call "shared dialogue". In Table 5.2c below, the influences of sharing with fellow students, friends and family have been added not only to the representations in Figures 5.2b, but also three further cases where direct effects or both direct and indirect effects were evident.

5.2.2 MODERATING ROLE OF STUDENTS, FRIENDS AND FAMILY

As mentioned in Chapter 3, Section 4.7 and Section 5.2, in this research the moderating role of social actors concerns interactions that facilitate transformation with students, friends and family. Parker and Wilding (2012) reinforced the need to understand and further explore the contribution of social actors as facilitators of transformation, and other studies highlight the relevance of dialogue with a range of social actors (Kegan 1982; Aleman 1997; King 2000; Baumgartner 2002; Cranton 2006; Peltier et al. 2006; Merriam and Brockett 2007; Taylor 2009; Kasworm and Bowles 2012; Parker and Wilding 2012; Johansson and Felten 2014; Brock 2015a, 2015b). Initial evidence was provided in Section 4.7 on the role of social actors during the process of transformation. This extends previous studies such as King's (2000) study of adults learning English as a second language. This study concluded that learners undergoing transformation are influenced by family and friends. In a different context, Brock and Abel (2012) found items relating to "support from other students (76%) and classmates (59%)" had the highest averages amongst respondents reporting TL.

These responses though, were non-significant (p = 0.419 and 0.474 respectively) and the conclusion was that "peer support was not important" (Brock and Abel 2012, p.12). In contrast, using the TISS significant evidence emerged of learners "engaging in dialogue with others" at SHI (Taylor 2009, p.7; Brookfield 2012; Stuckey et al. 2013; Taylor and Laros 2014), further supporting the notion of "shared dialogue" (Johansson and Felten 2014, p 15).

Recall from Section 5.2.1 that moderation effects were tested on models with direct and mediational paths between triggers, emotions and FoR. It can be seen in the summary of Table 4.6a, there are three cases of direct effects that arise independently of mediated pathways of which two are onto critical reflection. Although there is no mediation via emotions, moderators may still influence direct effects between triggers and FoR. Furthermore, omitting these from moderation analysis would mean the *personal* factor was underrepresented with regards to FoR linkages.

In the model representing personal, negative and critical reflection (model 12 in Table 4.6a) *path b* between negative emotions and critical reflection was omitted from mediational analysis (see Section 5.2.1). Significance for this path was attained at better than 10% using DWLS estimation, although the estimate was significantly different to zero at greater than 10% under bootstrapping. However, the path is included in the table below on the grounds that both DWLS and bootstrapping arrive at similar estimates (excluding standard errors which are usually larger for bootstrapping) (see Appendix 9 in the volume of supporting materials). In this case, interaction terms may therefore result in the estimation of a moderating effect where, at best, weak evidence of a mediated linkage exists.

Interactions are presented for each social actor in Table 5.2c in similar diagrammatical format as in Table 4.6a for meditational pathways, where the three left columns in Table 5.2c again represent the central variables (*g1* to *g3)* of Figure 5.2a and the fourth column re-produces diagrams taken from Figures 4.6*b* to *f* for cases where direct and indirect effects of triggers were detected.

Furthermore, to aid interpretation of the diagrams the following features are added:

- The final four columns provide a summary of the moderating effects of dialogue with social actors and in general include summaries of influences on each of the pathways *a*, *b* and *c* between central variables.

  However, because of the absence of either a direct path or one arm of an indirect path, only two of the path coefficients are shown in a number of cases. The decision to include or exclude a path coefficient is based on the Wald statistics for slope (S) and intercept (I) coefficients being nonzero at the 0.05 significance level or better.

- Hence the three columns on the right of the table show the presence or absence of moderating effects associated with interactions with students, friends and family.

- A green S, I or both indicate the presence of a moderating effect in which speaking to a social actor relative to not doing so led to an increased emotional state or increased usage of a FoR; red coloured letters indicate that *not* engaging in dialogue with a social actor led to an increase. The symbol ✗ indicates absence of such effects. That is, Wald tests for differences in a pair of intercepts or slopes were not significant at 0.05 or better. That is, dialogue with a social actor or absence of it makes no difference as indicated by the difference in both intercepts and slopes being statistically no different to zero.

- No cases were noted in Chapter 4 where slopes and intercepts were such that the line for dialogue with a social actor intersected the line for not reporting dialogue. However, slopes of lines describing the moderating effects are downward sloping in some cases and upward sloping in others. The presence of a negative sign on a red or green letter in Table 5.2c indicates that a line slopes downward. If absent the line slopes upward.

- Boxes with the same coloured outlines are shown moderating effects that occur on the same path within the column for each of the social actors students and family. For example, there are three occurrences of red boxes indicating that the impact of emotions on FoR (*path b*) is moderated by discussion with family. Similarly, in three cases the direct effect of a trigger on a FoR (*path c*) is moderated by dialogue with family.

	Trigger	Emotion	Thinking		Path	Social Actors		
						Students	Friends	Family
1	Failure	Positive	Understanding		a	I'	X	IS
					b	S	X	X
2			Reflection		a	I'	X	IS
					b	IS	X	X
3			Critical reflection		a	I'	X	IS
					b	I	X	S
					c	S	X	I
5		Negative	Reflection		a	I	X	X
					b	I'	X	I'
8	Personal	Positive	Reflection		b	S	X	X
					c	I'	X	X
9			Critical reflection		b	X	X	S
					c	X	X	I
11		Negative	Reflection		a	I	X	X
					b	X	X	X
12			Critical reflection		a	I	X	X
					b	X	X	S
					c	I	X	I

Table 5.2c Moderating role of students, friends and family on estimated relationships between central variables

From the above summary table, the following over-arching conclusions can be drawn on dialogue with students:

- Dialogue with students is more effective at facilitating positive emotions blue boxes, *path a* in Models 1, 2, 3), although the positive emotional effects decline as a triggering failure is experienced more intensely. Not engaging in dialogue with students heightens negative emotions and these emotions intensify as failures and personal triggers are rated more highly (blue boxes, *path a in* Model 5, 11 and 12).

- Dialogue with students increases the usage of understanding, reflection and critical reflection as ratings of positive emotions increase (purple boxes, *path b* in the first three models)

- In the case of Model 5, talking to students has a greater impact on reflection for those reporting that this was not definitely done, although as negative emotions increase, dialogue with students diminishes the usage of reflection (purple box, *path b*). Thus, negative emotions have an inverse effect on reflection compared with positive emotions.

- Dialogue with students facilitates critical reflection after failures and personal triggers in the absence of impacts on both negative and positive emotions (green boxes, *path c* in Model 3, 8 and 12). That is dialogue with students about failures and personal triggers significantly increases critical reflection. Critical reflection is posited by Cranton (2006) and Peltier et al. (2005) as an output or goal of TL theory and as providing initial indication of transformation.

- Unlike critical reflection, where the direct impact of personal triggers on reflection is concerned, talking to students promotes this FoR, although as a personal trigger is rated more important, dialogue diminishes the use of reflection (green box, *path c*, Model 8).

Dialogue with friends overall has no significant effect on any interactions between the central variables of transformation as represented by *g4* in figure 5.2a. This may result from misunderstandings by friends of the impact of both personal and failure triggers on study plans, progression, gaining lucrative or resume-enhancing internships, and career development in the remote and intensive learning environment of SHI. This interpretation rests on assuming "friends" are external to SHI such as friendly relationships centred in respondents' home regions. However, friends might include relationships of this type built among peers attending SHI. There is some evidence that this might have occurred, as 51.1%

of those definitely agreeing or agreeing somewhat that they had spoken with friends, also definitely agreed or agreed somewhat that they had spoken to fellow students.

That is, it is possible students thought of friends as people external to and internal to SHI. This would suggest that some signals of difference in speaking to or not speaking to friends would have emerged in the analysis of interactions with social actors. This was not found as noted above. Alternatively, it might be the case that there are cancelling effects of friends outside SHI and those inside the institution. Overall, the failure to distinguish in the TISS between "friends" and "fellow students" may have masked influences – potentially negative in consulting friends external to SHI. In future applications of the TISS, this issue should be addressed. Nevertheless, on the other hand, average responses on TISS statements concerning friends and students do differ substantially in Table 5.2c, suggesting important effects associated with speaking with fellow students.

Conclusions concerning dialogue with family are that:
- Dialogue with family when failing promotes positive emotions (yellow boxes; *path a* in Model 1, 2 and 3).
- Dialogue with family when a personal trigger occurs has no effect on either positive or negative emotions (the absence of a row for *path a* in Model 9 and the cross appearing for *path a* in Model 12), but as for Model 3 (involving a failure trigger) there are influences of family on *paths b* and *c*.
- In Models 3 and 9, *path c* is different for those reporting dialogue compared with those who did not, in that the latter group report greater usage of critical reflection. Of interest the triggers in the two models are different, with the latter being a personal trigger. That is, not talking to family about personal triggers, which substantially occur within in the family is conducive to critical reflection. However, this cannot be taken as a general rule because the *path c* in Model 12 and the red boxes denote a positive direct impact of the personal trigger on critical reflection.
- A difference in Model 12 compared with Models 3 and 9 is that the former concerns negative emotions and the latter positive affective state. Thus, when feeling negative and experiencing a personal trigger family promote critical reflection (red box, *paths b* and *c* in Model 12). When failure is the trigger and emotions are positive, the affective impact of talking to family tends to reduce critical reflection (Model 3, *path b*). While in the other model with red boxes (that is, Model 9), there is no link from the personal trigger to affective state, the impact of positive emotions is the same as found in Model 3.

- Overall, the impact of dialogue with family on critical reflection is complicated – sometimes facilitating this FoR, sometimes inhibiting it via family influences on affective state. However, it would seem that at SHI, talking to family when feeling negative promotes critical reflection, but not when feeling positive.
- Finally, when feeling negative (Model 5), dialogue with family is slightly more effective at promoting reflection, although as negative emotions intensify a reduction in reflection is evident.

Taking the three classes of social actor together, dialogue with students clearly promotes increased use of FoRs. Indeed this is clearer than in the case of friends where no effects were discerned (although the possibility of conflating influence from types of friends – as above – must be acknowledged). It is also clearer compared with family where the impact of interactions is linked to the form of trigger and affective state. It would appear that social actors on campus – in particular fellow students – in the remote and intensive SHI environment play a more consistent role in the transformational process.

As mentioned in Section 2.2, the findings of Lave and Wenger (1991) that Communities of Practice are sites for situated learning. Situated learning occurs unintentionally rather than formally, where learners are engaged in activities within a context and culture that supports learning (Lave and Wenger 1991). Situated learning further requires the learning to be "situated" within contexts and cultures allowing members of groups freely to exchange knowledge through informal processes. According to them, people "learn better in social settings and through social interaction" (Lave and Wenger 1991, cited in Gannon-Leary and Fontainha 2007, p.3). In the SHI context evidence has emerged that this is the case when interactions occur between students.

Furthermore, the findings support the view that peer groups (fellow students) are more dominant and have greater influences on learning than that of parents (or family). In Table 5.2c, a total of 14 significant interactions are presented on linkages between central variables for students, compared to the 10 for family. When learners at SHI seek the perspectives of fellow students concerning triggers, emotions and FoR's, they may reconsider their own meaning perspectives. Thus as in another study concerning children (Barbour et al. 2008), "The peer group serves as a barometer for examining...feelings about self and family".

Initial evidence is therefore found through the TISS for the moderating role of social actors in the process of transformation. Given this earlier evidence, the finding in this TISS-based research that "friends" do not have significant effects does not appear anomalous, even given the suggestion above of conflation by some respondents of friends and fellow students.

However, when considering the role of family Parker and Wilding (2012, p.11) suggest the contribution of parents and family and a wide range of other individuals might facilitate learning and thus the process of transformation. For them, uncertainty existed as to the role of these actors on the interlinkages between triggers, emotions and reflection. Until now, the role of family has been un-estimated. With the TISS, initial evidence was uncovered of the influence of Habermasian communicative learning, although family is crucial to learning and self-development (Aleman 1997; Baumgartner 2002; Cranton and Carusetta 2004). Yet, the evidence from the TISS is that family can be negative as well as positive catalysts moderating the process of transformation.

As seen in previous sections (Section 5.1.3), there may be further explanations for these findings based on underlying cultural variations through which individuals interpret experiences and make meaning of experiences differently (Festinger 1957; Tisdell and Tolliver 2003; Mistry and Wu 2010). Recall from Section 5.1.3 that culture had the greatest effect on non-invariance between FoR's. Further research including a broader range of social actors such as educators or advisors, such as in Brock and Abel (2012), may extend our understanding. Consequently, there is encouragement in the current research at SHI to pursue similar approaches via surveys in other studies of factors that moderate transformation.

5.3 FEEDBACK BETWEEN EMOTIONS AND REFLECTION

Little is known of the interconnection between emotions and FoR in the process of transformation and: "By recognising the interrelationship of cognition and emotion, we can give greater attention to what is most necessary: ways to facilitate the transformative experience." (Taylor 2012, p.566). Given four decades of TL history, only relatively recently did Mezirow concede that the emotions are inextricably linked to transformative learning and that both his rational approach and the extra-rational approach espoused by Dirkx could co-exist (Dirkx et al. 2006; Section 2.5.2). In response to the emergence of other approaches to transformation, Mezirow acknowledged that emotions played a role in the transformation of an experience (Mezirow et al. 2009).

Damasio (1999, cited in Mälkki 2010, p.51) confirms the role of emotions in transformation as producing "a given reaction in a triggering situation". Further Mälkki (2010, p.49), argued for "more understanding concerning the challenges of reflection … through utilizing other research [about] the interconnections between cognition and emotion". Similarly Hochschild (2003) and Theodosius (2008) argue that a level of cognition is required to manage emotions and emotions affect levels of cognition. It is therefore plausible that reciprocal relationships or feedback is involved between emotions and FoR. Reciprocal pathways of these types are shown on the right of Figures 1.2, 3.6 and 5.2a

With data from the TISS, significant reciprocal relationships were reported in Section 4.8 between emotions and FoR, as argued by Hochschild and Theodosius. That is, evidence was found to reject the null hypothesis H_{2d}: Forms of reflection and emotions are not reciprocally related.

However, testing positive and negative emotions in relation to all three FoR's using autoregressive cross-lagged models yielded only one feedback effect that was significant at 5% or better. This was between positive emotions and reflection, as indicated in Figure 4.8a. It provides for feedback between the reflection factor and positive emotions. That is factors related to "questioning the way others did something", "thinking over what was being done and considering alternatives", "reflecting on actions to see whether improvements were possible" and "re-appraising experiences to learn from them and improve for the future" were reciprocally related to a factor capturing "enjoyment", "hope" and "pride" during a semester of learning at SHI.

Therefore the first evidence is provided in this thesis that promoting enjoyment, hope and pride among learners during a semester of study promotes reflection and conversely, reflection promotes these positive emotions simultaneously. Also there was weaker evidence of the negative reciprocal relationship between reflection and negative emotions, as demonstrated in figure 4.8b. In this case, the cross-lagged relationships between reflection and negative emotions were only "weak", implying that reflection improves affective state (Gelman 2013). This model therefore predicts that increases in reflection reduce negative emotions, which in turn lead to further increases in reflection. Agreement is thus found with Scherer (1994, cited in Ekman and Davidson 1994) that positive emotions are more effective at promoting reflection and negative emotions curtail usage of FoR's.

Even though limited evidence has been found in the SHI context for reciprocal relations, it implies a re-estimation of meditational pathways allowing for that feedback to be included. The reason is that finding reciprocal relations suggests the possibility of biased estimates for the coefficients between emotions and reflection in particular (Gujarati 2003)

Contributions from the models in Section 4.8 indicate that in practice, fostering reflection is reliant on positive affective states and that reflection has positive effects on emotional state. Therefore and in agreement with the quote from Mälkki (2010) and Taylor (2012) above, the relationships discovered in the TISS between affection and cognition may deliver initial insights into the process of fostering transformation among H&T learners in the context of the SHI. Yet encouragement in this context is to pursue similar approaches via surveys in other cross-sectional studies of reciprocal relations between emotions and FoR during transformation.

5.4 SUMMARY

In this chapter, findings on hypotheses were discussed in relation to current TL literature and the research context at SHI. In Section 5.1, an evaluation was undertaken of hypotheses H_{1a} and H_{1b} on the existence, reliability, validity and invariance of latent factors underpinning TISS responses across age, status, gender and culture. The implications of evidence on Hypotheses H_{2a}, H_{2b} and H_{2c} were considered in Section 5.2. These hypotheses concern mediated and moderated relationships. In the final Section 5.3, the relatively scant evidence of feedback between emotions and FoRs (hypothesis H_{2d}) was considered.

The discussion of hypotheses thus addressed the three objectives pursued in Section 1.2 and 3.1, namely:

4. To design, pilot and apply surveys to gather data on variables highlighted in TL theory, including the central variables, before and after embarking on a semester of learning.

5. To extract latent constructs and evaluate their reliability, validity and measurement invariance, in particular, invariance of the structures of latent constructs across groups based on age, status, gender and culture.

6. To construct structural equation models for central variables to examine the mediated, moderated and feedback relationships of Figure 1.2.

The objectives above were formulated on the basis of the overarching research questions posed in Section 1.2 and 3.6. First: Can a survey instrument be designed, with appropriate reliability and validity, to measure the central variables of triggers, emotions, forms of reflection and "facilitators" of change, such as dialogue with relevant people? The answers provided indicate that benchmarks on reliability, convergent validity and discriminant validity were met for all central variables.

The second research question is: Are differences apparent in survey responses on central variables for major demographic groupings, defined by age, status as new or returning students, gender and culture? In each of the sections on central variables (Sections 5.1.1 to 5.1.4), differences in reporting across groups were discussed. Findings indicated that there were only minor, explicable departures from invariance on central variables between age, status and gender. Most divergence from invariance occurred for culture and recommendations are made in Section 5.1 to further apply the TISS in culturally homogenous groups (see Byrne and Watkins 2003). Nonetheless, the overarching conclusion is that the TISS provides a useful means of gathering information on central variables that have desirable characteristics across groups based on age, status and gender. To the extent there are issues with culture and invariance, it nevertheless proved to be the case in the investigation of SHI data that well-fitting measurement and structural models were able to be estimated.

Finally, if quantitative evidence on central variables can be gathered with a survey, can that evidence be used to assess relationships debated in the transformational literature? This question is considered in Section 5.2 by setting findings in Chapter 4 in the context of TL debates. The answer to the final question is that resolution of debated relationships is possible using the TISS and in the SHI context clear quantitative signals were obtained.

In addressing the objectives and by answering the proposed research questions, the overall aim is met, which is to: appraise relationships between triggering incidents, emotions and forms of reflection, and how these are modified by interactions with students, friends and family. In the final chapter, future research including modifications of the TISS are considered, recommendations for management and delivery of programmes and recommendations for facilitation of transformation including dealing with disorienting dilemmas and emotional responses to them.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 RESEARCH CONCLUSIONS AND CONTRIBUTIONS

In response to concerns and unconfirmed conjectures in the TL literature, as discussed in Chapter 2 above, the aim in this research is to measure and estimate relationships between triggering incidents, emotions and forms of reflection, referred to as the "central variables" of transformation (refer to section 1.2 and 3.6). Supporting this aim, three overarching questions were posed at the outset. First, can a survey be designed, with appropriate reliability and validity, to measure the central variables taking into account the roles of social actors that might facilitate the process of transformation. The stimulus for this comes from the TL literature (Cranton 2002; Dirkx et al. 2006; Newman 2013). Second, are there differences in reporting on central variables for groups by age, status as a new or returning student, gender and culture. Finally, can the quantitative evidence gathered with a survey – be used to assess the functional connections between central variables, which theory suggests may involve mediated, moderated and feedback relationships (see Chapter 1.2 and Chapter 2).

Consequently, three overarching objectives were formulated to address the aim:

1. To design, pilot and apply surveys to gather data on variables highlighted in TL theory, including the central variables, before and after embarking on a semester of learning.

2. Extract latent constructs and evaluate their reliability, validity and measurement invariance, in particular, invariance of latent constructs across groups based on age, status, gender and culture.

3. Construct structural equation models for central variables to examine the mediated, moderated and reciprocal relationships shown in Figure 1.2.

The Transformative Incident Student Survey (TISS) was administered over two semesters in academic year 2011/12 and the first semester of 2012/13. The paper-based survey was distributed to learners on two occasions (Weeks 3 and 17) of study at SHI. In the design of the TISS, survey material from existing TL research was considered in addition to adopting survey items from other research areas and introducing new survey items. The data gathered with the TISS were screened, cleaned and missing values imputed. Thirty-three learners filled out the TISS in more than one semester and 10 did not participate in both of the administration periods. Overall, 372 valid surveys were returned in time 1 (Week 3) and 334 in time 2 (Week 17).

One further participant was eliminated from time 2 because responses were not provided to most survey items. Therefore, a total of 44 responses in two administration periods across three cohorts were omitted from this study, so that information was available for analysis from 333 respondents.

These 333 responses were analysed at time 2 of each semester, to address the first two objectives concerning the extraction, validity, reliability and measurement invariance of latent constructs. The same information was used to assess structural models involving the central TL variables, paying particular attention to how emotions first mediate the impact of triggers on forms of reflection and second how interactions with social actors (namely fellow students, friends and family) moderate the relationships between central variables. Third, to assess the feedback relationships in Objective 3, data for both Times 1 and 2 were employed. The TISS data for Time 1 further allow an assessment to be made of the central variables before commencing current studies.

Of the 333 respondents, 57.1% were female and 73.9% were aged from 18 to 22. The largest proportion was Asian (34.2%), followed by Eastern Europeans (18.6%), Mainland Chinese (18%) and Indians (13.5%). At the end of the second semester of administration, new entrants to SHI remained under-represented, therefore warranting a third administration of the TISS exclusively for new entrants. Yet, students returning to the SHI learning environment comprised 52% of the sample.

The research on Time 1 and 2 was successful. That is, it was possible to design, pilot and apply a survey to gather data on the core TL elements and locate latent constructs that are valid, reliable and demonstrate degrees of measurement invariance for age, gender and status, although measurement invariance with respect to culture is problematic. Having established these features of TISS data, the relationships of Objective 3 could reasonably be explored. In this part of the investigation, as discussed in the previous two chapters, evidence was found of mediated, moderated and feedback or reciprocal relationships. Thus, overall, evidence to support the aim and three objectives was found, although there were some departures as in the case of measurement invariance with respect to culture. In the following sections of the current chapter, these outcomes are reviewed first, second limitations of the research are considered, third steps that might be taken in subsequent research are suggested, and fourth recommendations are made to practitioners.

6.2 MEASUREMENT MODELS
6.2.1 FINDINGS ON CENTRAL VARIABLES
Triggering constructs

The TISS extends prior research not only in the range of triggers captured, but also in establishing composite reliability, and discriminant and convergent validity according to benchmarks recommended by Fornell and Larcker (1981) and Raykov and Grayson (2003). Some trigger items in the TISS were taken from previous studies by King (2000), the CSBV (2007), Jester and Hoggan (2009), while others were based on discussions with staff and observation of the SHI environment and the multinational population of students.

Using the 26 statements on triggers, two latent factors emerged. One concerned failure, which underpinned responses to six TISS statements; the other construct accounted for responses on four items associated with personal situations. None of the success items or those relating to the international environment were assigned to latent constructs. That is, underpinning constructs explaining these statements did not account for appreciable amounts of variation in responses to TISS statements. Success and moving to an unfamiliar environment are thought in the literature to play important roles (Mezirow 1990; Finger and Asun 2001; King and Wright 2003; Cranton 2006; Jester and Hoggan 2009; Pekrun et al. 2009; Aquino-Russell and Russell 2009; Mistry and Wu 2010; Parker and Wilding 2012).

The latent construct "Failure" influences failures in academic work, job-related issues (missing a job, pay rise and promotion) and those relating to duties and meetings. The "Personal" construct underpinned responses to TISS statements on parental issues (their separation, employment and finances) and the death of a close friend or family member. That is, during a semester the occurrence of one of the measured items given in parentheses above was associated with one of the latent construct. These factors have been proposed in the literature as influential (King 1998, 2000; King and Wright 2003; Jester and Hoggan 2009; Brock 2010). Overall, support for previous theorising has been found in the case of failure and personal circumstances, while successes and environmental factors were not supported. As discussed below, these findings were made using an instrument (the TISS) that has desirable reliability and validity (see Section 4.2 to 4.5).

Affective constructs

The TISS statements on emotional states were adapted from Pekruns' AEQ (Pekrun 2011). The one-factor model preferred by Pekrun, in which both negative and positive statements load onto the single factor, showed poor goodness-of-fit characteristics at SHI. It was found at SHI that two factors one encompassing negative emotions and one encompassing positive emotions – displayed satisfactory goodness of fit, composite reliability and discriminant validity. The two factors were appreciably, and negatively correlated. Additionally, the measured items pride and anger displayed negative error correlations to shame. One explanation of this is that roughly 30% of some unmeasured influence underpins at least some part of responses on the three measured items, as it seems reasonable that increases in pride or anger could be negatively related to feelings of shame. Alternatively, it may be that as pride and anger increase difficulties arise in accurately measuring shame. Finally, unaccounted errors in hopelessness and shame are positively correlated, indicating that feeling shame is related to hopelessness.

The factors failure and personal explain much of the variation in responses on the statements pride, anger, shame and hopelessness. However, it seems likely that the unexplained and correlated errors point towards educators being sensitive to the four emotions, and act to mitigate their correlated impacts. For example, reducing feelings of shame might diminish both hopelessness and anger. Overall, with the TISS, two affective states were identified at SHI, which as mentioned above is a departure from the work of Pekrun (2011).

Forms of reflection (FoRs)

As in Kember et al. (2000) and Peltier et al. (2005), students at SHI did not undertake learning activities without thinking. In other words, in an intense learning environment, students did not adopt "habitual action" as a form of cognitive processing; rather at SHI understanding, reflecting and critically reflecting on their lives occurred, where teaching, learning, living and socialising are concentrated in two campus buildings. According to Cranton (2006), critical reflection is an inherent part of transformation. This echoes Mezirow's original conceptions that critical reflection via reflective action fosters perspective transformation as individuals test the validity of underlying meaning perspectives (Finger and Asun 2001; Cranton 2006; Mezirow et al. 2009). SHI learners are thus testing the validity of assumptions so as to establish if values, beliefs and worldviews are still appropriate.

The finding of transformation at SHI occurred even though specific TL strategies and programmes were not integrated into the curricula. This suggests transformation happens naturally or spontaneously in the SHI environment. This finding receives support from Lave and Wenger (1991) who proposed that learning (which can lead to transformation) occurs unintentionally rather than formally. Based on the contributions of this research, introducing formalised elements of TL may prove beneficial for learners and educators in that forms of reflection could be managed on an individual basis. This would serve to foster transformation and if deemed appropriate, promote transformative education which relates to the institutional perspective and how programmes fostering transformational curricula are designed, provided and regulated, involving stronger organisational, political, ethical and cultural dimensions (Stevens-Long et al. 2012).

Additionally, both positive and negative emotions were found to play a vital role in the process of transformation in that these, to varying degrees, mediate the impact of the triggering constructs failure and personal on forms of reflection. In only a few cases were direct links found between combinations of triggers and FoRs, pointing to the importance of emotions during transformation. Thus, the research presented here sheds light on the "relationship between emotions and transformative learning" which Taylor and Cranton (2012, p.13) claimed "is not yet well understood, and we know little about ... how they foster or inhibit reflection". This is further highlighted by Yorks and Kasl (2006) who acknowledge the nature of transformation and the role of emotions within and beyond the classroom. Hence, parallels exist between the current research and existing TL literature.

6.2.2 LIMITATIONS OF THE RESEARCH ON CENTRAL VARIABLES

The range of possible triggers, even within a uniform and controlled learning environment may be larger than expected as numerous unknown factors outside the formal environment may contribute in some measure to the process of transformation and personal development. As such, further research is needed on a greater range of triggers beyond the 26 included in the TISS, including a possibly greater range of triggers related directly to experiences in the formal classroom.

Additionally, Mezirow's (1978, cited in Mezirow et al. 2009) triggers or life events may be epochal, happening at once, or developmental experiences occurring over a protracted period of time. The administration of the TISS captured triggers retrospectively, meaning respondents had to think back to the most important triggers.

Although data were valid and reliable, the ability to respond accurately to triggering incidents in the past may be obscured by their epochal or developmental nature or alternatively, an individuals' ability to use reflection as a cognitive skill that develops as the semester of study progresses. This again points toward a need for longitudinal data to enhance the accuracy to which instantaneous or developmental life events are captured.

Pekrun et al. (2011) suggested a broader variety of emotions beyond those proposed by the original AEQ should be included. The AEQ statements included in the TISS were extended in the form of a longer list of emotions requiring categorical yes/no responses. The extended list was based on a prior study in the SHI context by Coy (2012). The yes/no statements included a broader range of emotions but failed to provide sufficient variability in responses, thus proving inconclusive. Further applications of the instrument might consider this extended list of emotions and a possible redesign so as to allow respondents to report on a Likert scale.

Secondly reverse coded emotional statements (such as those relating to hopelessness) may have delivered more valid results as, according to Johansson and Felten (2014) respondents tend to avoid negatively worded statements. Furthermore, item wording could be amended to consider statements pertaining to emotions experienced beyond the classroom and related to those experienced during the many events and duties in the students' practical learning experiences.

Drawing samples large enough to allow separate extraction of factors, particularly for cultural groups, could generate a clearer understanding of differences between different groups of respondents, providing greater insight across groups into how the structure of latent constructs vary and how the mediated and direct effects of triggers on FoRs vary.

Overall, given the results summarised above, there is encouragement in this work to pursue similar approaches via surveys in other studies of transformation. Moreover, there is encouragement to study the relationships between triggers, emotions and FoRs that arise using the TISS or a somewhat modified version of it.

TISS data were collected over two time periods. The length of the TISS and administering it three times led to an information source that was of the order of a "big data" set. These are typically very large and "offer data and insights that could not be obtained in other ways" (Parks 2014, p. 355).

Also, the data collected went beyond the aims of this research, allowing for future exploration of variables and conjectures in the area of research, as discussed in Chapter 2. As a result, certain elements of the data set remain wholly or partially unexamined.

Areas where there has been only partial exploitation of gathered data are responses to TISS statements on triggers, emotions and FoRs in the period before the current semester began. This data might be exploited more fully to gain insights into changes in the central variables from the beginning of a semester up to the time of the second administration of the TISS, (which occurs during a semester of study). Additionally, there may be value in analysing reports on the central variables in each semester until a programme of study is completed, allowing insight hopefully into developmental change as discussed above. Alternatively, a version of the TISS might be administered on more than one occasion in a semester to capture epochal triggers. This version would need to be a much-reduced version of the instrument given in the appendices if student non-response and its impacts on gathering full information are to be avoided. Gathering data in additional periods would also permit an examination of the role of nonlinearity in relationships between central variables and the constructs representing them (Hancock and Lawrence 2006). Nonlinearity would emerge if triggers or planned TL interventions have different impacts on affective states and on the movement of students from one Mezerowian step to another.

Data that have not been examined at all involve responses to statements about "Kinds of Knowledge". Although beyond the objectives posed in this research, insights into the content, process and premise of reflection on Habermasian (1981) instrumental, communicative and emancipatory knowledge (see Section 2.1.1) would deliver valuable contributions into how each FoR construct is used. Although the research presented here delivers findings on the usage of each FoR, further analysis of TISS elements would elucidate how knowledge is accumulated and used during transformation.

6.2.3 FURTHER RESEARCH ON CENTRAL VARIABLES

Some of the limitations of the current investigation were suggestive of areas for further research as discussed in the preceding section. One obvious limitation was the emphasis, in accordance with the calls from TL scholars, on a quantitative approach. However, qualitative approaches might assist in gaining greater insight into the findings. One area for such an approach is to gain an understanding of why 16 trigger items did not survive the principal components analysis reported in Section 4.2.2. For example, interviewing respondents about the multi-cultural environment might clarify why this was not important across all students; and possibly lead to findings about particular clusters of students for whom it does not matter, while in other clusters, environment does matter.

Pekrun et al. (2011) argued for a broader variety of emotions beyond those proposed by the original AEQ. Although the TISS showed higher reliability than Pekrun's original one factor model, it seems plausible that respondents interpret statements such as shame and anxiety in an ambiguous manner. With regards to the impact of positive emotions and the contribution these have to fostering TL, a broader range of positive emotions could be incorporated so that there are equal numbers of TISS statements on positive and on negative emotions. A reason for taking such a step is that current TL thinking is that positive emotions are more likely to enhance reflective thinking (Johansson and Felten 2014). Furthermore, the interplay between positive and negative emotions are not just opposite formulations of each other, such as hope and hopelessness (Pekrun 2006). Further explorations of the meanings attached to the emotion statements via qualitative methodologies may enhance future reliability of instruments within the field.

Additionally, examination of potentially nonlinear relationships between emotions may warrant further examination. If indeed emotions are considered dynamic and variable, as argued by Averill (1980, cited in Ekman and Davidson 1994), then longitudinal research could shed light on emotional responses as learning circumstances within and outside the classroom vary.

Research in the field of emotional intelligence (Low 2000; Lord et al. 2002; Emmerling and Goleman 2003; Nelson et al. 2005) points towards help from others to manage emotions and, as seen in previous chapters, social actors contribute to the process of transformation and TL to varying degrees. Studies by Woods (2016) showed that over time, peer networks effectively convert negative emotions to positive ones.

Thus, further research may consider the role of peers in transforming negative emotions to positive ones using longitudinal data either within a given semester or over numerous semesters of study.

The latent FoR factors are correlated, consistent with the idea that they represent manifestations of thinking approaches that lie on a continuum (Kember et al. 2000; Peltier et al. 2006), spanning understanding to critical reflection in the case of SHI.

From a learner's perspective, reflection and critical reflection dimensions for example, may be used to varied extents within different learning contexts. An area for further research would be to determine if FoR's are used in different intensities and combinations within a classroom setting. A related area would be to compare the FoRs used in classrooms with those applied in practical, vocational learning, which also occurs at SHI, as it does widely in hospitality education. This may shed further light on concerns by Peltier et al. (2006) that the habitual action dimension failed to gain support in their research, which was also the case at SHI.

Another area of further research would be to consider changes in usage of FoR's over time. In the current research, changes were observed in usage of reflection in two periods (See Section 4.8 where an auto-regressive cross-lagged model was applied.). This provides an impetus to explore in greater detail the nature of FoR usage. This endeavour would require longitudinal data, as was the case in other extensions of the research. In relation to reflection, this data would allow examination of how the abilities to reflect evolve over time (Mezirow 1998; Finger and Asun 2001; Cranton 2006). Such longitudinal data might be gathered within numerous semesters of study, permitting examination of FoR usage when students are in classroom settings and when they are away from SHI on practice-based internships working for hospitality providers.

6.2.4 CONTRIBUTIONS TO OVERALL OBJECTIVES AND AIM

In the current investigation, an alternative methodology is provided that is consistent with calls from Cranton (2000, cited in Newman 2012), Dirkx et al. (2006), Newman (2012), Taylor (2000, 2007), Behnke et al. (2014) and Stone and Duffy (2015). Thus as stated in Objective 2, it is possible to extract latent constructs and evaluate their reliability, validity. Further, as stated in the aim, the current research has established that it is possible to measure quantitatively the central variables of TL theory, namely triggering incidents, emotions and forms of reflection.

6.2.5 RECOMMENDATIONS FOR PRACTICE

Educators could increase awareness and understanding of the range of potential triggers within and outside the classroom environment, to gain a holistic understanding of the learning and how these may influence their endeavours to promote transformation or transformative learning in an educational setting. One possibility is that the full range of failures and personal experiences be used to provide educators with a holistic orientation to learners' contexts. This means recognising learners' diverse ways of transforming information to knowledge and incorporates the role of affective domains and alternate ways of knowing, which include "affective, intuitive and spiritual ways" of knowing (Vaughn 2016, p.341). For Yorks and Kasl (2006, p.46) this means educators should view learners in their "fullness of being: as an affective, intuitive, thinking, physical, spiritual self".

Furthermore, from the findings in this research, it remains clear that successful experiences in a learner's context are important but triggers associated with failures displayed most variation in how respondents rated them. Possibly this attests to the short-term effects of these experiences and their measurable effects on emotions and forms of reflection. Additionally, experiences beyond the classroom, such as personal issues were important as triggers for respondents. Both failure and personal considerations have direct and indirect effects (via emotional well-being) on the ability of an individual to reflect at different levels, from simple understanding to critical reflection. The dynamic impacts of failures, personal and parental triggers is difficult for classroom teachers to capture and know about within the educational setting. This suggests sensitively acquiring awareness of a range of occurrences that may affect learners' lives. This reinforces the view of Cranton (2006) and Taylor (2012) that TL educators be aware of learner context, develop a holistic orientation within the classroom, and strive to build authentic relationships with and among learners.

Dirkx et al. (2006, p.126) were of the view that "there exists an inner world with emotional and imaginative dimensions throughout the learning experience that seek to foster intellectual and cognitive growth". Furthermore, Schutz and Pekrun (2007) see value in knowing how to integrate findings from emotion studies into classroom practice, not only to benefit learners' development of cognitive skills and performance, but also to feedback to institutions the importance of emotional processes and how to accommodate them and allow them to facilitate learning.

As noted in Chapter 5, educators should strive to create learning environments that mitigate against the influence of negative emotions in favour of positive ones, hopefully fostering conscious reassessment of assumptions throughout the process of transformation and deeper learning (Entwistle et al. 2002; Speth et al. 2003). That is, practitioners should attempt to foster positive learning contexts within and outside the classroom in a continuous, supportive manner rather than providing these solely when disorienting dilemmas are reported.

As students are burdened with academic assignments and vocational and practical skills-based learning (such as restaurant skills and events training) over a short period of time at SHI, positive reinforcement in their learning may offer a greater platform for transformation. Thus, positive feedback to written assessments, presentations and seminars, and to practical duties during the semester at SHI could offer students opportunities to reflect and critically reflect. Overall, "By recognising the interrelationship of cognition and emotion, we can give greater attention to what is most necessary: ways to facilitate the transformative experience" (Taylor 2012, p.566) .

Evidence provided in this investigation indicates an occurrence of involuntary transformation among individuals. It occurs in an unplanned manner while engaged with academic study and extracurricular activities at SHI. Planned reflective activity over a semester of study at SHI is sparse and isolated. Further, if reflection is required, it remains formalized as an assessment in particular modules and is graded using objective measures as one line of a grading matrix. Reflection or critical reflection is not promoted as a cognitive skill that would benefit from constant development. Mezirow (1998) thought critical reflection is essential in employment and Peltier et al. (2005) reinforce the need to promote reflective thinking as a skill that is necessary to gain valuable insights at work, and may ultimately contribute to effective decision-making. Given the potential developmental benefits for individuals and the potential gains for business, there appears to be a compelling case for education in hospitality and tourism embracing TL (Kember et al. 2008; Dirkx 2011).

Recommendations for institutions and educators thus include formalizing TL programs across subjects and levels of study with tools in place to measure changes in reflective activity and provide support on an individual basis. In its current form, the TISS and elements used in it from the Critical Reflection Questionnaire (Kember et al. 2000), require respondents to consider their thinking processes and may have a role in promoting reflection.

6.3 INVARIANCE AMONG CENTRAL VARIABLES

6.3.1 CONTRIBUTIONS OF THE RESEARCH ON INVARIANCE OF CENTRAL VARIABLES

As discussed earlier, theorists have proposed roles for demographic variables in transformation. Mezirow (1990), Cranton (2006), Aquino-Russell and Russell (2009), Jester and Hoggan (2009) and Mistry and Wu (2010) suggest immersion in other cultures may substantially affect cognition; Mezirow (1998), Merriam (2004) and Cranton (2006) see cognitive ability and hence reflection as reliant on age; Peltier et al. (2006) and Brock (2010) perceived differences by gender on importance of triggers, emotions and forms of reflection; King (2000) found individuals' characteristics are related to the choice of persons with whom to enter into dialogue.

With regards to age, no differences were found between triggers, responses to positive and negative emotions and the sharing of these with facilitators to transformation, such as family, friends and parents. The TISS therefore provides evidence at SHI that central variables to transformation are experienced similarly, independent of age. However, it should be remembered that age was measured dichotomously as under 21 and 21 and over. Should the same result be found in larger samples, where variation in age might be measured using more categories, this could indicate that the intensity of the learning environment at SHI leads people however old to feel the importance of triggers, the attendant emotions and seek support in similar ways.

Exceptionally, FoRs were found to differ by age, consistent with Mezirow (1998), Merriam (2004) and Cranton (2006), who state that reflection and critical reflection are cognitive abilities that develop with age, and are more commonly found in adult education. No differences were found on the understanding factor and the 21-and-over group reported more clearly (in the sense of less measurement error) on reflection and critical reflection constructs. Therefore, while agreement was found with TL authors of age dependency, yet it was found that higher FoRs occur in those 21 and over, whereas the authors quoted above thought the individuals needed to be 30 or older to adopt reflection and critical reflection. If so, this suggests that the emphasis in the TL literature that higher forms of thinking in response to triggers are associated with being older than 30 might in appropriate learning environments be untrue. This possibility is reinforced when it is recalled that 47.8% of the SHI sample are younger than 21 and only 8% of the population are 25 and above and that critical reflection showed the highest composite reliability between all FoR constructs (see Section 4.4.2).

There were only slight differences in measurement invariance with respect to status, being new to SHI or a returning student. In particular, new and returning students only report differences; in the trigger statements about parental finances and internships. It seems that students returning from internships in Switzerland are more independent. Their higher earnings compared to other countries, may lower the dependency on family for income. New students would had not done internships and thus respond differently to the role of parents as a trigger.

With regards to gender, there was no difference in reporting on sharing issues with family, friends and parents. Additionally, only slight differences between understanding were evident. That is females and males, respond similarly to reflection and critical reflection, but the latter group is more accustomed to applying their understanding in learning situations. This is not to say that one or the other group is more adept at reflection or critical reflection, rather it may suggest males show a preference for using knowledge during activities at the expense of appraising that knowledge.

Differences in reporting on triggers by gender was evident. Males seemed to be more concerned with financial earnings and failures in achieving higher pay, possibly either during their internships, or in the future. Conversely, females were more concerned with socially relevant items such as planning a school meeting or social gathering and although not generalizable, in this context they displayed less sensitivity to pay than males.

The largest deviation between females and males was on emotions, where males indicated more error in reporting on negative emotions. This is a departure from the finding of King (1997; 2000), Pekrun et al. (2009) and Brock (2010, 2012) that no significant differences of emotions exist by gender. King and Brock were using the LAS instrument that previously had been criticised as unreliable and invalid (see Section 3.2) and they were not engaged in assessments of measurement invariance using latent constructs.

Differences in responses to central variables were greatest for culture. Belonging to a Confucian or "Other" culture affects the process of transformation, be it the experience of personal or failure triggers, responses to positive and negative emotions, the impact of these on FoR's, or sharing with family, friends and parents to facilitate adjustment. As mentioned in the previous chapter, this may be a consequence of how cultural groups were defined and how each group interprets and responds to items in the TISS.

Nonetheless, the TISS provides insight into the frequent deficiency in earlier endeavours of ignoring the role of respondents' home cultures (Taylor and Snyder 2012). As demonstrated in previous chapters, much has been written theoretically on experience of different cultures being a trigger for transformation (Barron and Arcodia 2002; Tisdell and Tolliver 2003; Brown 2006; Cranton 2006; Peltier et al. 2006; Campbell and Uys 2007, cited in Gannon-Eary and Fontainha 2007; Aquino-Russell and Russell 2009; Jester and Hoggan 2009; Mistry and Wu 2010; Al Otabi 2012; Brock 2015*a*). Yet, findings from the TISS extend this notion in providing evidence not only of culture as a trigger, but that transformation as a process is interpreted differently across cultural groups in each of the TL steps, including how culture influences movements from one Mezirownian step to another.

6.3.2 LIMITATIONS OF THE RESEARCH ON INVARIANCE OF CENTRAL VARIABLES

The aim in the current research was to explore incidents experienced by learners that trigger reflective processes during a semester of study. Plausibly, variables such as type and length of practical internship, prior work experience (other than internships) and elements related to familial upbringing, may influence the interpretation of TISS statements. Evaluation of central variables against these variables may provide greater understanding of responses to the TISS. For example, this may elucidate the contributions triggers experienced prior to joining SHI have on how individuals responded during a semester of study that was the focus of the current investigation.

Reporting TISS items by cultural group produced more differences compared with disaggregation of TISS responses by other demographic groups. By using the groupings of Gupta et al. (2002), the "Confucian" group consisted of seven nationalities whereas the "Other" group included 27 nationalities. Although a comprehensive study, further research using cultural clustering other than that proposed by Gupta et al (2002) could deliver additional or alternative insights on the role of culture.

6.3.3 FURTHER RESEARCH ON INVARIANCE OF CENTRAL VARIABLES

There is a general pointer to further research on the influence of group membership. As mentioned in previous sections, is the notion of further examination of demographic groups based on age and culture. Gender and status are dichotomous variables, whereas age could be realised as a continuous variable and culture modelled via more nominal groups than was the case above.

In the current research, age groups were defined as either "under 21" years of age or "21 and over", whereas only two cultural groups were used – "Confucian" and a non-Confucian "other" group. Millsap (2011) indicated that that one method used to analyse measurement invariance (MGCFA) allows for greater rigour in the analysis of measurement and structural invariance, with the prerequisite that each group consists of a minimum of 100 cases and that each group is of similar size. These constraints suggest further research could allow for subdivision into more groups for each demographic variable, but a larger sample overall is required and within each group a large number of respondents is required.

This was not possible in the current investigation as, for example, ages were tightly clustered around the mean of 24, with only 8% of respondents being 25 or above. Creating a continuous age variable or at least introducing more age bands may provide further support for the conclusions above, but might reveal different findings, which are perhaps consistent with the view in TL theory that reflective ability develops with age (Merriam 2004). Applying the TISS in larger populations where wider ranges of ages are represented should resolve these uncertainties.

In the case of detecting cultural variations, applying the method of analysis used in the current research, but for larger cultural sub-samples would be one means of investigating cultural influences more fully. In this way departures from invariance could be handled by constructing dichotomous variables for each cultural group and include them as explanators in later structural equation modelling. Alternatively, homogenous cultural groups could be analysed separately as recommended by Byrne and Watkins (2003). Using either approach is an extension of the current research on cultural influences.

Another area for attention in the TISS would be the possibility of re-wording statements to be more culturally suitable and unambiguous worded. For example, items related to sharing with friends, family and parents as facilitators for TL may be interpreted differently by different cultures. It is plausible that for some respondents, but not all, there are only fine delineations between what qualifies as a friend or parent and how this differs from the broader term "family". Additionally, as proposed by Peltier et al. (2005), interactions between students and instructors could be explored. These were omitted from the current research. Also, as noted above, Peltier et al. (2005) recommend the inclusion of a wider range of demographic variables, such as level of study (graduate versus undergraduate students) and prior work experience.

Finally, it seems that trialling TISS-like instruments in other populations, including populations of students in public institutions on non-accelerated programmes could provide interesting comparisons with the findings of this research at SHI, a private provider.

6.3.4 CONTRIBUTIONS TO OVERALL OBJECTIVES AND AIM

These conclusions and recommendations regarding invariance of the structures of latent constructs across groups based on age, status, gender and culture aid in attaining Objective 2. In terms of finding sufficient invariance to investigate structural models in Objective 3, there is sufficient indication in the invariance studies that this is possible, although it may be such structural models would need to include indicators for culture in particular.

6.3.5 RECOMMENDATIONS FOR PRACTICE

Merriam (2004) states that the ability to contextualise transformation is dependent on age, whereas it is proposed here that status as new or returning student may influence student perceptions of what triggers are and what they are not. Furthermore, Brock (2010) perceived differences by gender; and Mezirow (1990), Cranton (2006), Nguyen et al. (2006), Aquino-Russell and Russell (2009), Jester and Hoggan (2009), Mistry and Wu (2010) and Taylor and Snyder (2012) suggest cultural influences exist when contextualising experiences.

It has been recommended that as classrooms become more culturally diverse, instructional designers and teachers should consider the presence of cultural sensitivity and seek tension-reducing strategies (Tervalon and Murray-Garcia 1998, Aquino-Russell and Russell 2009). This is especially pertinent to classroom activities that promote group work as at SHI, where in any given group a range of cultures, ages and genders may be present.

Overall, with the TISS insights have been gained on the range of central variables and that differences in realisation of them emerged in the intensive environment of SHI for groups of respondents based on age, status, gender and culture, with the greatest variations being due to culture. These findings provide support for the notion that learners should be considered in their "fullness of being" (Yorks and Kasl 2006, p.46). This implies that educators should understand that demographic variables influence the process of transformation, which in turn implies educators appreciate how these variables may influence endeavours to promote transformation.

In Sections 6.2 and 6.3, findings on Objectives 1 and 2 were assessed; next attention is turned to contributions, shortcomings and further research on Objective 3.

6.4 MEDIATION AMONG CENTRAL VARIABLES

6.4.1 CONTRIBUTIONS OF THE RESEARCH ON MEDIATION INVOLVING CENTRAL VARIABLES

As discussed in Chapter 5, the mediating effects of affective states reflect the view of Scherer (1994, cited in Ekman and Davidson 1994) and Fredrickson (1998) that negative emotions suppress reflective behaviour and that FoRs are fostered by positive emotions. The TL literature says little about direct and indirect or mediated effects of triggers on FoRs. In fact, some authors argue that TL theory does not emphasise sufficiently the impact of emotions (Dirkx et al. 2006; Taylor 2007; Kitchenham 2008; Mälkki 2010). In particular, Mälkki (2010, p.49), argued for "more understanding concerning the challenges of reflection" through research on "the interconnections between cognition and emotion". The results presented in Chapter 4 do suggest that emotions can have an important impact on FoRs. Particularly, situations where found in which emotions mediate the effects of a trigger on FoRs, although there are situations where the impact of triggers on FoRs is independent of affective state.

A final contribution puts into question the nature of Mezirow's emotionally charged disorienting dilemmas that catalyse transformation and TL (Mezirow 1978, cited in Mezirow et al. 2009). According to Johansson and Felten (2014), negative emotions propel transformative change. Findings in this research indicate that negative emotions may not be exclusive to transformation as quoted by Scherer and Fredrickson above; that negative emotions do not promote reflective behaviour and that FoRs are strongly influenced by positive emotions.

6.4.2 LIMITATIONS OF THE RESEARCH ON MEDIATION BETWEEN CENTRAL VARIABLES

The mediation models presented in Chapter 4 indicated medium effect sizes according to Kenny's (2016) criteria. The mediated linkages between triggers and FoR's were investigated using the approach of Preacher and Hayes (2007), although multiple mediators were not considered simultaneously. This is a limitation as both positive and negative emotions may well intervene simultaneously between triggers and FoRs. Neither were there considerations of how these mediators may interact with each other in the mediated model as these "typically will be intercorrelated" (Preacher and Hayes 2007, p.28). Taking these steps may deliver further or alternative insights into the roles of positive and negative emotions as mediating variables between triggers and FoR's. This is one area for further research.

6.4.3 FURTHER RESEARCH ON MEDIATION BETWEEN CENTRAL VARIABLES

Further research may endeavour to test the mediating role of both positive and negative emotions using multiple mediation. In this manner, the interrelationships between these emotions would shed light onto how FoRs are affected by triggers via both types of emotions simultaneously. As mentioned in Chapter 5, positive and negative emotions should not be viewed as opposite ends of a spectrum, rather they are complementary (as seen in the higher correlations between the negative and positive affective constructs).

Additionally, further research should consider longitudinal data to examine non-linearity of emotional mediators as is supported by Averill (1980, cited in Ekman and Davidson 1994) who argued for the dynamic state of emotions. This would add insights into how reporting on positive and negative emotions evolve over a semester of intensive study.

6.4.4 CONTRIBUTIONS TO OVERALL OBJECTIVES AND AIM

The hypothesis regarding the mediating role of emotions was addressed in Objective 3. More broadly, with this objective the intention was to assess relationships theorised between central variables – triggers, emotions and forms of reflection (FoR) – in the transformative learning literature.

6.4.5 RECOMMENDATIONS FOR PRACTICE

Lord and Kanfer (2000) propose that to increase the welfare of individuals in an organisation, positive emotions should be promoted and negative ones inhibited. The findings indicate disadvantageous effects of negative emotions on FoRs; compared with the role of positive emotions in promoting understanding, reflection and critical reflection. The general purpose of TL is to elucidate dependencies between emotions and cognition as a function of self-development and individual transformation. The findings in the current investigation are that emotions fuel a process that leads to transformation of our "intellectual ... and ... emotional dimensions" (Dirkx et al. 2006, p. 125). Entwistle et al. (2002) emphasised the importance of positive learning environments in which students have "freedom in learning" so as to promote deep learning. Similarly, Scherer (1994, cited in Ekman and Davidson 1994) and Fredrickson (1998) argue that negative emotions do not promote reflective behaviour and that FoRs are strongly influenced by positive emotions. For the first time, these propositions were confirmed, albeit in the case of a private, degree awarding institution, which operates an intensive learning environment.

The role of institutions and educators is thus explicitly recognised by educational theorists in terms of their contribution to creating supportive and positive learning environments and fostering positive emotions among learners. In terms of the findings in the current research, the mitigation of triggers such as failures in academic work, duties, planning events or failures related to seeking job opportunities, promotion or pay rises should be on the agenda of educators. Where TL is not part of H&T education, triggering dilemmas may go unnoticed, leading to transformation in the absence of teacher support or losing the opportunity to foster transformation in thinking. As Woods (2016) found, learners that share failures and negative experiences find the attendant negative emotions over time turning to positive ones. Therefore, for example, educators providing formative feedback to learners on assessments could purposefully include positive elements, so as to entice positive emotions. Further, it seems that including trusted others in discussions facilitate this process, which is taken up next.

6.5 MODERATION AMONG CENTRAL VARIABLES
6.5.1 CONTRIBUTIONS OF THE RESEARCH ON MODERATION BETWEEN CENTRAL VARIABLES

In this research, the impacts of interactions with fellow students, friends and family on the linkages between the central variables were considered. Taylor (2009) and Mezirow (cited in Taylor 2012) proposed that transformation and critical reflection are dependent on a process of socialisation and entering into discussions with social actors that is dialogue influences the relationship between an experience and the ability to critically reflect on it.

The findings indicate that entering into dialogue with family and fellow students have differing effects on emotions and FoRs. For example, sharing failures with family increased negative emotions, which detract from the usage of FoRs. However, with personal issues, sharing with family was found to increase positive emotional states and therefore critical reflection. On the other hand, sharing both failures and personal triggers with students promotes critical reflection, the ultimate goal of transformation and TL (Peltier et al. 2005 and Cranton 2006).

It was also found that dialogue with friends overall has no significant effect on any the relationships between the central variables. This may result from misunderstandings by friends of the impact of both personal and failure triggers on study plans, progression, gaining lucrative or resume-enhancing internships, and career development in the remote and intensive learning environment of SHI.

However, this interpretation rests on assuming "friends" are external to SHI such as friendly relationships centred in respondents' home regions.

Clear evidence is thus provided in this research for individuals advancing through the transformational-learning model (Figure 1.2 and 3.6) and undergoing transformation, but also for the differing contributions that dialogue with different social actors have on this process.

6.5.2 LIMITATIONS OF THE RESEARCH ON MODERATION BETWEEN CENTRAL VARIABLES

The research presented here, did not include a broader range of social actors such as teachers, educators or advisors, as proposed in Brock and Abel (2012). This may have furthered understanding of the impact of dialogue on interactions between the central variables. However, as outlined in Section 2.6.2, teachers and members of the faculty where purposefully, at the time of instrument design, omitted from contributions as social actors or facilitators. This is in part not only due to the vocational nature of education at SHI as underscored by Warrell and Kawalilak (2011, p.730), who believe the relationship between student and teacher should "place greater emphasis on academic and career-related guidance". Additionally, it may have been unethical to implicate faculty members in the findings related to dialogue experienced by individuals. Even though Cranton and Carusetta (2004) argue for open communication between students and teachers, at the research site this is guided by organisational codes of conduct that limit opportunities for building authentic relationships.

In the previous sub-section, the assumptions that "friends" consist of people external to SHI such as individuals from the respondents' home regions. It is however conceivable respondents interpreted "friends" to mean relationships of this type built up among SHI students. Given the differences in findings on the moderating roles of friends and fellow students, it is probable that SHI respondents draw distinctions between "fellow students" and other students at SHI they consider to be friends.

Nevertheless, a deeper investigation is required that makes clearer what the impacts of dialogue are with friends external to SHI, friends made at SHI, and fellow students who are not considered friends.

In the analysis of responses to section TI B of the TISS, triggers related to problem solving were omitted from the PCA. This is contrary to a proposal from Peltier et al. (2005), Closs and Antonello (2011), and Mezirow (1990). Given the methodological approach of first identifying triggers via PCA, confirming them in CFA and then using them in SEMs, it was not possible to examine the notion that reflection and critical reflection enable "us to correct distortions in our beliefs and errors in our problem-solving" (Mezirow 1990, p.98). Furthermore, PCA led to the omission of five other statements relating to the spirituality of an event, the meaningfulness or depth of discussions with social actors and responses to the fourth step in Mezirows (1978, see Table 2.1a) ten step process, "Realising others have gone through what they are feeling" or as formulated in the TISS, "I am not alone in my thinking and feelings" (Appendix 1, Section TI B).

Finally, testing for moderating effects was only based on examining linkages between central variables that had statistical significance at better than 5%, which limits the findings in terms of testing for moderating effects of social actors, where a regression link was not present. If the absence of some mediations arose in the cross-sectional analysis because the initial linkages and the moderating influences of social actors were somehow conflated, it may be that another form of analysis involving longitudinal data would reveal other combinations of triggers, emotions and FoRs where moderators play a contributory role.

6.5.3 FURTHER RESEARCH ON MODERATION BETWEEN CENTRAL VARIABLES

Authentic relationships between staff and students are an area for further investigation. As mentioned above, in the intense learning environment at SHI, staff avoid inappropriate relations with students. As noted in the previous sub-section, relationships between staff and students were not investigated. In the future as advised by Brock and Abel (2012), this may further understanding of how interactions between staff and students affect relationships between the central variables. This would help in assessments of Taylor's (2007) critique of research (up to 2005) that equalising power in teaching relationships would foster learner autonomy and the development of trusting relationships.

As mentioned above, in the current research a clear distinction was not drawn between "friends" and "fellow students". In future applications of the TISS, this issue should be addressed. Similarly, different sorts of family structures may have differing effects on relationships between central variables, allowing future researchers to explore the influence of familial structures on the scholastic environment.

Additionally the depth and meaningfulness of dialogue and interactions with social actors should be explored in greater detail, where the learner is allowed to feel comfortable, safe, and feels able to take up the many opportunities offered to communicate with others (King and Heuer 2009, cited in Mezirow et al. 2009; Taylor 2009, cited in Mezirow et al. 2009). These steps could profitably be pursued via qualitative enquiries that complement responses to the TISS.

In the PCA, problem solving did not matter and the identified triggers made no contribution to reporting on increased problem-solving ability. As proposed by Mezirow (1990), Peltier et al. (2005) and Closs and Antonello (2011), further research may illuminate the process of transformation uncovered with the TISS and the contributions of central variables to problem solving. Peltier et al. (2005) is concerned that students entering the business world lack the skills of reflective thinking that may ultimately contribute to effective decision-making.

Studies by Woods (2016) showed that over time, peer networks and dialogue with social actors effectively convert negative emotions to positive ones. Thus, further research may consider the role of peers in transforming negative emotions to positive ones using longitudinal approaches.

Moreover, in the current research, investigating three types of social actors led to testing $18 \times 3 = 54$ moderators of which there was a need to identify intercept and slope type effects. This resulted in 54×2(intercept, slope)$\times 2$(dialogue and non-dialogue) resulting in 216 interactions. As such this imposed a large analytical burden, which might be replicated in other environments. In addition, it would be informative to include those social actors not included in the study such as teachers, operational and vocational staff and academic-programme leaders.

Finally, as mentioned in the previous sub-section, estimation of the effect of moderators where a link between central variables was not statistically significant, might further contribute to understanding of social actors in the transformation process.

6.5.4 CONTRIBUTIONS TO OVERALL OBJECTIVES AND AIM

The possibility of moderating, or facilitating, roles of social actors was addressed in Objective 3. The contribution of this objective to the overall aim, which was to assess the relationships between the central areas of triggers, emotions and forms of reflection (FoR), against the current transformative learning literature was thus attained.

6.5.5 RECOMMENDATIONS FOR PRACTICE

Overall, the net effect is that sharing triggering experiences, emotions and FoRs with fellow students during a semester of study, and to an extent with family, promotes individual transformation. This happens independently of a purposeful agenda to promote transformative learning and transformative education within the SHI environment and curricula. This being said, if TL is deemed to be an appropriate outcome for learners within HE, the role that fellow students particularly play in guiding this process is undeniable at SHI and it suggests investigations of moderating roles might be undertaken in other forms of HE.

In this sense, Taylor and Laros (2014) appeal for staff and educators to become more aware of the context in which individuals learn, to ensure systems are in place that allow for the development of authentic relationships between faculty and staff, and to promote a holistic orientation that appreciates learners in the entirety of their lives. Dirkx's et al. (2006) perspective is that transformation centres on the inner world of the individual, with transformation being a constant process, occurring daily albeit unconsciously, in an attempt to understand individual's state of being in the world (Dirkx et al. 2006). Whether the influence of staff and educators can be as or more effective than that of fellow students and family is an open question.

At SHI where lectures are assigned students as personal academic tutors (PAT), the opportunities for guidance as transformation proceeds is an extension of normal PAT roles or activities, and may be a valuable point of interaction in terms of authentic relationships, contextual awareness and holistic orientations towards students. Furthermore, as yet the usage of PAT's is underutilised by both students and teachers and as such, it is a formalised process installed for the benefit of both parties. Using the formal PAT function, may overcome the concerns by lecturers, who currently avoid building trusting relations with students, opening up opportunities for discussions of the triggers, emotions and FoRs experienced by students during their studies.

Furthermore, the appointment of a welfare officer would benefit discussions related to transformation beyond the formalised role of PAT's and would allow for informal, yet confidential and trusting dialogue with students.

Finally, a "study buddy" system is in place at degree level, which brings students together in pairs over the semester of study, might be extended to sub-degree level. In this system students are teamed as co-learners for both formal academic responsibilities such as studying together, planning assignments and delivering presentations. Additionally, the system provides the opportunity for individuals to share experiences, information, and knowledge informally, beyond concerns related to academic study. Allowing students to team up may further promote or facilitate transformation via the moderating influence of fellow students established in this investigation.

6.6 FEEDBACK RELATIONSHIPS BETWEEN EMOTIONS AND REFLECTION
6.6.1 CONTRIBUTIONS OF THE RESEARCH ON FEEDBACK BETWEEN EMOTIONS AND REFLECTION

Consistent with Objective 3, the TISS was designed to deliver evidence of reciprocal relations between emotions and reflection, in line with the call by Mälkki (2010, p.49) to understand "the interconnections between cognition and emotion". Until now little was known of the potential connections between emotions and FoRs in the process of transformation. For (Taylor 2012, p.566) "by recognising the interrelationship of cognition and emotion, we can give greater attention to what is most necessary: ways to facilitate the transformative experience." In the current investigation, compared with Mezirow's rational approach (See Section 2.5.1), support was found for Dirkx's extra-rational approach to transformation that "there exists an inner world with emotional and imaginative dimensions throughout the learning experience that seeks to foster intellectual and cognitive growth" (Dirkx et al. 2006, p.128).

The contribution in this current research is that feedback and simultaneous relationships arise involving emotions and cognition. That is, there is evidence that positive emotions promote reflection and conversely, reflection affects emotional states. The feedback from FoRs to emotional state is a demonstration of Dirkx et al.'s view that there is an inner world involving emotions that fosters intellectual and cognitive growth. In particular, promoting enjoyment, hope and pride among learners was found to promote reflection and conversely, learners reflect on these emotions.

In addition to this, students experiencing anger, anxiety, shame, hopelessness and boredom, were found to reflect less, which fed back to increases the experience of these negative emotions. Overall, the research provides support for the view of Scherer (1994, cited in Ekman and Davidson 1994) that positive emotions are more effective at promoting reflection and negative emotions limit intellectual activity involving the higher order forms of reflection.

Furthermore, the usage of critical reflection is favoured in the absence of emotions. In the mediated models, three out of four cases involved direct links from triggers to the FoR, and no feedback between emotions and usage of this FoR. This may be either because critical reflection is practiced by the fairly young population (averaged 24 years old) and they are not adept at it yet, or the population has not learnt yet how to balance critical reflection in the presence of emotions. The latter possibility may arise because respondents who reported critical reflection do so from the position of isolating their study approaches from their emotions. Critical reflection nonetheless is present, confirming the value of the transformational model and showing evidence of transformation and TL.

Similarly, for the understanding FoR there is no feedback to emotions. However, only in the case of the FAILURE/PERSONAL construct was the usage of understanding enhanced by positive emotions.

Thus, there is a suggestion in one of four mediated cases relating to critical reflection (failure via positive emotions) that emotions are managed and influenced as critical reflection is employed. Further research, applying the TISS to older student populations could permit confirmation of this conclusion.

6.6.2 LIMITATIONS OF THE RESEARCH ON FEEDBACK

Only one FoR effect was measured, that being between positive and negative emotions and reflection. No support was found for feedback relationships between emotions and other FoR's. Furthermore, testing positive and negative emotions in relation to all three FoR's using autoregressive cross-lagged models yielded only one feedback effect that was significant at 5% or better. This was between positive emotions and reflection, as indicated in Figure 4.8a. Wong and Law (1999) proposed the choice of instrumental variables should base on sound theoretical basis and on empirical conclusions.

In this research, further testing with an alternate range of instrumental variables could indicate significant reciprocal linkages between emotions and other FoR's. Furthermore, estimation using time-lagged models (instead of cross-lagged models; Wong and Law 1999), where the instrumental variables across time periods regress onto the variables of interest, may similarly indicate feedback between emotions and FoR's beyond those found in this research.

6.6.3 FURTHER RESEARCH ON FEEDBACK

As mentioned in section 2.5.2 and 4.8, little is known about time lags and reciprocal relations between emotions and FoRs. Further research may consider the concept of latency or response time of emotions (Scherer 1994, cited in Ekman and Davidson 1994) and thus attempt to use longitudinal data to extend the number of cross-lags in the model investigated here, or through the usage of longitudinal time-lagged models (Regressing instrumental variables onto longitudinally reciprocated time points omitting correlated errors between endogenous variables; Wong and Law 1999) establish how the relations between emotions and FoRs unfold over time.

Due to the fact that triggers in Time 0 (the period before the semester in which students responded to the TISS) were used as instrumental variables to test for reciprocal relationships, further considerations to variable selection may influence the significance values of cross-lagged linkages. Wong and Law (1999, p.72) advise selection of instrumental variables based on "sound theories". The choice of instrumental variables in the current investigation was based on empirical conclusions that may be different in other data sets; nevertheless, this suggests that reciprocal relations between FoRs and affective states should be investigated empirically in different institutional settings.

Finally, further research may consider applying the TISS to older student populations in similar contexts to determine if an emotional component is simultaneously used with critical reflection. As mentioned, the absence of reciprocity between emotions and critical reflection may be a function of age as suggested by Merriam (2004), even though feedback was found in the case of reflection.

6.6.4 CONTRIBUTIONS TO OVERALL OBJECTIVES AND AIM

The investigation of feedback relationships between emotions and FoRs addresses a concern formalised in Objective 3. In total, all three forms of relationships proposed in Objective 3 have been established in the current research, thus providing support for the relations between central variables and their moderation consistent with theoretical proposals in the transformative learning literature.

6.6.5 RECOMMENDATIONS FOR PRACTICE

This research contributes to the development of TL theory in an educational context and illuminates for the first time, events that catalyse the transformational process and the reciprocity with which central variables unfold. The finding of reciprocity confirms a theoretical consideration of TL researchers as in the quotes from Mälkki and Taylor above, and provide a basis for further theoretical developments involving feedback. Indication is provided for the need to manage emotions as learners move from reflection to critical reflection, so as to promote the usage of the latter FoR. Forming learning environments, which are supportive and emotionally comforting, may promote the natural development of transformation as proposed by Kegan (1982). This serves not only learners, but also academic institutions when considering instructional design, learning outcomes, support services, guidance and assessment strategies. More so, it may invigorate curriculum designers to introduce content that meaningfully takes into account triggers internal and external to the classroom, and affective responses so as to foster deeper forms of learning.

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TRANSFORMATION AND STUDY CHANGE AMONG HOSPITALITY AND TOURISM STUDENTS

SUPPORTING MATERIALS

Martin Jost

A thesis submitted in partial fulfilment of

the requirements for the degree of

Doctor of Philosophy

QUEEN MARGARET UNIVERSITY

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APPENDIX 1: QUESTIONNAIRE (ADMINISTRATION 1)

Family name: _____

Name: _____

Group/Course: _____

Age: _____

Gender: _____

Nationality: _____

What is your first language? _____

Fathers' occupation (if retired or deceased,
give what they worked as before)

_____

TI A: The following indicate a number of triggering incidents (TIs) that you personally may have experienced *BEFORE* the start of this semester. Triggering incidents are any important moments, experiences or "vivid happenings" in your life.

Please think back and indicate the importance of each using the scale below (Circle <u>one</u>).

5—definitely agree

4—agree somewhat

3—only to be used if a definite answer is not possible

2—somewhat disagree

1—definitely disagree

A major change in my social role or status............................ 5 4 3 2 1

An important success in my academic work............................ 5 4 3 2 1

An important failure in my academic work............................ 5 4 3 2 1

A success related to my duties............................ 5 4 3 2 1

A failure related to my duties............................ 5 4 3 2 1

A success related to a job opportunity............................ 5 4 3 2 1

A failure related to a job opportunity............................ 5 4 3 2 1

A success related to a promotion............................ 5 4 3 2 1

A failure related to a promotion............................ 5 4 3 2 1

A success related to a pay rise............................ 5 4 3 2 1

A failure related to a pay rise............................ 5 4 3 2 1

A success related to planning a school meeting
or social gathering............................ 5 4 3 2 1

A failure related to planning a school meeting
or social gathering............................ 5 4 3 2 1

A success related to taking part in an event............................ 5 4 3 2 1

A failure related to taking part in an event............................ 5 4 3 2 1

A traumatic or catastrophic personal happening............................ 5 4 3 2 1

The influence on me of different cultures............................ 5 4 3 2 1

A change through living in an international
environment............................ 5 4 3 2 1

A romantic relationship............................ 5 4 3 2 1

A personal injury or serious illness............................ 5 4 3 2 1

A parental divorce or separation............................ 5 4 3 2 1

A death of a close friend or member of family............................ 5 4 3 2 1

A conversion to another religion............................ 5 4 3 2 1

A change in personal financial status............................ 5 4 3 2 1

A change in employment of one (or both) of my
parents............................ 5 4 3 2 1

A change in financial status of one (or both)
of my parents............................ 5 4 3 2 1

TI B: When thinking about the most important *triggering incident* above, please rate how you feel about the following statements using the same scale above.

I realized that I had to think about things differently............................ 5 4 3 2 1

The triggering incident was
spiritual............................ 5 4 3 2 1

I have thought about this triggering incident more than
once since it happened............................ 5 4 3 2 1

I have spoken to my friends about this triggering incident............................ 5 4 3 2 1

I have spoken to my family about this triggering incident............................ 5 4 3 2 1

I have spoken to my fellow students about this triggering
incident............................ 5 4 3 2 1

The discussions I had with friends, family
and/or fellow students were meaningful............................ 5 4 3 2 1

I am not alone in my thinking and my feelings............................ 5 4 3 2 1

I am more aware of the importance of being able
to solve problems............................ 5 4 3 2 1

Going through this important triggering incident
has given me the skills to solve problems............................ 5 4 3 2 1

**TI C: When thinking about the most relevant *triggering incident* above
I felt the following.** (Circle <u>all</u> that apply)

Fun	Happiness	Fulfilment
Neutral	Positive	Frustration
Satisfaction	Worried	Upset
Sad	Unfair	Enjoyment
Hope	Pride	Anger
Anxiety	Shame	Hopelessness
Boredom	Disappointment	

TI D: When thinking about the *triggering incident* in A,B and C above, rate yourself on how it *affected your PREVIOUS STUDIES*.

(Use the same scale as in TI A above).

As a result of the triggering incident I changed the way
I look at myself as a student………………………....………… 5 4 3 2 1

The triggering incident has affected me as a student and
has challenged some of my firmly held ideas about my learning……....5 4 3 2 1

As a result of the triggering incident I have changed
my normal ways of approaching my studies...……………….....…… 5 4 3 2 1

The triggering incident has led me to discover faults in my
learning that I had previously believed to be right.........………….....…5 4 3 2 1

SE A: Now to change direction, think about your *PREVIOUS STUDIES* (PS). Please rate yourself on the following statements, using the responses:.

5—definitely agree
4—agree somewhat
3—only to be used if a definite answer is not possible
2—somewhat disagree
1—definitely disagree

I enjoy acquiring new knowledge……………………….................…… 5 4 3 2 1

I have an optimistic view toward studying…………………................ 5 4 3 2 1

I'm proud of my capacity………………………………............… 5 4 3 2 1

Studying makes me irritated……………………………….........…… 5 4 3 2 1

I get tense and nervous while studying………………………............ 5 4 3 2 1

I feel ashamed that I can't absorb the simplest
of details……………………………………………….......… 5 4 3 2 1

I feel hopeless when I think about studying…………………........……. 5 4 3 2 1

The material bores me ……………………………….................…… 5 4 3 2 1

SE B: When thinking about my *PREVIOUS STUDIES* I felt the following.
(Circle all that apply)

Fun	Happiness	Fulfilment
Neutral	Positive	Frustration
Satisfaction	Worried	Upset
Sad	Unfair	Enjoyment
Hope	Pride	Anger
Anxiety	Shame	Hopelessness
Boredom	Disappointment	

SR: Please indicate your level of agreement with statements about your actions and thinking in *PREVIOUS STUDIES*.

5—definitely agree
4—agree somewhat
3—only to be used if a definite answer is not possible
2—somewhat disagree
1—definitely disagree

Understanding

My previous studies required me to understand concepts
taught by the lecturer or teacher. …………………………….......5 4 3 2 1

To pass previous courses I needed to understand the content……….... 5 4 3 2 1

I needed to understand the material taught by the lecturer or teacher
in order to perform practical task………………………….........…… 5 4 3 2 1

In previous courses I had to continually think about
the material being taught………………………………….........… 5 4 3 2 1

Reflection

I sometimes questioned the way others did something and
tried to think of a better way……………………………........…… 5 4 3 2 1

I liked to think over what I was doing and consider
alternative ways of doing it……………………………….........…… 5 4 3 2 1

I often reflected on my actions to see whether I
could have improved on what I did………………………........…… 5 4 3 2 1

I often re-appraised my experience so I could learn from
it and improve for my next assessment...…………......……………… 5 4 3 2 1

Critical Reflection

As a result of my last course I have changed the
way I look at myself…………………………………...….......…… 5 4 3 2 1

My last course has challenged some of my firmly held ideas…………. 5 4 3 2 1

As a result of my last course I have changed
my normal way of doing things………………………………..........… 5 4 3 2 1

During the last course I discovered faults in what
I had previously believed to be right........………………….... ……...5 4 3 2 1

Habitual Action

When I am working on some activities , I can do them
without thinking about what I am doing………………………........… 5 4 3 2 1

When learning the class did things so many times that I
started doing them without thinking about it………………….........… 5 4 3 2 1

As long as I can remember handout material for
examinations, I do not have to think too much…..……………….......… 5 4 3 2 1

If I follow what the lecturer says, I do not have to
think too much in my studies…………………………………......…… 5 4 3 2 1

AT: Please indicate your level of agreement with statements about your actions and thinking (AT) in _PREVIOUS STUDIES_.

5—definitely agree
4—agree somewhat
3—only to be used if a definite answer is not possible
2—somewhat disagree
1—definitely disagree

AT A: _In my last course how did I deal with the question:_ What were the facts?

I preferred learning the important facts in my last course……….............. 5 4 3 2 1

I still remember a lot of the facts in my last course………….............. 5 4 3 2 1

I preferred learning about theories in my last course………....…............ 5 4 3 2 1

The information in case studies was always interesting…….....…............ 5 4 3 2 1

I preferred taking notes in class………………....……................. 5 4 3 2 1

I preferred to underline the important facts in my textbook……...…......... 5 4 3 2 1

I preferred to concentrate on just one part of my
assessments in my last course……………....……………………….....… 5 4 3 2 1

I preferred writing exams where I could reproduce
the facts that I knew…………….........…..........…………….……....… 5 4 3 2 1

I preferred assignments where I wrote about the facts……….…....…........ 5 4 3 2 1

AT B: _In my last course, how did I deal with the question:_ How do I know the facts were true?

I questioned if the facts were true……….....……………......…………… 5 4 3 2 1

I questioned my teacher to find out if the facts were true………...…....…..5 4 3 2 1

I asked my parents and friends about the facts……...…............……….. 5 4 3 2 1

I read other sources of information to find out if
the facts were true. ……….......…………………………… 5 4 3 2 1

I asked how it could be shown that the facts were true……...….…......…..5 4 3 2 1

I knew the facts were true based on my experience
in the past……….…….......…………………………………. 5 4 3 2 1

I asked why it is important for the facts to be true………......….......…... 5 4 3 2 1

I questioned whether facts that appear in books or on the internet,
were still true when I was learning them as they were when
they were written down

……….........……………………………………………........ 5 4 3 2 1

AT C: _Thinking back to my last course, how did I answer the question_: Why were the facts important to me?

I learned best by remembering facts……….…….......…………………… 5 4 3 2 1

I built on facts to create a clearer of
understanding of the concepts……….......…………………… 5 4 3 2 1

I tried to please my parents with good academic performance………........5 4 3 2 1

I needed the facts for an examination or to use in an essay....................... 5 4 3 2 1

I was interested in the facts……….……………………………. 5 4 3 2 1

I got better marks by knowing the facts……….…………………. 5 4 3 2 1

I needed to know the facts for my future job………..………………. 5 4 3 2 1

I needed to know the facts to communicate better
with fellow students or workers……….…………………… 5 4 3 2 1

Knowing the facts helped me do as well as I can……….…....………. 5 4 3 2 1

Knowing the facts helped me solve problems better……….....………. 5 4 3 2 1

AT D: _Thinking back to my last course, how did I answer the question_: What did others say about the course and/or the facts?

I preferred discussing things when I was
studying with others………..….....……………………………………… 5 4 3 2 1

I cared about what others said about my
study success……….………...……………………………………… 5 4 3 2 1

I changed what I thought, based on the opinions of others…...…....……...…5 4 3 2 1

It was important to me what my parents said about
my studies……….…………………………………………… 5 4 3 2 1

My parents influenced me a lot in my studies……….………………. 5 4 3 2 1

My friends were important to me in my studies……….……....…............. 5 4 3 2 1

I believed others to know more than me……..…………………………. 5 4 3 2 1

I preferred working in groups when studying……….....…………………. 5 4 3 2 1

I preferred doing presentations than doing a final exam……….…………. 5 4 3 2 1

I preferred doing presentations than writing an assignment...................... 5 4 3 2 1

AT E: _In my last course_: How did I integrate other points of view?

I listened to what teachers told me……….....…………...…................. 5 4 3 2 1

I listened to what other students told me……….….......…….…............ 5 4 3 2 1

I listened to what my parents told me……….....…….…………………. 5 4 3 2 1

I believe working in groups is the best way to learn……….…....…......... 5 4 3 2 1

I solved problems better when I am working in a group……….…….......... 5 4 3 2 1

I talked to a few people about course content……….....…...………….... 5 4 3 2 1

I read up on what others say about issues……….....…………………..... 5 4 3 2 1

Group pressure made me perform better in my studies……….......…........ 5 4 3 2 1

I questioned what others said, before I formed my own opinion……….......5 4 3 2 1

I tried to find out where the information came from
when someone told me something……….…………………… 5 4 3 2 1

AT F: _Thinking back to my last course, how did I deal with the question:_ Why should I believe in this conclusion?

I assumed my parents had more knowledge than me……….......…............ 5 4 3 2 1

I assumed other students had more knowledge than me……..…....……..... 5 4 3 2 1

I assumed my teachers knew better than me……….....…..……………. 5 4 3 2 1

I assumed or trusted that my teachers have a lot of knowledge…….......... 5 4 3 2 1

I assumed I did not need to question knowledge of people I trust…........... 5 4 3 2 1

I assumed I should accept the knowledge of the majority in a group…….... 5 4 3 2 1

I assumed I could believe persons who were older than me more…........... 5 4 3 2 1

I assumed I could believe students at a higher level of study more than
those at a lower level of study……….……………………… 5 4 3 2 1

I assumed the more experience a person has,
the more they should be listened too. …..………………… 5 4 3 2 1

I assumed what visitors from industry said at school was
truer that what we were taught……….…...…………………… 5 4 3 2 1

AT G: *In my last course*: What were my assumptions (about successfully completing the course)? **State if you agree or disagree with the following statements.**

I assumed my friends would help me through the studies……….........................yes / no

I assumed my family/parents would help me through my studies……................yes / no

I assumed I always had the ability to do my best……………….....................…...yes / no

I was realistic about what I can achieve……………..........…………….........…...yes / no

I assumed that the better I became at time management, the more my
learning would improve………...…….......yes / no

I planned my studies……...…….yes / no

I took time from studies for other activities………………..............................yes / no

I assumed the biggest problem with my studies was me……………........…...yes / no

I assumed that I would earn a lot of money after graduation……….…..…......yes / no

I assumed that in my future job, the more I get paid,
the better I would perform……..…….yes / no

I assumed that the more work experience I gained, the better
a manager I would become………...…...…...yes / no

I assumed the experiences I gained during my previous studies
cannot be used anywhere else……...…...yes / no

I assumed applying experience to a new environment takes time……...........yes / no

I assumed new experience results in new behaviour………...…..........….......yes / no

I assumed that when I was demotivated I was less productive…….……..........yes / no
The more work experience I got, the more I realised how
creativity at work is <u>not</u> needed……………................……........……..yes / no

Just because I was studying did <u>not</u> mean
I will be able to do my job better…..…..yes / no

I came to understand that my problem solving approach was different
to other people I know………...……...……...yes / no

I assumed that through speaking with other people
I gained an understanding of things………...…..............................…......yes / no

I assumed culture affects how students view their studies………...….............yes / no

I assumed that when fellow students are lazy,
it is pointless to try and help them …………...................…...................…...yes / no

In the future, as long as I have a job,
I will always be learning………...…...yes / no

I assumed the more high marks I obtained, the more motivated
I would be. …….……...……….......yes / no

I assumed the more praise I received, the more motivated
I would be……….………..……….........yes / no

If I talk positively with others, I gain their respect………...…..................….yes / no

I assumed I am good at my studies because I am positive…...........................yes / no

I assumed I would learn less in larger classes with
many more students………...…..…........yes / no

AT H: *Based on the above answers,* how do I know my assumptions are valid?

My teachers talked in class about the assumptions above………..................yes / no

I know things are true because I have experienced them………....................yes / no

My parents hold similar views to me……….....................................……...yes / no

My circle of friends shared similar beliefs……...…...............................…...yes / no

My fellow students had the same opinions……….............................……...yes / no

I read about my assumptions in books and literature………..........................yes / no

I reflected a lot about myself and knew myself well……...…...................…...yes / no

AT I: *Based on the above answers*: Should I change: my assumptions, the way I think and they way I do things?

I believed the way that I thought about things was mostly correct…….................yes / no

If I don't change myself, I might fail my studies………....................……...yes / no

If I don't change myself, I might not obtain a
job in the future……..……...yes / no

When I thought about the assumptions above, I realised that I
must think differently about certain things in my life……….......................yes / no

Already I thought about things differently to others so
I did not need to change……….......................................…….......yes / no

My culture, background or other characteristics guide me……….................yes / no

I would become a success in the future regardless of whether
I changed or not………...…….......yes / no

SEN: Now to change direction *yet* again, think about *HOW YOU STUDY NOW* (SN). Please rate yourself on the following statements, using the responses:.

5—definitely agree
4—agree somewhat
3—only to be used if a definite answer is not possible
2—somewhat disagree
1—definitely disagree

I enjoy acquiring new knowledge…………………...........……......... 5 4 3 2 1

I have an optimistic view toward studying………………...…………. 5 4 3 2 1

I'm proud of my capacity…………………………...........………. 5 4 3 2 1

Studying makes me irritated………………...........……………. 5 4 3 2 1

I get tense and nervous while studying……………........……………. 5 4 3 2 1

I feel ashamed that I can't absorb the simplest
of details……………….......................……. 5 4 3 2 1

I feel hopeless when I think about studying…………………….......…. 5 4 3 2 1

The material bores me …………………………………….....................5 4 3 2 1

T: Rate yourself on each of the following traits (Ts) as compared with the average person your age. We want the most accurate estimate of how you see yourself. (Mark one for each item)

5---Highest 10%
4---Above Average
3---Average
2---Below Average
1---Lowest 10%

Academic ability……………………………….....…. 5 4 3 2 1
Cooperativeness……………………………………. 5 4 3 2 1
Creativity………………………………………. 5 4 3 2 1
Drive to achieve……………………………...…....…. 5 4 3 2 1
Kindness……………………………………. 5 4 3 2 1
Leadership ability……………………………. 5 4 3 2 1
Mathematical ability……………………………. 5 4 3 2 1
Physical health……………………...............……. 5 4 3 2 1
Public speaking ability……………………….....…. 5 4 3 2 1
Self-confidence (intellectual) ………………………. 5 4 3 2 1
Self-confidence (social) ………………………. 5 4 3 2 1
Self-understanding…………………………….…... 5 4 3 2 1
Understanding of others……………………………. 5 4 3 2 1
Reading and Writing ability in English…………………. 5 4 3 2 1
Teamwork…………………………………. 5 4 3 2 1
Interpersonal skills……………………………. 5 4 3 2 1
Optimism……………………………………. 5 4 3 2 1
Popularity……………………………………. 5 4 3 2 1

THANK YOU!

APPENDIX 2: QUESTIONNAIRE (ADMINISTRATION 2)

TRANSFORMATIVE INCIDENT STUDENT SURVEY

Family name: _____

Name: _____

Group/Course: _____

TI A: The following indicate a number of triggering incidents (TIs) that you personally may have experienced *DURING* this semester. Triggering incidents are any important moments, experiences or "vivid happenings" in your life.

Please think back and indicate the importance of each using the scale below (Circle <u>one</u>).

5—definitely agree

4—agree somewhat

3—only to be used if a definite answer is not possible

2—somewhat disagree

1—definitely disagree

1. A major change in my social role or status............................ 5 4 3 2 1

2. An important success in my academic work............................ 5 4 3 2 1

3. An important failure in my academic work............................ 5 4 3 2 1

4. A success related to my duties... 5 4 3 2 1

5. A failure related to my duties... 5 4 3 2 1

6. A success related to a job opportunity.................................. 5 4 3 2 1

7. A failure related to a job opportunity................................... 5 4 3 2 1

8. A success related to a promotion.. 5 4 3 2 1

9. A failure related to a promotion... 5 4 3 2 1

10. A success related to a pay rise... 5 4 3 2 1

11. A failure related to a pay rise.. 5 4 3 2 1

12. A success related to planning a school meeting
    or social gathering... 5 4 3 2 1

13. A failure related to planning a school meeting
    or social gathering... 5 4 3 2 1

14. A success related to taking part in an event......................... 5 4 3 2 1

15. A failure related to taking part in an event.......................... 5 4 3 2 1

16. A traumatic or catastrophic personal happening..................... 5 4 3 2 1

17. The influence on me of different cultures............................. 5 4 3 2 1

18. A change through living in an international
    environment... 5 4 3 2 1

19. A romantic relationship... 5 4 3 2 1

20. A personal injury or serious illness................................... 5 4 3 2 1

21. A parental divorce or separation....................................... 5 4 3 2 1

22. A death of a close friend or member of family....................... 5 4 3 2 1

23. A conversion to another religion....................................... 5 4 3 2 1

24. A change in personal financial status.................................. 5 4 3 2 1

25. A change in employment of one (or both) of my
    parents.. 5 4 3 2 1

26. A change in financial status of one (or both)
    of my parents... 5 4 3 2 1

Which one was the most important for you? Please write the corresponding number on the left in the field below:

_____

TI B: When thinking about the most important *triggering incident* above, please rate how you feel about the following statements using the same scale as above.

I realized that I had to think about things differently.................... 5 4 3 2 1

The triggering incident was
spiritual... 5 4 3 2 1

I have thought about this triggering incident more than
once since it happened.. 5 4 3 2 1

I have spoken to my friends about this triggering incident............... 5 4 3 2 1

I have spoken to my family about this triggering incident................ 5 4 3 2 1

I have spoken to my fellow students about this triggering
incident... 5 4 3 2 1

The discussions I had with friends, family
and/or fellow students were meaningful..................................... 5 4 3 2 1

I am not alone in my thinking and my feelings............................. 5 4 3 2 1

I am more aware of the importance of being able
to solve problems... 5 4 3 2 1

Going through this important triggering incident
has given me the skills to solve problems................................. 5 4 3 2 1

TI C: When thinking about the most relevant *triggering incident* above I felt the following. (Circle <u>all</u> that apply)

Fun	Happiness	Fulfilment
Neutral	Positive	Frustration
Satisfaction	Worried	Upset
Sad	Unfair	Enjoyment
Hope	Pride	Anger
Anxiety	Shame	Hopelessness
Boredom	Disappointment	

TI D: When thinking about the *triggering incident* in A, B and C above, rate yourself on how it *affected your STUDIES DURING THE SEMESTER*.
(Use the same scale as in TI A above).

As a result of the triggering incident I changed the way
I look at myself as a student... 5 4 3 2 1

The triggering incident has affected me as a student and
has challenged some of my firmly held ideas about my learning............ 5 4 3 2 1

As a result of the triggering incident I have changed
my normal ways of approaching my studies.................................. 5 4 3 2 1

The triggering incident has led me to discover faults in my
learning that I had previously believed to be right....................... 5 4 3 2 1

SE A: Now to change direction, think about HOW YOU STUDIED. Please rate yourself on the following statements, using the responses:

5—definitely agree
4—agree somewhat
3—only to be used if a definite answer is not possible
2—somewhat disagree
1—definitely disagree

I enjoyed acquiring new knowledge…………………........................ 5 4 3 2 1

I had an optimistic view toward studying…………………................. 5 4 3 2 1

I was proud of my capacity………………………........................... 5 4 3 2 1

Studying made me irritated……………………….......................... 5 4 3 2 1

I got tense and nervous while studying……………………............. 5 4 3 2 1

I felt ashamed that I couldn't absorb the simplest
of details……………………………………………...................... 5 4 3 2 1

I felt hopeless when I thought about studying…………………....   5 4 3 2 1

The material bored me …………………………….......................   5 4 3 2 1

SE B: When thinking about *my STUDIES this semester,* I felt the following.
(Circle <u>all</u> that apply)

Fun	Happiness	Fulfilment
Neutral	Positive	Frustration
Satisfaction	Worried	Upset
Sad	Unfair	Enjoyment
Hope	Pride	Anger
Anxiety	Shame	Hopelessness
Boredom	Disappointment	

SR: Please indicate your level of agreement with statements about your actions and thinking *towards your STUDIES DURING THIS SEMESTER.*

5—definitely agree
4—agree somewhat
3—only to be used if a definite answer is not possible
2—somewhat disagree
1—definitely disagree

Understanding
My studies required me to understand concepts
taught by the lecturer or teacher. …………………………...............5 4 3 2 1

To pass my courses I needed to understand the content…........ ....5 4 3 2 1

I needed to understand the material taught by the lecturer or teacher
in order to perform practical tasks………………………….............5 4 3 2 1

In my courses I had to continually think about
the material being taught…………………………........................ 5 4 3 2 1

Reflection
I sometimes questioned the way others did something and
tried to think of a better way…………………………….................. 5 4 3 2 1

I liked to think over what I was doing and considered
alternative ways of doing it…………………………….................... 5 4 3 2 1

I often reflected on my actions to see whether I
could have improved on what I did……………………………......... 5 4 3 2 1

I often re-appraised my experience so I could learn from
it and improve for my next assessment……………….................. 5 4 3 2 1

Critical Reflection
As a result of my last course I have changed the
way I look at myself…………………………………...…................. 5 4 3 2 1

My last course has challenged some of my firmly held ideas…………. 5 4 3 2 1

As a result of my last course I have changed
my normal way of doing things…………………………….............. 5 4 3 2 1

During the last course I discovered faults in what
I had previously believed to be right……..……………………...... ……..5 4 3 2 1

Habitual Action
When I am working on some activities , I can do them
without thinking about what I am doing……………………........... 5 4 3 2 1

When learning the class did things so many times that I
started doing them without thinking about it……………….............. 5 4 3 2 1

As long as I can remember handout material for
examinations, I do not have to think too much…....………….......... 5 4 3 2 1

If I follow what the lecturer says, I do not have to
think too much in my studies………………………………............. 5 4 3 2 1

AT: Please indicate your level of agreement with statements about your actions and thinking (AT) during this LAST SEMESTER.

5—definitely agree
4—agree somewhat
3—only to be used if a definite answer is not possible
2—somewhat disagree
1—definitely disagree

AT A: *In my last course how did I deal with the question:* What were the facts?

I preferred learning the important facts in my last course…................. 5 4 3 2 1

I still remember a lot of the facts in my last course……...…............... 5 4 3 2 1

I preferred learning about theories in my last course…........................ 5 4 3 2 1

The information in case studies was always interesting……….............. 5 4 3 2 1

I preferred taking notes in class……………………………............... 5 4 3 2 1

I preferred to underline the important facts in my textbook……............. 5 4 3 2 1

I preferred to concentrate on just one part of my
assessments in my last course…....………………………............... 5 4 3 2 1

I preferred writing exams where I could reproduce
the facts that I knew…………………………………….................. 5 4 3 2 1

I preferred assignments where I wrote about the facts………............... 5 4 3 2 1

AT B: *In my last course, how did I deal with the question:* How do I know the facts were true?

I questioned if the facts were true…………................……… 5 4 3 2 1

I questioned my teacher to find out if the facts were true.……….............5 4 3 2 1

I asked my parents and friends about the facts……….............……… 5 4 3 2 1

I read other sources of information to find out if
the facts were true. …….………..................................……… 5 4 3 2 1

I asked how it could be shown that the facts were true....……..…..........5 4 3 2 1

I knew the facts were true based on my experience
in the past…………......………...................................……… 5 4 3 2 1

I asked why it is important for the facts to be true……..…..............…… 5 4 3 2 1

I questioned whether facts that appear in books or on the internet,
were still true when I was learning them as they were when
they were written down
…………..……… 5 4 3 2 1

AT C: *Thinking back to my last course, how did I answer the question*: Why were the facts important to me?

I learned best by remembering facts…………...................……… 5 4 3 2 1

I built on facts to create a clearer of
understanding of the concepts………..…..............................……… 5 4 3 2 1

I tried to please my parents with good academic performance…….…........5 4 3 2 1

I needed the facts for an examination or to use in an essay.................…… 5 4 3 2 1

I was interested in the facts…………...............................……… 5 4 3 2 1

I got better marks by knowing the facts……..…...................……… 5 4 3 2 1

I needed to know the facts for my future job……..……...............……… 5 4 3 2 1

I needed to know the facts to communicate better
with fellow students or workers……..………........................……… 5 4 3 2 1

Knowing the facts helped me do as well as I can……..………...............5 4 3 2 1

Knowing the facts helped me solve problems better……..…............…… 5 4 3 2 1

AT D: *Thinking back to my last course, how did I answer the question*: What did others say about the course and/or the facts?

I preferred discussing things when I was
studying with others………..…….. 5 4 3 2 1

I cared about what others said about my
study success…………..…….......................................……… 5 4 3 2 1

I changed what I thought, based on the opinions of others.……..............5 4 3 2 1

It was important to me what my parents said about
my studies…………..……..……… 5 4 3 2 1

My parents influenced me a lot in my studies……..………….......……… 5 4 3 2 1

My friends were important to me in my studies……..…...............…… 5 4 3 2 1

I believed others to know more than me……..……….................…… 5 4 3 2 1

I preferred working in groups when studying……..……...............…… 5 4 3 2 1

I preferred doing presentations than doing a final exam……..................5 4 3 2 1

I preferred doing presentations than writing an assignment.....................5 4 3 2 1

AT E: *In my last course*: How did I integrate other points of view?

I listened to what teachers told me…………..….................……… 5 4 3 2 1

I listened to what other students told me……….......................................5 4 3 2 1

I listened to what my parents told me.……….…....................................5 4 3 2 1

I believe working in groups is the best way to learn……..…..................5 4 3 2 1

I solved problems better when I am working in a group.……..................5 4 3 2 1

I talked to a few people about course content……..…..........................5 4 3 2 1

I read up on what others say about issues……….............................……5 4 3 2 1

Group pressure made me perform better in my studies……..…...........… 5 4 3 2 1

I questioned what others said, before I formed my own opinion...............5 4 3 2 1

I tried to find out where the information came from
when someone told me something………...5 4 3 2 1

AT F: *Thinking back to my last course, how did I deal with the question:* Why should I believe in this conclusion?

I assumed my parents had more knowledge than me……..............……… 5 4 3 2 1

I assumed other students had more knowledge than me.……....…........… 5 4 3 2 1

I assumed my teachers knew better than me……..…...........................… 5 4 3 2 1

I assumed or trusted that my teachers have a lot of knowledge……..........5 4 3 2 1

I assumed I did not need to question knowledge of people I trust............5 4 3 2 1

I assumed I should accept the knowledge of the majority in a group........5 4 3 2 1

I assumed I could believe persons who were older than me more...........5 4 3 2 1

I assumed I could believe students at a higher level of study more than
those at a lower level of study……..………...........................…… 5 4 3 2 1

I assumed the more experience a person has,
the more they should be listened too. ..….............................……… 5 4 3 2 1

I assumed what visitors from industry said at school was
truer that what we were taught………................................…… 5 4 3 2 1

AT G: *In my last course*: What were my assumptions (about successfully completing the course)?

State if you agree or disagree with the following statements.

I assumed my friends would help me through the studies……….........................yes / no

I assumed my family/parents would help me through my
studies……….……...yes / no

I assumed I always had the ability to do my best…………..….............yes / no

I was realistic about what I can achieve……….….........................yes / no

I assumed that the better I became at time management, the more my
learning would improve.……………….……...................................yes / no

I planned my studies………….…......................................yes / no

I took time from studies for other activities……..yes / no

I assumed the biggest problem with my studies was me……….................yes / no

I assumed that I would earn a lot of money after graduation…........................yes / no

I assumed that in my future job, the more I get paid,
the better I would perform……...yes / no

I assumed that the more work experience I gained, the better
a manager I would become……….…..yes / no

I assumed the experiences I gained during my previous studies
cannot be used anywhere else………..yes / no

I assumed applying experience to a new environment takes time……..............yes / no

I assumed new experience results in new behaviour.……….…...............yes / no

I assumed that when I was demotivated I was less productive………..................yes / no

The more work experience I got, the more I realised how
creativity at work is not needed……...............................….........yes / no

Just because I was studying did not mean
I will be able to do my job better.…….....................…….................yes / no

I came to understand that my problem solving approach was different
to other people I know…….....................…….................…….........yes / no

I assumed that through speaking with other people
I gained an understanding of things.…….....................…….............yes / no

I assumed culture affects how students view their studies.…….......................yes / no

I assumed that when fellow students are lazy,
it is pointless to try and help them …….....................…….............yes / no

In the future, as long as I have a job,
I will always be learning.…….....................…….......................yes / no

I assumed the more high marks I obtained, the more motivated
I would be. …….....................…….................…….................yes / no

I assumed the more praise I received, the more motivated
I would be.…….....................…….................…….................yes / no

If I talk positively with others, I gain their respect…….................yes / no

I assumed I am good at my studies because I am positive.................yes / no

I assumed I would learn less in larger classes with
many more students.....................…….................…….............yes / no

AT H: *Based on the above answers,* how do I know my assumptions are valid?

My teachers talked in class about the assumptions above.…….................yes / no

I know things are true because I have experienced them.…….................yes / no

My parents hold similar views to me.…….....................…….............yes / no

My circle of friends shared similar beliefs.…….....................yes / no

My fellow students had the same opinions.…….....................yes / no

I read about my assumptions in books and literature.…….................yes / no

I reflected a lot about myself and knew myself well.…….................yes / no

AT I *Based on the above answers*: Should I change: my assumptions, the way I think

and they way I do things?

I believed the way that I thought about things was mostly correct.…….................yes / no

If realised that if I didn't change myself, I might fail my studies.......................yes / no

I realised that if I don't change myself, I might not obtain a
job in the future.…….....................…….................…….........yes / no

When I thought about the assumptions above, I realised that I
must think differently about certain things in my life.…….................yes / no

Already I thought about things differently to others so
I did not need to change.....................…….................…….........yes / no

My culture, background or other characteristics guide me.…….................yes / no

I would become a success in the future regardless of whether
I changed or not.....................…….................…….................yes / no

T: Rate yourself on each of the following traits (Ts) as compared with the average person your age. We want the most accurate estimate of how you see yourself. (Mark one for each item)

5---Highest 10%

4---Above Average

3---Average

2---Below Average

1---Lowest 10%

Academic ability…………………………………………….	5 4 3 2 1
Cooperativeness……………………………………………	5 4 3 2 1
Creativity…………………………………………………….	5 4 3 2 1
Drive to achieve……………………………………………	5 4 3 2 1
Kindness……………………………………………………..	5 4 3 2 1
Leadership ability…………………………………………	5 4 3 2 1
Mathematical ability………………………………………	5 4 3 2 1
Physical health……………………………..................	5 4 3 2 1
Public speaking ability……………………………..........	5 4 3 2 1
Self-confidence (intellectual) ……………………………	5 4 3 2 1
Self-confidence (social) …………………………………	5 4 3 2 1
Self-understanding…………………………………………	5 4 3 2 1
Understanding of others……………………………………	5 4 3 2 1
Reading and Writing ability in English………..................	5 4 3 2 1
Teamwork……………………………………................	5 4 3 2 1
Interpersonal skills………………………………………….	5 4 3 2 1
Optimism……………………………………….................	5 4 3 2 1
Popularity……………………………………...................	5 4 3 2 1

THANK YOU!

HTMi The Hotel and Tourism
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Research Degrees
Registry Office
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Edinburgh, EH21 6UU

Confirmation of data collection offsite from QMU

This serves to confirm that QMU student Martin Jost (St nr: 00907968) has been
authorized by the Hotel and Tourism Management Institute, Switzerland (HTMi) to
conduct his data collection offsite from the Queen Margaret University, and on the
Institutes campus over the period of duration deemed necessary for that collection. The
HTMi is clear that this research will involve students studying on campus at that time,
but will support him in any way possible to obtain the findings envisaged.

Kind regards

David Coy
Academic Dean

HTMi Switzerland
Marientalweg 3
6174 Soerenberg
Canton Luzern

APPENDIX 4: RESPONDENT CHARACTERISTICS FOR ADMINISTRATIONS 1 AND 2

	Wave 1	Wave 2	Population
Female	57.6	57.1	55.4
Age			
18 to 20	48.2	47.8	48.4
21-22	26.0	26.1	25.1
23-25	17.7	17.7	18.1
Over 25	8.1	8.4	8.4
Mean	*21.3*	*21.4*	*21.3*
Std dev.	*2.8*	*2.8*	*2.8*
Nationality			
Mainland Chinese	18.6	18.0	17.1
Indian & Sri Lankan	13.6	13.5	14.3
Asian [1]	34.1	34.2	35.0
Eastern European [2]	18.3	18.6	17.6
Western European [3]	10.8	11.1	11.1
Other [4]	4.6	4.5	5.1
Qualification			
Certificate	22.3	22.2	24.5
MiT	2.8	3.0	3.1
Diploma	21.7	21.0	19.1
Higher Diploma	14.9	14.7	14.5
Degree	20.1	20.4	20.2
Post graduate	11.4	12.0	11.0
Masters	6.8	6.6	7.4
Returning students	51.7	52.0	52.0
Sample size	*323*	*333*	*382*

[1] 'Hong Kong, Indonesian, South Korean, Malaysian, Singaporean, Thailand, Taiwanese, Vietnamese and Japanese; [2]Bulgaria, Belarus, Kazakhstan, Latvia, Lithuania, Romania, Russia, Ukraine; [3]Switzerland, Germany, Greece, Hungary, Netherlands, Portugal, Turkey, United Kingdom; 4Australian, USA, Mauritius, South Africa, Brazil, Ecuador

A5.1: SKEWNESS AND EXCESS KURTOSIS

Code	Triggers	mean	sd	skewness	kurtosis
T18	Living in an international environment	3.940	0.977	-1.040	0.937
T14	A success related to taking part in an event	3.919	1.007	-1.143	1.154
T6	A success related to a job opportunity	3.81	1.088	-0.852	0.178
T2	An important success in my academic work	3.727	0.892	-0.684	0.435
T4	A success related to my duties	3.658	0.939	-0.557	0.127
T12	A success related to planning a school meeting or social gathering	3.628	0.941	-0.846	0.787
T1	A major change in my social role or status	3.592	0.992	-0.595	-0.036
T17	The influence on me of different cultures	3.577	1.097	-0.721	-0.088
T8	A success related to a promotion	3.183	1.061	-0.353	-0.346
T10	A success related to a pay rise	2.982	1.138	-0.197	-0.632
T24	A change in personal financial status	2.907	1.378	-0.054	-1.294
T19	A romantic relationship	2.844	1.427	0.089	-1.337
T16	A traumatic or catastrophic personal happening	2.751	1.205	-0.040	-0.953
T3	An important failure in my academic work	2.514	1.186	0.367	-0.802
T11	A failure related to a pay rise	2.456	1.093	0.242	-0.619
T7	A failure related to a job opportunity	2.453	1.216	0.449	-0.782
T9	A failure related to a promotion	2.393	1.026	0.162	-0.721
T5	A failure related to my duties	2.369	1.097	0.531	-0.374
T26	A change in financial status of one (or both) of my parents	2.336	1.374	0.509	-1.134
T13	A failure related to planning a school meeting or social gathering	2.321	1.085	0.469	-0.563
T15	A failure related to taking part in an event	2.144	1.040	0.800	0.092
T23	A conversion to another religion	2.114	1.330	0.717	-0.963
T20	A personal injury or serious illness	2.096	1.201	0.928	-0.129
T22	A death of a close friend or member of family	2.051	1.485	1.008	-0.596
T25	A change in employment of one (or both) of my parents	1.976	1.251	0.956	-0.366
T21	A parental divorce or separation	1.778	1.158	1.307	0.573
	n =333				

A5.2: ALTERNATIVE CFA ESTIMATIONS FOR TRIGGERS IN WAVE 2

	Method 1a	Method 1b	Method 2
	Continuous variables; MLE	*Polychoric correlations; MLE*	*Polychoric correlations; WLSMV*
Diagnostic			
Chi-square	31.8	57.1	45.3
Degrees of Freedom	31	31	31
p value of Chi-sq	0.426	0.003	0.047
RMSEA	0.009	0.050	0.037
p value RMSEA $\leq$ 0.05	0.987	0.464	0.810
Tucker-Lewis index (TLI)	0.999	0.977	0.992
Bentler CFI	0.999	0.984	0.994
SRMR	0.030	0.036	0.031
n	333	333	333
Factor	*Standardised Estimates*		
Failure			
T3	0.617**	0.665**	0.662**
T5	0.676**	0.715**	0.713**
T7	0.734**	0.780**	0.777**
T9	0.632**	0.686**	0.680**
T11	0.555**	0.601**	0.607**
T13	0.676**	0.719**	0.712**
Personal			
T21	0.778**	0.867**	0.894**
T22	0.594**	0.709**	0.720**
T25	0.723**	0.781**	0.766**
T26	0.486**	0.545**	0.503**

A5.2 (cont.)

Residual variances			
Failure			
T3	0.620**	0.557**	0.561**
T5	0.543**	0.489**	0.492**
T7	0.461**	0.391**	0.397**
T9	0.600**	0.530**	0.538**
T11	0.692**	0.639**	0.632**
T13	0.542**	0.484**	0.492**
Personal			
T21	0.395**	0.248**	0.200**
T22	0.648**	0.497**	0.482**
T25	0.477**	0.389**	0.413*
T26	0.764**	0.703**	0.747**
Correlations			
Failure with Personal	0.644**	0.687**	0.695**
T3 with T5	0.206**	0.243**	0.247**
T9 with T11	0.444**	0.503**	0.501**
T25 with T26	0.421**	0.541**	0.583**

** denotes significance at one per cent or better

A5.3: POLYCHORIC CORRELATIONS FOR 26 TRIGGER STATEMENTS

	T1A2	T2A2	T3A2	T4A2	T5A2	T6A2	T7A2	T8A2	T9A2	T10A2	T11A2	T12A2	T13A2	T14A2	T15A2	T16A2	T17A2	T18A2	T19A2	T20A2	T21A2	T22A2	T23A2	T24A2	T25A2	T26A2
T1A2	1	0.46	0.21	0.31	0.24	0.21	0.12	0.34	0.19	0.21	0.09	0.2	0.11	0.16	0.08	0.17	0.22	0.25	0.11	0.1	0.1	0.16	0.02	0.12	0.12	0.16
T2A2	0.46	1	-0.06	0.34	0.04	0.36	0.01	0.26	0.04	0.18	-0.02	0.32	-0.01	0.34	-0.02	0.15	0.22	0.25	0.05	-0.01	0.03	0.09	-0.02	0.06	0.08	0.03
T3A2	0.21	-0.06	1	-0.04	0.6	0	0.53	0.12	0.41	0.15	0.32	-0.16	0.49	-0.12	0.39	0.35	0.09	0.07	0.02	0.47	0.45	0.39	0.19	0.2	0.35	0.24
T4A2	0.31	0.34	-0.04	1	-0.02	0.37	-0.02	0.29	0.08	0.24	0.03	0.34	0.07	0.25	-0.02	0.02	0.1	0.19	0.21	0.09	-0.02	0.12	-0.09	0.08	0.11	0.09
T5A2	0.24	0.04	0.6	-0.02	1	0.03	0.55	0.17	0.48	0.13	0.39	-0.04	0.52	-0.12	0.45	0.28	0.01	0.01	0.07	0.46	0.47	0.4	0.26	0.21	0.36	0.25
T6A2	0.21	0.36	0	0.37	0.03	1	-0.3	0.34	-0.11	0.31	-0.12	0.38	0.01	0.36	-0.04	0.1	0.14	0.23	0.22	0.04	-0.04	0.11	0	0.04	0.08	0.09
T7A2	0.12	0.01	0.53	-0.02	0.55	-0.3	1	-0.01	0.56	-0.01	0.47	-0.15	0.57	-0.17	0.46	0.31	-0.03	-0.1	0.04	0.47	0.42	0.34	0.23	0.15	0.38	0.23
T8A2	0.34	0.26	0.12	0.29	0.17	0.34	-0.01	1	0.22	0.62	0.28	0.34	0.03	0.17	0.02	0.25	0.2	0.15	0.16	0.15	0.26	0.27	0.1	0.18	0.36	0.34
T9A2	0.19	0.04	0.41	0.08	0.48	-0.11	0.56	0.22	1	0.27	0.7	0	0.49	-0.04	0.42	0.35	0.07	0.01	0.1	0.39	0.43	0.35	0.27	0.16	0.38	0.19
T10A2	0.21	0.18	0.15	0.24	0.13	0.31	-0.01	0.62	0.27	1	0.25	0.22	0.01	0.17	0.05	0.22	0.16	0.19	0.15	0.18	0.26	0.32	0.15	0.15	0.39	0.27
T11A2	0.09	-0.02	0.32	0.03	0.39	-0.12	0.47	0.28	0.7	0.25	1	0.02	0.44	-0.12	0.37	0.34	0.01	-0.03	0.08	0.38	0.49	0.31	0.3	0.16	0.38	0.21
T12A2	0.2	0.32	-0.16	0.34	-0.04	0.38	-0.15	0.34	0	0.22	0.02	1	-0.24	0.51	-0.1	0.04	0.21	0.12	0.12	0	-0.15	-0.07	-0.02	-0.02	0.02	0.05
T13A2	0.11	-0.01	0.49	0.07	0.52	0.01	0.57	0.03	0.49	0.01	0.44	-0.24	1	-0.12	0.58	0.19	0.03	-0.03	0.04	0.41	0.39	0.31	0.28	0.13	0.38	0.19
T14A2	0.16	0.34	-0.12	0.25	-0.12	0.36	-0.17	0.17	-0.04	0.17	-0.12	0.51	-0.12	1	-0.12	0.01	0.24	0.19	0.16	-0.13	-0.17	-0.1	0.01	0.07	-0.06	-0.01
T15A2	0.08	-0.02	0.39	-0.02	0.45	-0.04	0.46	0.02	0.42	0.05	0.37	-0.1	0.58	-0.12	1	0.21	-0.01	-0.06	0.02	0.45	0.44	0.2	0.28	0.09	0.32	0.19
T16A2	0.17	0.15	0.35	0.02	0.28	0.1	0.31	0.25	0.35	0.22	0.34	0.04	0.19	0.01	0.21	1	0.16	0.13	0.12	0.4	0.41	0.39	0.27	0.29	0.36	0.22
T17A2	0.22	0.22	0.09	0.1	0.01	0.14	-0.03	0.2	0.07	0.16	0.01	0.21	0.03	0.24	-0.01	0.16	1	0.51	0.03	0.01	-0.04	-0.05	0.1	0.13	0.07	0.18
T18A2	0.25	0.25	0.07	0.19	0.01	0.23	-0.1	0.15	0.01	0.19	-0.03	0.12	-0.03	0.19	-0.06	0.13	0.51	1	0.08	-0.02	0	0.03	0.06	0.2	0.07	0.15
T19A2	0.11	0.05	0.02	0.21	0.07	0.22	0.04	0.16	0.1	0.15	0.08	0.12	0.04	0.16	0.02	0.12	0.03	0.08	1	0.19	0.15	0.21	0.06	0.12	0.2	0.17
T20A2	0.1	-0.01	0.47	0.09	0.46	0.04	0.47	0.15	0.39	0.18	0.38	0	0.41	-0.13	0.45	0.4	0.01	-0.02	0.19	1	0.63	0.46	0.27	0.27	0.44	0.29
T21A2	0.1	0.03	0.45	-0.02	0.47	-0.04	0.42	0.26	0.43	0.26	0.49	-0.15	0.39	-0.17	0.44	0.41	-0.04	0	0.15	0.63	1	0.61	0.58	0.32	0.68	0.48
T22A2	0.16	0.09	0.39	0.12	0.4	0.11	0.34	0.27	0.35	0.32	0.31	-0.07	0.31	-0.1	0.2	0.39	-0.05	0.03	0.21	0.46	0.61	1	0.35	0.27	0.56	0.4
T23A2	0.02	-0.02	0.19	-0.09	0.26	0	0.23	0.1	0.27	0.15	0.3	-0.02	0.28	0.01	0.28	0.27	0.1	0.06	0.06	0.27	0.58	0.35	1	0.46	0.53	0.44
T24A2	0.12	0.06	0.2	0.08	0.21	0.04	0.15	0.18	0.16	0.15	0.16	-0.02	0.13	0.07	0.09	0.29	0.13	0.2	0.12	0.27	0.32	0.27	0.46	1	0.46	0.59
T25A2	0.12	0.08	0.35	0.11	0.36	0.08	0.38	0.36	0.38	0.39	0.38	0.02	0.38	-0.06	0.32	0.36	0.07	0.07	0.2	0.44	0.68	0.56	0.53	0.46	1	0.71
T26A2	0.16	0.03	0.24	0.09	0.25	0.09	0.23	0.34	0.19	0.27	0.21	0.05	0.19	-0.01	0.19	0.22	0.18	0.15	0.17	0.29	0.48	0.4	0.44	0.59	0.71	1

A5.4: INVARIANCE

In this appendix, the invariance results summarised in Table 4.2.3c of Chapter 4 for triggers are presented in greater detail. The tables of results below consist of rows for invariance types with respect to age, status, gender and culture (the variables of interest). The results are obtained using the polychoric covariance matrices for each value taken by a variable of interest, with these used to estimate simultaneously the same CFA on the covariance matrices. For example, in the case of age invariance, two distinct covariance matrices were assembled, one for respondent under 21 and one for respondents who were 21 or older. For each simultaneously estimated CFA, the Chi-sq is given, along with changes in it from the previously tested invariance type (Brown 2006, Kline 2011, Hoyle 2012). To decide if a form of invariance is attained, a comparison is made on the basis of changes in Chi-sq (Blankson and McArdle 2013).

Because Chi-sq is sensitive to sample size, it can be unclear if a conclusion is driven by the tendency for the statistic to be large in large samples, rather than an invariance feature. For this reason, it is recommended a range of goodness-of-fit diagnostics be checked when sample sizes are very large (of the order of a thousand or more) and that changes in the CFI diagnostic be calculated to see they are small. In this research, the sample sizes available for invariance testing via MGCFA are less than 200 and, in such cases, it is generally the case that researchers rely on the significance or non-significance of changes in Chi-sq (Cheung and Rensvold 2002; Brown 2006; Meade et al. 2008; Blankson and McArdle 2013). For example, in Table A5.4.1a, changes in Chi-sq from row to row are not statistically significant at 0.05 or better, suggesting measured and latent-construct invariance across age bands. Also, MIMIC was used to check the conclusions reached with MGCFA on the basis of Chi-sq change. In MIMIC the full sample of 333 cases can be used. However, a limitation of the MIMIC procedure is that only two forms of invariance can be tested – weak and equal factor means. The conclusions reached with MGCFA on these invariance forms were confirmed by the MIMIC approach. In the interest of brevity, MIMIC results are not reported in this appendix.

A5.4.1: Age invariance for triggers

First, results for simultaneous estimation of the same structural configuration are shown in Table A5.4.1a. It can be seen that Chi-sq suggests poor fit to the covariance matrices compared with the overall CFA of Table 4.2.2b (in Chapter 4) and the configural models for each age group in Table 4.2.3a.

This arises because another step is taken when testing invariance, namely error correlations and factor variances are fixed at zero (Brown 2006). This is done as error correlations introduced into the triggers CFA of Chapter 4 may mask invariance failure that explains variation between groups. Factor variances are fixed at zero, as they are the subject of one test of latent-construct invariance, which is explored *after* assessing invariance for measured items. It might be asked why report separate configural CFAs for each covariance matrix (as in Tables 4.2.3a of Chapter 4) if the testing for invariance involves simultaneous estimations using more than one covariance matrix. A reference on this point is Brown (2006, p.271): "If markedly disparate measurement models are obtained between groups, this outcome would contraindicate further invariance evaluation".

	Chi-sq	*df*	*ΔChi-sq*	*Δdf*	*p* **value**
Measured items					
Configural	178.50	68	-	-	
Weak (loadings equal)	187.33	76	8.83	8	0.357
Strong (loadings & intercepts equal)	198.71	84	11.38	8	0.181
Strict (loadings, intercepts & residuals equal)	211.53	94	12.82	10	0.234
Latent constructs					
Equal variances	213.54	96	2.01	2	0.366
Equal covariance	213.93	97	0.39	1	0.532
Equal means	214.93	99	1.00	2	0.607

Table A5.4.1a Age invariance of triggers

In moving from configural to weak-invariance, the Chi-sq value in Table A5.4.1a increases by 8.83 and degrees of freedom increase by eight (because pairs of loadings are constrained to be equal in weak-invariance testing for age bands). The p value for a Chi-sq test based on these values is 0.357. Hence, there is little reason to reject the null hypothesis of equal loadings across the age bands. Similar conclusions can be drawn for strong invariance (relative to weak invariance) and strict invariance (relative to strong invariance), leading to the conclusion that loadings, intercepts and residuals are equal across age bands at SHI. To test for equality of variances across groups, the approach taken is to follow Brown (2006) and compare the Chi-sq value obtained assuming equal variances with that for strict invariance.

A5.4.2: Status, gender and cultural invariance for triggers

Trigger invariance across these variables is reported in the tables of this section. After each, a summary is provided of constraints that were relaxed on particular trigger statements in the TISS. For each variable of interest, configural invariance was confirmed (and reported in Chapter 4 Tables 4.2.3a and b). For status, one intercept and one error variance were freed to attain partial strict invariance across new and returning students (Tables A5.4.2a and b).

	Chi-sq	*df*	*ΔChi-sq*	*Δdf*	*p* value
Measured items					
Configural	179.00	68	-	-	-
Weak (loadings equal)	182.89	76	3.89	8	0.867
Strong (loadings & intercepts equal)	199.72	84	16.83*	8	0.032
free intercept for T13	185.66	83	2.77	7	0.905
Partial Strict (loadings, intercepts & residuals equal)	209.97	93	24.31**	10	0.007
free error for T25	197.53	92	11.87	9	0.221
Latent constructs					
Equal variances	199.08	94	1.55	2	0.461
Equal covariances	199.09	95	0.01	1	0.920
Equal means	200.42	97	1.33	2	0.514

** (*) denotes significance at one (five) per cent or better

Table A5.4.2a Invariance of triggers by status

	New	Returning
Intercept for T13 (*failure related to a school meeting or social gathering*)	2.32	1.99
Error for T25(*a change in parental employment*)	0.192	0.383

Table A5.4.2b Non-invariant item parameters among triggers for status

Gender invariance is reported in Table A5.4.2c. It can be seen that three times constraints were relaxed to reach the point of partial strict invariance. The differences in freed unstandardised parameters are given in Table A5.4.2d.

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	161.42	68	-	-	
Weak (loadings equal)	179.23	76	17.81*	8	0.023
free loading for T11	167.56	75	6.14	7	0.524
Partial Strong (loadings & intercepts equal)	174.80	83	7.24	8	0.511
Partial Strict (loadings, intercepts & residuals equal)	201.95	93	27.15**	10	0.002
free error for T13	195.04	92	20.24*	9	0.016
free error for T9	189.21	91	14.41	8	0.072
Latent constructs					
Equal variances	190.45	93	1.24	2	0.538
Equal covariances	190.54	94	0.09	1	0.764
Equal means	194.23	96	3.69	2	0.158

** (*) denotes significance at one (five) per cent or better

Table A5.4.2c Invariance of triggers by gender

	Male	Female
Loading for T11 (*failure related to a pay rise*)	0.727	0.547
Error in T9 (*failure related to a promotion*)	0.557	0.436
Error for T13 (*failure related to a school meeting or social gathering*)	0.618	0.500

Table A5.4.2d Non-invariant item parameters among triggers for gender groups

The nationalities of TISS respondents are summarised in Table 4.1b of Chapter 4. However, all but one national grouping contained fewer than 100 respondents (see Table A5.4.2e). These were gathered into cultural groups using the classification of Gupta et al. (2002) and then were bundled into clusters of sufficient size for MGCFA (Brown 2008; Kline 2011), with the intention of preserving the cultural distinctiveness of the first two clusters shown in Table A5.4.2f.

Nationalities	n	%
Mainland Chinese	60	18.0
Indian & Sri-Lankan	45	13.5
Asian[1]	114	34.2
Eastern European[2]	62	18.6
Western European[3]	37	11.1
Other[4]	15	4.5
Total	333	100

[1] *Hong Kong, Indonesian, South Korean, Malaysian, Singaporean, Thailand, Taiwanese, Vietnamese and Japanese;* [2] *Bulgaria, Belarus, Kazakhstan, Latvia, Lithuania, Romania, Ukraine, Russia;* [3] *Switzerland, Germany, Greece, Hungary, Netherlands, Portugal, Turkey, United Kingdom;* [4] *Australian, USA, Mauritius, South Africa, Brazil, Ecuador*
Table A5.4.2e Nationalities of TISS respondents.

Confucian (CHC) Nationality		Other Nationality		
China		Australia	Indonesia	Russia
Hong Kong		Belarus	Kazakhstan	South Africa
Japan		Brazil	Latvia	Sri-Lanka
Singapore		Bulgaria	Lithuania	Switzerland
South Korea		Ecuador	Malaysia	Thailand
Taiwan		Germany	Mauritius	Turkey
Vietnam		Greece	Netherlands	UK
		Hungary	Portugal	Ukraine
		India	Romania	USA
n =	122	211		
% =	36.6	63.4		

Table A5.4.2f Grouping of nationalities into cultural clusters

To ensure at least partial strict invariance across measured items, seven invariance constraints were relaxed, as shown in Tables A5.4.2g and A5.4.2h. Thus, over the three variables of interest in this section namely; status, gender and culture, partial measurement invariance is attained. However, there is full latent-construct invariance across only two of the three variables of interest.

The final test for structural invariance across latent means is presented in Table A5.4.3g and A5.4.3h.

When moving from equal covariances to equal means, the Chi-square increases by 6.30 for two degrees of freedom (for the two latent means of failure and personal). In order to avoid under identification in this form of invariance, means in the *Confucian* group are fixed to zero therefore allowing means of factors in the *Other* group to vary freely (Brown 2006, Beaujean 2014, Muthén 2014). Under identification is largely as a result of the prior step for strong invariance, where intercepts are constrained to equality. Latent means thus lack an origin and extra restrictions are added to scale the latent variable. Therefore, values of -0.126 and -0.326 in the *Other* group are not represented as means, rather these are scaled metrics of deviations from the zero-order mean in the *Confucian* group. This means that for every unit change in the means of the *Confucian* group, *Other* means will change by -0.126and -0.326 respectively. This approach is used in subsequent tests of mean equality in the invariance tables that follow. Similar findings emerge when checking invariance for the other central variables, as set out in appendix tables that follow. These tables can be interpreted using the notes given in this and the previous subsection.

	Chi-sq	*df*	*ΔChi-sq*	*Δdf*	*p value*
Measured items					
Configural	143.65	68	-	-	
Weak (loadings equal)	152.71	76	9.06	8	0.337
Strong (loadings & intercepts equal)	178.86	84	26.15**	8	0.001
free intercepts for T5	173.00	83	20.29**	7	0.005
free intercepts for T3	164.96	82	12.25*	6	0.057
free intercepts for T25	159.37	81	6.66	5	0.247
Partial Strict (loadings, intercepts & residuals equal)	184.10	91	24.73*	10	0.006
free residuals for T13	178.22	90	18.85*	9	0.026
free residuals for T5	173.00	89	13.63	8	0.092
Latent constructs					
Equal variances	179.06	91	6.06*	2	0.048
free latent variance for "Failure"	174.67	90	1.67	1	0.196
Equal covariance	177.25	91	2.58	1	0.108
Equal means	183.55	93	6.30*	2	0.043

** (*) denotes significance at one (five) per cent or better
Table A5.4.2g Invariance of triggers by culture

	Confucian	Other
Intercept for T3 (*academic failure*)	2.746	2.405
Intercept for T5 (*failure in duties*)	2.631	2.299
Intercept for T25 (*change in parental employment*)	2.057	2.362
Error for T5 (*failure relating to duties*)	0.466	0.755
Error for T13 (*failure related to a school meeting or social gathering*)	0.445	0.747
Variance for *failure*	0.416	0.652
Mean for *failure*	0.000[1]	-0.126
Mean for *personal*	0.000	-0.326

[1]*Factor means for Confucian are fixed to zero.*

Table A5.4.2h Non-invariant item parameters among triggers for cultural clusters

A6.1: SKEWNESS AND EXCESS KURTOSIS

	mean	sd	skew	kurtosis
Enjoyment	4.306	0.781	-1.383	2.913
Hope	3.958	0.901	-0.879	0.735
Pride	3.589	1.059	-0.444	-0.474
Anxiety	2.976	1.234	-0.002	-1.059
Shame	2.727	1.340	0.175	-1.188
Anger	2.718	1.094	0.202	-0.621
Boredom	2.640	1.155	0.203	-0.836
Hopelessness	2.228	1.152	0.633	-0.584
n = 333				

Table A6.1a: Skewness and kurtosis for TISS responses to Pekrun et al. (2011) items

A6.2: DICHOTOMOUS RESPONSES ON EMOTIONS EXPERIENCED WHILE STUDYING

Emotion	%	Emotion	%
Positive	46.5	Pride	20.7
Fun	44.1	Unfair	19.8
Enjoyment	42.3	Neutral	19.5
Satisfaction	41.4	Boredom	15.6
Worried	37.8	Upset	13.8
Hope	35.4	Anxiety	13.5
Fulfilment	30.0	Anger	10.8
Disappointment	26.4	Hopelessness	9.9
Happy	25.8	Sad	9.3
Frustration	23.4	Shame	3.3
	n = 333		

Table A6.2a: Dichotomous emotion statements in percentages

The dichotomous statements were included on the TISS as a trial for alternative ways of eliciting emotional responses from SHI students. The correlation between responses to Pekrun et al. (2011) statements and dichotomous responses to comparable emotions (for example the statement on enjoyment from Pekrun et al. and circling the word enjoyment) was 0.915. This indicates that dichotomous responses are positively and highly correlated with Pekrun et al. statements. Future administrators of a TISS-like instrument might therefore consider using a greater range of words (such as in the table above) to elicit emotional responses to study. This would of course involve effort to validate the dichotomous approach first.

A6.3: INVARIANCE

In this appendix, tables comparable to those of A5.4 on triggers are given on invariance testing of Pekrun et al.'s (2011) emotions statements and the underlying latent constructs. The ensuing tables can be interpreted on the basis of the notes given in A5.4.

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	108.00	38	-	-	-
Weak (loadings equal)	111.90	44	3.90	6	0.690
Strong (loadings & intercepts equal)	116.40	50	4.50	6	0.609
Strict (loadings, intercepts & residuals equal)	127.58	58	11.18	8	0.192
Latent constructs					
Equal variances	131.63	60	4.05	2	0.132
Equal covariances	131.87	61	0.24	1	0.624
Equal means	132.22	63	1.35	2	0.509

Table A6.3a Invariance of emotions by age

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	104.27	38	-	-	-
Weak (loadings equal)	124.14	44	19.87**	6	0.003
free loading for P8	114.45	43	10.18**	1	0.001
free loading for P3	106.16	42	1.89	1	0.169
Partial Strong (loadings & intercepts equal)	115.59	48	9.43	6	0.151
Partial Strict (loadings, intercepts & residuals equal)	127.93	56	12.34	8	0.137
Latent constructs					
Equal variances	136.87	58	8.94*	2	0.011
free Positive variance	130.31	57	2.38	1	0.123
Equal covariances	133.40	58	3.09	1	0.079
Equal means	143.11	60	9.71**	2	0.008

** (*) denotes significance at one (five) per cent or better

Table A6.3b Invariance of emotions by status

	New	Returning
Loading for P8 (*the material bored me*)	0.645	1.349
Loading for P3 (*I was proud of my capacity*)	2.069	1.012
Variances for *Positive*	0.148	0.258
Means for *Positive*	0.000[1]	-0.172
Means for *Negative*	0.000	0.152

[1]*Factor means for new are fixed to zero.*

Table A6.3c Non-invariant parameters among emotions for status

	Chi-sq	*df*	*ΔChi-sq*	*Δdf*	*p* value
Measured items					
Configural	93.53	38	-	-	-
Weak (loadings equal)	102.08	44	8.55	6	0.201
Strong (loadings & intercepts equal)	107.69	50	5.61	6	0.468
Strict (loadings, intercepts & residuals equal)	113.19	58	5.50	8	0.703
Latent constructs					
Equal variances	122.79	60	9.60**	2	0.008
free Negative variance	114.01	59	0.82	1	0.365
Equal covariances	116.54	60	2.53	1	0.112
Equal means	117.65	62	1.11	2	0.574

** (*) denotes significance at one (five) per cent or better

Table A6.3d Invariance of emotions by gender

	Female	**Male**
Variances for *Negative*	0.250	0.480

Table A6.3e Non-invariant parameters among emotions by gender

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	96.60	38	-	-	-
Weak (loadings equal)	108.84	44	12.24*	6	0.057
free loading for P3	103.31	43	6.71	5	0.243
Partial Strong (loadings & intercepts equal)	112.52	49	9.21	6	0.162
Partial Strict (loadings, intercepts & residuals equal)	135.89	57	23.37*	8	0.003
free error for P2	128.52	56	16.00*	7	0.025
free error for P4	121.65	55	9.13	6	0.166
Latent constructs					
Equal variances	128.36	57	6.71*	2	0.035
free Negative variance	124.29	56	2.64	1	0.104
Equal covariances	131.98	57	7.69**	1	0.005
free covariances between Positive and Negative	124.29	56	0.00	0	-
Equal means	131.11	58	6.82*	2	0.033

*** (*) denotes significance at one (five) per cent or better*
Table A6.3f Invariance of emotions by culture

	Confucian	Other
Loading for P3 (*I'm proud of my capacity*)	0.965	1.702
Error for P2 (*I have an optimistic view towards studying*)	0.140	0.418
Error for P4 (*Studying makes me irritated*)	0.580	0.995
Variances for *Negative*	0.224	0.369
Covariances between *Positive* and *Negative*	-0.106	-0.226
Means for *Negative*	0.000 [1]	-0.207
Means for *Positive*	0.000	0.130

[1]*Factor means for Confucian fixed to zero*
Table A6.3g Non-invariant parameters among emotions for culture

A7.1: SKEWNESS AND EXCESS KURTOSIS

Code	Form of Reflection	Mean	Standard deviation	Skewness	Kurtosis
H2	When learning the class did things so many times that I started doing them without thinking	3.183	1.089	-0.143	-0.775
H1	When working on some activities, I can do them without thinking about what I am doing	3.108	1.237	-0.224	-1.049
H3	As long as I can remember hand-out material for examinations, I do not have to think much	3.009	1.173	-0.006	-0.963
H4	If I follow what the lecturer says, I do not have to think too much in my studies	2.877	1.220	0.096	-1.075
U2	To pass previous courses I needed to understand the content	4.231	0.838	-1.127	1.209
U1	My previous studies required me to understand concepts taught by the lecturer or teacher	4.189	0.739	-0.895	1.528
U3	I needed to understand the material in order to perform practical tasks	4.054	0.866	-0.908	0.780
U4	In previous courses I had to continually think about the material being taught	3.652	0.965	-0.602	-0.015
R2	I liked to think over what I was doing and consider alternative ways of doing it	4.027	0.804	-0.603	0.168
R1	I sometimes questioned the way others did something and tried to think of a better way	4.018	0.821	-0.781	0.843
R3	I often reflected on my actions to see whether I could have improved on what I did	3.988	0.821	-0.628	0.183
R4	I often re-appraised my experience to learn from it and improve for my next assessment	3.982	0.864	-0.636	-0.040
CR1	As a result of my last course I have changed the way I look at myself	3.796	1.081	-0.773	-0.041
CR2	My last course has challenged some of my firmly held ideas	3.511	1.031	-0.660	0.082
CR4	During the last course I discovered faults in what I had previously believed to be right	3.480	1.034	-0.534	-0.258
CR3	As a result of my last course I have changed my normal way of doing things	3.426	1.145	-0.366	-0.741

n = 333

A7.2: COMPARISON OF TISS FOR RESULTS AGAINST KEMBER ET AL. 2000.

Diagnostic	Four factor CFA	Kember model
Chi-Square	151	179
Degrees of Freedom	92	100
Bentler CFI	0.98	0.90
N	333	303
Factor	**Standardised estimates**	
Habitual action		
H1	0.47	0.63
H2	0.57	0.69
H3	0.60	0.37
H4	0.51	0.47
Cronbach's α	0.79	0.62
Understanding		
U1	0.82	0.62
U2	0.70	0.66
U3	0.67	0.67
U4	0.62	0.70
Cronbach's α	0.86	0.76
Reflection		
R1	0.64	0.48
R2	0.74	0.62
R3	0.73	0.59
R4	0.69	0.51
Cronbach's α	0.86	0.63
Critical reflection		
CR1	0.83	0.62
CR2	0.67	0.57
CR3	0.67	0.54
CR4	0.78	0.61
Cronbach's α	0.86	0.68
Factor covariance		
Habitual action		
with Understanding	0.37	Not reported
with Reflection	0.24	Not reported
with Critical Reflection	0.26	0.18
Understanding		
with Reflection	0.64	0.25
with Critical Reflection	0.52	0.44
Reflection		
with Critical Reflection	0.50	0.38

[1]Only those results reported by Kember et al. (2000) included. No report of error covariances and significance.

A7.3: INVARIANCE

In this appendix, tables comparable to those of A5.4 on triggers are given on invariance testing of Kember et al's (2000) reflection statements and their underlying latent constructs. The ensuing tables can be interpreted on the basis of the notes given in A5.4. Factor covariances are not shown as following Brown (2006) and Kline (2011), for more than two latent constructs it is clearer to do MGCFA construct by construct.

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	11.42	4	-	-	-
Weak (loadings equal)	14.87	7	3.45	3	0.178
Strong (loadings & intercepts equal)	16.66	10	1.79	3	0.617
Strict (loadings, intercepts & residuals equal)	20.10	14	3.44	4	0.487
Latent constructs					
Equal variances	21.45	15	1.35	1	0.245
Equal means	21.62	16	0.17	1	0.680

Table A7.3a Invariance of understanding by age

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	15.48	4	-	-	-
Weak (loadings equal)	22.32	7	6.84	3	0.077
Strong (loadings & intercepts equal)	32.34	10	10.02*	3	0.018
free intercept for U3	25.96	9	3.64	2	0.162
Strict (loadings, intercepts & residuals equal)	38.76	13	12.80*	4	0.012
free error for U3	31.67	12	5.71	3	0.126
Latent constructs					
Equal variances	31.83	13	0.16	1	0.689
Equal means	31.86	14	0.03	1	0.862

** (*) denotes significance at one (five) per cent or better
Table A7.3b Invariance of understanding by status

	New	Returning
Intercept for U3 (*I needed to understand the material in order to perform practical tasks*)	4.150	3.937
Error for U3	0.283	0.495

Table A7.3c Non-invariant parameters of understanding for status

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	8.84	4	-	-	-
Weak (loadings equal)	20.11	7	11.27*	3	0.010
free loading for U4	11.36	6	2.52	2	0.284
Partial strong (loadings & intercepts equal)	13.92	9	2.56	3	0.464
Partial strict (loadings, intercepts & residuals equal)	29.16	13	15.24**	4	0.004
free error for U1	21.95	12	8.03*	3	0.045
free error for U2	17.69	11	3.77	2	0.152
Latent constructs					
Equal variances	17.80	12	0.11	1	0.740
Equal means	18.79	13	0.99	1	0.320

** (*) denotes significance at one (five) per cent or better

Table A7.3d Invariance of understanding by gender

	Female	Male
Loading for U4 (*In previous courses I had to continually think about the material being taught*)	0.756	1.357
Error for U1 (*My previous studies required me to understand concepts taught by the lecturer or teacher*)	0.239	0.427
Error for U2 (*To pass previous courses I needed to understand the content*)	0.336	0.513

Table A7.3e Non-invariant parameters of understanding for gender

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	14.17	4	-	-	-
Weak (loadings equal)	24.87	7	10.70*	3	0.013
free loading for U2	17.70	6	3.53	2	0.171
Strong (loadings & intercepts equal)	25.84	9	8.14*	3	0.043
free intercept for U4	21.36	8	3.66	2	0.160
Strict (loadings, intercepts & residuals equal)	42.53	12	21.17**	4	0.000
free error for U2	33.88	11	12.52**	3	0.006
free error for U1	28.20	10	6.84*	2	0.033
free error for U3	24.41	9	3.05	1	0.081
Latent constructs					
Equal variances	27.90	10	3.49	1	0.062
Equal means	27.97	11	0.07	1	0.791

** (*) denotes significance at one (five) per cent or better
Table A7.3f Invariance of understanding by culture

	Confucian	Other
Loading for U2 (*To pass previous courses I needed to understand the content*)	1.525	0.774
Intercept for U4 (*In previous courses I had to continually think about the material being taught*)	3.768	3.534
Error for U2 (*To pass previous courses I needed to understand the content*)	0.286	0.596
Error for U1 (*My previous studies required me to understand concepts taught by the lecturer or teacher*)	0.245	0.412
Error for U3 (*I needed to understand the material in order to perform practical tasks*)	0.426	0.240

Table A7.3g Non-invariant parameters of understanding for culture

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	6.30	4	-	-	-
Weak (loadings equal)	7.62	7	1.32	3	0.724
Strong (loadings & intercepts equal)	12.85	10	5.24	3	0.155
Strict (loadings, intercepts & residuals equal)	22.39	14	9.54*	4	0.049
free error for R1	15.14	13	2.29	3	0.514
Latent constructs					
Equal variances	16.85	14	1.71	1	0.191
Equal means	21.60	15	4.75*	1	0.029

** (*) denotes significance at one (five) per cent or better
Table A7.3h Invariance of reflection by age

	Under 21	21 and over
Error for R1 (*I liked to think over what I was doing and consider alternative ways of doing it*)	4.150	3.868
Means for *Reflection*	0.000[1]	0.117

[1]*Factor means for under21 fixed to zero*
Table A7.3i Non-invariant parameters of reflection for age

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	6.36	4	-	-	-
Weak (loadings equal)	7.85	7	1.49	3	0.685
Strong (loadings & intercepts equal)	15.17	10	7.32	3	0.062
Strict (loadings, intercepts & residuals equal)	30.61	14	15.44*	4	0.004
free error for R4	20.23	13	5.06	3	0.167
Latent constructs					
Equal variances	22.85	14	2.62	1	0.106
Equal means	33.72	15	10.87**	1	0.001

** (*) denotes significance at one (five) per cent or better
Table A7.3j Invariance of reflection by status

	New	Returning
Error for R4 (*I often re-appraised my experience to learn from it and improve for my next assessment*)	0.217	0.451
Means for *Reflection*	0.000[1]	-0.172

[1]*Factor means for New fixed to zero*

Table A7.3k Non-invariant parameters of reflection for status

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	8.93	4	-	-	-
Weak (loadings equal)	14.79	7	5.86	3	0.119
Strong (loadings & intercepts equal)	21.67	10	6.88	3	0.076
Strict (loadings, intercepts & residuals equal)	22.96	14	1.29	4	0.863
Latent constructs					
Equal variances	23.03	15	0.07	1	0.791
Equal means	23.58	16	0.55	1	0.458

Table A7.3l Invariance of reflection by gender

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	9.71	4	-	-	-
Partial weak (loadings equal)	20.51	7	10.80*	3	0.013
free loading for R3	16.49	6	6.78*	2	0.034
free loading for R4	12.67	5	2.96	1	0.085
Partial strong (loadings & intercepts equal)	14.58	8	1.91	3	0.591
Partial strict (loadings, intercepts & residuals equal)	27.72	12	13.14*	4	0.012
free error for R1	23.38	11	8.80*	3	0.032
free error for R2	20.13	10	5.55	2	0.062
Latent constructs					
Equal variances	28.59	11	8.46**	1	0.004
free variance for Reflection	20.13	10	0.00	0	1.000
Equal means	29.15	11	9.02**	1	0.003

** (*) denotes significance at one (five) per cent or better
Table A7.3m Invariance of reflection by culture

	Confucian	Other
Loading for R3 (*I often reflected on my actions to see whether I could have improved on what I did*)	1.032	1.564
Loading for R4 (*I often re-appraised my experience so I could learn from it and improve for my next assessment*)	1.108	1.787
Error for R1	0.323	0.521
Error for R2	0.321	0.475
Variance for *Reflection*	0.339	0.118
Means for *Reflection*	0.000[1]	0.155

[1]*Factor means for Confucian fixed to zero*
Table A7.3n Non-invariant parameters of reflection for culture

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	11.76	4	-	-	-
Weak (loadings equal)	15.19	7	3.43	3	0.330
Strong (loadings & intercepts equal)	16.74	10	1.55	3	0.671
Strict (loadings, intercepts & residuals equal)	25.86	14	9.12	4	0.058
free error for CR1	21.52	13	4.78	3	0.189
Latent constructs					
Equal variances	27.32	14	5.80*	1	0.016
free variance for Critical reflection	21.52	13	0.00	0	1.000
Equal means	21.55	14	0.03	1	0.862

*** (*) denotes significance at one (five) per cent or better*
Table A7.3o Invariance of critical reflection by age

	Under 21	21 and over
Error for CR1 (*As a result of my last course I have changed the way I look at myself*)	0.807	0.532
Variance for *Critical Reflection*	0.362	0.602

Table A7.3p Non-invariant parameters of critical reflection for age

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	14.56	4	-	-	-
Weak (loadings equal)	15.75	7	1.19	3	0.755
Strong (loadings & intercepts equal)	24.51	10	8.76*	3	0.033
free intercept for CR4	17.95	9	2.20	2	0.333
Partial strict (loadings, intercepts & residuals equal)	26.98	13	9.03	4	0.060
Latent constructs					
Equal variances	27.78	14	0.80	1	0.371
Equal means	27.81	15	0.03	1	0.862

* denotes significance at five per cent or better
Table A7.3q Invariance of critical reflection by status

	New	Returning
Intercept for CR4 (*During the last course I discovered faults in what I had previously believed to be right*)	3.612	3.363

Table A7.3r Non-invariant parameters of critical reflection for status

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	19.85	4	-	-	-
Weak (loadings equal)	23.05	7	3.20	3	0.362
Strong (loadings & intercepts equal)	25.09	10	2.04	3	0.564
Strict (loadings, intercepts & residuals equal)	32.18	14	7.09	4	0.131
Latent constructs					
Equal variances	32.27	15	0.09	1	0.764
Equal means	32.70	16	0.43	1	0.512

Table A7.3s Invariance of critical reflection by gender

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	15.64	4	-	-	-
Weak (loadings equal)	16.67	7	1.03	3	0.793
Strong (loadings & intercepts equal)	19.43	10	2.76	3	0.430
Strict (loadings, intercepts & residuals equal)	30.96	14	11.53*	4	0.021
free errors for CR2	24.80	13	5.37	3	0.147
Latent constructs					
Equal variances	26.89	14	2.09	1	0.148
Equal means	27.28	15	0.39	1	0.532

** (*) denotes significance at one (five) per cent or better
Table A7.3t Invariance of critical reflection by culture

	Confucian	Other
Error for CR2 (*My last course has challenged some of my firmly held ideas*)	0.431	0.748

Table A7.3u Non-invariant parameters of critical reflection for culture

A8.1: SKEWNESS AND EXCESS KURTOSIS

Code	Facilitators	Mean	Standard deviation	Skewness	Kurtosis
Think	I realized I had to think about things differently	4.042	0.936	-1.244	1.670
Probsol	I am more aware of being able to solve problems	4.030	0.864	-0.924	0.984
Probskill	Going through this incident gave me problem-solving skill	3.721	1.049	-0.771	0.179
Notalone	I am not alone in my thinking and my feelings	3.589	1.235	-0.714	-0.497
Discuss	Meaningful discussions with friends, family and students	3.544	1.082	-0.674	0.031
Thought	I have thought about this triggering incident more than once	3.399	1.125	-0.370	-0.644
Friends	I spoke to my friends about this triggering incident	3.297	1.217	-0.420	-0.855
Family	I spoke to my family about this triggering incident	3.186	1.347	-0.266	-1.204
Spirit	The triggering incident was spiritual	2.847	1.148	-0.117	-0.799
Students	I spoke to fellow students about this triggering incident	2.757	1.275	0.112	-1.159

$n = 333$

A8.2: INVARIANCE

The following tables set out MGCFA results for the single factor *Social*. With one exception, measurement and latent-construct invariance are complete as in only the case of status is there a case of partial invariance.

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	0.00 [1]	0	-	-	-
Weak (loadings equal)	0.50	2	0.50	2	0.779
Strong (loadings & intercepts equal)	3.24	4	2.75	2	0.253
Strict (loadings, intercepts & residuals equal)	4.01	7	0.77	3	0.857
Latent constructs					
Equal variances	4.04	8	0.03	1	0.862
Equal means	4.41	9	0.37	1	0.543

** (*) denotes significance at one (five) per cent or better

[1] *Just identified model with zero chi-square and degrees of freedom resulting from six correlations and six freely estimated parameters (three loadings, three errors, latent variable is fixed to one)*

Table A8.2a Invariance of sharing by age

	Chi-sq	*df*	*ΔChi-sq*	*Δdf*	*p* value
Measured items					
Configural	0.00 [1]	0	-	-	-
Weak (loadings equal)	0.35	2	0.35	2	0.839
Strong (loadings & intercepts equal)	6.69	4	6.34*	2	0.042
free intercept for students	0.78	3	0.43	1	0.512
Strict (loadings, intercepts & residuals equal)	6.06	6	5.28	3	0.152
Latent constructs					
Equal variances	7.42	7	1.36	1	0.244
Equal means	7.42	8	0.00	1	1.000

** (*) denotes significance at one (five) per cent or better
[1] *Just identified model with zero chi-square and degrees of freedom*

Table A8.2b Invariance of sharing by status

	New	**Returning**
Intercept for Students (*I spoke to fellow students about this triggering incident*)	2.940	2.636

Table A8.2c Non-invariant parameters of sharing for status

	Chi-sq	*df*	*ΔChi-sq*	*Δdf*	*p* value
Measured items					
Configural	0.00 [1]	0	-	-	-
Weak (loadings equal)	1.68	2	1.68	2	0.432
Strong (loadings & intercepts equal)	2.49	4	0.80	2	0.670
Strict (loadings, intercepts & residuals equal)	4.85	7	2.36	3	0.501
Latent constructs					
Equal variances	5.17	8	0.32	1	0.572
Equal means	6.50	9	1.33	1	0.249

** (*) denotes significance at one (five) per cent or better
[1] *Just identified model with zero chi-square and degrees of freedom*

Table A8.2d Invariance of sharing by gender

	Chi-sq	df	ΔChi-sq	Δdf	p value
Measured items					
Configural	0.00 [1]	0	-	-	-
Weak (loadings equal)	4.24	2	4.24	2	0.120
Strong (loadings & intercepts equal)	6.96	4	2.72	2	0.257
Strict (loadings, intercepts & residuals equal)	8.07	7	1.11	3	0.775
Latent constructs					
Equal variances	14.01	8	5.94*	1	0.015
free variance for Sharing	8.07	7	0.00	0	1.000
Equal means	10.36	8	2.29	1	0.130

** (*) denotes significance at one (five) per cent or better
[1] *Just identified model with zero chi-square and degrees of freedom*
Table A8.2e Invariance of sharing by culture

	Confucian	Other
Variance for *Sharing*	0.527	1.001

Table A8.2f Non-invariant parameters of sharing for culture

In this appendix the procedures used to test for mediated and moderated effects are described, using the example of the *Failure* trigger, *Positive* emotions, *Understanding* and sharing with *Friends*. Testing was done in two phases:

- First, to expand on Section 4.6, the mediated and direct effects of *Failure* on *Understanding* are tested (Appendix A9.1 and Appendix10);

- Second, as in Section 4.7, the moderating influences of sharing with *Friends* are examined for the pathways identified in the first step (see Appendix A9.1a, A9.2, A9.2a/b).

A9.1: MEDIATED AND DIRECT EFFECTS

To test a mediated effect (such as the pathway *Failure* →*Positive* →*Understanding* in Figure A9.1a) a product of coefficients, $a \times b$, must be assessed for statistical significance. This can be problematic as such a product may not satisfy distributional assumptions required in a test of significance, even though the individual coefficients may do so (Kenny 2015).
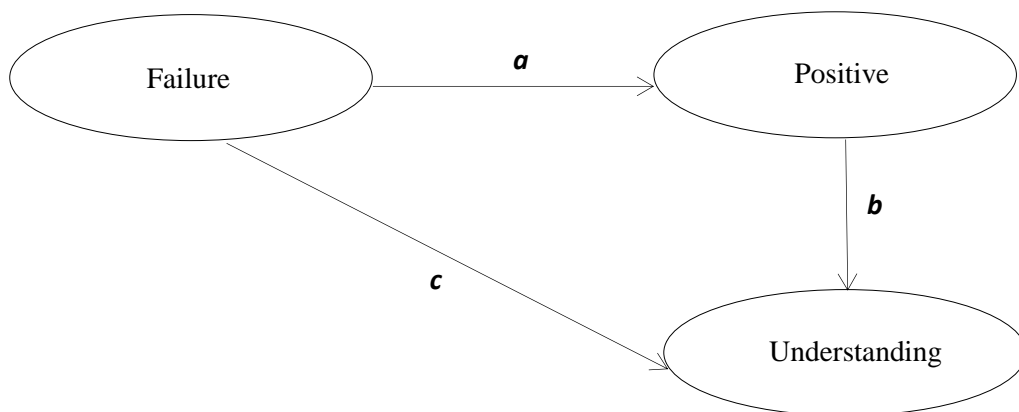
Figure A9.1a Potential direct and indirect effects

Because polychoric correlations are used for ordinal variables, the individual coefficients reported in tables throughout the research are for latent variables underpinning each measured item and so are normally distributed. To conduct a test of significance for the product that is free of distributional assumptions, bootstrapping of standard errors (SEs, Brown 2006; Kenny 2015) is used with the estimates produced with DWLS (Rosseel 2016).

Bootstrapped standard errors may be larger than those produced by other means (such as maximum-likelihood estimation), therefore providing a challenge to significance of coefficients found by those other means. Coefficient estimates from robust DWLS for the model of Figure A9.1a are given in columns 1 and 3 of Table A9.1a.

The coefficients in the two columns are equal, but SEs and diagnostics differ. In line with research elsewhere, diagnostics are improved, in particular the RMSEA, TLI and CFI, when bootstrapping (Finney and DiStefano 2006).

It will be noted that for the first items of each factor standard errors are not reported. This is because to identify the system and obtain a solution for the SEM, initial items were required to have loadings of one, with factor variances free. Also required were zero intercepts for each initial item, freely estimated factor intercepts and factor covariances set to zero (Hoyle 2012). As expected, comparison of columns 2 and 4 reveals that bootstrapped standard errors are greater than robust DWLS estimates, except in three cases. Nevertheless, differences are not great, suggesting that conclusions drawn on the basis of either will be the same. This is indicated by the incidence of *s in each row of estimates, indicating that p values fall into the same range of values.

The conclusions on existence of mediated and direct influences on *Understanding* are the same for each approach. First, the direct effect *Failure* $\rightarrow$ *Understanding* is not supported and the coefficient (0.050) is regarded as being indistinguishable from zero. It is therefore concluded that for the direct effect $c = 0$. On the other hand, for the mediated effect there is moderate evidence of an impact (as $p < 0.05$). However, in Cohen's classification, the effect is small as the standardised magnitude of the product $a \times b$ is 0.115 (Cohen 1988; Field 2009). The conclusion is that *Positive* emotions mediate the effect of *Failure* on *Understanding*. Taken together these findings lead to the conclusion that the influence of *Failure* on *Understanding* is fully mediated by *Positive* emotions (as the direct effect is discarded), but the mediated effect is relatively slight. Overall, *Failure* has only a small effect on *Understanding*, with the direct effect being zero (that is, the coefficient c can be set to zero).

A9.1a: DWLS and bootstrapped estimates for the example

Diagnostic	Robust DWLS	Robust SEs	Bootstrap	Bootstrap SEs
Chi-square	253.2		176.8	
Degrees of Freedom	206		206	
p value of Chi-sq	0.014		0.750	
RMSEA	0.026		0.005	
p value RMSEA ≤ 0.05	1.00		0.995	
Tucker-Lewis index (TLI)	0.925		1.02	
Bentler CFI	0.933		0.996	
SRMR	0.063		0.050	
n	333		333	
Number of bootstraps			1000	1000
Failure				
T3	0.624		0.624	
T5	0.658**	0.127	0.658**	0.098
T7	0.712**	0.109	0.712**	0.131
T9	0.718**	0.110	0.718**	0.116
T11	0.630**	0.107	0.630**	0.121
T13	0.650**	0.107	0.650**	0.110
Positive				
P1	0.713		0.713	
P2	0.819**	0.163	0.819**	0.178
P3	0.508**	0.188	0.508**	0.200
Understanding				
U1	0.737		0.737	
U2	0..618**	0.123	0.618**	0.130
U3	0.692**	0.128	0.692**	0.150
U4	0.540**	0.140	0.540**	0.167
Failure × Sharing				
T3 × Friends	0.603		0.603	
T5 × Friends	0.676**	0.101	0.676**	0.098
T7 × Friends	0..723**	0.133	0.723**	0.138
T9 × Friends	0.695**	0.114	0.695**	0.120
T11 × Friends	0.605**	0.116	0.605**	0.123
T13 × Friends	0.660**	0.112	0.660**	0.118
Positive × Sharing				
P1 × Friends	0.593		0.593	
P2 × Friends	0.911**	0.269	0.911**	0.296
P3 × Friends	0.537**	0.222	0.537**	0.231
Regressions				
Failure → Positive (*a*)	-0.265**	0.063	-0.265**	0.063
R^2	0.070		0.070	
Positive → Understanding (*b*)	0.435**	0.092	0.435**	0.094
Failure → Understanding (*c*)	0.050	0.054	0.050	0.056
R^2	0.180		0.180	
A × B	-0.115*	0.012	-0.115*	0.014

**(*) indicates $p \leq 0.01$ (0.05)

Table A9.1a DWLS and bootstrapped estimates for the example

A9.2: THE MODERATING EFFECTS OF SHARING WITH OTHERS

While bootstrapping has the benefit of avoiding distributional assumptions, there are costs as drawing bootstrapped samples of sufficient size (often 1,000 or more) involves considerable time and computing resource. This was found to be the case when testing the product $a \times b$. Consequently, subsequent assessments of moderating effects were undertaken using robust DWLS SEs (Finney and DiStefano 2006; Rosseel 2016). In the previous section these were noted as being for the normally distributed latent measures underpinning TISS responses and it was noted they did not differ greatly from those obtained by bootstrapping.

Having established *Positive* emotions as a complete mediator, this section concerns the possibility that sharing with relevant people may alter the strength of the relationships from *Failure* to *Positive* emotions and from *Positive* emotions to *Understanding*. To do this, responses to the three TISS statements on speaking to friends, family and fellow students, were used to create dichotomous variables. Other formulations are possible (Hoyle 2012); however, the presentation of results can be streamlined using dichotomous or dummy variables. These have value one for responses "definitely agree" and "agree somewhat" while "only to be used if a definite answer is not possible", "somewhat disagree" and "definitely disagree" were coded as zero (termed "definite dialogue" and "not definite dialogue" in Appendix 10.4). To estimate moderating effects, the direct effect is eliminated and allowance is made in the SEM for the possibility of sharing affecting the mediating pathways as in Figure A9.2a.
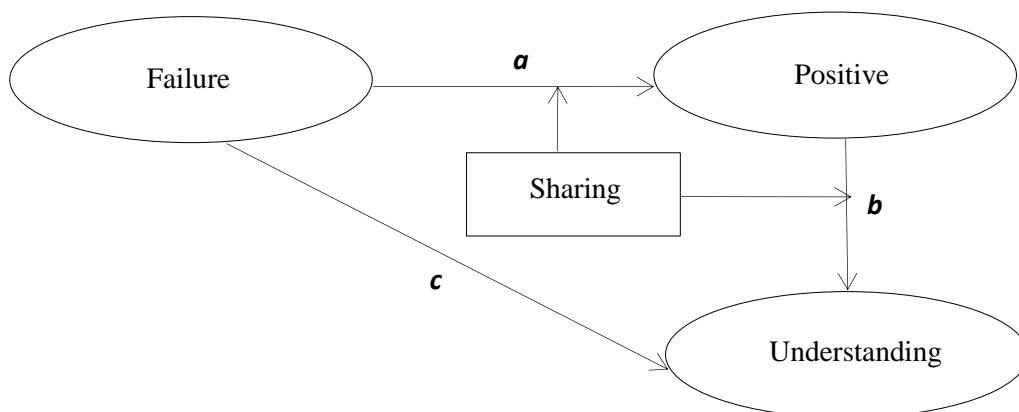
Figure A9.2a Indirect effect and potential moderating effects

Moderating influences take two forms in the SEMs for this analysis. There may be an effect that is associated with sharing with one set of social actors (that is strongly agreeing or agreeing a set of important people were consulted; i.e. "definite") regardless of the influences of *Failure* on *Positive* emotions or of *Positive* emotions on *Understanding*. This is referred to as the "intercept" in studies of moderators (Brown 2006; Hoyle 2012). It is possible also that as the influence of antecedent variables intensifies (for example, respondents agree or strongly agree that a failure in some aspect of SHI life was an influence), the impact of *Sharing* changes. This is referred to as the "slope" in moderation studies (Brown 2006; Hoyle 2012). Both influences were estimated by adding equations to the model of Table A9.1a (after removing the direct effect of *Failure* on *Understanding*). Results are shown in Table A9.2a, where it can be seen that the coefficients of the mediating pathway remains significantly different to zero (Kenny 2015) and close to the values shown in Table A9.1a. Further, there is evidence that the *Sharing* intercept affects the linkage from *Positive* to *Understanding*.

A9.2a: DWLS and bootstrapped estimates for the example

	Unstandardised Coefficient [1]	*p* value
Failure → Positive (*a*)	-0.190**	0.005
Moderation: sharing with friends		
Intercept	0.095	0.174
Slope	-0.048	0.738
Positive → Understanding (*b*)	0.391**	0.000
Moderation: sharing with friends		
Intercept	0.188**	0.007
Slope	-0.109	0.632

** indicates $p \leq 0.01$
[1] Unstandardised coefficients are shown in this table so a comparison can be made below with *semtools* estimates of within-group intercepts and slopes.
Table A9.2a DWLS and bootstrapped estimates for the example

Results for estimations involving moderation are affected frequently by multicollinearity (Hoyle 2012). This occurs when there are high correlations between variables used to explain an outcome, for example using *Failure*, *Sharing* and *Sharing* × *Failure* to estimate the relationship between *Failure* and *Positive* emotions.

In estimations of this type, multicollinearity affects significance tests of coefficients, often suggesting that an estimate is not significantly different to zero, when on other evidence it is.

Further, it becomes difficult to estimate the effect of one variable precisely, say *Sharing*, although the combination of *Positive*, *Sharing* and *Sharing × Positive* can be estimated with reasonable precision (Gujarati 2003). These issues may be further compounded in the current situation, as simultaneously moderating influences on the two arms of a mediated relationship are estimated. To untangle the influences of multicollinearity, Wald tests are applied to test moderating effects, using the *semtools* software (Field et al. 2012; Pornprasertmanit 2016).

In the moderator results of Table A9.2b, only the *Sharing* intercept significantly affects the link from *Positive* to *Understanding*. To assess whether the findings in the table are affected by multicollinearity, it is possible to undertake Wald tests using the *semtools* software to probe for differences in intercepts and slopes for each value of the dichotomous *Sharing* variable. The results are shown in Table A9.2b. Now intercepts are seen to differ from zero for each moderating effect in each group of respondents represented by the dichotomous variable. Further, slopes differ from zero among those respondents who did not agree (dialogue not definite) they had discussions with friends. Thus, multicollinearity masks effects that differ across those who agreed they shared with friends and those who did not. The results are presented also in Figure A9.2b.

A9.2b: Effects and significance of sharing with friends

Linkage	Intercept or slope	Dialogue	Unstandardised Coefficient	*p* value
Failure → Positive	Intercept			
		Not agreed	4.73**	0.000
		Agreed	4.83**	0.000
	Slope	Not agreed	-0.190**	0.004
		Agreed	-0.237	0.084
Positive → Understanding	Intercept			
		Not agreed	2.40**	0.000
		Agreed	2.59**	0.000
	Slope	Not agreed	0.391**	0.001
		Agreed	0.282	0.213

** denotes $p < 0.01$

Table A9.2b Effects and significance of sharing with friends

It appears that the intercepts differ a little across respondents who agreed and those who did not. This can be seen in the closeness of the intersections of each pair of lines with the

vertical axis on the left in the figure. However, from Table A9.2b, the intersections for moderation of the *Positive → Understanding* relationship are significantly different.

These statements are consistent because the SEM underpinning Table A9.2b provides estimates of the *differences* in intercepts for those who agreed and those who did not agree they shared with friends. (For example, the differences between intercepts in Table A9.2b are 0.10 and 0.19).

More can be said about the influence of sharing with friends on the basis of the slopes in Table A9.2b. These differ from zero in the case of those who did not agree (not definite dialogue) they shared. For this group, slopes are significantly different to zero at better than 1%. Now compare this finding with the results for the group who agreed they shared. In this case, slopes are not significantly different to zero at even 5% in Table A9.2b. This difference in finding from Table A9.2a is probably associated with multicollinearity. Thus, on the basis of Table A9.2a it is concluded sharing with friends moderates the mediational relationship because intercepts suggest enhancement of the impact of *Positive* emotions on *Understanding*. In addition, it can be seen from Table A9.2b and Figure A9.2b that sharing or not sharing with friends has influence within each group on the basis of differences in slopes.
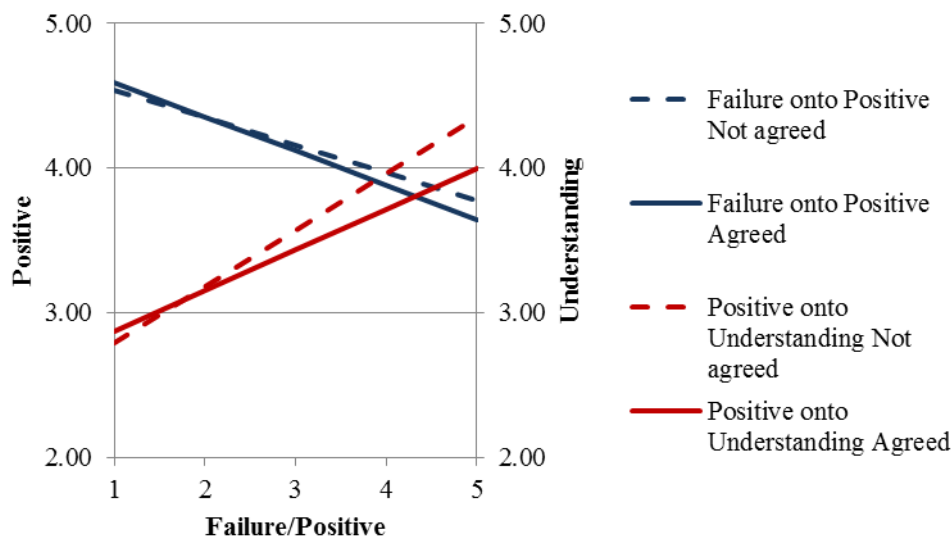
Figure A9.2b The influences of sharing with friends on the mediated pathway

SEM results are given here for the diagrams of Section 4.6 that involve mediation effects, with the exception of A10.3.1 and A10.3.2 to demonstrate results where mediation was not found. Due to minimal disparity between robust DWLS and bootstrapped models, results in Section 4.6 indicate bootstrapped mediations with higher fit indices, where-as below results for the robust DWLS are reported.

A10.1: MEDIATION OF THE IMPACT OF FAILURE ON FORMS OF REFLECTION
A10.1.1: Positive emotions and understanding

Diagnostic	Benchmark	Including direct effect	Excluding direct effect
Chi-square		84.9	86.5
Degrees of freedom		57	58
p value of Chi-sq	> 0.05	0.010	0.009
RMSEA	< 0.06	0.038	0.038
p value RMSEA ≤ 0.05	> 0.50	0.872	0.873
Tucker-Lewis index (TLI)	≥ 0.95	0.984	0.980
Bentler CFI	≥ 0.95	0.989	0.985
SRMR	< 0.08	0.041	0.042
n		333	333
Factor	**Item**	**Standardised loadings**	
Failure	T3	0.644** [1]	0.642**
	T5	0.681**	0.681**
	T7	0.799**	0.799**
	T9	0.690**	0.692**
	T11	0.593**	0.596**
	T13	0.726**	0.725**
Positive	P1	0.862**	0.863**
	P2	0.728**	0.750**
	P3	0.482**	0.496**
Understanding	U1	0.893**	0.861**
	U2	0.685**	0.596**
	U3	0.750**	0.692**
	U4	0.521**	0.440**
Regressions			
Mediated pathway:	Failure $\rightarrow$ Positive	-0.331**	-0.298**
	R^2	0.110	0.089
	Positive $\rightarrow$ Understanding	0.555**	0.454**
Direct pathway:	Failure $\rightarrow$ Understanding	0.094 [2]	-
	R^2	0.282	0.206
Error correlations			
	T3 with T5	0.292**	0.294**
	T9 with T11	0.506**	0.504**
	P2 with P3	0.363**	0.343**
	U3 with U4	0.331**	0.276**
	U1 with U3	-0.513**	-0.461*

[1] **(*) denotes significant at better than one (five) per cent [2] $p = 0.151$ (Also, the difference in Chi-sq values for the estimations is 2.601, which for one df has $p = 0.107$)

A10.1.2: Positive emotions and reflection

Diagnostic	Benchmark	Including direct effect	Excluding direct effect
Chi-square		89.8	86.7
Degrees of freedom		58	59
p value of Chi-sq	> 0.05	0.005	0.011
RMSEA	< 0.06	0.041	0.038
p value RMSEA ≤ 0.05	> 0.50	0.822	0.873
Tucker-Lewis index (TLI)	≥ 0.95	0.984	0.987
Bentler CFI	≥ 0.95	0.988	0.891
SRMR	< 0.08	0.041	0.041
n		333	333
Factor	**Item**	**Standardised loadings**	
Failure	T3	0.644** [1]	0.644**
	T5	0.681**	0.681**
	T7	0.790**	0.790**
	T9	0.691**	0.691**
	T11	0.610**	0.610**
	T13	0.725**	0.725**
Positive	P1	0.814**	0.814**
	P2	0.767**	0.767**
	P3	0.519**	0.520**
Reflection	R1	0.533**	0.533**
	R2	0.673**	0.673**
	R3	0.799**	0.799**
	R4	0.823**	0.823**
Regressions			
Mediated pathway:	Failure → Positive	-0.329**	-0.328**
	R^2	0.108	0.108
	Positive → Reflection	0.783**	0.782**
Direct pathway:	Failure → Reflection	0.001 [2]	-
	R^2	0.612	0.611
Error correlations			
	T3 with T5	0.291**	0.291**
	T9 with T11	0.494**	0.494**
	P2 with P3	0.312**	0.311**
	R1 with R2	0.211**	0.211**

[1] **(*) denotes significant at better than one (five) per cent

[2] *p* = 0.983

A10.1.3: Positive emotions and critical reflection

Diagnostic	Benchmark	Including direct effect
Chi-square		74.6
Degrees of freedom		57
p value of Chi-sq	> 0.05	0.059
RMSEA	< 0.06	0.031
p value RMSEA ≤ 0.05	> 0.50	0.966
Tucker-Lewis index (TLI)	≥ 0.95	0.990
Bentler CFI	≥ 0.95	0.993
SRMR	< 0.08	0.038
n		333

Factor	Item	Standardised loadings
Failure	T3	0.651**[1]
	T5	0.685**
	T7	0.798**
	T9	0.685**
	T11	0.586**
	T13	0.727**
Positive	P1	0.792**
	P2	0.777**
	P3	0.560**
Critical reflection	CR1	0.794**
	CR2	0.673**
	CR3	0.695**
	CR4	0.555**

Regressions		
Mediated pathway:	Failure → Positive	-0.325**
	R^2	0.105
	Positive → Critical reflection	0.613**
Direct pathway:	Failure → Critical reflection	0.235**
	R^2	0.337

Error correlations		
	T3 with T5	0.282**
	T9 with T11	0.513**
	P2 with P3	0.257**
	CR2 with CR4	0.264**
	CR3 with CR4	0.254**

[1] **(*) denotes significant at better than one (five) per cent

A10.1.4: Negative emotions and reflection

Diagnostic	Benchmark	Including direct effect
Chi-square		122.5
Degrees of freedom		80
p value of Chi-sq	> 0.05	0.002
RMSEA	< 0.06	0.040
p value RMSEA ≤ 0.05	> 0.50	0.880
Tucker-Lewis index (TLI)	≥ 0.95	0.981
Bentler CFI	≥ 0.95	0.986
SRMR	< 0.08	0.043
n		333

Factor	Item	Standardised loadings
Failure	T3	0.774** [1]
	T5	0.747**
	T7	0.731**
	T9	0.686**
	T11	0.679**
	T13	0.703**
Negative	P4	0.605**
	P5	0.664**
	P6	0.771**
	P7	0.804**
	P8	0.469**
Reflection	R1	0.490**
	R2	0.659**
	R3	0.844**
	R4	0.808**

Regressions		
Mediated pathway:	Failure → Negative	0.433**
	R^2	0.187
	Negative → Reflection	-0.230**
Direct pathway:	Failure → Reflection	-0.149*
	R^2	0.105

Error correlations		
	T3 with T9	-0.266**
	T3 with T11	-0.437**
	T5 with T11	-0.248**
	T9 with T11	0.447**
	P4 with P6	-0.382**
	P4 with P8	0.212**
	R1 with R2	0.257**

[1] **(*) denotes significant at better than one (five) per cent

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A10.2: Mediation of the impact of personal triggers on forms of reflection

A10.2.1: Negative emotions and reflection

Diagnostic	Benchmark	Including direct effect	Excluding direct effect
Chi-square		94.9	91.9
Degrees of freedom		58	59
p value of Chi-sq	> 0.05	0.002	0.004
RMSEA	< 0.06	0.044	0.041
p value RMSEA ≤ 0.05	> 0.50	0.979	0.815
Tucker-Lewis index (TLI)	≥ 0.95	0.979	0.981
Bentler CFI	≥ 0.95	0.984	0.986
SRMR	< 0.08	0.047	0.049
N		333	333
Factor	**Item**	**Standardised loadings**	
Personal	T21	0.979** [1]	0.968**
	T22	0.688**	0.690**
	T25	0.700**	0.708**
	T26	0.495**	0.503**
Negative	P4	0.686**	0.681**
	P5	0.689**	0.687**
	P6	0.658**	0.645**
	P7	0.730**	0.726**
	P8	0.529**	0.527**
Reflection	R1	0.499**	0.501**
	R2	0.660**	0.662**
	R3	0.863**	0.862**
	R4	0.781**	0.781**
Regressions			
Mediated pathway:	Personal $\rightarrow$ Negative	0.380**	0.401**
	R^2	0.145	0.161
	Negative $\rightarrow$ Reflection	-0.269**	-0.330**
Direct pathway:	Personal $\rightarrow$ Reflection	-0.099 [2]	-
	R^2	0.102	0.109
Error correlations			
	T25 with T26	0.584**	0.578**
	P4 with P6	-0.325**	-0.297**
	P7 with P6	0.320**	0.336**
	R1 with R2	0.248**	0.246**

[1] **(*) denotes significant at better than one (five) per cent

[2] $p = 0.211$

A10.2.2: Negative emotions and critical reflection

Diagnostic	Benchmark	Including direct effect
Chi-square		139.3
Degrees of freedom		58
p value of Chi-sq	> 0.05	0.000
RMSEA	< 0.06	0.065
p value RMSEA ≤ 0.05	> 0.50	0.037
Tucker-Lewis index (TLI)	≥ 0.95	0.953
Bentler CFI	≥ 0.95	0.965
SRMR	< 0.08	0.059
N		333

Factor	Item	Standardised loadings
Personal	T21	0.905** [1]
	T22	0.700**
	T25	0.753**
	T26	0.547**
Negative	P4	0.645**
	P5	0.701**
	P6	0.681**
	P7	0.745**
	P8	0.472**
Critical reflection	CR1	0.709**
	CR2	0.711**
	CR3	0.737**
	CR4	0.715**

Regressions		
Mediated pathway:	Personal → Negative	0.381**
	R^2	0.145
	Negative → Critical reflection	-0.128 [2]
Direct pathway:	Personal → Critical reflection	0.208*
	R^2	0.039

Error correlations		
	T25 with T26	0.540**
	P4 with P6	-0.298**
	P4 with P8	0.191*
	P7 with P6	0.281*

[1] **(*) denotes significant at better than one (five) per cent

[2] $p = 0.081$

A10.3: EXAMPLES OF NON-MEDIATION OF PERSONAL INFLUENCES ON FORMS OF REFLECTION

A10.3.1: Positive emotions and reflection

Diagnostic	Benchmark	Including direct effect	Excluding direct effect
Chi-square		112.8	75.5
Degrees of freedom		40	40
p value of Chi-sq	> 0.05	0.000	0.001
RMSEA	< 0.06	0.065	0.052
p value RMSEA ≤ 0.05	> 0.50	0.074	0.414
Tucker-Lewis index (TLI)	≥ 0.95	0.955	0.978
Bentler CFI	≥ 0.95	0.967	0.984
SRMR	< 0.08	0.061	0.056
N		333	333
Factor	**Item**	**Standardised loadings**	
Personal	T21	0.787** [1]	0.907**
	T22	0.666**	0.712**
	T25	0.908**	0.748**
	T26	0.719**	0.526**
Positive	P1	0.824**	0.823**
	P2	0.709**	0.756**
	P3	0.513**	0.518**
Reflection	R1	0.587**	0.586**
	R2	0.709**	0.709**
	R3	0.793**	0.794**
	R4	0.798**	0.797**
Regressions			
Mediated pathway:	Personal → Positive	-0.057 [2]	-
	R^2	0.003	
	Positive → Reflection	0.768**	0.774**
Direct pathway:	Personal → Reflection	-0.110 [3]	-0.188*
	R^2	0.612	0.634
Factor correlation			
	Personal with Positive	-	0.000
Error correlations			
	P2 with P3	0.322**	0.317**
	T25 with T26	-	0.560**

[1] **(*) denotes significant at better than one (five) per cent
[2] *p* = 0.415
[3] *p* = 0.060

A10.3.2: Positive emotions and critical reflection

Diagnostic	Benchmark	Including direct effect	Excluding direct effect
Chi-square		86.1	76.6
Degrees of freedom		40	41
p value of Chi-sq	> 0.05	0.000	0.001
RMSEA	< 0.06	0.059	0.051
p value RMSEA ≤ 0.05	> 0.50	0.185	0.435
Tucker-Lewis index (TLI)	≥ 0.95	0.969	0.977
Bentler CFI	≥ 0.95	0.978	0.983
SRMR	< 0.08	0.054	0.056
N		333	333
Factor	**Item**	**Standardised loadings**	
Personal	T21	0.753** [1]	0.749**
	T22	0.663**	0.664**
	T25	0.930**	0.931*
	T26	0.726**	0.727**
Positive	P1	0.802**	0.800**
	P2	0.763**	0.762**
	P3	0.560**	0.568**
Critical reflection	CR1	0.732**	0.732**
	CR2	0.718**	0.718**
	CR3	0.732**	0.732**
	CR4	0.690**	0.690**
Regressions			
Mediated pathway:	Personal → Positive	-0.050 [2]	-
	R^2	0.003	
	Positive → Critical reflection	0.519**	0.509**
Direct pathway:	Personal → Critical reflection	0.191**	0.165*
	R^2	0.296	0.286
Factor correlation			
	Personal with Positive	-	0.000
Error correlations			
	P2 with P3	0.265*	0.256*

[1] **(*) denotes significant at better than one (five) per cent

[2] *p* = 0.470