Understanding Optimism
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Contents

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Declaration

I hereby declare that I am the author of this thesis and that the work presented herein is my own. This work has not been submitted for any other degree or professional qualification.

Published works

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Abstract

I present seven empirical studies that investigate two main themes regarding two main approaches of optimism: explanatory style and dispositional optimism. The first theme incorporates measurement issues and conceptual ideas of optimism and the second involves optimism interventions on depressive symptoms. In Study 1 I explored the potential psychometric structure of causal attributions and dispositional optimism. Attributions may be best viewed as reflecting large differences in cognitive style, and smaller independent positive- and negative-event biases. For dispositional optimism, a two-factor model was supported. Study 2 examined correlations between optimism and the Five-Factor Model of personality. Dispositional optimism and explanatory style had similar association patterns with personality, although there were some differences. Study 3 tested and supported a model in which dispositional optimism mediates the link between explanatory style and psychological well-being. Study 4 compared the levels of optimism expression in two ethnic groups, finding that Mainland Chinese participants were more optimistic and less pessimistic than White British. Study 5 examined attributional biases and found that individuals show more optimistic biased style for themselves than for other people. Studies 6 and 7 tested effectiveness of optimism interventions on depressive symptoms. It demonstrated that self-monitored optimism interventions on a daily basis could effectively reduce depressive symptoms and increase optimistic explanatory style. Taken together, the studies replicated some previous investigations regarding measurement issues and conceptual ideas of optimism, and explored novel approaches to examining the essence of attributional bias and effectiveness of optimism interventions in depression treatment. My investigation of attributional bias is the first to test this idea using new and comparable measures of attributions. Practicing self-administered optimism interventions is, to my knowledge, also the first time these interventions have been applied in a sample with mild-to-moderate depressive symptoms. This may provide an easily monitored and low-cost alternative to traditional treatments of depression.

Chapter 1: What is optimism?

The optimist sees the rose and not its thorns; the pessimist stares at the thorns, oblivious to the rose. – Kahlil Gibran (1951, p. 45)

1.1 Origins and concepts of optimism

Optimism from a philosophically historical view

As originally forwarded by Aristotle and as long noted by philosophers afterwards, human beings are not merely what they are (actuality), but more essentially are what they are not yet but can be (potentiality) (Chang, 2001a). This idea has been prominently reflected in the subsequent literature of important philosophers. It was believed that it is the power of potentiality that determines who and what we are and how we exist in the world. Here the potentiality means that the range of possibilities between the two opposite expectations of good or bad things happening, are outstanding.

Though the roots of psychological accounts of optimism are believed to have originated from the attempts of leading philosophers of the modern period (Domino & Conway, 2001), the development of philosophical understanding of optimism can be traced back to the articulations of the French philosopher Descartes (1596-1650), who claimed "there is no soul so weak that it cannot, if well-directed, acquire an absolute power over its passions" (Descartes, 1985).

The original sense of optimism comes from the Latin word *optimum*, meaning 'the best possible', and technically has its roots in the writings of Gottfried Leibniz (1646-1716). Leibniz (2010) believed it was God who created the universe and described it as "the best of all possible worlds." The term optimism was used to name the unique maximum or minimum instance of an infinite class of possibilities in his description. Later, several famous philosophers, including David Hume (1711-

1776), Georg Wilhelm Friedrich Hegel (1770-1831), and Friedrich Nietzsche (1844-1900), all contributed to the development of psychological accounts of optimism (Domino & Conway, 2001).

Psychologists have begun to pay attention to optimism from a philosophical perspective as well. Though Sigmund Freud (1856-1939) was best known for his pioneering and fundamental work in psychoanalysis, in later life he dedicated his career to communicating a better social and anthropological understanding of his essential psychoanalysis principles, which included the philosophical and psychological status of optimism and pessimism. Freud (1961) claimed that striving for happiness is in the nature of humans. This process is completed in two simultaneous-existing forms: an individual wishes to feel extreme joy in life experience and to avoid distress at the same time. Influenced by the political success of Hitler's Nazi party in the 1930s in Germany, Freud shifted from his originally sceptical view for the future to being deeply pessimistic about the future of humans (Domino & Conway, 2001). Another pioneering psychologist, William James (1842-1910), felt similarly pessimistic towards the happiness of humans. However, James put more emphasis on the individual level, claiming that only each individual has the ultimate choice between optimism and pessimism (James, 1985).

The philosophical explanation of the origins and development of optimism are still in progress. All the ideas illuminated above have contributed to our current understanding of the nature of optimism theoretically. Many theorists have discussed optimism in human nature in positive terms. One of the useful definitions of optimism was contributed by anthropologist Tiger (1979, p. 18): "a mood or attitude associated with an expectation about the social or material future – one which the evaluator regards as socially desirable, to his [or her] advantage, or for his [or her] pleasure". Partly based on this definition, Peterson (2000a) regarded optimism as a three-factor construct with cognitive, emotional and motivational aspects.

As stated above, optimism has long been discussed in positive terms as generalized human nature by philosophers and theorists like Descartes, Leibniz, Hume, and Hegel (Domino & Conway, 2001). At the same time, differential

psychologists began to address optimism as an individual difference, a trait people possess to varying degrees. Though these two approaches of optimism, human nature and individual difference, are basically consistent; the differential perspective focuses more on the influence of an individual's experience to the characteristic optimism. Treating optimism as an individual difference means that it is a person's experience that influences whether one is optimistic or pessimistic (Peterson, 2000a).

Dictionary definitions of optimism

The Oxford Dictionary provides two related definitions of optimism. The first is "hopefulness and confidence about the future or the success of something". The second conception seems a little bit broader, referring to the belief that "this world is the best of all possible worlds". Along the lines of the first definition, Scheier and Carver (1987) identified optimism as dispositional optimism. Dispositional optimism refers to positive expectations in a given situation (Scheier & Carver, 1987) and recently has been conceptualized as broad and general expectancies (Scheier & Carver, 1992, 1993). Following the second definition, the term optimism has been applied to the habitual way that people explain their life events, and was identified as an explanatory style (Seligman, 1991) or attributional style (Abramson, Seligman, & Teasdale, 1978; Peterson et al., 1982).

While many other competitive models of optimism have been proposed, such as the Hope construct (Snyder, 1989, 2002; Snyder et al., 1991), the leading approaches of optimism are explanatory style and dispositional optimism (Carver, Scheier, & Segerstrom, 2010; Forgeard & Seligman, 2012). These two concepts and theoretical themes are my main concerns in this research. I will now turn to explicitly describe these two models.

1.2 Explanatory Style

It has been claimed that individuals are naive psychologists who try to explain the causes of their own behaviours and those of others (Heider, 1958). One of the prevailing ideas in psychology is, then, that individuals inherently tend to come up with explanations for behaviours and outcomes in their lives (Peterson, 2000a). These views form the foundation of attributional theory. Attributions are taken as the thoughts and beliefs people hold about the relationships between various observations and life events, especially those thoughts and beliefs that seek to explain causal relationships (Poropat, 2002).

1.2.1 Historical Development of models of explanatory Style

The development of attributional theory has a considerable history.

Three dimensions of attributional style

Research on attributional style is widely considered (Abramson et al., 1978) to have begun with Heider (1958). Heider differentiated internality and externality as perceived determinants of outcomes. Internality involves explanations "within the person", which occur when an individual blames him- or herself for a problem. By contrast, external explanations turn for causal influences to factors "within the environment". These are exemplified in cases when one blames something outside of oneself.

The next major enlargement of theories of explanatory style came with Weiner (1974), who added stability as a second attributional component. According to Weiner, stability refers to attributions about the consistent causes, for instance, whether the cause is enduring or fleeting. The final enlargement, forming attributional style theory as it exists today, was initiated by Abramson et al. (1978). They proposed a three-dimensional model, which incorporated dimensions of internality-externality, stability-instability, and globality. In this theory, internal and external attributions resemble the framework of Heider (1958). Stable and instable attributions are parallel with and the theory of Weiner (1974). Globality, the novel attributional factor in this theory, is linked to predictions about how likely a causal

factor is to operate across a broad range of additional situations. These three dimensions, internal versus external, stable versus unstable, and global versus specific, have been combined to form the three-dimensional model of explanatory style (Abramson et al., 1978).

During the 1980s, attributional style became a widely-accepted way of defining and measuring optimism as an individual difference, and much of the current research on attributions has been inspired by work on this three-dimensional model of attributional style.

Development of the theory of explanatory style

During the early studies of Maier and Seligman (1976) with animals, it was found that after being exposed to uncontrollable aversive stressors, animals give up and become helpless, and later continue to act helpless even when the uncontrollable negative situations are now under control. This similar phenomenon was tested and supported on humans as well in later studies (Hiroto & Seligman, 1975; Klein, Fencil-Morse, & Seligman, 1976), and was called "learned helplessness". It was presumed that after experiencing uncontrollable negative events, animals and people become helpless because they have "learned" that there is no difference in responses and their subsequent consequences (Maier & Seligman, 1976). Furthermore, this learning is developed into a generalized expectation that it is futile to attempt a different future by any action. Helplessness then occurs later following this pessimistic generalized expectancy of action-outcome independence.

It has been found that certain individuals respond pessimistically after being exposed to uncontrollable aversive events, while other individuals never give up and become helpless in similar situations. To account for the different responses of human helplessness following uncontrollable adversities, the three-dimensional model of explanatory style was added to the original learned helplessness model. (Abramson et al., 1978; Peterson et al., 1982). Theory of explanatory style assumes that causal explanations for a negative event definitively determine whether a person will develop general helplessness or not. If an individual attributes adversity to an

internal cause, self-esteem is thought to suffer. If they attribute adversity to long-lasting (stable) causes, helplessness is thought to be enduring. If they attribute a negative event to a global cause, helplessness is regarded as pervasive (Abramson et al., 1978; Peterson et al., 1982).

Based on ideas of explanatory style, the reformulated learned helplessness theory (Abramson et al., 1978) was developed. According to this theory, people usually search for an explanation for events, especially negative ones occurring in their lives. Explanation for negative events can vary along three dimensions: internal versus external, stable versus unstable, and global versus specific (Abramson et al., 1978). Later on, Seligman (1991) developed research of learned helplessness into learned optimism by reframing the theory of explanatory style. Thoughts of helplessness were transformed into optimistic explanatory style, or simply optimism. Individuals may view negative events as having causes which are unstable, specific, and external (an "optimistic explanatory style") or as stable, global, and internal – a pessimistic explanatory style (Buchanan & Seligman, 1995; C. Peterson & Steen, 2009). People who hold an pessimistic explanatory style will feel pessimistic and be more prone to depression as a consequence (Peterson & Seligman, 1984). By contrast, An individual who is characterized with an optimistic explanatory style appears to be protective for depression (Seligman, 1991).

Generally speaking, explanatory style refers to habitual explanations people provide for the causes of positive and negative events in terms of their stability, globality, and internality (Peterson et al., 1982). As these explanations are predicted to influence behaviour and mood – in particular depression – they are of clinical as well as theoretical importance (Buchanan & Seligman, 1995; C. Peterson & Steen, 2009).

1.2.2 Measures of explanatory style

Explanatory style or attributional style is mainly reflected in the Attributional Style Questionnaire (the ASQ; Peterson et al., 1982), which is the associated self-report measure of attributional style. As Peterson et al. (1982, p. 288) said, ASQ 'yields scores for individual differences in the tendencies to attribute the causes of bad and good events to internal (versus external), stable (versus unstable), and global (versus specific) factors.' Accordingly, this self-report questionnaire was developed to assess the habitual explanation of life events in terms of the stability, globality, and internality of the causes of positive and negative events (Peterson et al., 1982; 2011).

This questionnaire includes six positive events (e.g., "*You do a project that is highly appraised*") and six negative events (e.g., "*You have been looking for a job unsuccessfully for some time*"). Each of these 12 different hypothetical events is followed by a series of 4 questions which are arranged in the same order. Respondents are asked to generate an explanation for each event (the first question), and then to rate this explanation along three dimensions (the remaining three questions): internal versus external, stable versus unstable, and global versus specific. These three dimensions, internality, stability, and globality, are defined respectively as "factors within the person or within the environment" (Heider, 1958), "the degree of temporal consistency of the cause" (Scheier & Carver, 1987), and "the extent to which the cause is perceived to recur in other situations" (Abramson et al., 1978).

Basically, the ASQ yields composite scores for explanatory style for positive events (CoPos, CP, or ASQ Positive) and negative events (CoNeg, CN, or ASQ Negative); as well as scores for six subscales (Internal Positive, Stable Positive and Global Positive; Internal Negative, Stable Negative, and Global Negative). To calculate an overall composite score (CPCN or ASQ Total) of explanatory style, the negative-event composite is subtracted from the positive-event composite.

Based on responses to these three dimensions for each ASQ event, the subject is assigned an optimistic or a pessimistic explanatory style. An optimistic explanatory style consists of explaining positive events as enduring, global and internally generated, while also explaining negative events as unstable, specific, and

externally caused (Forgeard & Seligman, 2012). Reflected in the measuring and scoring of the ASQ, a positive score of CPCN represents an optimistic explanatory style and a negative score of CPCN represents a pessimistic explanatory style. Optimistic explanatory style scores have been linked to protection from depression (Peterson & Seligman, 1984) and physical illness (Wise & Rosqvist, 2006) as well as higher academic achievement, subjective and physical well-being, and career achievement (Forgeard & Seligman, 2012).

Psychometric properties of the ASQ

Within attributional models of depression, the attributions are seen as causing distinct behavioural consequences. For example, low self-esteem is predicted to result from internal attributions regarding negative events, while chronic depression is suggested to result from stable attributions for negative events (Peterson et al., 1982). In this model of learned helplessness, depression emerges as a consequence of experience with uncontrollable negative events (Abramson et al., 1978). The concept of attributional style, however, predicts that the three types of explanation (internality, stability, and globality) are correlated with each other within at least each event valence.

However, more recent research based on this model has resulted in findings that are somewhat counterintuitive. One of the earliest studies dealing with this question was conducted by Peterson et al. (1982). They reported that attributions for positive events and attributions for negative events were uncorrelated (r = .02). This lack of correlation between explanatory styles for positive and negative events has been found in other work as well. For example, P.J. Corr and J.A. Gray (1996) examined the factor structure of the ASQ in two independent samples using Varimax rotated principal components analysis. They found that positive and negative explanatory styles were independent. Additionally, whereas for negative events, internality ratings were largely independent of stability and globality ratings, for positive events these three dimensions formed a single factor, suggesting that explanations for positive and negative events might have different structures.

Succeeding studies have used larger samples, and incorporated confirmatory structural equation modelling (SEM), allowing a better understanding of the structure of attributions by contrasting competing theoretical models. For instance, Higgins, Zumbo, and Hay (1999) reported a confirmatory factor analysis of the ASQ identifying three correlated factors in a sample consisting of more than 1,000 subjects. This model was a good fit for attributions of both negative events and positive events. Consistent with several other studies, the stability and globality factors correlated strongly, with internality-externality being more independent of the globality in this study.

Multi-method analytic strategies were incorporated later in attributional style SEM analysis since it was realized that subjects are generating multiple responses to each ASQ event. This is an important innovation, as misleading results can arise in analyses of data generated from multiple correlated responses based on each item, and it is true in the ASQ where all three attributions are samples for each event. Based on this multi-method analysis strategy, it was confirmed that the three-dimension structure of explanatory style still provided a good account of responses to negative events in terms of correlated latent factors of internality-externality, stability-instability, and globality-locality (Hewitt, Foxcroft, & MacDonald, 2004). However, this model indicated higher correlations between internality and the other two factors for negative events.

Other measures of explanatory style

In addition to the most widely-used tool, the ASQ, several other measures have been developed to assess explanatory style. Most of these measurements are designed on the basis of similar criteria and scoring method with the ASQ, though they consist of different events or are adapted to suit subjects with diverse backgrounds. The Expanded Attributional Style Questionnaire (EASQ;Peterson & Villanova, 1988) is one such tool. The EASQ yields the same composite and subscale scores as the ASQ, but contains only 24 negative events, each of which subjects indicate a cause of the event and rate the three dimensions of internality, stability, and globality of the cause on 7- point Likert scales. The EASQ is claimed to be a better measure in

investigations of the reformulated learned helplessness theory than the ASQ, since it is believed that people's explanatory style for negative events connects highly with helplessness and depression (Metalsky, Joiner, Hardin, & Abramson, 1993) .

Based on the reformulated helplessness theory of depression (Abramson et al., 1978), Abramson and Metalsky (1989) developed the self-report Cognitive Style Questionnaire (CSQ) as another modified and expanded version of the ASQ. The CSQ made two modifications to the ASQ. First, ratings of the probable consequences and self-worth implications were added to each hypothetical event, which make it possible to measure all three components of the cognitive vulnerability factor implied in the reformulated learned helplessness theory. Second, the hypothetical events were extended to include 12 positive and 12 negative events in the CSQ. In a review with 30 studies, Haeffel et al. (2008) reported the psychometric and validity properties of the CSQ.

In addition to generally widely-accepted measures of explanatory style listed above, there are some other explanatory style measures developed in specific domains of different backgrounds (for a review, see Smith, Caputi, & Crittenden, 2013), such as the Academic Attributional Style Questionnaire (AASQ; Peterson & Barrett, 1987), the Sport Attributional Style Scale (SASS; Hanrahan, Grove, & Hattie, 1989), the Team Attributional Style Questionnaire (TASQ; Shapcott & Carron, 2010), and the Workplace Explanations Survey (WES; Smith et al., 2013). The most widely used measure for assessing children's explanatory style is the Children's Attributional Style Questionnaire (CASQ; Kaslow, Tannenbau, & Seligman, 1978). The CASQ consists of 24 positive and 24 negative hypothetical events. This instrument has the same construction and format as the original ASQ.

The ASQ, the EASQ, the CSQ, the AASQ, the SASS, the TASQ, the WES, and the CASQ are all self-report measures, among which the ASQ has been most-widely used in application. The second popular way of assessing explanatory style is the Content Analysis of Verbatim Explanations (CAVE; Peterson, Berres, & Seligman, 1985) technique. This instrument was developed to assess explanatory style by analysing statements, journal entries, speeches, and other written materials

which are believed to contain causal explanations. The CAVE has been frequently used in studies of explanatory style and physical well-being considering its advantage in longitudinal research (Peterson, 1988).

1.2.3 Stability and heritability of explanatory style

Is explanatory style a relatively stable personality trait? Are attributions stable enough across time and situations to guarantee the existence of the designated explanatory style? To answer these questions, the consistency of explanatory style has been explored by several studies, which suggest that there is at least some stability in attributional style over time and circumstances. For example, in a study conducted by Tiggemann, Winefield, Winefield, and Goldney (1991), explanatory style was measured in young adults across a period of three years. The results showed that explanatory style tested in the first time period was moderately correlated to explanatory style measured in the second (r = .44).

In another longitudinal study, Burns and Seligman (1989) reported that explanatory style for negative events during early adulthood was positively related to explanatory style for negative events 52 years later (r = .54), and the dimension of stability accounted for most of the observed correlations of explanatory style for negative events. Explanatory style for positive events, however, was not as stable as that for negative events. The composite positive score at baseline was not significantly correlated with the same test at 52 years later (r = .13).

The stability of explanatory style can be partly explained by its heritability or the influence of biological factors on this trait. So far as I know, not many genetic studies have been done to explore the heritability of explanatory style. In one exception, Schulman, Keith, and Seligman (1993) conducted a pioneering twin study with a sample of 115 pairs of identical twins and 27 pairs of dizygotic twins. Participants were directed to complete the ASQ. The composite score summing up responses to both positive and negative events (CPCN), the scores for the sub-scale of negative events (CN), and reactions to the positive events (CP) were analysed separately. For CPCN, the correlations were .48 for identical twins and 0.00 for dizygotic twins, which suggests a substantial hereditary effect of explanatory style.

For CN, the correlations were .43 for identical twins and -.03 for dizygotic twins, showing the same pattern as CPCN. In contrast, the scale for positive events (CP) also showed a moderate correlation of .50 for identical twins. Comparatively, however, the correlation for dizygotic twins was nearly as high (.41), which might demonstrate a substantial effect of shared environment. The different patterns suggest that heritability of explanatory style may be indirect.

1.2.4 Self-serving attributional bias and optimistic explanatory style

People have a need to view themselves positively. This is easily the most common and consensually endorsed assumption in research on the self. – Heine, Lehman, Markus, and Kitayama (1999, p. 766).

As one of the most important psychosocial systems of optimism, explanatory style or attributional style has been the subject of a large body of research, which provides consistent evidence for the linkage between this trait and many other psychological traits. Such attributions can be functional and adaptive and may serve psychological and social purposes when attributional bias applies (Mezulis, Abramson, Hyde, & Hankin, 2004; Sanjuan & Magallares, 2014). This comes along with the proposal of positive cognitive bias of human nature (Heider, 1958) and much prior research concerning individuals' biased attributions to happenings in their lives (Cadinu, Arcuri, & Kodilja, 1993). Though attributional bias and explanatory style basically share similar measures and scoring methods currently, they have been proposed and studied mostly separately.

Attributional bias was argued to be manifested in two related and different modes. One is self-serving attributional bias, which refers to the tendency of individuals to explain negative events or outcomes with more external or contextual causes, while attributing positive events or outcomes to more internal or controllable causes (Mezulis et al., 2004). The other form of attributional bias is self-other bias,

assuming that individuals tend to promote a favourable perception in attribution of the self in comparison to others (D. T. Miller & Ross, 1975). This tendency of self-serving attributional bias is pervasive in the general population across age, ethics, and psychopathology (Mezulis et al., 2004).

The theoretical basis of self-serving bias in attribution derived from the interaction between motivation and cognition certainty, suggesting that people tend to "accept responsibility for positive behavioural outcomes and to deny responsibility for negative behavioural outcomes" (Bradley, 1978, p. 59). Prior studies addressing self-serving attributional bias are quite varied in the measures and thus in the operational definitions of this bias. This self-serving bias used to focus on the attributional dimension of internality by assuming that individuals exhibit more internal attributions for positive events than for negative events (Greenberg, Pyszczynski, & Solomon, 1982; Nurmi, 1992).

With the development of the most widely-used measure of attributions, the ASQ, it has been debated that it is insufficient to establish a self-serving attributional pattern only using the internality dimension. Accordingly, this self-serving bias has been extended to also include the other two dimensions of attributions, namely stability and globality. Self-serving attributional bias is consequently conceptualized as the tendency of people to attribute positive situations to more internal, stable, and global causes than for negative situations (Mezulis et al., 2004).

Though self-serving attributional bias and optimistic explanatory style have been reported separately in most of previous studies, these two concepts have similar definitions since self-serving bias has been conceptualized within the three-dimensional model of attributions. While an optimistic explanatory style consists of explaining positive events as enduring, global and internally generated, while also explaining negative events as unstable, specific, and externally caused (Forgeard & Seligman, 2012); self-serving attributional bias is defined as the tendency of people to attribute positive situations to more internal, stable, and global causes than for negative situations (Mezulis et al., 2004). Accordingly, an optimistic explanatory style is a positive pattern consistent with self-serving attributional bias defined above,

or, in other words, self-serving attributional bias is the universal positive bias in explanatory style.

Evidence of interchangeability between these two concepts is found in the similarity of measuring and scoring as well. Basically, the ASQ and the adaptation versions of the ASQ were among the most commonly used self-report measures in prior studies of self-serving attributional bias (for review, see Mezulis et al., 2004). While a more "optimistic" attributional style for a domain means higher scores for positive events and a lower score for negative events for that domain (Forgeard & Seligman, 2012), a self-serving attributional bias represents a positive score when attributions for negative outcomes are subtracted from attributions for positive outcomes (Sanjuan & Magallares, 2014). Specifically, on one hand, if the subtraction score of the ASQ Negative from the ASQ Positive is positive, it represents a self-serving attributional bias or an optimistic explanatory style, reflecting stronger attributions along internal, stable and global causes for positive than for negative events. On the other hand, if the subtraction score of the ASQ Negative from the ASQ Positive is negative, it then stands for lack of a self-serving attributional bias or an optimistic explanatory style, reflecting weaker attributions for positive than for negative events (Sanjuan & Magallares, 2014).

Moreover, prior research along both lines of optimistic explanatory style and self-serving attributional bias is consistent in their findings of beneficial influences on well-being (Forgeard & Seligman, 2012; Mezulis et al., 2004). For reasons of consistency, in my research of positive bias in attributions, the tendency of holding an optimistic explanatory style and the tendency of expressing a self-serving attributional bias will be referred to as equal to each other, both referring to the tendency of individuals to explain positive situations through internal, stable and global causes, and negative situations to external, unstable and specific causes. That is, self-serving attributional bias is taken as the tendency of holding an optimistic explanatory style in explanation of positive and negative events normally specified in the ASQ.

1.2.5 Explanatory style, hopelessness, and depression

Hopelessness is an important concept in establishment and development of the hopelessness theory of depression (Abramson, Metalsky, & Alloy, 1989), in which depression is conceptualized as an overabundance of negative moods and negative cognition. According to the hopelessness theory of depression, hopelessness is conceptualized as the expectancy that future outcomes will be stable, global, and will negatively influence many aspects of an individual's life regardless of his or her efforts (Abramson et al., 1989). As a result, hopelessness about the future constitutes a sufficient and proximal cause of a subtype of depression, called hopelessness depression (Abramson et al., 1989). 'The hopelessness theory represents a theory-based approach to the classification of a subset of the depressive disorders and postulates the existence in nature of hopelessness depression…' (Abramson et al., 1989, p. 359).

Abramson et al. (1989) pointed out that hopeless depression are more likely to occur when negative events are attributed to stable and global causes. Comparatively, the influence of internality dimension is deemphasized when symptoms of hopelessness depression are discussed. Separation between the internality dimension and the other two attributional dimensions (stability and globality) was supported by empirical studies. For instance, Higgins et al. (1999) reported a confirmatory factor analysis of the ASQ identifying three-correlated factors in over 1,000 subjects. It indicated that the stability and globality factors correlated strongly (r = .61 for negative events, r = .67 for positive events), with internality-externality being more independent of the globality (r = .35 for negative events, r = .28 for positive events). Thus, in ASQ, Hopelessness (stability + globality of negative events) is produced as a composite score separately from other composite scores.

This attributional model of depression has accumulated substantial evidence from empirical studies (e.g. Vazquez, Jimenez, Saura, & Avia, 2001). For instance, 295 secondary school students were instructed to complete measures of attributional style, self-esteem, and depression (Kurtovic, 2012). This study indicated that hopelessness correlated significantly with depression (r = .58). Similarly, Ahrens and Haaga (1993) reported that hopelessness is significantly correlated with depressive

symptoms (r = .20) (Peterson & Vaidya, 2001). Cross-sectional studies propose that a pessimistic attributional style is correlated with hopelessness and thus depression. On the other hand, an optimistic explanatory style has been linked to protection from depression. A pessimistic explanatory style predicts increases in depression over time in different populations, such as lower-class women, children, and depressed patients (Peterson & Seligman, 1984). Peterson and Vaidya (2001) reported that hopelessness positively correlated with depression in their study with a group of college students (r = .20).

1.3 Dispositional Optimism

As mentioned in the beginning of this chapter, one of the two related concepts of optimism provided theoretically by the Oxford Dictionary is "hopefulness and confidence about the future or the success of something". Consistent with this dictionary definition and following traditional folk wisdom about optimism, Scheier and Carver (1987) have studied a personality trait identified as *dispositional optimism*. Based on theoretical studies on the expectancy-value model and self-regulatory model, dispositional optimism originally referred to positive expectations in a given situation and later was conceptualized as broad and general expectancies (Scheier & Carver, 1992, 1993).

Framed within the definition of dispositional optimism, being optimistic means simply that people expect good things to happen to them in the future, and being pessimistic means that people expect bad experience in the future (Carver et al., 2010; Scheier & Carver, 1987). It has long been believed that the level of generalized favourable expectancies for the future is related prospectively with many, perhaps all, facets of life (Carver & Scheier, 2014). This belief has been supported by a good deal of systematic studies in the past 25 years or so (Carver et al., 2010; Scheier & Carver, 1987, 1992).

1.3.1 Historical development of models of dispositional optimism

The perspective of "dispositional optimism" originated theoretically from the expectancy-value model and has been developed from research conducted by Scheier and Carver (2001). There is a long history of theoretical research on motivation of behaviour, and two facets have been identified in the proposed expectancy-value model. On one hand, it is assumed that people act around the pursuit of goals (Austin & Vancouver, 1996). Goals are states or actions that people take as desirable or undesirable. The more important a given goal is to an individual, the greater is the element of value in the person's motivation to pursue this goal. People have no motivation to act without having a goal that is valued to some extent. That is, people are inclined to fit their actions to values they regard as desirable.

On the other hand, expectancy was proposed to be the other conceptual element of the motivation model (Carver & Scheier, 2001). The assumption of expectancy is linked to a sense of confidence and doubt about a given goal's attainability or avoidability. A person has no desire to take action if he or she lacks confidence. Only if people have adequate confidence will they move into effort. Confidence and doubt are also important for a person to continue or quit an action.

Based on this model of motivation, dispositional optimism was proposed and is seen as a broad and generalized version of confidence and persistence in pursuit of desirable goals (Scheier & Carver, 1992). It is assumed that optimism should be continuous even when progress is difficult or slow in the face of adversity (Carver et al., 2010). According to Carver and Scheier (2001), virtually all fields of human activity can be defined in term of goal pursuit, and people's thoughts and actions imply the identification and adoption of goals and the adjustment of behaviour toward these goals. As a result, Carver and Scheier (2001) refer to their perspective in dispositional optimism as a self-regulatory approach. To be specific, optimism enters into a self-regulatory loop when people ask themselves about the obstacles to pursuing the goals they have adopted. Do people still believe they can achieve their desirable goals in the face of impediments? Optimists and pessimists are differentiated depending on their belief. If people are confident in achieving the goals even in face of difficulties, they are seen as being optimistic; if not, they are pessimistic individuals.

Carver et al. (Carver et al., 2010; Scheier & Carver, 1992) stated that "optimism and pessimism are confidence and doubt […] pertaining to life, rather than to just a specific context". Here we can see that optimism and pessimism are broad, generalized versions of expectations to future life, rather than to just a specific narrow context. And this generalized confidence or doubt will continue during actual behaviour even in the face of difficulties.

1.3.2 Measures of dispositional optimism

To assess dispositional optimism, researchers ask people directly whether they expect outcomes in their future lives to be beneficial or unbeneficial (Scheier & Carver, 1992). This way of assessing dispositional optimism is acquired by using self-report questionnaires such as the Life Orientation Test (LOT; Scheier & Carver, 1985) or its successor the Life Orientation Test-Revised (LOT - R; Scheier, Carver, & Bridges, 1994).

The LOT consists of 12 items (four filler items included), in which four are described in a positive direction (e.g., "*I always look on the bright side of things*"), and four in a negative direction (e.g., "*I rarely count on good things happening to me*"). Respondents are directed to assess the extent to which they agree with each of the 12 items on a 5-point scale (4 = strongly agree, 3 = agree, 2 - neutral, 1 = disagree, and 0 = strongly disagree).

The LOT was revised later to resolve indistinguishable problems among dispositional optimism and other personality traits, such as Neuroticism (Scheier et al. (1994). Two originally problematic (positively worded) items were eliminated. To keep the scoring balance between positively worded and negatively worded items, one new positively worded item was added and one negatively worded item was removed. As a result, the LOT-R consists of 10 items (four filler items included), in which three items are keyed in a positive perspective and three in a negative direction. For each item, respondents assess their levels of agreement or disagreement on a 5-point scale.

Scheier and Carver (1985) originally proposed the LOT to measure a one-dimensional bipolar construct of dispositional optimism. For LOT-R, (Scheier et al., 1994) also proposed that "confirmatory factor analysis further indicated that the single-factor solution was superior to a two-factor one." However, evidence indicated that the two-factor model, which declared that optimism and pessimism represent two distinct traits, was proposed and replicated in many studies later (Chang, Maydeu-Olivares, & D'Zurilla, 1997; L. Chang & McBrideChang, 1996; Creed, Patton, & Bartrum, 2002; Roysamb & Strype, 2002). The applicability of this

two-factor model was also supported in studies with Eastern subjects (Cheng & Hamid, 1997; Li, 2012; Sumi, 2004).

1.3.3 Stability and heritability of dispositional optimism

Stability of dispositional optimism

Is dispositional optimism a relatively stable personality trait across time and situations? How consistent is an individual's level of dispositional optimism? As with most personality traits, test-retest reliabilities are relatively high in several longitudinal studies (although it is not always the case). For instance, within a group of 182 middle-generation women, Atienza, Stephens, and Townsend (2004) found the LOT test-retest correlation of .73 across a one-year period.

Lucas, Diener, and Suh (1996) conducted one study across a period of four weeks, during which 212 college students were required to assess their dispositional optimism twice using the LOT. The test-retest correlation of dispositional optimism between the two periods was .76. Also, with a group of 82 college students, Billingsley, Waehler, and Hardin (1993) reported a test-retest correlation of .78 for the LOT across a period of four weeks. In the pioneering study of LOT formation, Scheier and Carver (1985) found an even higher test-retest correlation of .79., based on assessments of 142 participants within a four-week interval. Studies conducted in Eastern societies have also reported the stability of the LOT and the LOT-R. For instance, in a Hong Kong Chinese sample, test-retest reliability coefficients across a period of five months were reported as .68 for the LOT and .66 for the LOT-R (Lai, Cheung, Lee, & Yu, 1998).

However, research results on consistency of dispositional optimism over longer time periods are controversial. For example, in a study across a 10.4 year period in a group of 209 middle-aged women, Matthews, Räkkönen, Sutton-Tyrrell, and Kuller (2004) found a test-retest correlation of .71, similarly to other traits. However, in another 10-year-period study conducted by Suzanne C. Segerstrom (2007), the LOT test-retest correlation of dispositional optimism was only .35.

Though there were less than 100 participants, the result nevertheless indicated that change in dispositional optimism is possible at least for some people.

Heritability of dispositional optimism

The definition of dispositional optimism as a general tendency to have positive or negative expectancies (Scheier & Carver, 1987) is compatible with ideas of evolutionary psychology addressing the general characteristics of a species.

To test the heritability of dispositional optimism, Plomin et al. (1992) conducted the pioneering study in a sample of more than 500 same-sex pairs of middle-aged identical and fraternal twins, half of whom were reared together (126 pairs of identical and 146 pairs of fraternal twins) and half raised apart (72 pairs of identical and 178 pairs of fraternal twins). Participants took the LOT twice over a period of three years. For identical twins reared apart, the correlations indicated heritabilities of 23% for LOT optimism and 27% for LOT pessimism. As expected, the correlations for identical twins raised together were lower, 39% for LOT optimism and 20% for LOT pessimism. Generally speaking, a heritability of 25% for optimism was reported in this study. Similarly, in a sample consisted of 428 Italian twin pairs (aged 23-24 years), Caprara et al. (2009) reported a heritability of 28% for dispositional optimism.

Research on the heritability power of dispositional optimism has also conducted in much larger samples. For instance, Mosing, Zietsch, Shekar, Wright, and Martin (2009) measured dispositional optimism in 3,053 Australian twins (ranging in age from 50 to 94 years) using the LOT over 50 years. The sample included 501 identical female twins, 153 identical male twins, 274 dizygotic female twins, 77 dizygotic male twins, 242 dizygotic opposite-sex twin pairs, and 561 single twins (without participation of the co-twin). This study revealed that additive genetic factors explained 36% of the variation in dispositional optimism. This sample was combined with 406 pairs of Swedish twins later to analyse the relationship between dispositional optimism and mental health (Mosing, Pedersen, Martin, & Wright, 2010). A heritability estimate of 34% for dispositional optimism was reported in this

combined sample. Another twin study conducted by Mosing et al. (2012) explored the relationship between dispositional optimism and longevity, and it indicated that the association between dispositional optimism and longevity may have genetic involvement as well.

In addition to genetic behavioural studies that directly investigate the heritability power of dispositional optimism, some other studies offered evidence using different approaches. For example, in a study with two separate population-based cohorts, Rius-Ottenheim et al. (2012) reported that parental longevity was positively associated with dispositional optimism in adult offspring, indicating some sort of genetic underpinning in this personality trait. Later, J. J. Yu and Ko (2013) investigated the link between father's and child's dispositional optimism in a sample of 422 father-child dyads in South Korea. It found that father's dispositional optimism was positively correlated with child's dispositional optimism ($r = .55$). These kinds of studies support the heredity of dispositional optimism from the aspect of generation transmission.

Previous research based on twin studies suggests that heritabilities of dispositional optimism (.25-.36) are not that high (compared with typical personality traits) but statistically significant, indicating that there is stability in dispositional optimism and an influence of genetic factors on this trait. Attempts to identify specific genomic elements underlying variations of optimism have shown mixed results (see review of Carver & Scheier, 2014). It also should be kept in mind that, like all other personality traits, optimism is still affected by non-shared environmental effects, or the experiences people have in life.

1.4 Benefits of Optimism

Optimism has had a constantly favourable reputation over the years. A variety of poets, writers, philosophers, psychologists, and social workers, have described optimism as greatly beneficial to both individuals and the general world around us (Chang, 2001b). On the other hand, pessimism is considered as at least contributing to depression, passivity, morbidity, and failure. It is believed that optimism has had an adaptive value in dealing with environmental risks and life challenges over the million or so years of evolution (Tiger, 1979). And, this adaptive advantage of being optimistic still works for people to achieve more in current life (Seligman, 2011).

Optimism is a cognitive construct intertwined with emotional, motivational, and behavioural processes, and research of optimism has extended to diverse directions in psychological studies (Carver & Scheier, 2014). Research over the past three decades has documented beneficial effects of optimism on enhancing well-being. A large and growing literature indicates that, no matter how optimism is conceptualized and measured, it is linked to positive emotions and behaviours; to prominent physical well-being; to persistence and active coping strategies; to outstanding academic and occupational performance; and even to resilient and adaptive social relationships (for reviews, see Andersson, 1996; Carver & Scheier, 2014; Carver et al., 2010; Forgeard & Seligman, 2012; Scheier & Carver, 1992).

Regarding the two optimism models, optimistic explanatory style scores have been linked to protection from depression (Peterson & Seligman, 1984) and physical illness (Wise & Rosqvist, 2006) as well as higher academic achievement, subjective and physical well-being, and career achievement (Forgeard & Seligman, 2012). Similarly, self-serving attributional bias has also long been positively associated with mental and physical health (for review, see Mezulis et al., 2004). Not surprisingly, the studies of dispositional optimism have shown that higher levels of optimism are correlated with positive life outcomes in various contexts (Carver et al., 2010; Scheier & Carver, 1987, 1992, 1993). Generally speaking, no matter how optimism is conceptualized and measured, research is uniform in indicating that optimism is

bonded with beneficial characteristics: happiness, achievement, health, and persistence.

1.4.1 Optimism and physical well-being

Based on the widely accepted perspective that optimism is generally beneficial in life of human being, increasing number of physicians has acknowledged the benefits of thoughts and emotions characterized by optimism on physical well-being (Peterson & Bossio, 2001; Rasmussen, Scheier, & Greenhouse, 2009).

Explanatory style examines the habitual explanations people provide for events, and is seen as a distal influence on helplessness and failures of adaption that involve helplessness (Peterson & Seligman, 1984; Seligman, 1991, 2011). This expectation of helplessness is theoretically linked to outcomes such as physical well-being. Empirical studies concerning this issue have been facilitated by development of widely accepted measures of attributional style, such as the ASQ and CAVE.

Having a higher level of dispositional optimism has also been consistently involved with better physical health. The potential mechanism underlying this correlation is that thinking positively about the future may result in a more active attitude towards the stressors of life than thinking pessimistically, and lower stressor responses may lead to less physical detriments on the body, and may result in better physical health as a final result (Carver et al., 2010).

Numerous studies have been conducted to examine the positive link between optimism (including both explanatory style and dispositional optimism) and physical health based on both general settings (see reviews by Forgeard & Seligman, 2012; Kamen & Seligman, 1987; Norvell, 1992; Peterson, 1988, 2000b; Rasmussen et al., 2009; Scheier & Carver, 1987, 1992; Seligman, 1989; Snyder, 2002) and many different specific contexts, including the immune system (Suzanne C. Segerstrom & Sephton, 2010), chronic pain (Goodin & Bulls, 2013), cancer, AIDS (Tomakowsky, Lumley, Markowitz, & Frank, 2001), cardiovascular health (Bennett & Elliott, 2005; Giltay, Geleijnse, Zitman, Hoekstra, & Schouten, 2004), carotid atherosclerosis (Matthews et al., 2004), ambulatory blood pressure (Räikkönen & Matthews, 2008),

coronary heart disease (Tindle et al., 2009), and bone marrow transplantation (Hochhausen et al., 2007). There is also evidence that optimists show more adaptive sleep patterns both for children (Lemola et al., 2011) and adults (Lemola, Raikkonen, Gomez, & Allemand, 2013).

Rasmussen et al. (2009) conducted a meta–analysis using 108 studies exploring the relationship between optimism (including dispositional optimism and explanatory style) and physical health, and reported an overall correlation of .18 (p < .001) between optimism and physical health outcomes, and this correlation remained significance even after adjusting for Neuroticism and psychosocial factors. Taken together, optimism is characterized by its health-promoting properties, though it is still not quite clear what the possible mechanisms are linking optimism and health.

1.4.2 Optimism and psychological well-being

Well-being has been measured largely in two distinct traditions, hedonic and eudemonic well-being, or of subjective well-being and psychological well-being, with the former normally measured with the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) and the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), and the latter being most widely implemented using the Ryff scales of psychological well-being (RSPW; Ryff, 1989; Ryff & Keyes, 1995).

While subjective well-being focuses on happiness and pleasure (Diener, Suh, Lucas, & Smith, 1999), psychological well-being, which stems from the tradition of eudemonic well-being and was further developed in the field of positive psychology, emphasizes the fulfilment of human potential (Ryff, 1995). According to Ryff (1989), psychological well-being is defined by six related dimensions, including autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance.

Explanatory style and subjective well-being

Explanatory style is a distal influence on helplessness and failures of adaption that involve helplessness. As Wise and Rosqvist (2006, p. 293) said, "Explanatory style can have a significant and prolonged impact on well-being. Whereas pessimistic explanatory style can negatively impact several facets of well-being, …, optimistic explanatory style may serve as a protective factor".

It seems that individuals with an optimistic explanatory style tend to have promising expectations for the future, believing that good will prevail and whatever events are being experienced will all be worthwhile in the end. Moreover, individuals with an optimistic explanatory style tend to accept stressful experiences because of this viewpoint. These beliefs and acceptance help individuals who have an optimistic explanatory style to cope effectively with challenging and demanding situations. Effective and positive coping then finally facilitates well-being.

The argument that explanatory style predicts well-being arises from many studies associating depressive symptoms with a pessimistic explanatory style, measured with the ASQ or the CAVE. For example, Peterson and Seligman (1984) reviewed a variety of evidence showing that a pessimistic explanatory style predicts increases in depression over time in different populations, such as lower-class women, children and depressed patients. Similarly, Ahrens and Haaga (1993) reported that attributional style for positive events was associated with positive affectivity ($r = .47$), and attributional style for negative events was associated with negative affectivity ($r = .21$), depression ($r = .31$), and anxiety ($r = .38$). In addition, hopelessness (stability and globality of the ASQ) is significantly correlated with depressive symptoms ($r = .20$) (Peterson & Vaidya, 2001).

Additionally, one study conducted on a sample of 280 adults who were divided into three age groups reported that a pessimistic explanatory style in negative affiliation domains correlated significantly with depressive symptoms in older adults (Isaacowitz, 2005). The positive relationship between explanatory style for negative events and depression was also supported by an SEM-approach study, in which the

correlation between these two variables was reported as .30 (Ledrich & Gana, 2013). Further, in a recent study, Sanjuan and Magallares (2014) reported the positive correlations between self-serving attributional bias and higher scores of life satisfaction (r = .31) and affect balance (r = .46). Longitudinal studies also give support to the beneficial effect of an optimistic explanatory style on mental health. For example, in a four-week follow-up study with a group of 167 college students, Kleiman, Liu, and Riskind (2013) found that an optimistic attributional style predicted decreased levels of stressful events over the following four weeks, even when symptoms of depression were controlled for.

The links between explanatory style and subjective well-being have also been investigated in a wide range of contexts including different stressful situations, such as heart transplant patients (Jowsey et al., 2012), breast cancer patients (Colby & Shifren, 2013), and patients with advanced cancer (Applebaum, Stein, Rosenfeld, & Breitbart, 2012). Results of these studies indicated significant positive association between an optimistic explanatory style and overall subjective well-being.

Dispositional optimism and subjective well-being

People with a high level of dispositional optimism tend to expect good things to happen to them in the future, even when confronting difficulties. This general tendency yields a relatively positive mix of feelings and adaptive coping strategies, which enhancing subjective well-being and good health (Wrosch & Scheier, 2003).

The relationship between dispositional optimism and subjective well-being has been investigated in numerous studies, which mainly used the LOT or LOT-R. In a review of 56 studies (Andersson, 1996), it was reported that the average weighted correlation between dispositional optimism and depressive symptoms was -.45. Peterson and Vaidya (2001) also reported that expectations were significantly correlated with depressive symptoms (r = -.55).

Studies conducted in people in different life stages revealed that being optimistic is a beneficial property for both young and old people. For example, with a group of 504 high school students, Creed et al. (2002) found that students with high

level of dispositional optimism scored low on psychological distress. Isaacowitz (2005) addressed this issue in a wider range with three age groups (young, middle-aged, and older adults). The study reported that dispositional optimism correlated with greater life satisfaction and lower levels of depressive symptoms across all three age groups. It also found that dispositional optimism was correlated with positive affect (r = .44) in one study with 225 adults aged from 65 to 94 years (Ferguson & Goodwin, 2010).

Evidence from twin studies provides further support for the positive aspects of being optimistic. Plomin et al. (1992) reported (n = 500) that dispositional optimism was significantly associated with depression and life satisfaction (.54 on average). These associations remain significant even after Neuroticism is controlled for. This result is further supported by another twin study with a larger sample (n = 1,304). It indicated that dispositional optimism predicts high levels of mental health (Mosing et al., 2010; Mosing et al., 2009).

Studies conducted on people in stressful situations may better explain the significant correlations tween optimism and subjective well-being. Those situation-specific studies involved different groups of participants including gay men with AIDS (Taylor et al., 1992), skin cancer patients (Luo & Isaacowitz, 2007), patients with breast cancer (Colby & Shifren, 2013), muscle disease patients (Graham et al., 2014), freshmen in college (Brissette, Scheier, & Carver, 2002; Chemers, Hu, & Garcia, 2001; Rand, Martin, & Shea, 2011), ethnic minority adolescents in urban areas (Vacek, Coyle, & Vera, 2010), women after childbirth (Carver & Gaines, 1987), and older widows in their first single year (Minton, Hertzog, Barron, French, & Reiter-Palmon, 2009). In summary, previous research indicates that individuals scoring high on optimism tests are more likely to perform adaptive, health-promoting behaviors even when they confronted with challenging situations.

Is this positive correlation between dispositional optimism and subjective well-being consistent across time? This issue has been addressed in at least one longitudinal study. This study investigated the effects of optimism on subjective well-being at two time points over a six-year interval, and reported that being

optimistic was correlated with higher levels of positive affect and life satisfaction (Daukantaite & Zukauskiene, 2012).

Optimism and psychological well-being

Several studies have reported the positive relationship between dispositional optimism and psychological well-being. For example, Augusto-Landa, Pulido-Martos, and Lopez-Zafra (2011) reported in a sample of 217 undergraduates that dispositional optimism showed significant positive associations with all six dimensions of psychological well-being (r ranged from .38 to .59).

Similarly, in a study conducted within a group of 225 older adults, Ferguson and Goodwin (2010) found that dispositional optimism was positively correlated with Purpose in Life (one of the six dimensions of psychological well-being). The positive correlation between dispositional optimism and psychological well-being was reported in an adolescent sample as well. It revealed that LOT-R scores were positively correlated with all six dimensions of the RPWB (r ranged from .32 to .56) (Monzani, Steca, & Greco, 2014).

The relationship between explanatory style and psychological well-being has not been reported in previous literature as to my knowledge.

1.4.3 Optimism, resources, and success

Optimists normally have more positive feelings and feel happier than pessimists in various contexts. Due to the better coping strategies and better psychological adjustments optimists have, and the resulting better health than pessimists, it is plausible to infer that being optimistic can transform short-term optimistic tendencies to a long-term approach of persistent goal pursuit and active coping strategies, which endows optimists with more advantageous socio-economic resources and superior opportunities for being successful than pessimists. Gould, Dieffenbach, and Moffett (2002) interviewed 10 Olympic champions about their psychological characteristics. They found that extraordinary athletic performance was characterized by higher than average level of dispositional optimism and hope. Here next I will review some

related empirical studies in the literature illustrating the positive relationship between optimism, resources, and success.

Previous studies demonstrate that students with higher levels of optimism deal more easily with their first-year transition both socially and academically than students scored lower in optimism. For example, a group of freshmen took a battery of measures (including dispositional optimism, self-esteem, coping, depression, perceived stress, and perceived social support) both at the beginning and at the end of the starting semester (n = 89). Students with higher levels of dispositional optimism experienced fewer increases in stress and depression, and greater increases in access to social networks than pessimistic students over the first semester of college (Brissette et al., 2002). Similarly, in a much larger sample of college freshmen (n = 2,189), L. S. Nes, Evans, and Segerstrom (2009) also found that optimistic students had better psychological adjustment and motivation than pessimists in the period of college transition. Students with a higher level of dispositional optimism were more likely to return to school for the second year, with increased motivation and decreased distress.

Similar results were found in studies involving attributional style in academic backgrounds. For example, Peterson and Barrett (1987) reported that first-year students with a positive explanatory style were more likely to have specific academic goals and to utilize academic advising systems more efficiently, resulting in higher grades on exams than students with a negative explanatory style. Benefits of an optimistic explanatory style was expanded to athletic performance as well (Gordon, 2008).

Other studies have shown that optimists may also have better job performance and higher income than pessimists. For instance, in a study conducted within groups of insurance agents, Seligman and Schulman (1986) found that people with a more positive explanatory style were more likely to keep their jobs after the internship period, and tended to get a higher level of assessment on job performance. Suzanne C. Segerstrom (2007) investigated the association between dispositional optimism and several social resources in a group of law students. The 10-year

follow-up study found that students with higher levels of optimism before starting school predicted higher income 10 years later. Further, both self-serving attributional bias and dispositional optimism were found to be positively correlated with self-confidence and forecast of future performance in a study with a group of MBA students (Libby & Rennekamp, 2012).

One reason for the positive link between optimism and job performance may be due to higher levels of career planning in optimists. Creed et al. (2002) found that dispositional optimism was positively correlated with career exploration and career planning. People who scored highly on the LOT-R produced more career-related goals, and expressed more confidence about their career planning.

In addition, the benefits of being optimistic on social domain may also partly account for optimists' success in academic and career performance. MacLeod and Conway (2005) reported that people with more positive expectations for the future tended to have broader social networks. The longitudinal study described earlier also demonstrated that increases in optimism were linked to developing larger social networks across a 10-year period, indicating that optimism and social networks may reinforce each other (Suzanne C. Segerstrom, 2007). Basically, optimists are assumed to hold a better management in social relationships than pessimists (for a review, see Carver & Scheier, 2014).

1.4.4 Optimism interventions included in positive psychology interventions

Psychologists and therapists have traditionally equated mental health with the absence of mental illness. When a patient improved, he or she was taken to be psychologically well. This view was fundamentally changed when positive psychology was merged into mental health research and practice (Seligman, Steen, Park, & Peterson, 2005). Previous research has shown that well-being can be promoted by engaging in diverse positive activities, such as savouring (Bryant & Veroff, 2007), practicing forgiveness (Reed & Enright, 2006), using signature strengths (Linley, Nielsen, Wood, Gillett, & Biswas-Diener, 2010), and expressing optimism and gratitude (Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011). These

activities, so-called positive psychology interventions (PPI), aim to boost positive emotions, thoughts, and behaviours, and other desirable consequences. Empirical studies have indicated that these positive activities are effective for promoting well-being and decreasing negative symptoms (for a review, see Sin, Della Porta, & Lyubomirsky, 2011).

Even before the promotion of positive psychology by the American Psychology Association, many different kinds of positive intervention methods had been developed, though it is true that this trend has been greatly enhanced since positive psychology has emerged. With the development of positive psychology interventions, more and more controlled PPI designs began to explore their clinical practice on people with mental illness, especially depression. A growing number of positive psychology interventions have been tested on people with depressive symptoms and those clinically diagnosed with depressive disorders.

The efficacy of specific positive perspectives has been proved in promoting well-being and decreasing depressive disorders. A meta-analysis of 51 positive psychology interventions (including optimism interventions) revealed that this form of treatment is effective for improving well-being (r=0.29) and ameliorating depressive symptoms (r=0.31). Findings suggested that clinicians should be encouraged to incorporate positive psychology techniques into their clinical work, particularly for treating depression. Also, delivering positive psychology interventions as individual and group therapy and for relatively longer periods of time is strongly suggested (Sin & Lyubomirsky, 2009).

Another review paper on positive psychology intervention research proposed neural models for how such treatment might relieve depression, based on theory and outcomes of research in social psychology, affective neuroscience and psychopharmacology (Layous, Chancellor, Lyubomirsky, Wang, & Doraiswamy, 2011). For clinical depression treatments, some pioneering positive psychology interventions, which consist of multiple positive-psychology based exercises, have also been developed. For example, Seligman and colleagues (2006) proposed positive psychotherapy (PPT) based on his new conceptualization of happiness and previous positive psychology interventions in clinical practice.

Seligman and colleagues (2006) carried out a pilot study for testing the efficacy of individual PPT. Thirty-two participants diagnosed with MDD (scores more than 50 on the ASRS) were assigned to three groups: individual PPT group, treatment as usual group (TAU), and TAU and antidepressant medications group (TAUMED). For this study, PPT, which consisted of 14 sessions (including optimism and hope interventions) during a period of 12 weeks, was administered to address both positive and negative aspects of the clients. It showed that clients in the PPT group reported greater well-being, more improvement in depressive symptoms, and higher rates of remission, compared with clients in the other two groups. By identifying and using the client's character strengths, PPT established a balance between promoting positive emotions and reducing negative depression. It was a remarkable benefit for the clients to be taught positive social techniques, which greatly promoted their consciousness of being kind, having gratitude and savouring life.

Optimism interventions have been integrated with other positive activities in most of previous practices, and have been tested singularly as well in some multi-intervention studies. Research shows that optimism interventions are effective in enhancing well-being and deducing negative emotions (Austenfeld, Paolo, & Stanton, 2006; Burton & King, 2004; Fosnaugh, Geers, & Wellman, 2009; Littman-Ovadia & Nir, 2014; Meevissen, Peters, & Alberts, 2011).

1.4.5 Underlying mechanism: optimism and coping

It has long been believed that optimism may confer positive effects on psychological and physical well-being (Carver et al., 2010; Nes & Segerstrom, 2006). The potential mechanism underlying these benefits has been explored in numerous studies, the majority of which proposed the importance of coping strategies. Coping is regarded as a straightforward influence of optimism and pessimism regarding how people feel when they encounter problems (Carver et al., 2010).

Theoretically, coping has been defined as "the cognitive and behavioural efforts made to master, tolerate, or reduce external and internal demands and conflicts among them" (Folkman & Lazarus, 1980). By this definition and the

differential nature of people, it is plausible to expect people are different in coping with problems or stressful situations within their own environments. Additionally, the widely accepted distinction in conceptualizing coping is between problem-focused coping and emotion-focused coping (Folkman & Lazarus, 1980; Folkman & Moskowitz, 2004), in which the former addresses external demands of stressors and the latter addresses internal demands of problems. Another distinction conceptualizes coping as approach coping (dealing with the demands of the stressors) and avoidance coping (escaping from the demands of the stressors or emotions related to the stressors) (Suls & Fletcher, 1985).

Theoretically, the construct of dispositional optimism stemmed from an expectancy-value model in which behaviour embodies the pursuit of desired goals, and a general self-regulatory model in which positive expectations arouse increased effort to achieve desired goals (Carver & Scheier, 2001; Scheier & Carver, 1985). This assumption is supported in empirical studies and shows that positive expectancies lead to involvement and continued effort to attain desired goals, whereas pessimistic expectancies lead to disengagement and reduced effort from goal pursuit (L. S. Nes, Segerstrom, & Sephton, 2005). As a personality trait, optimism could affect particular ways of thinking and behaving. It is reasonable to expect that there is a potential mediating role of coping between optimism and adjustment to specific situations.

Scheier and Carver (1985) reported their findings about the beneficial effects of dispositional optimism on physical well-being, and proposed that these benefits could be attributed to the increased likelihood of successful coping held by optimists who normally take actions early when being confronted with problems. This claim was supported by a study within a group of college students (Scheier, Weintraub, & Carver, 1986). The authors found that optimists and pessimists differ in the strategies they use to cope with stressful episodes. Compared with pessimistic participants, optimistic subjects prefer problem-focused coping when they confront stressful situations. The optimists seek social support and focus on positive aspects of the stressful episodes. Comparatively, pessimists tend to use emotional-focused coping and emphasize stressful feelings.

A number of studies further support the potential role of coping strategy for mediating optimism and stress. In one study, undergraduates were asked to recall the most stressful event they had experienced in the last month and complete a survey of coping strategies relating to that event (Carver, Scheier, & Weintraub, 1989). The authors found that dispositional optimism was positively correlated with active problem-focused coping (r = .32). Billingsley et al. (1993) reported similar results in their study, which was conducted with 82 college students over a period of four weeks (r = .38 for Time 1 and r = .29 for Time 2). In another study with a larger sample (420 undergraduates), dispositional optimism was also found to be positively correlated with active coping strategy (r = .23) (Fontaine, Manstead, & Wagner, 1993). A meta-analysis of 56 studies revealed that the average weighted correlation between dispositional optimism and coping strategies was .20 (Andersson, 1996).

Differences in coping strategies between optimists and pessimists have been investigated in some studies with specific contexts. For instance, in one pioneering study conducted within a group of cancer patients (Carver et al., 1993), 59 patients who were diagnosed with early-stage breast cancer were interviewed to assess their levels of optimism and coping strategies before and after their surgeries. It revealed that optimistic patients initiated coping efforts before surgery and used different coping strategies to deal with the crisis. Another study with a larger sample of 165 breast cancer patients reported similar results (Schou, Ekeberg, & Ruland, 2005). High levels of dispositional optimism have been linked to positive coping styles in some specific groups, such as women executives (Fry, 1995), cancer patients (Horney et al., 2011; Llewellyn et al., 2013), HIV-infected patients (Rogers, Hansen, Levy, Tate, & Sikkema, 2005), postnatal women (Rauch, Defever, Oetting, Graham-Bermann, & Seng, 2013), and athletes (Chirivella, Checa, & Budzynska, 2013; Nicholls, Polman, Levy, & Backhouse, 2008; Thompson, Gaudreau, Hoar, Hadd, & Lelievre, 2008), and with particular backgrounds, including the work environment (Strutton & Lumpkin, 1992) and posttraumatic situations (Prati & Pietrantoni, 2009).

Nes and Segerstrom (2006) investigated the relationship between dispositional optimism and coping strategy in one meta-analysis (K = 50, N = 11.629). Both categories of coping distinctions (problem-focus versus emotion-focus,

and approach versus avoidance) were included. Analysis results showed that dispositional optimism correlated positively with problem-focused coping ($r = .13$) and approach coping ($r = .17$), and correlated negatively with emotion-focused coping ($r = -.08$) and avoidance coping ($r = -.21$). It revealed that optimists are inclined to eliminate, reduce, or handle stressors or related emotions when confronting stressful situations, while pessimists seek to ignore, avoid, or escape from stressors or emotions emerged. This stable coping tendency is especially apparent for the distinction between approach and avoidance coping strategies.

The potential mediating role of coping between optimism and beneficial results has been mainly restricted to dispositional optimism in previous literature to my knowledge. There are few studies examining the potential mechanism underpinning the benefits of explanatory style in the literature so far. Some researchers, however, began to address this issue recently. For example, in a study conducted with 205 adults, Sanjuan and Magallares (2014) found that attributional style was positively correlated with active coping ($r = .35$) and negatively correlated with avoidant coping ($r = -.35$). Structure model analysis indicated that coping strategies mediated the relationship between attributional style and subjective well-being.

1.5 Outline of the current research

1.5.1 Optimism in positive psychology

Though optimism has long been a focus of interest in the field of psychology, it has been expanded exponentially since the initiating and rising of positive psychology.

The underlying assumption of positive psychology is that positive states or traits are not necessarily the obverse of negative experiences and traits; and positive emotions and behaviours are described by a completely separate psychological process that functions via an isolated neural mechanism (Duckworth, Steen, & Seligman, 2005). Positive psychology was proposed as 'the scientific study of positive experience and positive individual traits, ..., a field concerned with well-

being and optimal functioning…' (Duckworth et al., 2005). On the basic level, positive subjective experience in the past (e.g. life satisfaction), the present (e.g. sensual pleasure), and in the future (e.g. optimism) are taken as important individual levels in positive psychology (Seligman, 2002).

One reason I have focused on optimism emerges from the basic findings of this trait in positive psychology. Positive psychology often focuses on well-being as an outcome (Duckworth et al., 2005). It also focuses on resources for resilience, or character strengths (Park, Peterson, & Seligman, 2004). Park et al. (2004) reported that of 24 character strengths that he identified one, optimism, had the strongest link to life satisfaction – one of three significant marks of well-being. Over the last 35 years, hundreds of cross-sectional and longitudinal studies have revealed that optimism is positively associated with a host of psychological variables, such as self-esteem, academic achievement, coping strategy, positive emotions, and perhaps most importantly, predicts psychological and physical well-being both in the presence and absence of stressors (Carver & Scheier, 2014; Carver et al., 2010; Forgeard & Seligman, 2012; Scheier & Carver, 1992). Optimism seems to be a desirable personality trait and individual variable, attracting more and more attention in the field of positive psychology.

Another reason to focus on optimism came from some promising findings for optimism interventions. Based on the widely-accepted correlations between optimism and many other positive outcomes across individuals and contexts, positive interventions in optimism have been designed to improve psychological well-being by enhancing an individual's optimistic expectations. Some optimism interventions have been practiced in longitudinal experimental studies (Duckworth et al., 2005; Seligman et al., 2006). In some of these studies, optimism interventions were combined into the whole framework of positive psychotherapy (e.g. Seligman et al., 2006; Seligman et al., 2005). In some other studies, optimism interventions were taken as main therapy methods (e.g. Johnstone, Rooney, Hassan, & Kane, 2014; Littman-Ovadia & Nir, 2014; Meevissen et al., 2011). Results of these studies supported that optimism interventions were effective in increasing psychological well-being and reducing negative emotions.

As described earlier, optimism has been conceptualized and measured in different ways, among which dispositional optimism and optimistic explanatory style are regarded as two main contrasting approaches (Carver et al., 2010; Forgeard & Seligman, 2012). Though there are other psychological constructs proposed as explanations for the optimistic thinking process, such as the cognitive model of hope (Snyder et al., 1991), here in my research, optimism, if not specified, refers to the two main approaches, dispositional optimism and explanatory style.

There are many promising aspects of optimism to be investigated and explored. Over the last three and half years, my work focused mainly on two themes, of which the first is to understand what optimism is and how we measure it, and the second is to explore the possibility of optimism interventions on depressive symptoms. The research described in the thesis consists of two main parts. Part I incorporates measurement issues and conceptual ideas of optimism (from Chapter 2 to Chapter 6). Part II involves optimism interventions on depressive symptoms (Chapter 7 and Chapter 8).

1.5.2 Part I measurement and concepts of optimism

In the first part of my study, I focus on some basic and important aspects of optimism, including five points that concern measurement and concepts of explanatory style and dispositional optimism.

First, I investigated the potential psychometric structure of the ASQ and the LOT-R. As the most widely-accepted measure for explanatory style and for dispositional optimism respectively, the ASQ and the LOT-R have been applied in numerous studies. As mentioned earlier, the ASQ assigns subjects an optimistic or a pessimistic explanatory style. An optimistic explanatory style consists of explaining positive events as enduring, global and internally generated, while also explaining negative events as unstable, specific, and externally caused (Forgeard & Seligman, 2012). If we are to understand the mechanism by which clinical and life outcomes are influenced by explanatory style, it is important that we understand the structure of the ASQ, decomposing the complex admixture of attributions, valences and events.

These components may have effects that are not apparent in a simple summing up of positive and negative scores.

Similarly, though the LOT-R was originally supposed to measure a one-dimensional bipolar construct of dispositional optimism (Scheier et al., 1994), evidence from some studies indicates that the positively and negatively phrased items in the measure split into two factors – dispositional optimism and dispositional pessimism (e.g. Chang et al., 1997). It is important to address this issue before we apply the LOT-R in our other studies.

Second, both explanatory style and dispositional optimism have been assessed in their linkage to traditional personality traits, and most studies found that optimism was positively correlated with Extraversion, and negatively correlated with Neuroticism (e.g. Boland & Cappeliez, 1997). However, inconsistent results were found in other studies. For example, Musgrave-Marquart, Bromley, and Dalley (1997) reported that optimistic explanatory style was modestly correlated with Conscientiousness but none of the other dimensions of the personality scale. Since optimism is taken as relatively stable individual personality trait, it is important to use traditional and well-established personality constructs as external criteria, investigating the relationship between optimism and personality traits. So, I examined correlations between two main approaches of optimism, explanatory style and dispositional optimism, and the Five-Factor Model of personality (FFM; McCrae & Costa, 1987).

Third, though optimism has been linked to well-being in previous studies and both optimistic explanatory style and dispositional optimism have been identified as positive factors in promoting well-being, few investigations have tested both dispositional optimism and explanatory style in the research of psychological well-being. Additionally, studies in which both explanatory style and dispositional optimism are measured in the same sample have yielded inconsistent results on the relationship between these two constructs. My study aimed to test a mediating model in which dispositional optimism mediates the link between explanatory style and psychological well-being.

Next, optimism-related research in recent years has been mainly conducted in Westerners or English-speaking countries particularly, and it therefore may be less valid for understanding the behaviours in population of other cultures. Since examination of optimism across different cultural and ethnic groups is a crucial but often neglected concern, the potential cultural differences between certain Easterners (Mainland Chinese) and Westerners (White British) were investigated. I compared the levels of optimism expression in these two ethnic groups, and explored cultural indications of the results.

Finally, after examination of basic and fundamental issues in psychometric structure and associations with personality and psychological well-being, I conducted a pilot study on the basis of core concepts and measurement of attributional style. Previous research has confirmed that people often give optimistically biased attributions regarding themselves. However, it remains unclear what individuals would do when they are explaining the same events for other people. I examined attributional biases using new measures that are adapted from the standard ASQ.

1.5.3 Part II optimism interventions

Because of all the direct or indirect associations between optimism and personal and social benefits, it is not surprising that optimism is reported to be relevant to clinical psychology. Though positive psychology interventions have been applied in some pioneering studies, very little systematic work has been done to investigate potential advantageous effects of optimism interventions on psychotherapy applications in concrete settings. How to convert the benefits of optimism to systematic and effective interventions assisting pessimists to cope more actively with adversities in their lives is still underexplored.

Optimism interventions applied in previous studies consisted of different manipulation techniques, in which the Best Possible Self (BPS; Lyubomirsky et al., 2011), and the self-administered optimism training (SOT; Fresco, Moore, Walt, & Craighead, 2009) have been developed on the theoretic basis of dispositional optimism and explanatory style respectively. Applications of these two optimism manipulations in empirical studies have yielded results confirming the positive

effects of optimism interventions on enhancing well-being. However, no research including both these optimism interventions has been conducted so far to my knowledge.

On the basis of previous findings that both these optimism techniques are effective in promoting psychological well-being and reducing depressive symptoms, in the second part of my research, I designed and conducted two studies to test the advantages of optimism interventions in reducing dysphoria. Two different optimism manipulations were adapted from the BPS and SOT respectively. These two optimism intervention strategies were applied in two experiments in two undergraduate samples, aiming to investigate the beneficial effect of optimism interventions on depressive symptoms.

1.5.4 Measures

Eight measures in total were involved in my research.

1.5.4.1 The Attibutional Style Questionnaire (ASQ)

The original English version of the ASQ (Peterson et al., 1982) was used to measure explanatory style of the British students. Attributional Style of Mainland Chinese participants was measured using a Mainland Chinese version of the ASQ (Zhang, 2006). The original English version of the ASQ was obtained from Dr Seligman, who granted permission to use this test for research purposes.

Just as the original English version of ASQ, the Chinese ASQ is composed of 12 different hypothetical situations, consisting of 6 positive events (e.g., "*You do a project that is highly appraised*") and 6 negative events (e.g., "*You have been looking for a job unsuccessfully for some time*"). Each of these 12 different hypothetical situations is followed by a series of 4 questions which are arranged in the same order. The first question following each situation asks for the one major cause of the situation. This question is not used in scoring and simply serves as an aid to better answer the remaining questions. The remaining three questions are arranged in the same order for each situation and measure three different dimensions. The second question following each situation measures whether the subject's

response is internal or external (e.g. *"is the cause of your unsuccessful job search due to something about you or to something about other people or circumstances"*). The third question following each situation measures whether the subject's response is stable or unstable (e.g. *"in the future when looking for a job, will this cause again be present"*). The fourth question following each situation measures whether the subject's response is global or specific (e.g. *"is the cause something that just influences looking for a job or does it also influences other areas of your life"*).

For each response, subjects marked an answer in the range of 1 to 7. (for internality vs. externality dimension, from *'Totally due to other people or circumstance'* to *'Totally due to me'*; for stability vs. instability dimension, from *'Will never again be present'* to *'Will always be present'*; for globality vs. specificity dimension, from *'Influence just this particular situation'* to *'Influence all situations in my life'*). For positive events, a score of 1 is the lowest or worst possible score, whereas a score of 7 is the highest or best possible score. Conversely, for negative events, a score of 1 is the highest or best possible score, and a score of 7 is the lowest, or worst possible score. Reliabilities for the original English version of the ASQ were reported as $\alpha = .50$ for Internal Positive, $\alpha = .58$ for Stable Positive, $\alpha = .44$ for Global Positive, $\alpha = .46$ for Internal Negative, $\alpha = .59$ for Stable Negative, and $\alpha = .69$ for Global Negative (Peterson et al., 1982). Reliabilities for the original Mainland Chinese version of the ASQ were reported as $\alpha > .77$ (apart from internality, where $\alpha = .49$) (Zhang, 2006).

Traditionally, the scale produces scores for the explanation along the theme of positive and negative events (Peterson et al., 1982). As a result, composite attributional styles were calculated separately for positive and negative events. Higher scores for positive events and lower scores for negative events on any area demonstrate a more "optimistic" attributional style for that domain, i.e., more external, temporary and specific for bad events, and more internal, stable and global for good events. Generally, the ASQ scoring produces three composite scores and six scores of the individual dimension measures based on participants' responses to the scale items. The three composite scores are Composite Negative (CoNeg, CN, or

ASQ Negative), Composite Positive (CoPos, CP, or ASQ Positive), and Composite Positive minus Composite Negative (CPCN or ASQ Total). Here the CPCN scoring is theoretically based on the belief that an optimistic explanatory style is explicit when people make attributions for both positive and negative events they encounter in life.

In some cases, two other composite scores, Hopelessness and Hopefulness, are also produced separately for negative and positive events, based on some research results that the stability and globality factors correlated strongly, with internality-externality being more independent (Higgins et al., 1999). The six individual dimension scores are Internal Negative, Stable Negative, Global Negative, Internal Positive, Stable Positive, and Global Positive. This scoring method was applied in almost all previous studies dealing with explanatory style in the literature.

1.5.4.2 The Attributional Style Questionnaire – Other (ASQ – Other)

Attributional Style for others was measured using an adapted Chinese version of the ASQ, differing in that subjects are asked to imagine the event occurring to a fictional character "Wang Chen", described as being a healthy undergraduate of normal intelligence. The same events, instructions to generate causes, and ratings scales were used as in the ASQ.

As in the standard ASQ, 12 events, 6 positive and 6 negative, were divided across the domains of achievement and affiliation in the ASQ-Other. Respondents were asked to generate a likely cause for such an event, and, subsequently, to rate these causes on the following three characteristics: Internal versus external causation (e.g. "*is the cause of Wang's unsuccessful job search due to something about Wang Chen or to something about other people or circumstance*"), stability versus instability (e.g. "*in the future when looking for a job, will this cause again be present for Wang Chen*"), and specificity versus global applicability (e.g. "*is the cause something that just influences looking for a job or does it also influence other areas of Wang Chen's life*").

All responses are on the same 7-point scale (for internality vs. externality dimension, from '*Totally due to other people or circumstance*' to '*Totally due to*

Wang Chen'; for stability vs. instability dimension, from '*Will never again be present for Wang Chen*' to '*Will always be present for Wang Chen*'; for globality vs. specificity dimension, from '*Influence just this particular situation in Wang Chen's life*' to '*Influence all situations in Wang Chen's life*').

1.5.4.3 The Attributional Style Questionnaire – General (ASQ – General)

Attributional Style for general situations was measured using an adapted Chinese version of the ASQ, differing in that subjects are asked to imagine the event occurring for all people on average, not just the participants themselves. The same events, instructions to generate causes, and ratings scales were used as in the ASQ.

As in the original, 12 events, 6 positive and 6 negative were included. Respondents were asked to generate a likely cause for such an event, and, subsequently, to rate these causes on the same three characteristics as above: Internal versus external causation, stability versus instability, and specificity versus global applicability. All responses were rated on the same 7-point scale.

1.5.4.4 The Life Orientation Test-Revised (LOT-R)

The original English version of the Life Orientation Test-Revised (LOT - R; Scheier et al., 1994) was used to measure dispositional optimism in the British sample. A Mainland Chinese version of Life Orientation Test-Revised (CLOT-R; Lai et al., 1998) was used to measure dispositional optimism of the Mainland Chinese students.

The LOT-R is a brief modified version of the original Life Orientation Test (LOT; Scheier & Carver, 1985) and has been found to correlate 0.95 with the LOT (see Scheier et al., 1994). Support for the construct validity of the LOT-R has been reported in Scheier et al. (1994). Just as in the original English version of LOT-R, the CLOT-R comprises three positively phrased items (e.g. "*In uncertain times, I usually expect the best*"), three negatively phrased items (e.g. "*I hardly ever expect things to go my way*"), and four filler items. The psychometric properties of the Mainland Chinese LOT-R were reported by Lai et al. (1998) as $\alpha = .70$. For all items of both the English and Chinese versions, see the Appendix. Respondents are directed to assess the extent to which they agree with each of the 10 items on a 5-

point scale (4 = strongly agree, 3 = agree, 2 - neutral, 1 = disagree, and 0 = strongly disagree).

1.5.4.5 The Ryff Scales of Psychological Well-being (RSPW)

Psychological well-being was measured with a Chinese version of the Ryff Scales of Psychological Well-being (Chen, 2010). The original English version of the RSPW and this Chinese version of the RSPW were obtained from Dr Ryff, who granted permission to use these tests for research purposes.

The Chinese version of the RSPW consisted of nine items for each of the six dimensions: Self-Acceptance (e.g. "*I made some mistakes in the past, but I feel that all in all everything has worked out for the best*"), Positive Relationships With Others (e.g. "*Maintaining close relationships has been difficult and frustrating for me*"), Personal Growth (e.g. "*When I think about it, I haven't really improved much as a person over the years*"), Environmental Mastery (e.g. "*The demands of everyday life often get me down*"), Autonomy (e.g. "*I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people*"), and Purpose in Life (e.g. "*I enjoy making plans for the future and working to make them a reality*"). Items were rated on a 6-point Likert scale (1 = strongly disagree; 6 = strongly agree).

1.5.4.6 The Revised NEO Personality Inventory (NEO-PI-R)

Personality was measured with a Chinese version of the Revised NEO Personality Inventory (Yang et al., 1999).

Just as in the original English version of the NEO-PI-R (Costa & McCrae, 1992), the Chinese version contains the same 240 items with five domain scales assessing the five broad personality traits of the Five-Factor Model of personality (FFM; McCrae & Costa, 1987): Neuroticism (e.g. "*I often get angry at the way people treat me*"), Extraversion (e.g. "*I don't get much pleasure form chatting with people*"), Openness to Experience (e.g. "*I don't like to waste my time daydreaming*"), Agreeableness (e.g. "*I believe that most people will take advantage of you if you let them*"), and Conscientiousness (e.g. "*Over the years I've done some pretty stupid things*"). Items were rated on a 5-point Likert scale (1 = strongly disagree; 5 =

strongly agree). Reliabilities for the Chinese version of NEO-PI-R scale were reported ranging from .77 to .91 (Yang et al., 1999).

1.5.4.7 The Beck Depression Inventory (BDI)

A Chinese version of the Beck Depression Inventory (BDI; Chan & Tsoi, 1984), which was translated from the original version of the BDI (Shek, 1990) was used to measure depression. Chan and Tsoi (1984) reported the split-half reliability coefficient between odd and even items was .62 (p < .05), and test-retest reliability was .72 (p < .05).

The BDI is a 21-item, self-report measure that broadly assesse the symptoms of depression including affective (e.g. "*I feel quite guilty most of the time*"), cognitive (e.g. "*I feel my future is hopeless and will only get worse*"), somatic (e.g. "*I have lost more than ten pounds*"), and motivational components (e.g. "*I blame myself for everything bad that happens*"), as well as suicidal wishes (e.g. "*I would like to kill myself*"). Each item in the BDI describes a specific behavioural manifestation of depression (such as loss of appetite or somatic problem), and each symptom item consists of several statements that range from neutral to severe forms of symptoms. Assignment of a consistent weighted score of 0, 1, 2, and 3 was used for each item.

Admittedly, it seems that there are some overlap between BDI and LOT-R, since they both ask about bad expectations about the future. However, as the perspective of "dispositional optimism" originated theoretically from the expectancy-value model and put much emphasis on confidence or doubt pertaining to life, optimism and pessimism are broad, generalized versions of expectations to future life, rather than to just a specific narrow context.

1.5.4.8 The Satisfaction with Life Scale (SWLS)

Subjective well-being was measured with an on-line based Chinese version of the Satisfaction with Life Scale (SWLS; Chen & Zhang, 2004), which was translated from the original English version (Diener et al., 1985).

The SWLS is a five-item scale that measures general life satisfaction. It includes items such as '*If I could live my life over, I would change almost nothing*.' Responses are on a 7-point scale (1: strongly disagree to 7: strongly agree).

1.5.5 Participants

Sample 1

A total of 452 participants were included in sample 1, of which 267 undergraduates were recruited from Jinan University (JU), and 185 undergraduates were recruited from China Youth University for Political Science (CYUPS). Both these universities are located in Mainland China. All participants were native Chinese speakers. Participants in sample 1 completed the ASQ, the ASQ-Other, the LOT-R, the RPWB, and the NEO-PI-R.

In sample 1, there were 133 males (mean age = 20.70, SD = 1.30) and 319 females (mean age = 20.46, SD = 1.24). All participants took part in the present study on a voluntary and anonymous basis.

Sample 2

A total sample of 232 participants was recruited from the CYUPS (different subjects from sample 1). The participants were aged 17-21 years (mean age=18.76 years, SD=0.89); 97 males, 135 females. All participants in sample 2 took part in the present study on a voluntary and anonymous basis. All participants were native Chinese speakers. Participants in sample 2 completed two measures, the ASQ and the LOT-R. All participants took part in the present study on a voluntary and anonymous basis.

Sample 3

A total sample of 205 White British participants were recruited among students enrolled in a social science course in Edinburgh Napier University; 46 males and 159 females (mean age=20.10 years, SD=0.87). All participants were native English speakers. All participants in sample 3 took part in the present study on a voluntary and anonymous basis. Participants in sample 3 completed two measures, the ASQ

and the LOT-R. All participants took part in the present study on a voluntary and anonymous basis.

Sample 4

A total sample of 117 participants was recruited from Jinan University (different subjects from sample 1). The participants were aged 18-23 years (mean age=19.79 years, SD=1.11); 25 males, 92 females. All participants in sample 4 took part in the present study on a voluntary and anonymous basis. All participants were native Chinese speakers. Participants in sample 4 completed the ASQ-General. All participants took part in the present study on a voluntary and anonymous basis.

Sample 5

Fifty-two freshmen (22 males and 30 females) with depressive symptoms were recruited from the CYUPS. All participants were native Chinese speakers with ages ranging from 17 to 21. All participants in sample 5 took part in the present study on a voluntary basis. The 52 participants were randomly divided into one of the two conditions: an experimental group (n = 26) and a no-treatment control group (n = 26). Not all participants completed the whole procedure. Three participants dropped out of the intervention group and two dropped out of the control group. As a result, there were 23 participants in intervention group and 24 participants in the control group available for the final data analysis (M_{age} = 18.83, SD = 0.84) (19 males and 28 females).

Participants in sample 5 completed four measures, the BDI, the ASQ, the LOT-R, and the SWLS. All participants took part in the present study on a voluntary and anonymous basis.

Sample 6

Sixty-eight first-year university students (30 males and 38 females) were recruited from the CYUPS (different subjects from sample 5). All participants were native Chinese speakers with ages ranging from 17 to 21. All participants in sample 6 took part in the present study on a voluntary basis.

The 68 participants were randomly divided into one of the two conditions: an experimental group (n = 34) and a 'placebo'-treatment control group (n = 34). Not all participants completed the whole procedure. Four participants dropped out of the intervention group and five dropped out of the control group. As a result, there were 30 participants in intervention group and 29 participants in the control group available for the final data analysis (M_{age} = 19.03, SD = 0.74) (27 males and 32 females).

Participants in sample 6 completed four measures, the BDI, the ASQ, the LOT-R, and the SWLS.

Data collected from sample 1 and sample 2 was used in the study investigating psychometric constructs of the ASQ and the LOT-R, relationship between optimism and psychological well-being, relationship between optimism and personality, and exploration of attributional bias. Data collected from participants in sample 2 and sample 3 were applied in the cross-cultural study of attributional style and dispositional optimism. The study of attributional bias involved part of data collected from sample 1 and data collected from sample 4. Participants in sample 5 and sample 6 were recruited to examine intervention effects of optimism manipulations.

Chapter 2: The psychometric construct of optimism

As the most widely-applied measures for explanatory style and dispositional optimism respectively, the ASQ and the LOT-R have been psychometrically analysed in a number of studies since they were originally developed. In addition to controversial results and conclusions, previous studies in examining the psychometric constructs of these two measures have mostly been conducted in industrial countries. Investigating basic constructs of the ASQ and the LOT-R in Eastern cultural backgrounds has theoretical and empirical importance.

2.1 The psychometric construct of the ASQ

Regarding the psychometric construct of the ASQ, I set out to accomplish two main goals. First I wished to examine the structure of the ASQ using structural equation modelling of attributions for positive and negative events simultaneously. Second, I wished to test the role of cognitive style (such as global versus local explanations) that might play a role over and above explanatory bias. For instance, attributions of instability may apply to both positive and negative events. The literature motivating these aims is reviewed below.

2.1.1 Myths about attributional style

Attributional style has been developed from the original two-factor structure to the current widely accepted construct of three dimensions. Originally, two basic factors of casual explanations for actions – internality, a factor "with the person", which occurs when an individual blames him or herself for a problem, and externality, a factor "within the environment", when one blames something outside of oneself, were differentiated by Heider (1958). This notion of internality and externality was supported by Weiner (1974), who developed stability – the consistency of the cause – as another attributional component. Differentiation between stability and instability depends on whether the cause is taken as everlasting or as fleeting.

Later on, globality, which is linked to the prediction of recurrence of the same cause in other situations, was developed as a newly-applied notion of attributional

factor (Abramson et al., 1978). As a result, a three-dimensional model, which incorporated dimensions of internality, stability, and globality, was put forward by Abramson et al. (1978). Here in their opinion, internality and stability have basically the same meaning as the two components identified above by Heider (1958) and Weiner (1974). Thus far, these three dimensions, internal versus external, stable versus unstable, and global versus specific, have been combined to form the three-dimensional model of explanatory style. And the Attributional Style Questionnaire (ASQ; Peterson et al., 1982) was developed on the basis of these three-dimensional model of casual explanations.

As mentioned earlier, the ASQ assigns subjects an optimistic or a pessimistic explanatory style. An optimistic explanatory style consists of explaining positive events as enduring, global and internally generated, while also explaining negative events as unstable, specific, and externally caused (Forgeard & Seligman, 2012). If we are to understand the mechanism by which clinical and life outcomes are influenced by explanatory style, it is important that we understand the structure of the ASQ, decomposing the complex admixture of attributions, valences and events. These components may have effects that are not apparent in a simple summing up of positive and negative scores.

Within attributional models of depression, the attributions are seen to cause heavy distinct behavioural consequences. For instance, low self-esteem is agreed to be linked with internal attributions regarding negative events, while chronic depression is suggested to result from stable attributions for negative events (Haugen & Lund, 1998; Peterson et al., 1982). In this learned helplessness model, depression emerges as a consequence of experience with uncontrollable negative events (Abramson et al., 1978). Concept of attributional style however also predicts that the three types of explanation are correlated each other within at least within each valence. This is shown in graphically in Figure 2.1.
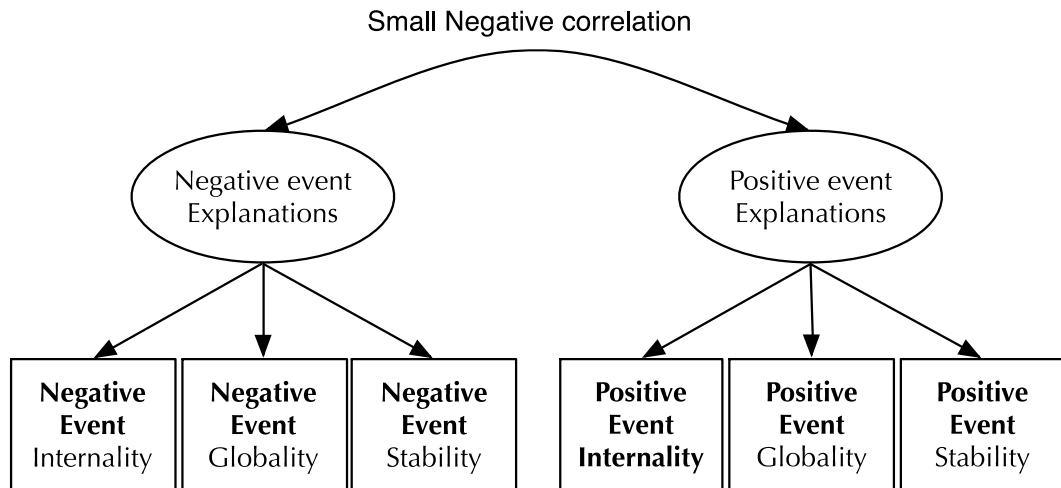
Figure 2.1: Proposed Model of attributional style based on learned helplessness theory of responses to experience of negative events.

Research based on this model has resolved in findings that are somewhat counterintuitive. The earliest data on this question was collected by Peterson et al. (1982). They reported that attributions for positive events and attributions for negative events were essentially uncorrelated (r = .02). This lack of correlation between explanatory styles for positive and negative events has been found in other work. For instance, P.J. Corr and J.A. Gray (1996) investigated the factor structure of the ASQ in two independent samples using Varimax rotated principal components analysis. They found that positive and negative explanatory styles were independent. In addition, whereas for negative events, internality ratings were largely independent of stability and globality ratings, for positive events these three dimensions formed a single factor, suggesting that explanations for positive and negative events might have different structures. The study of Bunce and Peterson (1997) also revealed that there is no correlation between explanations for positive and negative events. This independence was reported for ASQ composite score and the internality dimension as well.

Subsequent studies have used larger samples, and incorporated confirmatory structural equation modelling (SEM), allowing a better understanding of the structure of attributions by contrasting competing theoretical models. For instance, Higgins et al. (1999) reported a confirmatory factor analysis of the ASQ identifying three-correlated factors in over 1,000 subjects. This model fitted well (RMSEA = .02) for negative event attributions and for positive events as well (RMSEA = .02). Consistent with several other previous studies, the stability and globality factors correlated strongly (r = .61 for negative events, r = .67 for positive events), with internality-externality being more independent of the globality (r = .35 for negative events, r = .28 for positive events). Though different patterns appeared for negative and positive events regarding the correlation between internality and stability factors (r = .20 and r = .55 respectively).

The next major advance in modelling attributional style was the realization that, because subjects are generating multiple responses to each event, analyses must incorporate multi-method analytic strategies. This is an important innovation, as misleading results can arise in analyses of data generated from multiple correlated responses based on each item (as is true in the ASQ where all three attributions are samples for each event).

Using a multi-trait multi-method (MTMM) model, Hewitt et al. (2004) found that the three-factor structure of attributional style still provided a good account of responses to negative events in terms of correlated latent factors of internality-externality, stability-instability, and globality-locality. Contrasting, however, with previous studies, and reflecting the importance of correct modelling of the multiple assessments of each event, this model indicated higher correlations between internality and the other two factors (r = .52 for internality and stability and .45 between internality and globality). Here only negative event attributions were tested in this study.

The possibility of modelling both positive and negative event attributions jointly raises the possibility of addressing two questions. First, such data can establish whether attributions regarding the causes of positive events and negative events are

negatively correlated i.e., do individuals giving optimistic explanations for positive events tend to give optimistic explanations for negative events?

Secondly, a very different model of the ASQ and of attributions can be posed and tested. Rather than clustering around event valences to create an attributional style in which good and bad events are attributed to different types of causes, instead, subjects may have cognitive styles which apply independent of event valence, and these style factors may account for a preponderance of variance in the ASQ. This is shown graphically in Figure 2.2.
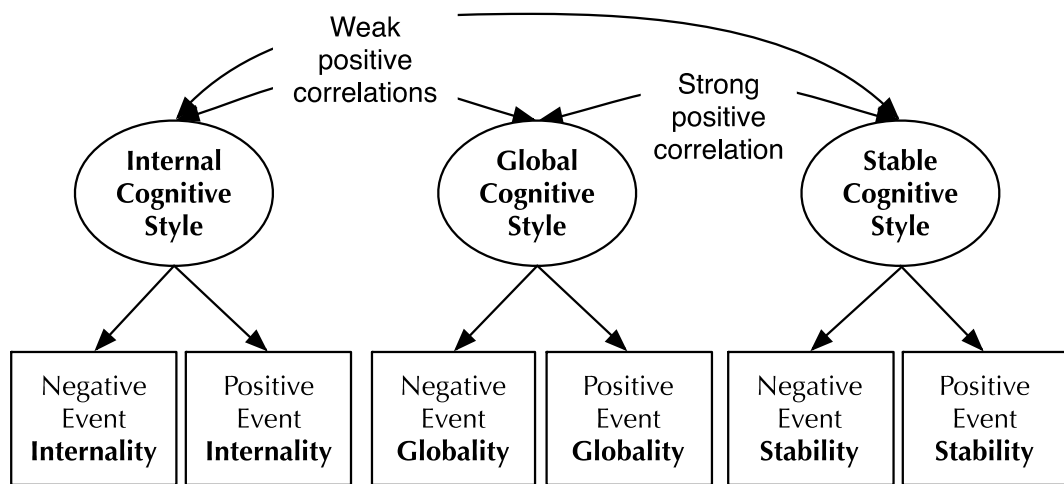
Figure 2.2: Proposed Model of Attributions in terms of valence-independent cognitive styles, rather than valenced biases.

As shown in Figure 2.2, a cognitive style model predicts that the tendency to apply global-local, internal-external and stable-unstable explanations to events may be independent of event valence: The same person who tends to ascribe, say, an internal cause to negative events may apply a similar internal explanation to positive events in their lives. It is, therefore, important to distinguish between cognitive style models, which would apply to events independent of valence, versus affect-linked attributional style models.

To summarize the findings to date, it is clear that adequate analyses of the structure of the ASQ require use of structural equation modelling and, in particular, of multi-trait multi-method modelling to account for the repeated entry of events into explanations (Campbell & Fiske, 1959; Hewitt et al., 2004). For negative events, research confirms a three-correlated factor structure. However no study in which both positive and negative events examined jointly have been conducted within models controlling for correlated event structure. This leaves the structure of the full ASQ unclear. In addition, a majority of studies to date have been conducted in Western samples, and it is not known whether the structure of explanatory style is invariant across culture.

After having examined relevant findings in current literature, I next outline in detail the two major research questions explored in the present study.

The first analyses sought to replicate the three correlated factor structure for negative events reported by Hewitt et al. (2004) using the MTMM model and the similar factor structures for positive events revealed by Higgins et al. (1999). These analyses can confirm (or disconfirm) that correlated factors of globality, stability, and internality emerge for both kinds of event. However, analyses of the different event valences in separate models miss the opportunity to test competing models incorporating attributions for the causes of both positive and negative events. Full data from positive and negative sections of the ASQ also allow testing a second important question; that of disentangling cognitive styles from optimistic and pessimistic attributions. It is to resolve these two questions that we turn next.

Data on attributions about both positive and negative events offer the opportunity to test whether the three attribution factors emerging for each event type are the same across events: That is whether globality for positive events is identical to the factor influencing globality ratings for negative events, and likewise for locality and internality as shown in Figure 2.2. To the extent that cognitive styles have important influences on responses, people's explanations of events will reveal coherent attributional styles for events independent of event-valence (Rotter, 1966), rather than explanations driven by experience with valence-specific outcomes

(Peterson et al., 1982). Of course both cognitive styles and valence-specific optimistic explanatory style factors may exist. This combined model is shown in Figure 2.3.3.

Cognitive Styles
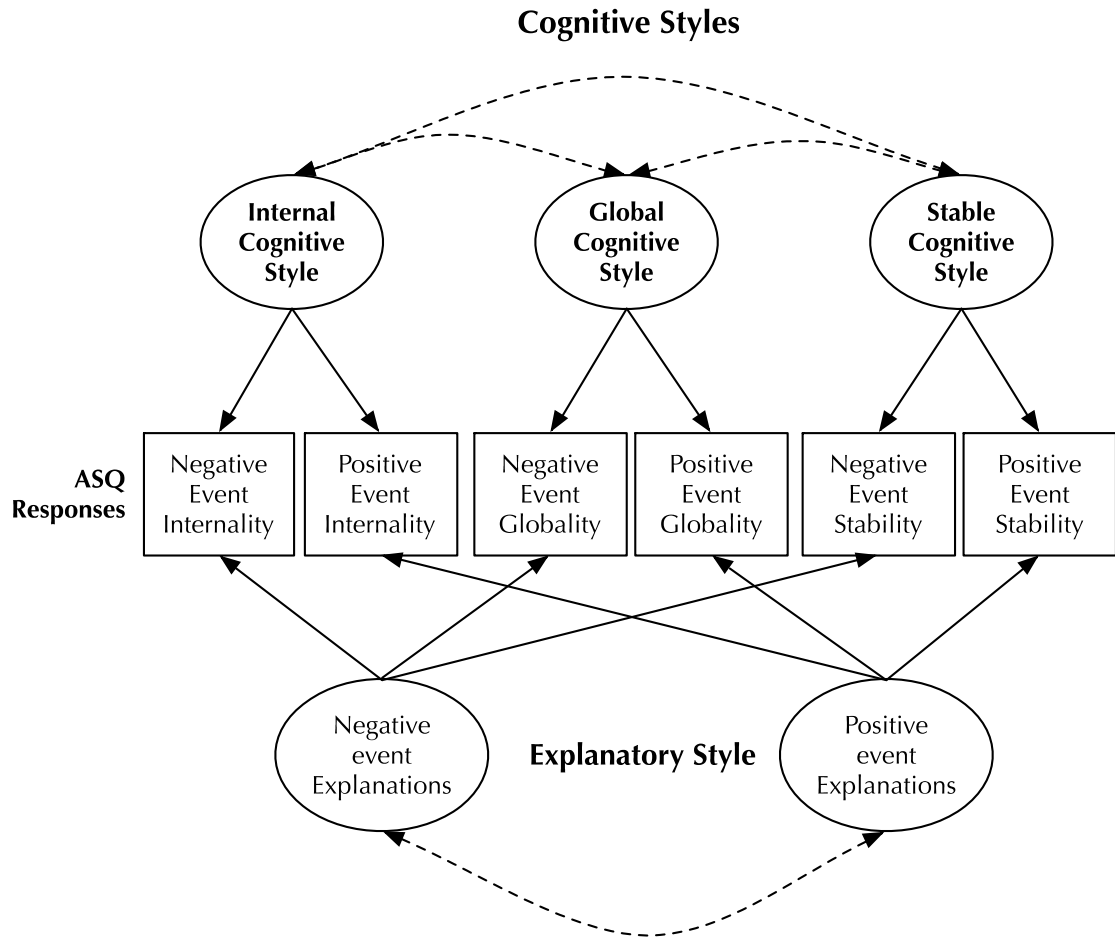
Figure 2.3: Combined framework for testing contrasting models of attributional Style.

Note: Explanatory style Models predict strong effects of valenced explanatory styles (negative event explanations & positive event explanations). By contrast, cognitive style Models predict large influences of internal –external, global – local & stable – unstable processing, biases independent of event valence.

Figure 2.3.3 lays out the full complexity of analytic outcomes tested here. As can be seen, six types of item response emerge from the ASQ: three attributions for each

of two event valences. These six response types are potentially accounted for by three cognitive styles (upper portion of Figure 2.3.3), and/or by two valence bias factors (lower portion of Figure 2.3.3). In addition, the three cognitive style factors may correlate or be independent of one another, likewise, negative event explanations may be negatively correlated with positive event explanations, or be uncorrelated.

Importantly, if explanatory biases for positive events and for negative events are uncorrelated, then the description of individuals as having either an optimistic or pessimistic explanatory style will be based on a composite of causes, and most individuals will have mixed biases. Alongside this, most people, if the cognitive style factors are influential on attributions, will tend to generate the same kinds of explanation for both positive and for negative events. And, the personal cognitive style which is predicted to be depressogenic (Abramson et al., 1978), will, paradoxically, be associated with a self-enhancing explanatory style for positive events. To this extent, a notion of positive or negative attributional style would not be applicable to most individuals.

Analyses and analysis techniques

We first replicated the model for negative events, and then extend this work to model positive events. Finally, in the second section of the analyses, we model both positive events and negative events simultaneously, testing the attributional style model, in which attributions regarding positive and negative events are clustered. We tested also if these clusters are correlated or not. These are contrasted with models in which attributions are driven instead by differences in cognitive style, independent of event valence, i.e., a tendency to ascribe events to local or stable causes, independent of whether they are positive or negative. Following this work, a second study is reported, replicating the proposed and confirmed joint model from study one in an independent sample.

All data were analysed at the item level. All variables were approximately normal. Given the 1-7 response scale for each item, data were analysed as continuous

(Rhemtulla, Brosseau-Liard, & Savalei, 2012). Models using polychromic input rendered highly similar solutions and fits. Correlations among item responses were used to estimate parameters in a confirmatory factor analysis framework, comparing proposed theoretical models, as described above. Final models were permitted to include explicit exploratory modifications where necessary (all modifications are noted explicitly). Modelling was undertaken using OpenMx (Boker et al., 2011; Boker et al., 2013) under R (R Core Team, 2012). All analyses took advantage or raw data supporting estimation of models using full information maximum likelihood estimation.

The adequacy of model fit was assessed using the comparative fit index (CFI), Tucker-Lewis index (TLI) and the Root Mean Square Error of Approximation (RMSEA). For CFI and TLI, values > 0.95 were taken as indicating acceptable fit (Hu & Bentler, 1999). For the RMSEA, values of < .05 indicated acceptable fit (C. Y. Yu, 2002). Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) are reported to aid model comparison.

2.1.2 Samples and instruments

Samples

There are two independent samples were included in this study (for detail of the two samples, see 1.5.4 of Chapter 1). Sample 1 was involved in constructing and testing the proposed model. Sample 2 was used to replicate the model. No subjects from the replication study participated in the initial modelling analysis.

Instruments

Attributional style was assessed using the Chinese ASQ (Zhang, 2006). Composite attributional styles were calculated separately for positive and negative events separately. Higher scores for positive events and a lower score for negative events on any area demonstrates a more "optimistic" attributional style for that domain, i.e., more external, temporary and specific for bad events, and more internal, stable and global for good events.

Reliabilities (Cronbach's α) were acceptable 0.84 for the total and, for positive events 0.84; for negative events .77; for internality, .65; for stability, .76; and .80 for globality.

Procedure

Participants were tested in groups of 30 to 50 by their lecturer. Each lecturer was trained on the administration of the task. After detailed instructions were provided, participants completed the paper-and-pencil questionnaires.

2.1.3 Testing models of causal attributions for positive and negative events

A total of 452 participants in sample 1 were involved in this testing.

Table 2.1 shows the descriptive statistics. Reliabilities were acceptable. No significant gender differences emerged and the data were pooled across sex in subsequent analyses.

Measures	Means	SD	Cronbach's Alpha
Negative Events	12.9	1.78	0.84
Internal Negative	4.45	0.67	0.49
Stable Negative	4.33	0.85	0.73
Global Negative	4.12	0.9	0.73
Positive Events	15.28	1.91	0.77
Internal Positive	5.03	0.7	0.65
Stable Positive	5.36	0.78	0.75
Global Positive	4.9	0.85	0.71
ASQ Total	2.38	2.17	0.84

Table 2.1: Means, SDs and Cronbach's Alpha for the ASQ scales.

Note: Means for ASQ dimensions are on a scale ranging from 1 to 7. (n = 452)

2.1.4 Structural equation modeling

I first tested the hypothesis that the structure of explanations for the causes of negative events reflects three factors of internality, stability and globality which are correlated. As in Hewitt et al. (2004), method (event) variance was accommodated using an MTMM structure. Hewitt et al. (2004) fit correlated factor models. Here I fit both this and the (statistically similar but theoretically distinct) higher-order model in keeping with the modelling to be undertaken below. Fit for both types of model is identical, and the correlated factor correlations are reported. This model is shown in Figure 2.4. For clarity, this correlated method variance is not shown on the figure.
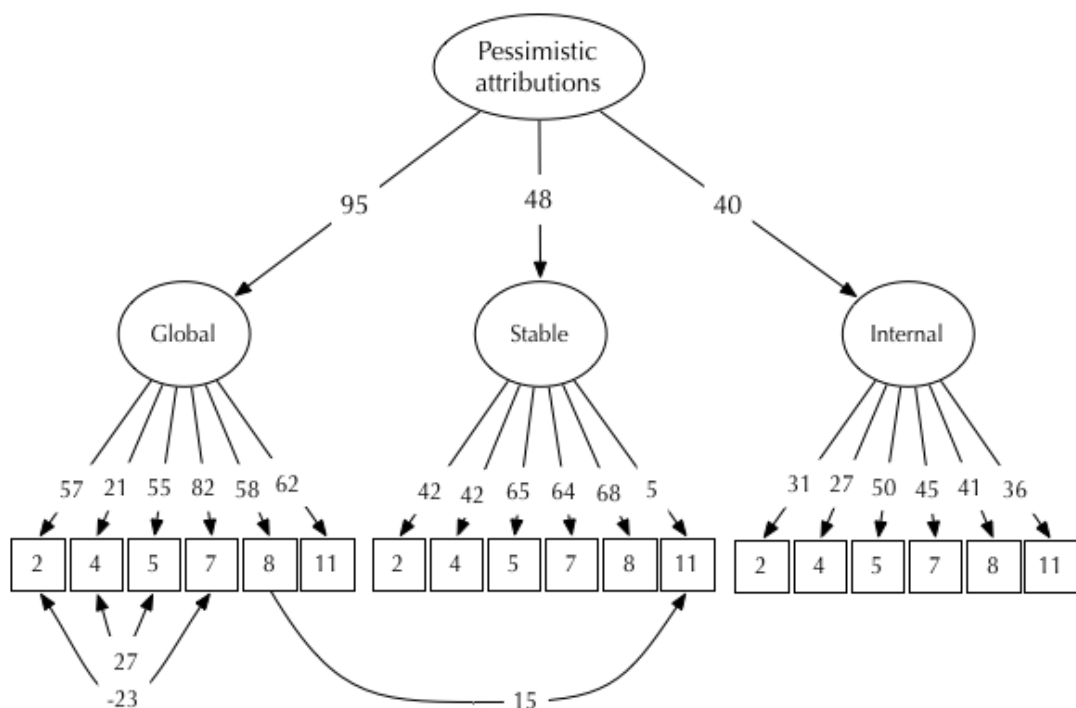
Figure 2.4: Well-fitting 3-factor model of attributional style for negative events.

The base model without modifications fitted reasonably well ($\chi^2(96) = 212.32$, $p < .001$; CFI = 0.94; TLI = 0.92; RMSEA = 0.044). Three modifications improved fit ($\chi^2 (3) = 47.1$, p<.001) by all criteria ($\chi^2(93) = 165.25$, p <.001; CFI = 0.97; TLI = 0.95; RMSEA = 0.033). The new paths all had loadings of .27 or below suggesting

the deviation of reality from the theoretical model is minor (see Figure 2.4). In a correlated factor model, stability and globality correlated .47, internality and globality had an r of .39, and internality and stability factors correlated = .20.

Thus, as previously reported by Hewitt et al. (2004), a model of causal attributions for negative events in terms of three correlated factors of globality, stability, and internality adequately accounted for responses to these negative events in the ASQ. We next turned to see if this model would fit well for positive events.

A model for positive events was constructed in the same fashion as the baseline model for negative events (see Figure 2.5). Fit measures for this model indicated excellent fit between model and data (χ^2 (96) = 152.48, p < 0.001; CFI = 0.98, TLI = 0.98, RMSEA = .027). No modifications were needed from base model. In the correlated factor model stability and globality correlated .57, internality and globality .48 and internality and stability .62: Considerably higher than was the case for negative events.
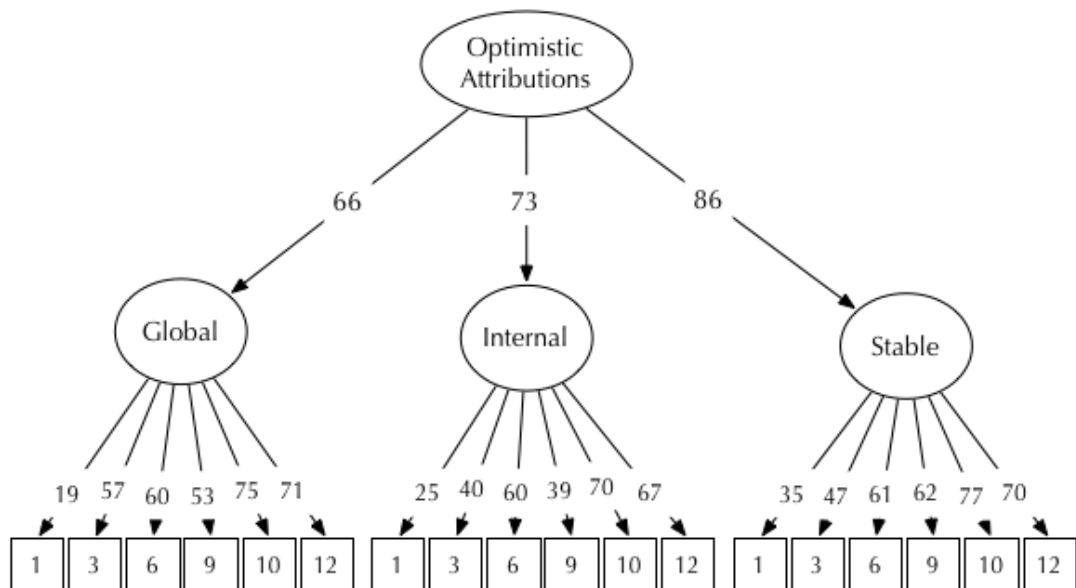
Figure 2.5: Well-fitting 3-factor model of attributional style for positive events.

As a result, as previously reported by Higgins et al. (1999), a model of causal attributions for positive events in terms of three correlated factors of globality, stability, and internality adequately accounted for responses to these positive events in the ASQ.

Analyses of separate ASQ positive events and ASQ negative events, then, indicated that these scales were well accounted for by three correlated factors of internality, stability, and globality. As can be seen in Figures 2.4 and 2.5, correlations between the three dimensions were high and significant, especially for negative events, where globality effectively defined the common factor.

I next moved on to construct models of both positive and negative ASQ events, jointly testing the competing models outlined in the introduction and shown in Figure 2.3.

Joint modelling of attributions of causality for positive and negative events

The sequence and fit statistics of all joint models tested are laid out in Table 2.2.

I first tested a model accounting for positive and negative event attribution in terms of just two negatively correlated factors of negative and positive event attributions (See Figure 2.1 and Figure 2.3 lower section **Figure 2.3**). This fitted poorly (χ^2 (521) = 1972.74, p < .001; CFI = 0.68; TLI = 0.64; RMSEA = 0.075; AIC = 2190.74; BIC = 2639.13) (see Table 2.2). I next modified this model setting the latent factors for positive and negative event attributions to be uncorrelated. This model fitted better than the first, but remained less than adequate (χ^2 (515) = 1058.89, p < .001; CFI = 0.67; TLI = 0.63; RMSEA = 0.076; AIC = 2232.34; BIC = 2676.72) (see Table 2.2).

I next tested a model accounting for the data in terms of three cognitive styles, i.e., in terms of tendencies to attribute global or local or stable causes to events, irrespective of their valence. This model was constructed by creating three uncorrelated latent variables: An Internal Style factor, with loadings from internality attributions for both positive and negative events, and similar Stability-Style and

Globality-Style factors, also loading from their respective attributes across the two event valences. This model fitted poorly (χ^2 (522) = 1509.05, p < .001; CFI = 0.79; TLI = 0.76; RMSEA = 0.061; AIC = 1725.05; BIC = 2169.33) (see Table 3.2). We therefore moved to a correlated cognitive styles model. This improved fit but was still not adequate (χ^2 (519) = 1375.91, p < .001; CFI = 0.82; TLI = 0.79; RMSEA = 0.057; AIC = 1597.91; BIC = 2054.53) (see Table 2.2). Next the preferred model containing both cognitive and explanatory style factors was tested.

Joint Models	χ^2 /df	CFI	TLI	RMSEA	AIC	BIC
Model 1 - correlated negative and positive event explanations	3.79	0.68	0.64	0.075	2190.74	2639.13
Model 2 - uncorrelated negative and positive event explanations	3.86	0.67	0.63	0.076	2232.34	2676.72
Model 3 - uncorrelated cognitive styles	2.89	0.79	0.76	0.061	1725.05	2169.33
Model 4 - correlated cognitive styles	2.65	0.82	0.79	0.057	1597.91	2054.53
Model 5 - "3-cognitive styles + 2-explanatory styles" in study 1 (see Figure 3.6)	**1.39**	**0.97**	**0.96**	**0.025**	**982.74**	**1690.29**
Model 6 – Replication of Model 5 in independent data	1.38	0.97	0.96	0.025	984.61	1695.13
Model 7 – Replication in the combined data set (see Figure 3.7)	1.52	0.97	0.96	0.024	1044.19	1822.99

Table 2.2: Fit statistics for Attributional Style.

Note: CFI = the comparative fit index; TLI = Tucker-Lewis index; RMSEA = Root Mean Square Error of Approximation. AIC = Akaike Information Criterion. BIC = Bayesian Information Criterion. Preferred model (Model 5) in Bold.

Results supported the predicted model (χ^2 (483) = 845.42, p <.001; CFI = 0.93; TLI = 0.91; RMSEA = 0.037). Modifications were suggested yielding good model fit

(χ^2 (458) = 634.34, p <.001; CFI = 0.97; TLI = 0.96; RMSEA = 0.025; AIC = 982.74; BIC = 1690.29) (see Table 2.2 and Figure 2.6). The new paths all had loadings of .23 or below suggesting the deviation of reality from the theoretical model is minor (see Figure 2.4), but see the discussion for elaboration on these modifications.

Joint modelling of attributions for positive and negative events thus supported three correlated cognitive style factors of internality, stability and globality, and two uncorrelated affective biases on judgments of positive and negative events.

2.1.5 Replication final ASQ model

In order to test the replicability of the final model, an independent sample was next collected. 232 undergraduates aged 17 – 21 years were recruited from a Chinese university (97 male, 135 female) as participants in the replication study. All testing procedures were identical, and no subjects from the replication study participated in the previous study.

Replicability was tested by running the exact model constructed for Study one, including the modifications required to raise that model to adequate fit. This model showed an excellent fit between model and data (χ^2 (458) = 633.43, p <.001; CFI = 0.97; TLI = 0.96; RMSEA = 0.025; AIC = 984.61; BIC = 1695.13) (see Table 3.2). The independent replication supported the structure found in previous study.

As the model fit well in both samples, we combined them in a final analysis to maximize the precision of all estimated parameters. This also fit well (χ^2 (458) = 696.42, p <.001; CFI = 0.97; TLI = 0.96; RMSEA = 0.024; AIC = 1044.19; BIC =1822.99) (see Figure 2.7, Table 2.2).
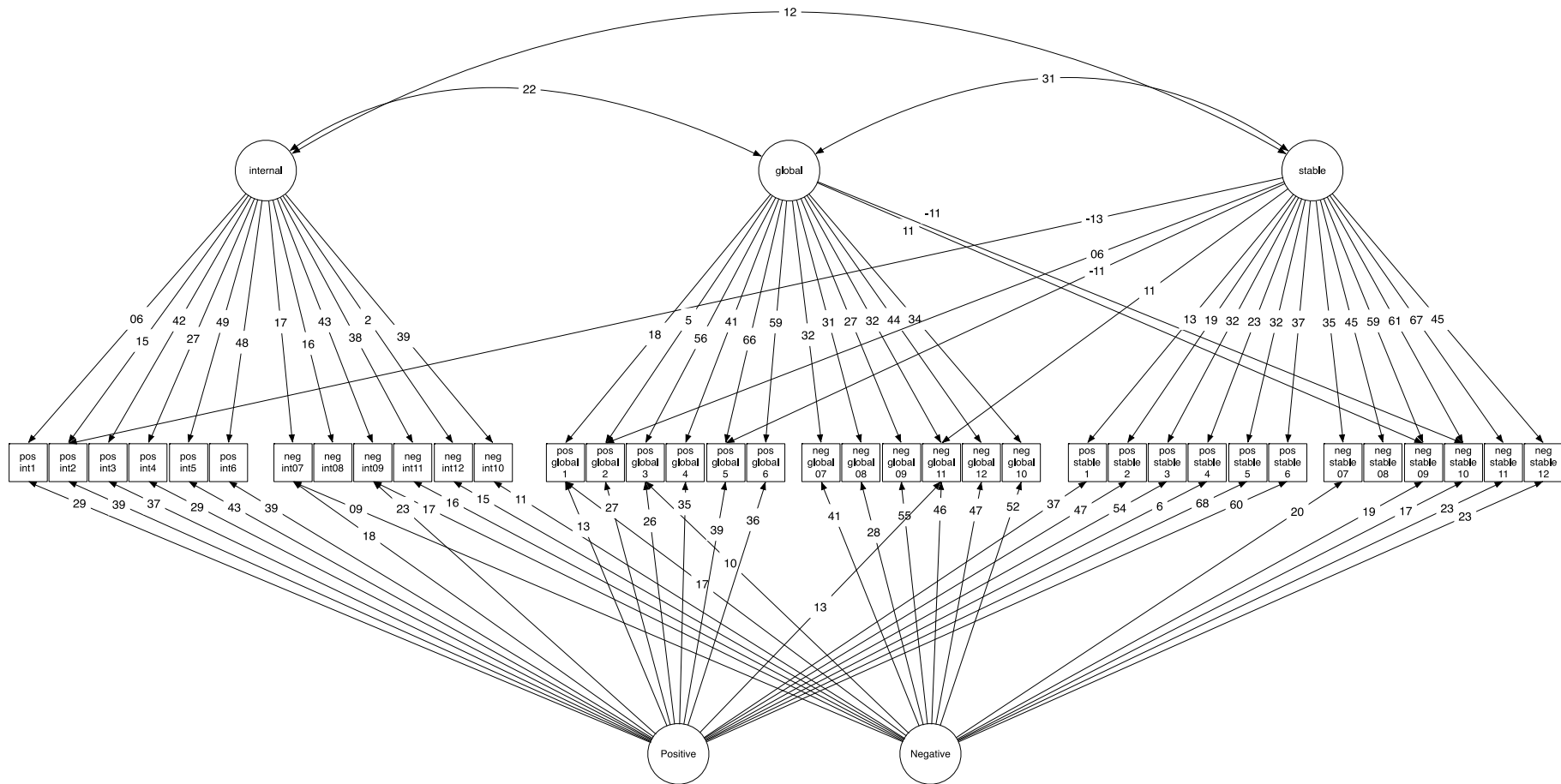
Figure 2.6: Well-fitting "3-cognitive styles + 2- explanatory styles" model of causal attributions for both positive and negative events.
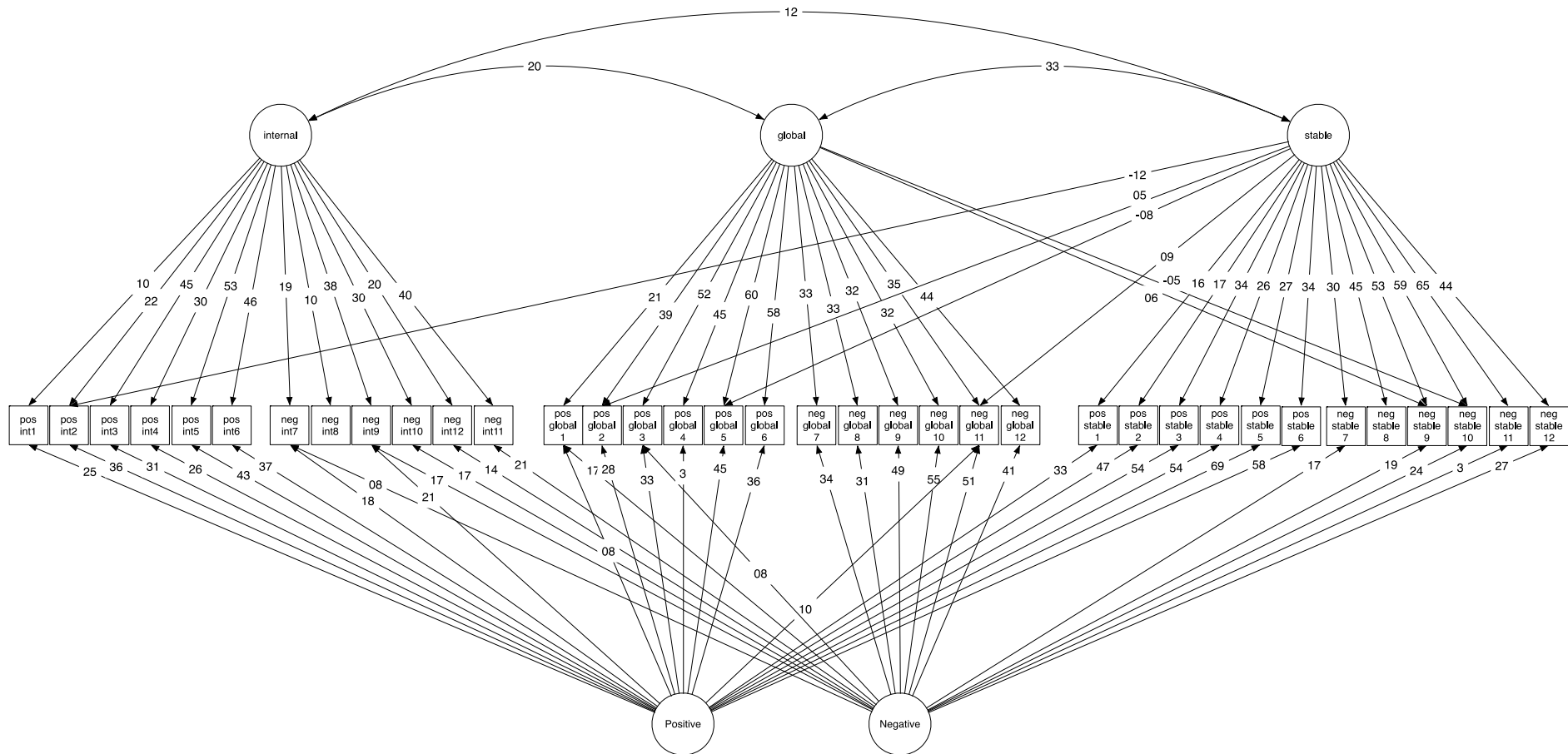
Figure 2.7: Well-fitting joint model in the combined data set.

2.1.6 Schematic model of attributional style

Explanatory style models of optimism focus on three aspects of attributions about the causes of positive and negative events: stability, pervasiveness, and internal-external control. Within positive and negative event valences, these three aspects are predicted to cluster forming explanatory style factors for each type of event, and these in turn are predicted to correlate negatively, in line with attributional accounts of depression. This structure was tested first in two studies including both positive and negative events simultaneously, as well as controlling for non-independence of responses within events.

Study one consisted of ASQ responses collected in 452 Chinese subjects. For models containing only positive or only negative events, the proposed three correlated-factor structure of explanatory style fit well. However, in joint models of both positive and negative events, three strong correlated cognitive style factors emerged, which applied to all events independent of valence. That is subjects who described events as local or as stable in nature, tended to do so for both positive and for negative events. In addition, two uncorrelated factors of attributions to positive and to negative events emerged.

To validate this model, an independent sample of 232 subjects was collected and the exact model from study one was confirmed as well fitting in this second sample. The ASQ captures two major structures: A set of cognitive styles: tendencies to process events as, for instance, internal or external in causation, and uncorrelated factors of bias regarding positive and negative event bias.

Simply, here in two studies I tested the structure of attributions made regarding the causes of positive and negative events (Abramson et al., 1978). Figure 2.8 shows in a schematic but quantitative form, the final conclusions emerging from the joint analysis of the first study one and the replication study.
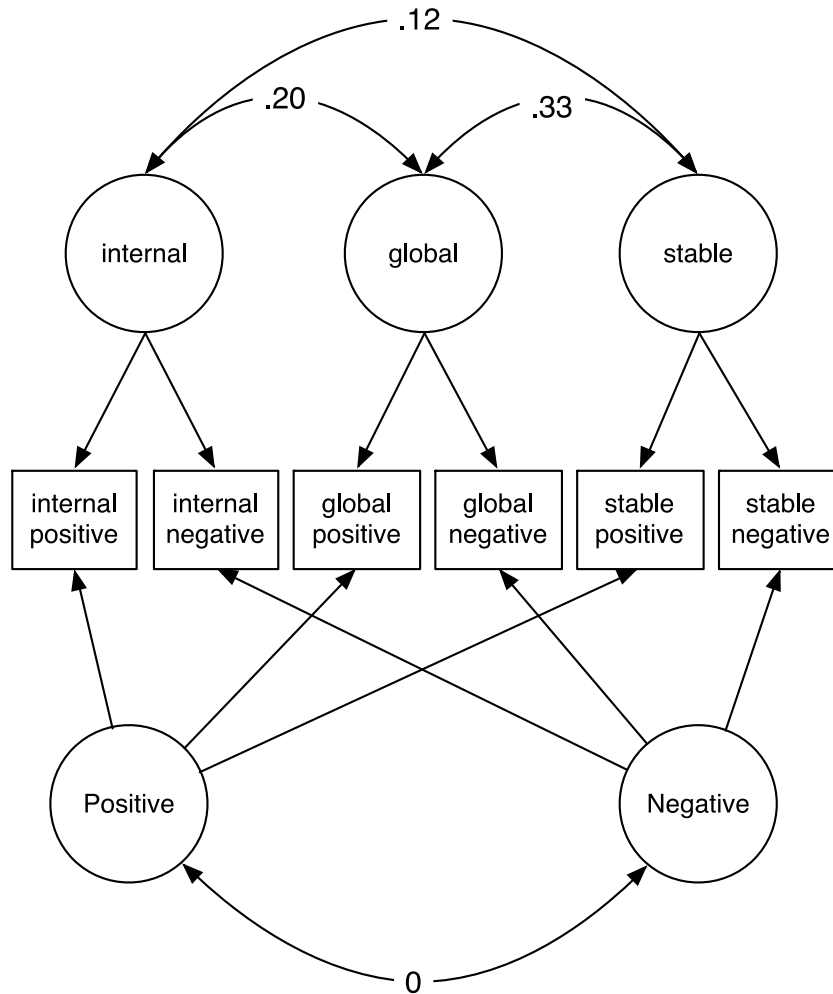
Figure 2.8: Final model reflecting results from combined data in two studies.

Analyses of single event valences revealed correlated globality, stability, and internality factors as reported by Hewitt et al. (2004) and Higgins et al. (1999) replicating in a non-Western sample the prior pattern and supporting the validity of the scale in China. However the joint analyses revealed a very different outcome. Attributional biases to positive events and to negative events emerged as uncorrelated. Importantly, three valence-independent cognitive styles were required to account for responding: global-local, stable-unstable, and internal-external. The implications of these findings are discussed below.

Cognitive styles emerged as an important influence on responding: valence-independent cognitive styles accounted for 85 percent of variance in the latent-factor model. This suggests that subjects apply consistent cognitive styles independent of event-valence, with personal tendencies to explain events as, for instance, global or local independent of event valence: Subjects rating positive events as global tended also to describe negative events in terms of global attributions, and likewise for the other two styles. The cognitive styles correlated modestly, with coherent tendencies to global-stable-internal vs local–unstable-external attributions.

It should be noted that several minor modifications were required to achieve accepted levels of fit for this model. These mostly involved small item-item correlations: this redundancy might allow a revised scale to be shortened. Eleven changes were theoretically significant paths from cognitive style to attributions outside the style: for instance from stability to globality of event 3. These indicate that revision or deletion of some items may improve the diagnostic coherence and utility of scales derived from well-fitting models of the ASQ.

Optimistic and pessimistic explanatory styles also emerged, with a pessimistic explanatory style associated with beliefs that the causes of negative events are stable, persuasive, and internal, and a positive bias for events being brief, affecting only one aspect of life, and be externally caused (Forgeard & Seligman, 2012). Supporting several empirical studies, optimistic and negative event were uncorrelated in the present data (P.J. Corr & J.A. Gray, 1996; Peterson et al., 1982).

Based on these findings, attributions may be best viewed as reflecting large differences in cognitive style (independent of event valence), and smaller independent positive– and negative-event biases. Scoring and interpretation of the ASQ should reflect this. Responses should be scored for cognitive style in addition to optimistic or pessimistic explanatory bias. For most individuals, mixed attributional styles should be expected: such as optimistic explanations for negative events and pessimistic attributions for positive events.

2.2 Separating optimism and pessimism

2.2.1 Previous understanding of dispositional optimism

Psychometric structure of the LOT

As the most frequently used measure of dispositional optimism, the LOT or its revised version, the LOT-R, has been applied widely in numerous studies. One critical issue concerning the dimensionality of this instrument, is whether it measures one dimension (optimism) or two dimensions (optimism and pessimism), is still not quite clear. This dispute has been examined by a number of empirical studies with controversial results demanding further investigation.

Theoretically, the basic conceptualization of dispositional optimism is formed on the behavioural self-regulation model, addressing both goals approach and goals avoidance (Carver & Scheier, 2001). Accordingly, expectancies should be involved in both goal approach and gaol avoidance processes. Based on this framework, dispositional optimism was originally assumed to be a bipolar dimension. Scheier and Carver (1985) suggested that the LOT measured a one-dimensional bipolar construct of dispositional optimism (n = 624). For the LOT-R, (Scheier et al., 1994) proposed that "confirmatory factor analysis further indicated that the single-factor solution was superior to a two-factor one" (n = 4,309).

At the same time, however, in a study with a sample of 889 male sailors in the Navy (Marshall, Wortman, Kusulas, Hervig, & Vickers Jr, 1992), evidence indicated that the positively and negatively phrased items in the measure split into two factors. The factor of positively phrased items was named as "optimism", and the factor of negatively worded items was named as "pessimism". This two-factor model, which declared that optimism and pessimism represent two distinct traits, was replicated in several later studies (Chang et al., 1997; L. Chang & McBrideChang, 1996; Creed et al., 2002; Roysamb & Strype, 2002). For example, in a sample of 347 undergraduates, Steed (2002) reported that the two-factor model was superior to the one-factor model using a confirmatory factor analysis (CFA) approach. This two-dimensional structure was replicated in an adolescent sample recently (Monzani et al., 2014).

Though most studies support the two-factor theory, it is not clear whether this two-dimensional model occurs through methodological bias or just reflects substantive differences among items. To deal with this issue, Kubzansky, Kubzansky, and Maselko (2004) reversed the framing of half of the items on each subscale, and compared the method artefact model with the two-factor model. Their results indicated that the bidimensional factor structure is consistent across all LOT versions no matter how each item is framed. In addition, McPherson and Mohr (2005) tested the potential effect of extremity of item wording on the LOT, and demonstrated that item extremity had no influence on the bidimensional structure at all.

Though the dimensional dispute of dispositional optimism has been mainly examined theoretically, there is at least one example in which the psychometric structure of dispositional optimism was investigated by linking it to physical index. Räikkönen and Matthews (2008) reported that while high pessimism predicted high ambulatory blood pressure, low optimism had no effects on this physical index. It indicated that dispositional optimism measured by the LOT may be not a bipolar construct as originally assumed.

To summarize the findings to date, a two-factor structure is psychometrically preferable to a one-dimension structure of total dispositional score (Suzanne C. Segerstrom, Evans, & Eisenlohr-Moul, 2011). This bidimensional structure of dispositional optimism was further supported in a large, age-heterogeneous sample (46,133 participants aged from 18 to 103 years). Results indicated that the LOT-R is bidimensional, consisting of an optimism factor and a pessimism factor. This two-dimensional construct model was found to be stable across gender and age groups (Herzberg, Glaesmer, & Hoyer, 2006).

Although different versions of the LOT or the LOT-R have been applied in a variety of research on optimism during the past two decades, a majority of these studies were conducted in Western samples. Consequently, it remains unclear for the applicability of the concept and structure of dispositional optimism in Eastern cultures. Sumi (2004) tested a measure of the Japanese translation of the LOT-R in 223 Japanese undergraduates. The original English version of the LOT or a Chinese

adaptation of the test has been conducted among Hong Kong Chinese (n = 620) and Taiwanese (n = 1,119) (Cheng & Hamid, 1997; Li, 2012). Results of these studies generally support the two-factor model that was found in most English-speaking samples.

However, even in the few studies of optimism in non-English speaking countries, controversy still exists. For instance, in a study of dispositional optimism with Hong Kong Chinese (Lai, 1997), a modified Chinese version of the Life Orientation Test was administered to one college student sample (n = 230) and an adult sample (n = 173). The results indicated that the predictive power of the LOT was owed to the optimism subscale. That is, the findings supported the unidimensional view of the LOT. This evidence for the one-factor model was replicated when the original English version of the LOT-R was applied in 248 Hong Kong Chinese (Lai et al., 1998).

Until recently, studies of dispositional optimism have been rarely conducted on Eastern cultures; and even fewer studies have been done with Mainland Chinese. One of the exceptions was a study conducted by Lai (2000) in 404 Hong Kong students and 328 Mainland Chinese students. A mixed scale of the LOT-R adaptation and the Chinese version of the original LOT were completed by the participants. CFA analysis indicated that while the bidimensional interpretation applied to the data of the Mainland Chinese students, the Hong Kong sample showed a one-factor model.

To further apply the widespread measure of dispositional optimism in Mainland China, it is necessary to examine the factor structure of the LOT-R in Mainland Chinese samples. A proper examination of the applicability of dispositional optimism to Chinese samples should apply translation of the LOT-R, which is currently the most prevalent measure. By using the translated version of the LOT-R, we attempted to provide results that are more generalizable to the scientific literature and to Eastern samples.

Linking dispositional optimism to explanatory style

As two main approaches to conceptualizing and measuring optimism, dispositional optimism and explanatory style have long been linked together and both have a wide range of applicability in research with parallel findings with depression, well-being and other related psychological constructs (Carver et al., 2010; Forgeard & Seligman, 2012).

Explanations for past events influence expectations for the future (Peterson & Seligman, 1984). That is, if a person attributes past failures to causes that are stable, he or she will expect more failures in the future, because the cause is likely to remain for a long time. If the cause of a negative event is attributed to global factors, the expectations tend to be that actions will not be under control even in many other situations. In parallel, if the explanation for a negative event is explained by internal factor, lower self-esteem tends to be displayed and passive expectation will be produced. Scheier and Carver (1992) also pointed out that explanatory style and dispositional optimism simultaneously rely on at least partly the same assumption, which claims that differences in people's expectations result in optimistic versus pessimistic consequences.

In a study conducted by Metalsky et al. (1993), 114 college students subjects were instructed to write down their expectations for their future performance on an exam, after they completed the EASQ. The results indicated that among undergraduates who received a low score, those who ascribed undesirable academic performance to stable and global factors expected themselves to not achieve well in the future. This result can be seen as evidence of potential influence of attributions on expectations.

Though dispositional optimism and explanatory style are taken as theoretically linked to each other, the results from empirical research exploring the relationship between these two variables is inconsistent. Measures of generalized expectancies (by the LOT) are only low or modestly associated with explanations for

negative events (by the ASQ) (Ahrens & Haaga, 1993; J. E. Gillham, Shatté, Reivich, & Seligman, 2001; Peterson & Vaidya, 2001).

Generally speaking, correlations between the two constructs were positive but varying between low and high across studies. Scheier and Carver (1992) reported that correlations between the ASQ and the LOT are not very strong. Peterson and Vaidya (2001) found a correlation of .20 between the ASQ and the LOT among a sample of 155 college students. In one study conducted by Ahrens and Haaga (1993), 94 undergraduates completed several measures included the LOT and the ASQ, and the correlation was reported as .30. In contrast, Hjelle, Belongia, and Nesser (1996) reported a correlation of .41 between the LOT and the ASQ composite in a subject of 436 college students. J. E. Gillham, Tassoni, Engel, DeRubeis, and Seligman (1998) reported a correlation of .63 and .41 between the LOT and the ASQ at two assessment points. These correlations went up to .77 and .49 after being corrected for attenuation respectively. Thus, correlations between the LOT and the ASQ ranged from .20 to .77 across these studies.

Aims and hypothesis

Given the inconsistency in previous research, the current study examined two issues regarding the nature of dispositional optimism. First, I wished to examine the utility of a Chinese version of the LOT-R to measure dispositional optimism with a Mainland Chinese sample. It is important to reach a resolution regarding the psychometric structure of this popular measure of dispositional optimism before its widespread application in Mainland China.

Based on previous findings mostly reporting a two-factor model of the LOT-R, it is hypothesized that the two-factor model is superior to the one-factor model in my study. Second, I set out to investigate the relationship of dispositional optimism and explanatory style through correlational analysis. Based on previous findings, I hypothesized that ASQ dimensions and LOT-R Optimism and LOT-R Pessimism would be weakly correlated.

2.2.2 Two-factor structure of the LOT

A total of 684 participants, 452 from sample 1 and 232 of which from sample 2, were included in this study (for detail of these two samples, see 1.5.4 of Chapter 1). There were 230 males and 454 females. The mean age of the total sample was 19.93 years (SD = 1.42).

Dispositional optimism was measured using the Chinese LOT-R (Lai & Yue, 2000).

Attributional style was assessed using the Chinese ASQ (Zhang, 2006).

Analysis Strategy

Structural equation modelling (SEM) was used to test potential mediating models comprising the LOT-R using Amos 17.0 (Arbuckle, 2008). All analyses took advantage of raw data supporting estimation of models using full information maximum likelihood estimation. Descriptive statistics and correlational analyses were obtained.

The adequacy of model fit was assessed using the comparative fit index (CFI), Tucker-Lewis index (TLI) and the Root Mean Square Error of Approximation (RMSEA). For CFI and TLI, values > 0.95 were taken as indicating acceptable fit (Hu & Bentler, 1999). For the RMSEA, values of < .05 indicated acceptable fit (C. Y. Yu, 2002). Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) are reported to aid model comparison.

Modelling

I first tested the one-factor model; all six items were specified as indicators of a single factor. The unidimensional model fit poorly with the data, with χ^2(10, N = 684) = 405.19, p < .001; CFI = .358; TFI = .306; RMSEA = .241; AIC = 427.193; BIC = 477.000.

I next turned to the two-factor model. Here the three positively worded items were specified as indicators of the Dispositional Optimism factor (LOT-R Optimism), and the three negatively worded items were specified as indicators of the Dispositional Pessimism factor (LOT-R Pessimism). Compared with the one-factor model, the two-factor model fit better with χ^2(8, N = 684) = 26.525, p < .001; CFI = .970; TFI = .944; RMSEA = .058; AIC = 52.525; BIC = 111.388 (See Figure 2.9). The correlation between the Dispositional Optimism factor and the Dispositional Pessimism factor was -.20 (p<.01). The factor loading ranged from .30 to .81 (See Figure 2.9).

Thus, as previously reported by many studies conducted in the Westerners, a two-factor model of dispositional optimism was supported in this Mainland Chinese sample. That is, the LOT-R measures two negatively correlated and independent constructs.
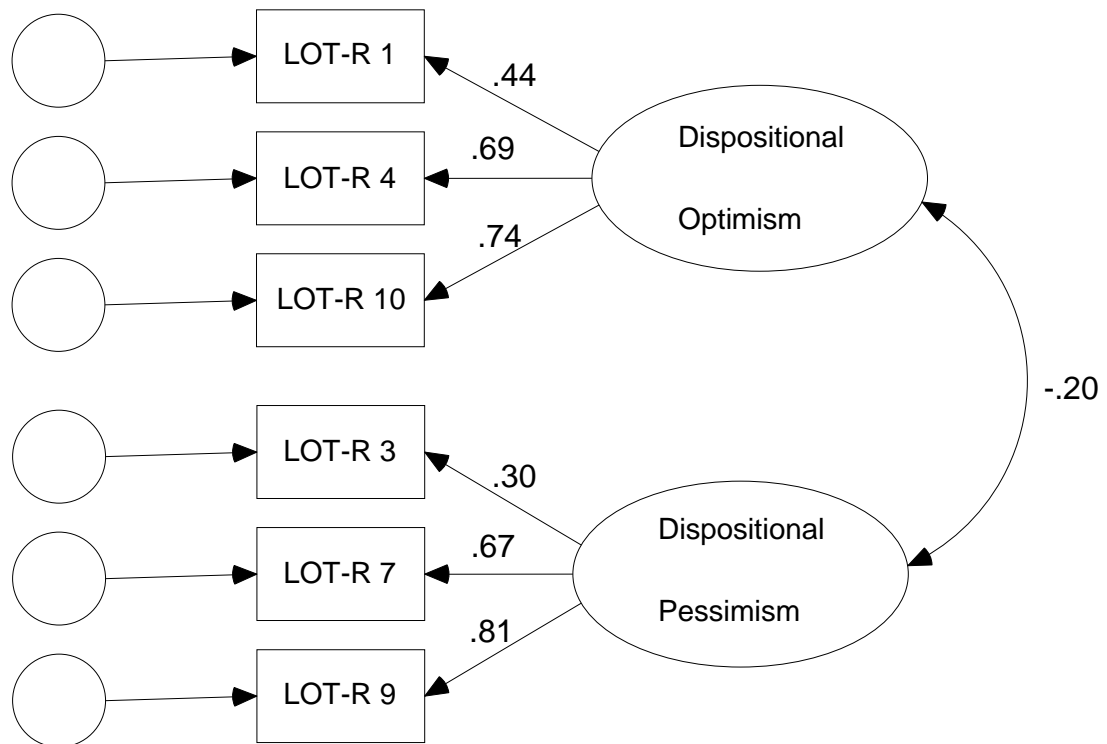
Figure 2.9: Standardized estimations for the two-factor model.

Descriptive statistics

The means, standard deviations and Cronbach's alpha of the total samples on LOT-R and ASQ are summarized in Table 2.3.

Correlational analysis

I next turned to examine correlations between dispositional optimism and explanatory style. I hypothesized that LOT-R Optimism and LOT-R Pessimism and ASQ dimensions would be weakly correlated. Table 2.4 shows the inter-correlations among the variables of interest. Consistent with previous studies, the LOT-R Optimism was positively correlated with the ASQ Total ($r = .12$, $p < .01$), but lower than correlations between these two variables reported by earlier studies (r ranged from .20 to .77). For individual dimensions, LOT-R Optimism was positively correlated with ASQ Positive ($r = .08$, $p < .05$) and Stable Positive ($r = .09$, $p < .05$),

and negatively correlated with Stable Negative ($r = -.10$, $p < .05$), but had no significant correlation either with ASQ Negative or with any three dimensions of negative events. No significant correlation was found between ASQ Pessimism and any ASQ dimensions.

Measures	Means	SD	Cronbach's Alpha
LOT-R Optimism	6.37	2.33	0.64
LOT-R Pessimism	4.89	2.04	0.61
ASQ Positive	15.22	1.88	0.83
Internal Positive	4.97	0.70	0.65
Stable Positive	5.33	0.78	0.74
Global Positive	4.91	0.83	0.69
ASQ Negative	12.93	1.83	0.78
Internal Negative	4.46	0.65	0.46
Stable Negative	4.33	0.87	0.72
Global Negative	4.14	0.92	0.73
ASQ Total	2.29	2.19	0.84

Table 2.3: Means, SDs and Cronbach's Alpha for the ASQ and the LOT scales.

Note: Means for ASQ dimensions are on a scale ranging from 1 to 7; Means for the LOT are on a scale ranging from 0 to 4 (n = 684).

Measures	1	2	3	4	5	6	7	8	9	10
1. LOT-R Optimism										
2. LOT-R Pessimism	-0.13**									
3. ASQ Positive	0.08*	0.03								
4. Internal Positive	0.05	0.05	0.77**							
5. Stable Positive	0.09*	0.04	0.85**	0.54**						
6. Global Positive	0.06	-0.02	0.81**	0.39**	0.52**					
7. ASQ Negative	-0.06	-0.05	0.30**	0.09*	0.25**	0.37**				
8, Internal Negative	0.04	0.01	0.26**	0.27**	0.19**	0.17**	0.59**			
9. Stable Negative	-0.10*	-0.04	0.16**	-0.04	0.26**	0.16**	0.78**	0.20**		
10.Global Negative	-0.05	-0.07	0.26**	0.03	0.11**	0.46**	0.83**	0.28**	0.47**	
11.ASQ Total	0.12**	0.07	0.61**	0.58**	0.52**	0.39**	-0.58**	-0.27**	-0.52**	-0.47**

Table 2.4: Correlations between measures.

*p < 0.05

**p < 0.01

2.2.3 What we should know about dispositional optimism

The primary goal of the current study was to address whether dispositional optimism measured by LOT-R was compatible with a one-factor or two-factor model in a Mainland Chinese sample. I found that the LOT-R was better interpreted as a bidimensional construct, which includes dispositional optimism and dispositional pessimism, than a unidimensional structure.

Originally, dispositional optimism was theoretically constructed on self-regulation theory, which involves approaching and avoiding goals of behaviour, and was then proposed to reflect a bipolar construct (Scheier & Carver, 1985). However, many studies demonstrated that the two-factor structure may better explain the psychometric structure of dispositional optimism (L. Chang & McBrideChang, 1996; Kubzansky et al., 2004; Marshall et al., 1992; McPherson & Mohr, 2005; Roysamb & Strype, 2002). The present study conducted in a Mainland Chinese sample supported the proposal of a bidimensional construct. Though prior studies concerning the psychometric structure of the LOT and LOT-R mainly support a two-factor model, it does not mean that individuals should be distinctively categorized as optimists and pessimists by a cut-off score. As noted in the study of Eichner, Kwon, and Marcus (2014), optimism is a continuous variable.

The second aim of the present study was to examine the correlations between dispositional optimism and explanatory style. Results indicated that dispositional optimism was positively correlated with the composite attributional style, which is consistent with most previous studies exploring the relationship between these two constructs, although the correlation was lower than earlier studies. New findings were reported for correlations between the LOT Optimism and individual dimensions of the ASQ. Specifically, the results demonstrated that LOT-R optimism was positively correlated with the stability dimension of positive events, and negatively correlated

with the stability dimension of negative events. This may reveal some interesting points in understanding the relationship between dispositional optimism and explanatory style. Regarding the fact that only a general correlation between the LOT or LOT-R and the ASQ composite has been reported in most previous studies, results in this study provide at least some further information to better understand the relationship between dispositional optimism and explanatory style.

Furthermore, my study provided empirical evidence of the correlational patterns between explanatory style and dispositional optimism in a non-Western sample. The results were generally consistent with findings of previous research in Western samples, in which explanatory style and dispositional optimism were reported to be weakly correlated (Forgeard & Seligman, 2012).

Chapter 3: Optimism and personality

A pessimist sees the difficulty in every opportunity. An optimist sees the opportunity in every difficulty. – Winston Churchill

3.1 Is optimism a personality thing?

Personality, as one of the most traditional and widely developed psychological models, has long been the focus of theorists and practitioners. There are at least three different well-established personality systems – Eysenck's three factor approach (Eysenck, 1965), the 16 personality factor system (Cattell, 1943), and the Five-Factor Model of personality (FFM; McCrae & Costa, 1987) – that have been proposed and studied in the last several decades. Among these three approaches, the FFM appears to have attained a dominant position in both research and application.

The FFM proposes that there are five fundamental dimensions of personality that are stable and consistent over time and across culture, namely Extraversion, Agreeableness, Neuroticism (Emotional Stability), Conscientiousness, and Openness to Experience (McCrae & Costa, 1987). The FFM is measured with the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992). Each of the five domains of the NEO-PI-R is represented by six specific scales that measure facets of each domain. For example, Neuroticism consists of Anxiety, Angry Hostility, Depression, Self-Consciousness, Impulsiveness, and Vulnerability; Extraversion consists of Warmth, Gregariousness, Assertiveness, Activity, Excitement-Seeking, and Positive Emotions (Costa & McCrae, 1995).

Explanatory style and personality

Explanatory style has been proposed as a cognitive variable designed to investigate the habitual causal explanations people provide for life events (Peterson & Seligman, 1984). Attributions are identified as thoughts and beliefs people hold for explaining various life events, and this individual difference has been assessed largely through its linkage to traditional personality traits, including almost all the main approaches in personality. Previous studies have indicated that attributions for life events, especially for negative events, provides understanding of the potential mechanism underlying the nature of other personality dispositions (e.g. Haugen & Lund, 1998).

Though both explanatory style and FFM have been taken as important to understanding personality, very few studies have been done to explore the relationship between these two constructs. In those studies, attributional style for negative events has been found to be negatively correlated with Conscientiousness. For example, in a study which investigated substance use in college students, Musgrave-Marquart et al. (1997) reported that attributions for academic failure was modestly correlated with Conscientiousness (r = -.18) but none of the other FFM dimensions. Similarly, Poropat (2002) reported that ASQ Negative was negatively correlated with Conscientiousness (r = -.16). Correlations between ASQ Positive, ASQ Total, and FFM dimensions have also been reported in this study. ASQ Positive was found to be positively correlated with Emotional Stability (r = .18) but not significantly associated with other FFM dimensions. By contrast, ASQ Total has been reported to correlate significantly with four FFM dimensions (Extraversion, r = .22; Agreeableness, r = .16; Conscientiousness, r = .20; Emotion Stability, r = .22).

In addition to FFM, correlations between ASQ dimensions and other personality frameworks have been investigated. For example, Haugen and Lund (1998) reported that attributions for positive and negative events correlated differently with self-

esteem, motive, self-efficacy, and defensiveness. In a group of Chinese college students, Wang and Zhang (2005) reported correlations between the ASQ and the Sixteen Personality Factor Questionnaire (16-PF). It revealed that individuals with a pessimistic explanatory style were also characterized by high sensitivity, high insecurity, high tension, and high anxiety.

In their study of ASQ validation, P.J. Corr and J.A. Gray (1996) examined ASQ correlations with several personality traits from the Eysenck Personality Questionnaire (EPQ) and the State-Trait Anxiety Inventory (STAI). Attributions for positive events correlated positively with Extraversion within the occupational sample of salespersons but did not correlate with any of the EPQ variables among a group of volunteers. Attributions for negative events was correlated with all EPQ variables, suggesting a trend of general dysphoria, e.g. high Neuroticism, high psychoticism, and low Extraversion, which was consistent with a general understanding of the relationship between negative attributional style and the FFM. On the other hand, anxiety measured using the STAI correlated positively with ASQ negative events scores and negatively with the ASQ positive events scores.

Studies examining the relationship between explanatory style and personality have often been intertwined with the investigation of potential gender differences in attributional style. For instance, Rim (1991) reported that for the dimension of stability, men scoring low on Neuroticism rated higher on positive than negative events, while for the global factor, those scoring high on Neuroticism rated higher on positive than on negative events. Women have different patterns. For all attributional styles, women who scored low on Neuroticism had higher scores on positive events than on negative events. Regarding Extraversion, both men and women with low scores got higher rates on positive than on negative events for the internal factor only.

Gender differences were also reported in a later study. Poropat (2002) investigated the relationship between explanatory style and the FFM in a group of college students, and discovered that the correlational patterns were different for men and women. Specifically, optimistic explanatory style was positively related to Agreeableness for both men and women, but was positively related to Extraversion only for men, and was negatively related to Neuroticism only for women.

Gender differences have also been reported in studies examining the link between explanatory style and other basic personality variables in addition to the FFM. For example, using the California Psychological Inventory (CPI) as a personality measurement, Bunce and Peterson (1997) reported that women's optimistic explanatory style negatively correlated with well-being and good impression. For men, different patterns emerged. Sociability negatively correlated with optimistic explanatory style. Though the mechanism underlying the gender differences in the attributional style-personality relationship is still not quite clear, these studies indicate that they are manifested differently between men and women.

Based on the prior studies mentioned above, it appears that there are no consistent pattered correlations between explanatory style and FFM variables and other personality frameworks. This lack of research called for the necessity of studies comparing these two important variables.

Dispositional optimism and FFM

Dispositional optimism is regarded as a relatively stable individual personality trait (Carver et al., 2010). Associations between dispositional optimism and the FFM have been found in many studies. Dispositional optimism is mainly manifested in Neuroticism and Extraversion, especially the former. For example, Williams (1992) reported that the LOT correlates positively with Extraversion ($r = .25$), and is also correlated negatively, but more strongly, with Neuroticism ($r = -.58$). This study was

conducted with 223 university students. Also, in a sample of 113 older women, Boland and Cappeliez (1997) linked optimism to low Neuroticism ($r = -.66$).

Significant correlations between dispositional optimism and other FFM dimensions have been reported. For example, Suzanne C Segerstrom, Castañeda, and Spencer (2003) reported strong positive correlations between LOT-R scores and Conscientiousness ($r = .31$), in addition to typical correlations of dispositional optimism with Extraversion ($r = .60$) and Emotional Stability ($r = -.46$). Furthermore, Agreeableness was found to be positively correlated with dispositional optimism in Ebert, Tucker, and Roth (2002)'s study ($r = .35$). The relationship between dispositional optimism and the FFM was expanded to Openness as well. Lounsbury, Saudargas, and Gibson (2004) reported positive correlations between dispositional optimism and all five FFM dimensions: Extraversion ($r = .27$), Conscientiousness ($r = .23$), Agreeableness ($r = .29$), Emotional Stability ($r = .60$), and Openness ($r = .30$). Similarly, in a larger-sample study ($N = 4,332$), Sharpe, Martin, and Roth (2011) reported that dispositional optimism (measured by three different questionnaires) was significantly correlated with all five FFM factors (assessed by five different measures). For Extraversion, $r_{average} = .44$; for Neuroticism, $r_{average} = -.56$; for Openness, $r_{average} = .21$; for Agreeableness, $r_{average} = .39$; for Conscientiousness, $r_{average} = .38$.

One of the unresolved debates about dispositional optimism is whether it is a continuous bipolar variable or a two-dimensional variable. Implied in measurement, there has long been an ambiguity in confirming the psychometric structure of the LOT. A few studies have tried to resolve this debate by linking dispositional optimism to some traditional and well-established personality constructs, such as the FFM. In these studies, the FFM or other fundamental personality traits have been used as external criteria to examine the psychometric structure and personality essence of dispositional optimism. For instance, a two-dimension structure of the LOT was

supported in Marshall et al. (1992)'s study in a sample of 889 male navy interns. This study discovered that LOT Optimism correlated more strongly with Extraversion than did LOT Pessimism, and LOT Pessimism correlated more strongly with Neuroticism than did LOT Optimism, showing that the LOT is related to both these domains of personality. However, the patterns revealed in Marshall et al.'s research were greatly reduced after item valence was controlled for in a recent study with a larger sample size (n = 1,016) (Kam & Meyer, 2012).

Aims of the current study

The present study set out to accomplish four main goals.

First, correlational analysis of ASQ measures, LOT-R variables and FFM factors were calculated and these analyses were expanded to specific facets of FFM dimensions in order to get a better understanding of the relationship between explanatory style and dispositional optimism, and to provide extra information concerning the relationship between optimism and the FFM. Based on previous research findings already discussed, LOT-R Optimism was hypothesized to be negatively related to Neuroticism, and positively correlated with Extraversion, Agreeableness, Openness, and Conscientiousness. Conversely, LOT-R Pessimism was hypothesized to be positively related to Neuroticism, and negatively correlated with the other four FFM factors.

For the ASQ measures, ASQ Positive was hypothesized to be negatively related to Neuroticism and positively correlated to Extraversion. ASQ Negative was hypothesized to be negatively related to Conscientiousness. Other potential correlations between ASQ variables and FFM factors, such as correlations between ASQ Negative and Extraversion, have not been reported previously. Based on past correlational analysis between FFM factors, ASQ Positive was hypothesized to be

positively related to Openness, Agreeableness, and Conscientiousness. ASQ Negative was hypothesized to be positive correlated with Neuroticism, and negatively related to Extraversion, Openness, and Agreeableness.

For specific facets of FFM factors, Depression (one of the six facets of Neuroticism) was hypothesized to be positively related to ASQ Negative and LOT-R Pessimism, and to be negatively correlated with ASQ Positive and LOT-R Optimism. Other potential correlations between ASQ, LOT-R variables, and FFM facets are unpredictable since no findings have been reported as to my knowledge.

Second we wished to explore gender difference in levels of explanatory style within the background of FFM as suggested by Poropat (2002). Examination of gender differences was extended to the relationship of dispositional optimism and FFM variables. This study set out to compare the ASQ, the LOT, and the FFM among men and women collectively as well as among men and women separately.

Third, since previous studies have suggested the FFM is a reliable external criterion for examining the psychometric structure of dispositional optimism, the next aim of this study was to test the associations between the FFM and dispositional optimism/pessimism. In addition to correlational analyses, a model using SEM was examined (see Figure 3.1). For this model, we hypothesized that all FFM dimensions are correlated with each other; LOT-R Optimism and LOT-R Pessimism will be predicted by FFM factors, especially Neuroticism and Extraversion; and LOT-R Optimism and LOT-R Pessimism are distinctive but negatively correlated factors.
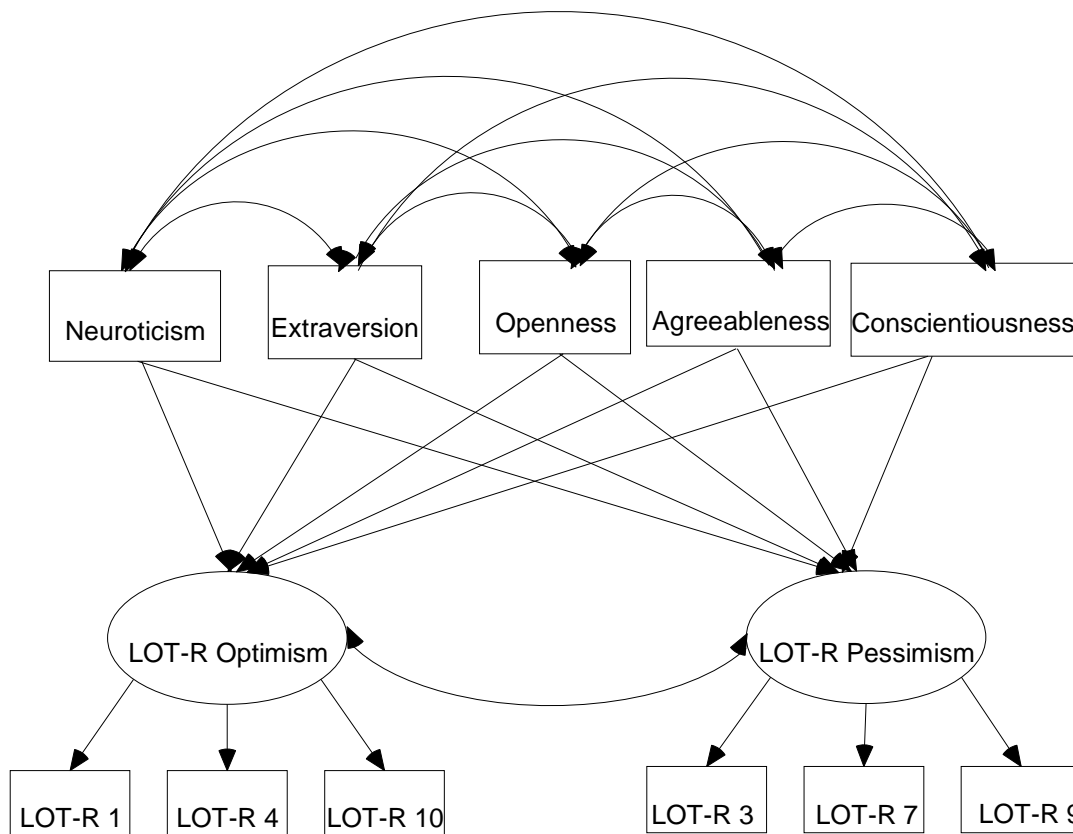
Figure 3.6: Proposal for an initial model with hypothesized relationship between LOT-R and FFM.

Finally, I set out to examine the relationship between attributional style and FFM with a SEM model (see Figure 3.2). In my earlier MTMM analysis of the ASQ, joint modelling of attributions supported three correlated cognitive style factors of internality, stability and globality, and two uncorrelated affective biases on judgments of positive and negative events. Accordingly, in this model, it was hypothesized that Internal Positive and Internal Negative are positively correlated, as are the other two cognitive style factors (Stability and Globality). All FFM dimensions are correlated

with each other. ASQ Positive and ASQ Negative will be predicted by FFM dimensions. Specifically, Neuroticism and Extraversion were expected to be predictors of attributional style.
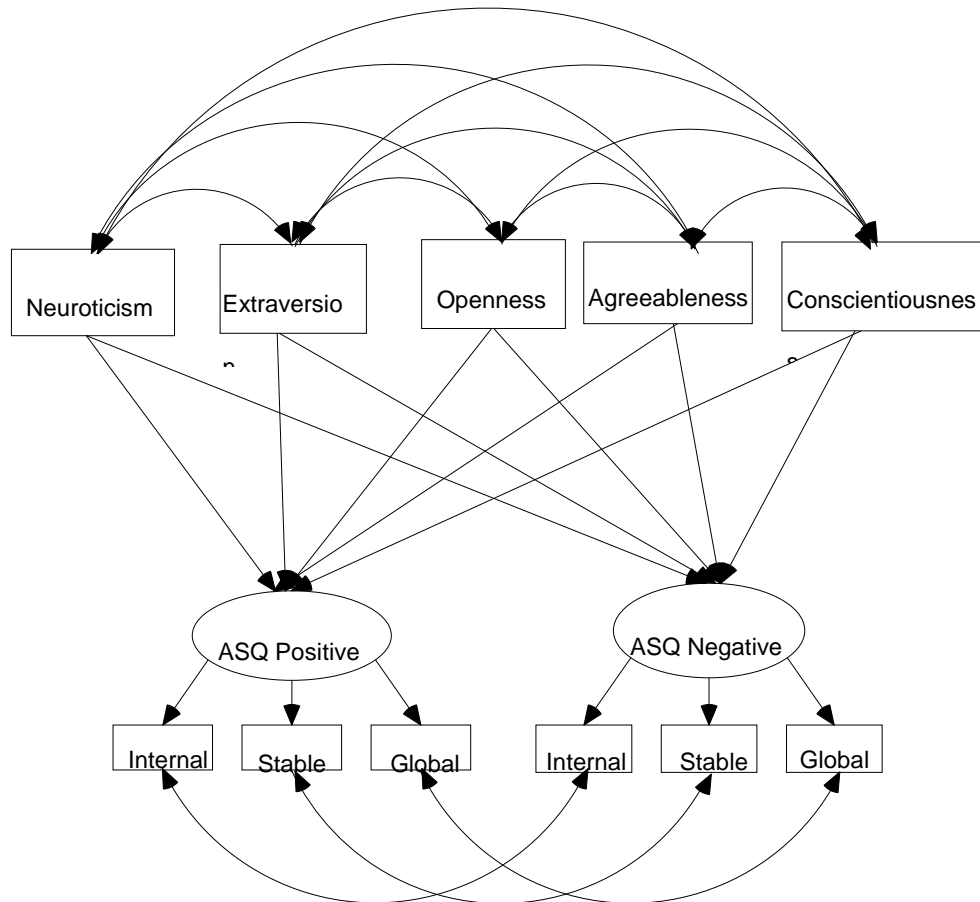
Figure 3.2: Proposal for an initial model with hypothesized relationship between ASQ and FFM.

3.2 Methods

Participants

A total of 452 participants (sample 1) were included in the current study (for detail of this sample, see 1.5.4 of Chapter 1).

Materials

Dispositional optimism was measured using a Chinese version of the Life Orientation Test-Revised (Lai & Yue, 2000). Subjects were scored for LOT-R Optimism and LOT-R Pessimism scores. Cronbach's α for LOT-R Optimism, .76; and, for LOT-R Pessimism, .82.

Attributional style was assessed using the Chinese ASQ (Zhang, 2006). Composite attributional styles were calculated separately for positive and negative events separately. Reliabilities (Cronbach's α) were acceptable .84 for the total and, for positive events, .84; for negative events, .77.

Though the NEO-PI-R is a well-established, psychometrically sound instrument that covers a full range of the Big Five personality traits, it has rarely been used in prior research partly due to its time-consuming length. The FFM was measured, in the present study, by a Chinese version of the NEO-PI-R (Yang et al., 1999). The internal consistency of the personality total from the NEO-PI-R was .83 in this sample. Reliabilities (Cronbach's α) were acceptable for five individual sub-scales (.89 for Neuroticism; .83 for Extraversion; .76 for Openness; .75 for Agreeableness; and .88 for Conscientiousness).

Analysis Strategy

Structural equation modelling (SEM) was used to test potential models constructing LOT-R and NEO-PI-R using Amos 17.0 (Arbuckle, 2008). All analyses took advantage of raw data supporting the estimation of models using full information maximum likelihood estimation. Descriptive statistics and correlational analyses were obtained.

The adequacy of model fit was assessed using the comparative fit index (CFI), Tucker-Lewis index (TLI), and the Root Mean Square Error of Approximation (RMSEA). For CFI and TLI, values > 0.95 were taken as indicating acceptable fit (Hu & Bentler, 1999). For the RMSEA, values of < .05 indicated acceptable fit (C. Y. Yu, 2002). Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) are reported to aid model comparison.

3.3 Results

Descriptive statistics

Table 3.1 demonstrates descriptive statistics and α reliability coefficients for the ASQ and the LOT-R scales. The ASQ reliabilities reported in Table 3.1 are similar to those reported by Peterson et al. (1982) and Poropat (2002).

Measures	Means	SD	Cronbach's Alpha
LOT-R optimism	8.27	1.84	0.76
LOT-R pessimism	3.85	1.99	0.82
ASQ Negative	12.90	1.78	0.84
Internal Negative	4.45	0.67	0.49
Stable Negative	4.33	0.85	0.73
Global Negative	4.12	0.90	0.73
ASQ Positive	15.28	1.91	0.77
Internal Positive	5.03	0.70	0.65
Stable Positive	5.36	0.78	0.75
Global Positive	4.90	0.85	0.71
ASQ Total	2.38	2.17	0.84

Table 3.1: Means, standard deviations and Cronbach's alpha for ASQ and LOT-R scales.

Descriptive statistics and Cronbach's alpha for NEO-PI-R scales are reported in Table 3.2.

Measures	Means	SD	Cronbach's Alpha
Neuroticism	**94.10**	**18.81**	**0.89**
Anxiety	16.87	4.32	0.66
Angry Hostility	13.58	4.13	0.62
Depression	15.29	4.40	0.68
Self-consciousness	17.68	4.17	0.63
Impulsiveness	15.58	3.57	0.50
Vulnerability	15.08	3.98	0.69
Extraversion	**106.15**	**15.39**	**0.83**
Warmth	20.90	4.25	0.72
Gregariousness	17.16	4.24	0.65
Assertiveness	15.08	3.64	0.60
Activity	16.01	3.33	0.42
Excitement-seeking	15.81	3.49	0.34
Positive Emotions	21.19	4.60	0.75
Openness	**109.44**	**13.47**	**0.76**
Fantasy	17.74	3.99	0.61
Aesthetics	20.01	4.13	0.62
Feelings	20.46	3.62	0.57
Actions	14.97	3.19	0.41
Ideas	17.31	4.71	0.74
Value	18.95	2.89	0.23
Agreeableness	**112.52**	**12.31**	**0.75**
Trust	20.05	3.65	0.63
Straightforwardness	17.73	3.83	0.54
Altruism	21.32	3.66	0.64
Compliance	18.10	3.34	0.37
Modesty	15.22	2.99	0.42
Tender-Mindedness	20.09	3.46	0.46
Conscientiousness	**111.14**	**17.15**	**0.88**
Competence	18.62	3.42	0.53
Order	16.97	3.90	0.56
Dutifulness	21.08	3.68	0.58
Achievement Striving	18.18	4.23	0.68
Self-Discipline	17.55	3.66	0.62
Deliberation	18.74	4.10	0.67

Table 3.2: Means, standard deviations and Cronbach's alpha for NEO-PI-R scales.

Correlational analyses

I first tested correlations between the ASQ, the LOT-R and the five NEO-PI-R scales for the entire sample (see Table 3.3). Both LOT-R Optimism and ASQ Total have

significantly negative correlations with Neuroticism, and significantly positive correlations with Extraversion, which is consistent with prior studies (e.g. Poropat, 2002; Sharpe et al., 2011). Both LOT-R Optimism and ASQ Total are significantly correlated with Openness, Agreeableness, and Conscientiousness for the entire sample. LOT-R Pessimism is positively correlated with Neuroticism and negatively correlated with Extraversion, Openness, and Conscientiousness, but not significantly correlated with Agreeableness.

As expected, ASQ Positive and ASQ Negative have different correlational patterns with the FFM. ASQ Negative is positively correlated with Neuroticism, and is negatively correlated with Extraversion and Conscientiousness, while ASQ Positive is positively related to four of the five NEO-PI-R dimensions (see Table 3.2).

Measures	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
LOT-R Optimism	-0.32**	0.40**	0.21**	0.22**	0.27**
LOT-R Pessimism	0.23**	-0.26**	-0.14**	-0.09	-0.25**
ASQ Negative	0.31**	-0.20**	-0.04	-0.09	-0.23**
ASQ Positive	-0.07	0.15**	0.22**	0.11*	0.19**
ASQ total	-0.32**	0.30**	0.23**	0.17**	0.36**

Table 3.3: Correlations of LOT, ASQ and NEO-PI-R for the entire sample.

$*P<0.05.$ $**P<0.01.$

To compare potential gender differences between the relationships of the LOT-R, ASQ, and FFM, these correlations are demonstrated separately for men and women in Table 3.4 and Table 3.5.

I first compared patterns of associations between men and the entire group. As shown in Table 3.4, correlational patterns between the LOT-R, ASQ and NEO-PI-R are quite similar for men and for the entire sample but still show differences. The significant correlation between LOT-R Optimism and Openness for the entire sample is absent for men. Similar patterns emerge for correlations between LOT-R Pessimism and Openness. However, LOT-R Pessimism is negatively correlated with Agreeableness for men while this correlation is absent for the entire sample.

Measures	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
LOT-R Optimism	-0.30**	0.35**	0.14	0.28**	0.41**
LOT-R Pessimism	0.18*	-0.26**	-0.13	-0.22*	-0.23**
ASQ Negative	0.38**	-0.21*	0.01	-0.04	-0.18*
ASQ Positive	-0.01	0.17*	0.23**	0.19*	0.18*
ASQ Total	-0.35**	0.34**	0.20*	0.20**	0.32**

Table 3.4: Correlations of LOT-R, ASQ and NEO-PI-R scales for men.

*P<0.05. **P<0.01.

Then correlational patterns of these variables between men and women were compared. Slight differences emerge (see Table 3.5). There is a positive correlation between LOT-R Optimism and Openness for women, which is absent among men. This is also the case for the negative correlation between LOT-R Pessimism and Openness. However, the negative correlation between ASQ Negative and Agreeableness for men is absent for women. Also, while ASQ Positive is positively correlated with Agreeableness for men, it is absent among women.

In addition to the correlational analysis between the ASQ, LOT-R, and the five main domains measured by the NEO-PI-R, correlations between the ASQ, LOT-R, and all NEO-PI-R facets for each domain for the entire sample were also calculated (see Table 3.6 to Table 3.10). These correlational analyses were aimed to examine the relationships among dispositional optimism, explanatory style, and specific personality facets described by the NEO-PI-R.

Measures	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
LOT-R Optimism	-0.34**	0.42**	0.23**	0.19**	0.20**
LOT-R Pessimism	0.26**	-0.26**	-0.14*	-0.02	-0.27**
ASQ Negative	0.28**	-0.20**	-0.06	-0.11*	-0.26**
ASQ Positive	-0.10	0.14**	0.22**	0.08	0.20**
ASQ Total	-0.31**	0.28**	0.24**	0.16**	0.38**

Table 3.5: Correlations of LOT-R, ASQ and NEO-PI-R scales for women.

*P<0.05. **P<0.01.

As shown in Table 3.6, LOT-R Optimism is negatively correlated with all six facets of Neuroticism, and LOT-R Pessimism is positively correlated with all Neuroticism facets. For attributional style, Hopelessness (stability + globality of negative events) was significantly positively associated with all six facets of Neuroticism, including Depression, which is consistent with the hopelessness theory of depression (Abramson et al., 1989) and findings reported by Peterson and Vaidya (2001). Here ASQ Negative is significantly associated with all six facets in addition to Neuroticism but ASQ Positive is not, which supports the lack of a correlation between ASQ Positive and ASQ Negative (Peterson et al., 1982).

Table 3.7 displays the correlations among LOT-R, ASQ, and Extraversion and its six facets, namely Warmth, Gregariousness, Assertiveness, Activity, Excitement-seeking, and Positive emotions. Prior research found significant correlations between optimism and positive affect (Ahrens & Haaga, 1993; Daukantaite & Zukauskiene, 2012; Scheier & Carver, 1992), which was supported here (see Table 3.7). Specifically, LOT-R Optimism and ASQ Positive are positively correlated with Positive emotions, while LOT-R Pessimism and ASQ Negative are negatively related to Positive emotions.

Table 3.8 provides results of correlational analyses of the LOT-R, the ASQ scales, and all facets of the Openness factor. As shown in Table 3.8, both LOT-R Optimism and ASQ Positive are positively correlated with four of the six facets of Openness, including Aesthetics, Feelings, Ideas, and Value. On the other hand, while LOT-R Pessimism is negatively associated with Feelings and Value, ASQ Negative shows no significant correlations with these two facets but is negatively correlated with Actions and is positively correlated with Fantasy.

Correlations between dispositional optimism, explanatory style, and six facets of Agreeableness are reported in Table 3.9. Here LOT-R Pessimism and ASQ Negative demonstrate similar patterns of correlation. Though these two scales are not significantly associated with Agreeableness as a whole, both are negatively correlated with Trust, Altruism, and Modesty. For LOT-R Optimism and ASQ Positive, similar correlational patterns appear. Both scales are significantly associated with Trust, Altruism, Modesty, and Tender-Mindedness in addition to their positive correlation with Agreeableness.

Table 3.10 presents correlations among the LOT-R, ASQ scales, and six facets of Conscientiousness. Here the correlational patterns are quite similar. Specifically, both LOT-R Optimism and ASQ Positive are positively correlated with Conscientiousness as a whole and all six facets of Conscientiousness. On the other hand, LOT-R

Pessimism and ASQ Negative demonstrate negative correlations with both Conscientiousness and all the six facets.

Measures	Neuroticism	Anxiety	Angry Hostility	Depression	Self-consciousness	Impulsiveness	Vulnerability
LOT-R Optimism	-0.32**	-0.24**	-0.20**	-0.32**	-0.26**	-0.14**	-0.29**
LOT-R Pessimism	0.23**	0.18**	0.17**	0.27**	0.14**	0.15**	0.12*
ASQ Negative	0.31**	0.21**	0.24**	0.28**	0.25**	0.17**	0.29**
Internal Negative	0.12**	0.05	0.09	0.10*	0.11**	0.08	0.14**
Stable Negative	0.26**	0.17**	0.21**	0.24**	0.21**	0.15**	0.23**
Global Negative	0.28**	0.22**	0.20**	0.25**	0.21**	0.14**	0.25**
Hopelessness	0.32**	0.23**	0.24**	0.28**	0.25**	0.17**	0.29**
ASQ Positive	-0.07	-0.06	-0.10*	-0.07	0.02	-0.05	-0.07
Internal Positive	-0.17**	-0.16**	-0.13**	-0.15**	-0.06	-0.11*	-0.16**
Stable Positive	-0.07	-0.07	-0.09	-0.05	0.01	-0.04	-0.08
Global Positive	0.04	0.07	-0.03	0.02	0.08	0.02	0.04
Hopefulness	-0.01	0.00	-0.07	-0.02	0.05	-0.01	-0.02
ASQ Total	-0.32**	-0.22**	-0.28**	-0.29**	-0.19**	-0.18**	-0.30**

Table 3.6: Correlations of LOT-R, ASQ and Neuroticism and its six facets for the entire sample.

*P<0.05. **P<0.01.

Measures	Extraversion	Warmth	Gregariousness	Assertiveness	Activity	Excitement-seeking	Positive Emotions
LOT-R Optimism	0.40**	0.35**	0.19**	0.28**	0.23**	0.13**	0.33**
LOT-R Pessimism	-0.26**	-0.23**	-0.17**	-0.16**	-0.14**	-0.06	-0.24**
ASQ Negative	-0.20**	-0.15**	-0.08	-0.21**	-0.17**	-0.05	-0.15**
Internal Negative	-0.11*	-0.08	-0.08	-0.07	-0.08	-0.05	-0.06
Stable Negative	-0.20**	-0.16**	-0.05	-0.22**	-0.17**	-0.02	-0.17**
Global Negative	-0.13**	-0.09	-0.05	-0.14**	-0.11*	-0.04	-0.10*
Hopelessness	-0.20**	-0.14**	-0.06	-0.21**	-0.17**	-0.04	-0.16**
ASQ Positive	0.15**	0.19**	0.05	0.07	0.06	0.07	0.12**
Internal Positive	0.13**	0.13**	0.01	0.12*	0.11*	0.04	0.11*
Stable Positive	0.15**	0.18**	0.06	0.11*	0.02	0.09	0.11*
Global Positive	0.08	0.14**	0.05	-0.03	0.02	0.05	0.07
Hopefulness	0.13**	0.19**	0.06	0.04	0.02	0.08	0.11*
ASQ Total	0.30**	0.29**	0.11*	0.23**	0.19**	0.10*	0.24**

Table 3.7: Correlations of LOT-R, ASQ and Extraversion and its six facets for the entire sample.

*P<0.05. **P<0.01.

Measures	Openness	Fantasy	Aesthetics	Feelings	Actions	Ideas	Value
LOT-R Optimism	0.21**	0.05	0.13**	0.17**	0.04	0.19**	0.13**
LOT-R Pessimism	-0.14**	-0.01	-0.08	-0.15**	-0.08	-0.08	-0.14**
ASQ Negative	-0.04	0.12*	-0.08	-0.02	-0.09*	-0.06	-0.01
Internal Negative	-0.06	0.06	-0.06	-0.06	-0.11*	-0.03	-0.04
Stable Negative	-0.05	0.09	-0.10*	-0.05	-0.02	-0.10*	0.04
Global Negative	0.02	0.10*	-0.02	0.05	-0.08	0.01	-0.02
Hopelessness	-0.02	0.11*	-0.07	0.01	-0.06	-0.06	0.01
ASQ Positive	0.22**	0.08	0.17**	0.24**	0.03	0.13**	0.15**
Internal Positive	0.17**	0.04	0.11*	0.16**	0.07	0.14**	0.07
Stable Positive	0.18**	0.05	0.11*	0.18**	0.06	0.09*	0.17**
Global Positive	0.19**	0.11*	0.18**	0.24**	-0.04	0.08	0.12*
Hopefulness	0.22**	0.09	0.17**	0.24**	0.01	0.10*	0.16**
ASQ Total	0.23**	-0.02	0.21**	0.23**	0.11*	0.16**	0.15**

Table 3.8: Correlations of LOT-R, ASQ and Openness and its six facets for the entire sample.

*P<0.05. **P<0.01.

Measures	Agreeableness	Trust	Straightforwardness	Altruism	Compliance	Modesty	Tender-Mindedness
LOT-R Optimism	0.22**	0.37**	0.05	0.32**	0.05	-0.29**	0.21**
LOT-R Pessimism	-0.09	-0.16**	-0.02	-0.18**	-0.05	0.24**	-0.10*
ASQ Negative	-0.09	-0.14**	-0.05	-0.15**	-0.04	0.15**	-0.03
Internal Negative	-0.03	-0.03	-0.02	-0.10*	-0.05	0.08	0.01
Stable Negative	-0.13**	-0.16**	-0.04	-0.16**	-0.04	0.10*	-0.11*
Global Negative	-0.02	-0.11*	-0.04	-0.08	-0.01	0.15**	0.04
Hopelessness	-0.08	-0.16**	-0.05	-0.14**	-0.03	0.14**	-0.04
ASQ Positive	0.11*	0.24**	-0.09*	0.22**	0.06	-0.24**	0.17**
Internal Positive	0.06	0.22**	-0.05	0.16**	-0.01	-0.26**	0.08
Stable Positive	0.08	0.22**	-.010*	0.19**	0.06	-0.25**	0.12*
Global Positive	0.13**	0.16**	-0.08	0.18**	0.08	-0.10*	0.21**
Hopefulness	0.12**	0.22**	-0.11*	0.21**	0.08	-0.20**	0.19**
ASQ Total	0.17**	0.33**	-0.05	0.31**	0.09	-0.34**	0.18**

Table 3.9: Correlations of LOT-R, ASQ and Agreeableness and its six facets for the entire sample.

*P<0.05. **P<0.01.

Measures	Conscientiousness	Competence	Order	Dutifulness	Achievement Striving	Self-Discipline	Deliberation
LOT-R Optimism	0.27**	0.33**	0.10*	0.18**	0.22**	0.25**	0.15**
LOT-R Pessimism	-0.25**	-0.22**	-0.15**	-0.10*	-0.21**	-0.25**	-0.19**
ASQ Negative	-0.23**	-0.19**	-0.16**	-0.11*	-0.15**	-0.26**	-0.17**
Internal Negative	-0.15**	-0.15**	-0.13**	-0.04	-0.12*	-0.13**	-0.12*
Stable Negative	-0.19**	-0.17**	-0.12*	-0.12*	-0.10*	-0.21**	-0.14**
Global Negative	-0.16**	-0.11*	-0.11*	-0.07	-0.12*	-0.21**	-0.12*
Hopelessness	-0.21**	-0.16**	-0.13**	-0.11*	-0.13**	-0.25**	-0.15**
ASQ Positive	0.19**	0.18**	0.11*	0.14**	0.16**	0.09*	0.16**
Internal Positive	0.21**	0.18**	0.14**	0.15**	0.18**	0.12**	0.18**
Stable Positive	0.17**	0.19**	0.11*	0.13**	0.14**	0.08	0.10*
Global Positive	0.10*	0.09	0.03	0.09	0.09	0.04	0.13**
Hopefulness	0.15**	0.16**	0.08	0.12**	0.13**	0.07	0.13**
ASQ Total	0.36**	0.32**	0.23**	0.22**	0.27**	0.29**	0.28**

Table 3.10: Correlations of LOT-R, ASQ and Conscientiousness and its six facets for the entire sample.

*P<0.05. **P<0.01.

SEM modelling for LOT-R and FFM

The proposed model (see Figure 3.1) between dispositional optimism and FFM was tested (as shown in Figure 3.3).
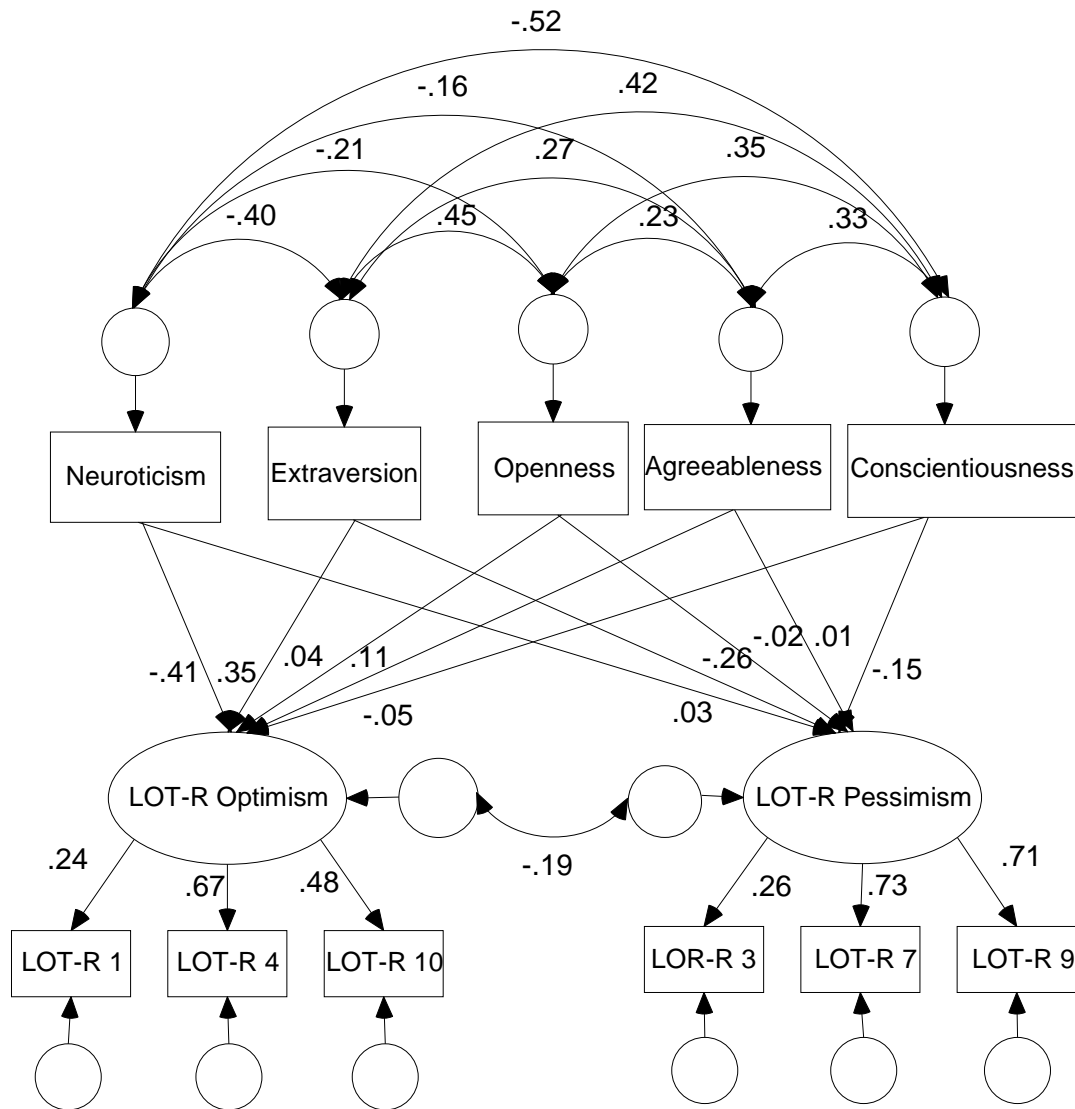
Figure 3.3: Standardized estimations for the initial model for LOT-R and FFM.

Standardized estimates of the original model are shown in Figure 3.3. Chi-square for the initial model was significant (χ^2 (28) = 86.74, p < .001). For the initial

base model, other index values were obtained as: CFI = 0.933; TLI = 0.869; RMSEA = 0.068; AIC = 162.736; BIC = 319.056. Although CFI or TLI values may be considered acceptable, modifications were suggested and made to the original model to obtain a better fit according to the results. These modifications include three relationships between the residual variances of measured variables, including a relationship between the residual variance of Neuroticism and the first item of LOT-R. The new paths all had loadings of .16 or below, suggesting that deviation from the theoretical model is minor (see Figure 2.4). These modifications significantly improved model fit, and the resultant model fit reasonably well (χ^2 (25) = 41.95, p =.018; CFI = 0.981; TLI = 0.957; RMSEA = 0.039; AIC = 123.945; BIC = 292.606).
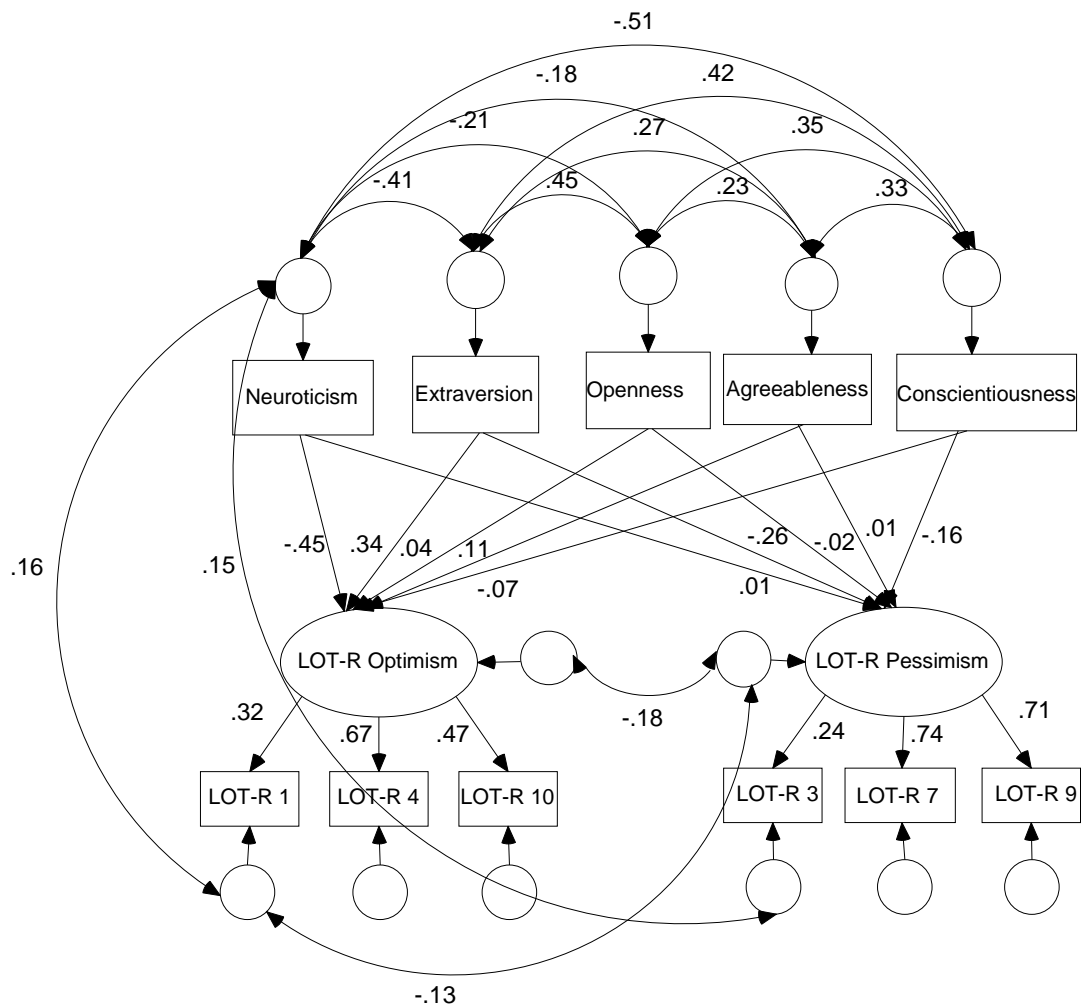
Figure 3.4: Standardized estimations for the modified model for LOT-R and FFM.

As shown in Figure 3.4, modelling analysis supports the initial model proposed in Figure 3.1. In this model, Extraversion predicts both LOT-R Optimism and LOT-R Pessimism with coefficients of .34 and -.26, respectively. Neuroticism predicts only LOT-R Optimism (standardized coefficient = -.45). All FFM dimensions are correlated with each other, with Neuroticism negatively correlated with the four other FFM factors.

Multi-group SEM for testing gender differences of the model LOT-R and FFM

To formally test the potential gender differences of the model for LOT-R and FFM (see Figure 3.4), multi-group SEM was conducted. See details in Chapter 3.3. I first tested this model in the male group. Fit measures for this model indicated excellent fit between model and data (χ^2 (24) = 24.60, p < 0.5; CFI = 0.99, TLI = 0.99, RMSEA = .014). Then, this model was tested in the female group. This model showed a good fit between model and data (χ^2 (24) = 34.35, p < 0.1; CFI = 0.98, TLI = 0.96, RMSEA = .037).

Finally, multi-group SEM was conducted to test gender differences of this model. In addition to unconstrained base model, Measurement weights, Structural covariances, and Measurement residuals were used as constrained conditions in multi group analysis. The fit statistics for baseline comparisons of all models tested are laid out in Table 3.11. Table 3.11 shows that the unconstrained model fits best for the data. Three constrained models have similar fits as the unconstrained model. Thus, this model is compatible in both male and female in this sample.

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	$\triangle$CFI
Unconstrained	.942	.867	.989	.972	.988	
Measurement weights	.908	.837	.967	.939	.965	-.023
Structural covariances	.908	.845	.970	.947	.969	-.019
Measurement residuals	.867	.837	.951	.939	.950	-.038

Table 3.11: Baseline comparisons for tested models between LOT-R and FFM.

SEM modelling for ASQ and FFM

The proposed model (see Figure 3.2) between dispositional optimism and FFM was tested (as shown in Figure 3.5).
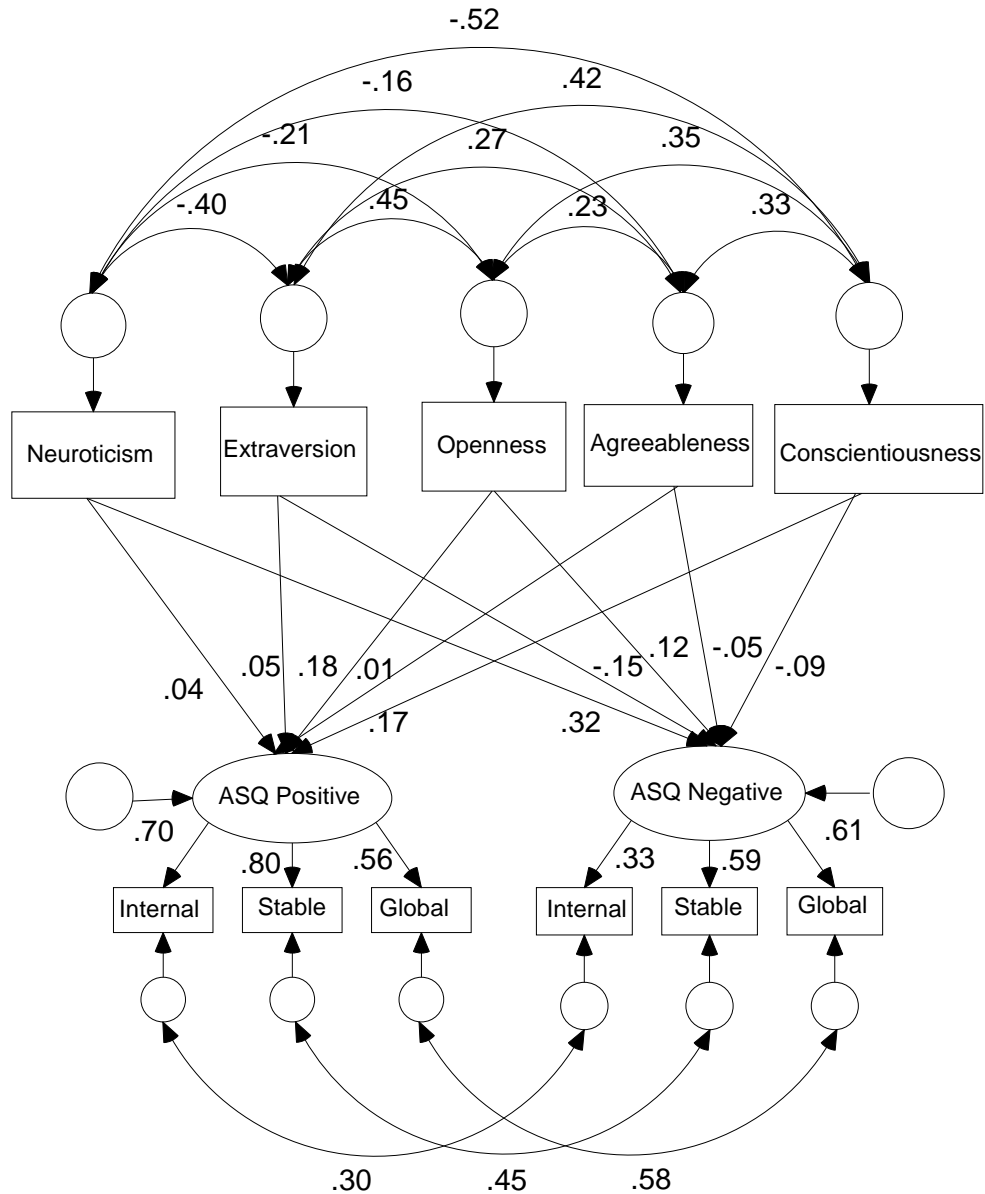
Figure 3.5: Standardized estimations for the initial ASQ-FFM model.

Standardized estimates of the original model are shown in Figure 3.5. Chi-square for the initial model was significant (χ^2 (26) = 88.75, p < .001). For the initial base model, other index values were obtained as: CFI = 0.950; TLI = 0.893; RMSEA = 0.073; AIC = 168.754; BIC = 333.301. Although CFI or GFI values may be considered acceptable, modifications were suggested and made to the original model

to obtain a better fit according to the results. These modifications include four relationships between the residual variances of measured variables, for instance a relationship between the residual variance of Neuroticism and ASQ Internal Positive. The new paths all had loadings of .23 or below, suggesting the deviation from the theoretical model is minor (see Figure 2.4). These modifications significantly improved model fit, and the resultant model fit reasonably well (χ^2 (22) = 37.17, p =.023; CFI = 0.988; TLI = 0.969; RMSEA = 0.039; AIC = 125.168; BIC = 306.170).
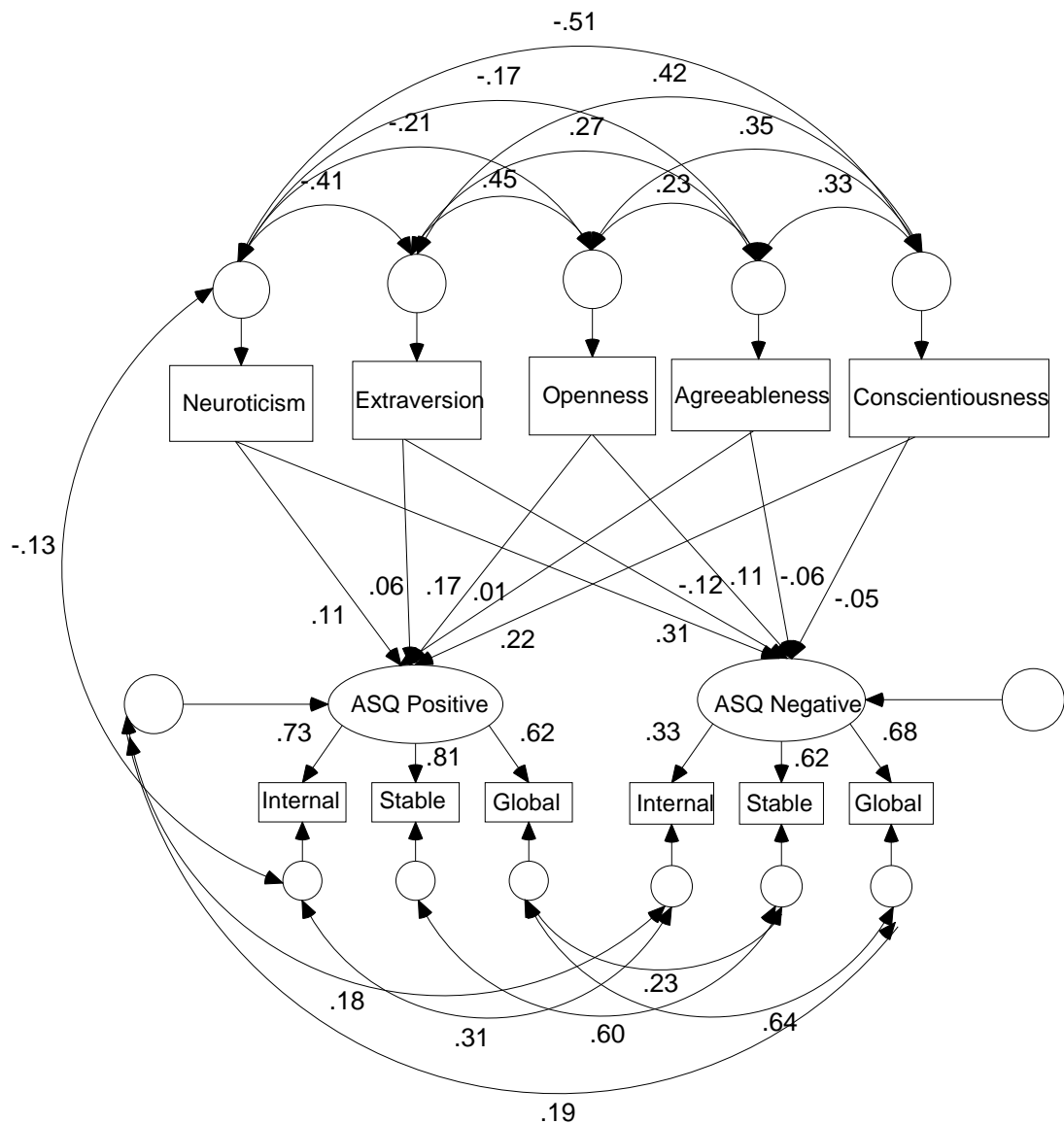
Figure 3.6: Standardized estimations for the modified ASQ-FFM model.

As shown in Figure 3.6, modelling analysis supports the initial model proposed in Figure 3.2. In this model, Neuroticism predicts ASQ Negative (standardized coefficient = .31). Conscientiousness predicts ASQ Positive with coefficients of .22. As predicted, Internal Positive and Internal Negative are positively correlated (r = .31), Stable Positive is positively correlated with Stable Negative (r = .60). Similarly, Global Positive is positively correlated with Global Negative (r = .64). All FFM dimensions are correlated with each other, with Neuroticism negatively correlated with the four other FFM factors.

Multi-group SEM for testing gender differences of the model ASQ and FFM

Similarly, multi-group SEM was conducted to test gender differences of the model for ASQ and FFM. See details in Chapter 3.3. This model was first tested in the male group. Fit measures for this model indicated acceptable fit between model and data ($\chi2$ (22) = 29.71, p < 0.5; CFI = 0.98, TLI = 0.96, RMSEA = .052). Then, this model was tested in the female group. For female, this model showed a good fit between model and data ($\chi2$ (22) = 29.18, p < 0.5; CFI = 0.99, TLI = 0.98, RMSEA = .032).

Finally, multi-group SEM was conducted to test gender differences of this model. In addition to unconstrained base model, Measurement weights, Structural covariances, and Measurement residuals were used as constrained conditions in multi group analysis. The fit statistics for baseline comparisons of all models tested are laid out in Table 3.12. It indicated that the unconstrained model fits best for the data. Three constrained models have similar fits as the unconstrained model. Thus, this model is compatible in both male and female in this sample.

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	△CFI
Unconstrained	.958	.895	.989	.971	.988	
Measurement weights	.941	.864	.974	.938	.973	-.015
Structural residuals	.906	.862	.957	.935	.956	-.032
Measurement residuals	.884	.855	.943	.927	.942	-.046

Table 3.12: Baseline comparisons for tested models between ASQ and FFM.

3.4 Optimism and the Five-Factor Model of personality

The link between attributional style, dispositional optimism, and traditional personality traits has great value in understanding both optimism constructs in a broader area. Taking optimism as personality trait is also supported by its considerable stability manifested in some genetic research mentioned earlier in Chapter 1.

In the present study, examining correlations among dispositional optimism, explanatory style, and the FFM factors provides some evidence of the related but distinct relationship between these two optimism structures. Generally, both LOT-R Optimism and ASQ Total have significantly negative correlations with Neuroticism, and significantly positive correlations with Extraversion, which is consistent with prior studies (e.g. Poropat, 2002; Sharpe et al., 2011). Specifically, both LOT-R Optimism and attributional style for positive events had strong associations with four of the five FFM factors, with the exception of Neuroticism, which is only significantly correlated with LOT-R Optimism. On the other hand, three of the Big Five factors, Neuroticism, Extraversion, and Conscientiousness showed strong correlations with both LOT-R Pessimism and attributional style for negative events, though Openness is only significantly correlated with LOT-R Pessimism and not

with ASQ Negative. The hypothesized correlation between LOT-R Pessimism and Agreeableness was not significant. Similarly, the negative correlation between ASQ Positive and Neuroticism was not found. As we predicted, ASQ Total was negatively related to Neuroticism, and positively correlated with Extraversion, Agreeableness, and Conscientiousness. The positive correlation between ASQ Total and Openness is significant, though it has not been reported before.

In the comparison between correlations with specific facets of each Big Five personality factor, dispositional optimism and explanatory style demonstrated mixed patterns. For example, while LOT-R Optimism, LOT-R Pessimism, and ASQ Negative are all strongly associated with depression, the correlation between attributional style for positive events and depression didn't reach statistical significance. All these correlational patterns imply that explanatory style and dispositional optimism are distinct but related constructs.

Do men and women have different patterns concerning the relationship between optimism and FFM?

Gender differences in correlations between explanatory style and FFM have been the focus of some prior studies. One such study conducted by Bunce and Peterson (1997) reported that men and women were different in their attributional styles for negative events and several personality traits, such as socialisation and good impression, which were measured by the California Psychological Inventory (CPI). Also, Poropat (2002) reported that the correlational patterns of attributional styles and FFM dimensions appeared to have gender differences. However, correlational analyses investigating potential gender differences in the relationship between dispositional optimism and the Big Five personality factors have not been published previously as to my knowledge. In my study, both the LOT-R and the ASQ scales were involved in examining their associations with FFM dimensions for potential gender differences.

The correlational patterns observed in the current study were not quite consistent with results in the study of Poropat (2002). Poropat reported that Conscientiousness is correlated with ASQ Positive for women only and is correlated with ASQ Negative for men only. However, results in the present study showed that

Agreeableness is the critical factor in differentiating men and women. Agreeableness is correlated with ASQ Positive for men but not women, while it is correlated with ASQ Negative for women but not men.

Considering the current study has been conducted in a Chinese sample while Poropat (2002) collected data from a group of Austrian undergraduates, and no cross-culture study regarding gender differences of the attributional style-FFM relationship has been reported in prior literature, these different findings may due to cultural influence. As regards potential gender influences on the relationship between LOT-R scales and the main NEO-PI-R dimensions, results showed that Agreeableness is correlated with LOT-R Pessimism for men but not for women. Openness is correlated with both LOT-R Optimism and LOT-R Pessimism for women but not for men.

Teasing apart dispositional optimism and dispositional pessimism by linking them to the FFM

It has been proposed that dispositional optimism and dispositional pessimism have distinct associations with the Big Five Personality factors, in which Neuroticism and Extraversion play a larger role than the other three FFM factors (Marshall et al., 1992). In Marshall et al.'s widely cited study, results indicated that dispositional optimism correlated more strongly with Extraversion than did dispositional pessimism, and dispositional pessimism showed a stronger correlation with Neuroticism than did dispositional optimism, and thus also supported a two-factor model of the LOT (Marshall et al., 1992).

Since then, this two-factor model has been demonstrated in many studies (Chang et al., 1997; L. Chang & McBrideChang, 1996; Creed et al., 2002; Roysamb & Strype, 2002). Based on previous research and the modelling analysis in Chapter 2.2, an initial base model, which incorporates two differentiable factors (LOT-R Optimism and LOT-R Pessimism) through their links to the FFM, was proposed. The hypothesized model of the relationship between dispositional optimism and the FFM is partially supported. Extraversion predicts both LOT-R Optimism and LOT-R Pessimism, but Neuroticism influences only LOT-R Optimism. These results are in

agreement with previous findings that Extraversion and Neuroticism are the two most influential predictors of optimism. The result that Neuroticism is not a predictor of pessimism in this model is quite unusual considering the strong relationship between these two variables in most previous studies.

Based on these findings, dispositional optimism may be best viewed as reflecting two distinct traits, namely Dispositional Optimism and Dispositional Pessimism, which are reflected in LOT-R Optimism items and LOT-R Pessimism items respectively. Scoring and interpretation of the LOT-R should reflect this. Responses should be scored separately for Dispositional Optimism and Dispositional Pessimism. For most individuals, it is possible to identify them as being optimistic in an absolute sense, because they agree with optimistic items (e.g. *'I'm always optimistic about my future'*) and disagree with pessimistic items (e.g. *'I rarely count on good things happening to me'*). Similarly, pessimists are people who agree with pessimistic items and disagree with optimistic items.

Are attributions for positive and negative events predicted differently by the FFM?

Though both explanatory style and the FFM have been taken as important personality traits, very few studies have explored the relationship between these two constructs and even fewer such studies have adopted the NEO-PI-R as a FFM measure and used a SEM approach. In those rare studies, attributions for negative events has been found to be negatively correlated with Conscientiousness (Musgrave-Marquart et al., 1997). Correlational analyses between ASQ and FFM dimensions support this finding. Moreover, we found that attributional style for negative and positive events had different correlational patterns with the FFM. While ASQ Negative is positively correlated with Neuroticism, and is negatively correlated with Extraversion and Conscientiousness, ASQ Positive is positively related to four of the five NEO-PI-R dimensions, excepting Neuroticism.

The hypothesized model of the relationship between attributional style and the FFM was partially supported. As expected, Neuroticism predicts ASQ Negative.

A new relationship between Conscientiousness and ASQ Positive, which initially wasn't raised, emerged in this model. Previously, ASQ Negative has been reported to be negatively correlated with Conscientiousness (Musgrave-Marquart et al., 1997; Poropat, 2002). Though attributions for positive and negative events may reflect differentiated cognitive styles, these results suggest that Conscientiousness may be considered as one important FFM predictor of attributional style.

In the examination of the psychometric structure of the ASQ in Chapter 1, results suggested that subjects apply consistent cognitive styles independent of event valence, with personal tendencies to explain events as, for instance, global or local: Subjects rating positive events as global tended also to describe negative events in terms of global attributions, and likewise for the other two styles. These coherent tendencies in cognitive styles are supported in the model, which links the ASQ and FFM. Internal Positive and Internal Negative are positively correlated, so are the other two cognitive style factors (Stability and Globality).

Chapter 4: Optimism and psychological well-being

4.1 Optimism and two approaches of well-being

Dispositional optimism and optimistic explanatory style have been taken as theoretically connected. For instance, Scheier and Carver (1992) found that differences in people's expectations result in optimistic versus pessimistic consequences. Also, Peterson and Seligman (1984) claimed that people's attributions for past events influence what they expect for the future. If individuals attribute past failures to causes that are internal, lower self-esteem tends to be displayed and passive expectation will be produced. If the explanation for a negative event is explained by stable factors, individuals will expect more failures in the future, because the cause is likely to remain for a long period. Similarly, if the cause of a negative event is attributed to factors that are global, the expectations tend to be that these causes will not be controllable even in different situations.

Empirical studies provide evidence for the link between explanatory style and dispositional optimism. For example, one study revealed that individuals with positive expectations for success also tend to have favourable attributions for their performance (M. Marshall & Brown, 2006). Additionally, dispositional optimism and explanatory style have also long been connected to each other because both variables have been found to be closely correlated with depression, well-being, and other related psychological constructs (Carver et al., 2010; Forgeard & Seligman, 2012; Yuan & Zhang, 2007).

As optimism has been mainly conceptualized and measured in two constructs of dispositional optimism and optimistic explanatory style, well-being has been

measured largely in two distinct traditions, of hedonic and eudemonic well-being. While hedonic or subjective well-being relates mainly to happiness, the eudemonic tradition focuses on psychological well-being, which is most widely implemented using the Ryff scales of psychological well-being (RSPW; Ryff, 1989; Ryff & Keyes, 1995).

In the field of positive psychology, the study of psychological well-being, which was developed by Ryff (1989), is very important, because this eudemonic approach of well-being stems from personal development, the effort and desire to achieve goals of life, and coping styles for life challenges. Six dimensions have been identified in Ryff's psychological well-being model, namely: self-acceptance or positive attitudes toward oneself, personal growth or development, purpose in life, control or mastery of the environment, positive relationships with others, and autonomy or ability to be independent. These six dimensions present a set of assessments related to positive performance, representing a general feeling of happiness that are distinct from subjective well-being (Ryff & Singer, 2006). As one of the most important predictors of well-being, optimism has been included in numerous studies that examined well-being, though they mainly focused on subjective well-being before the implementation of Ryff's psychological well-being.

Dispositional optimism has been found to be positively related to psychological well-being. For example, using an SEM approach, Augusto-Landa et al. (2011) reported in a sample of 217 undergraduates that dispositional optimism showed significant positive associations with all six psychological well-being dimensions (r ranged from .38 to .59). Similarly, in a study conducted within a group of 225 older adults, Ferguson and Goodwin (2010) found that dispositional optimism was positively correlated with Purpose in Life (one of the six psychological well-being dimensions; r = .46). The positive correlation between dispositional optimism

and psychological well-being has also been reported in an adolescent sample (Monzani et al., 2014), with LOT-R scores positively correlated with all six dimensions of the RSPW (r ranged from .32 to .56).

However, the relationship between explanatory style and psychological well-being, which is measured by the RSPW, has not been reported to my knowledge. Additionally, though there is much research suggesting that optimism is positively associated with high levels of well-being (Scheier & Carver, 1992; Scheier. et al., 2001), little has been done to explore the potential model of the two approaches of optimism and psychological well-being in one single study. Because expectations are regarded as a sufficient condition for maladaptive passivity following adversities (Abramson et al., 1978), it is rational to infer that expectations may mediate the relationship between explanatory style and well-being. Accordingly, it is reasonable to construct a model in which explanatory style influences psychological well-being through dispositional optimism.

Though explanatory style has not been linked to psychological well-being previously, the mediating role of explanatory style between dispositional optimism and subjective well-being has been examined in several previous studies. For example, Isaacowitz (2005) reported that negative affiliated explanatory style and dispositional optimism and pessimism predict subjective well-being (life satisfaction) measures across three different age groups (280 young, middle-aged, and older adults). In one study with a Chinese undergraduate sample (N = 350), Yuan and Zhang (2007) reported that ASQ Total was negatively correlated with dispositional optimism (r = -.30) and Satisfaction with Life (r = -.21) and positively correlated with depression (r = .26). Dispositional optimism was revealed to be a mediating variable that mediates the relationship between explanatory style and subjective well-being (depression and Satisfaction with Life).

Currently, few investigations, however, have tested both dispositional optimism and explanatory style together in the research of psychological well-being, or examined the potential mediating role of expectations on the relationship between attributional style and psychological well-being. There is no published research on the relationship between attributions, expectations, and psychological well-being to my knowledge.

In summary, previous investigations of optimism and well-being have shared two primary limitations: first, they have exclusively assessed only one construct of optimism (e.g. Augusto-Landa et al., 2011) or merely one approach of well-being (e.g. Ahrens & Haaga, 1993). Second, even in studies where the two fundamental constructs of optimism have both been assessed, research has not yet explored the potential mediating model linking all these constructs. Therefore, my study aimed to extend the positive psychology literature by examining the relationships among dispositional optimism, explanatory style, and psychological well-being in a non-Western sample. A further aim was to examine dispositional optimism as potential mediator of the beneficial effects of optimistic explanatory style on psychological well-being.

As an exploratory step, I first tested a model in which dispositional optimism and dispositional pessimism were hypothesized to predict RSPW dimensions (see Figure 4.1). In this model, LOT-R Optimism and LOT-R Pessimism are two differentiated but negatively correlated factors. RSPW dimensions (correlated with each other) will be predicted by LOT-R Optimism and LOT-R Pessimism. We next tested a model constructing the predictive role of explanatory style on RSPW dimensions (see Figure 4.2). In this model, ASQ Positive and ASQ Negative are hypothesized to influence and predict RSPW dimensions (correlated with each other).
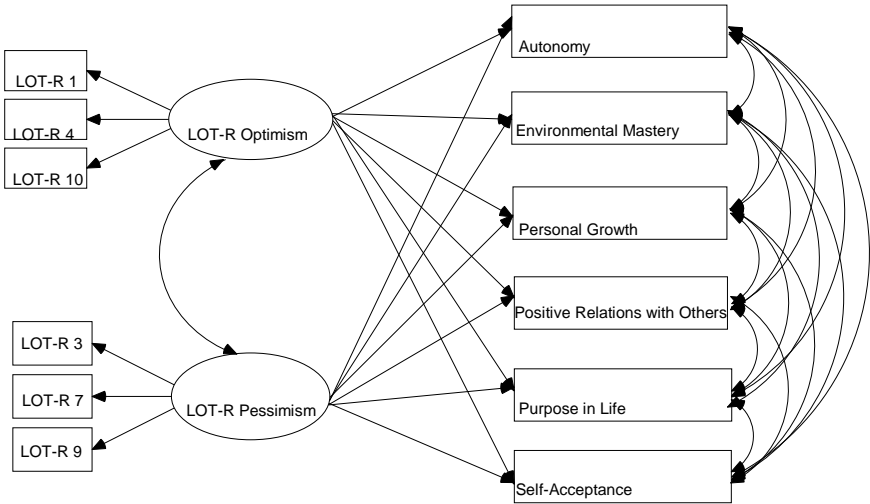
Figure 4.7: Proposal for an initial model with hypothesized relationship between dispositional optimism and psychological well-being.
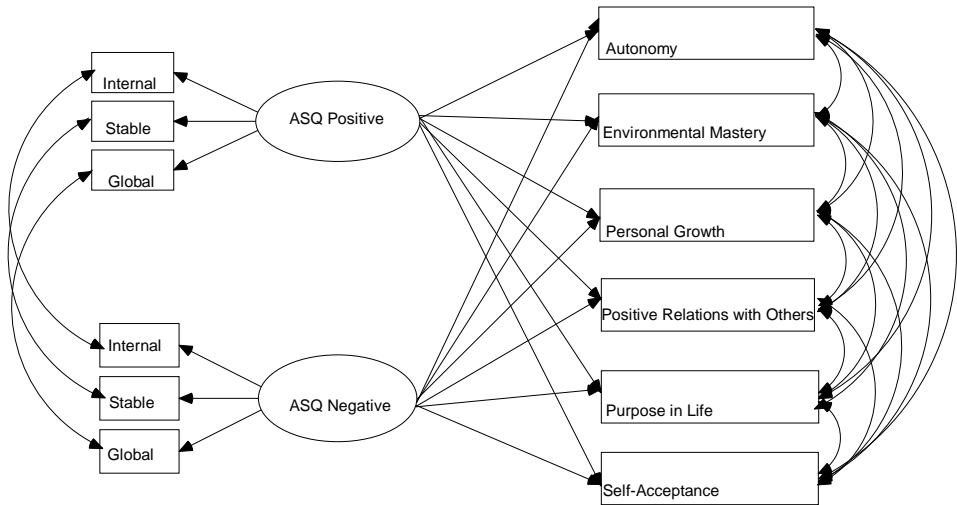
Figure 4.2: Proposal for an initial model with hypothesized relationship between explanatory style and psychological well-being.

If the first two models are supported by the data, we will then examine a model in which dispositional optimism acts as a potential mediator of the beneficial effects of optimistic explanatory style on psychological well-being. This proposed model, with LOT-R Optimism and LOT-R Pessimism partially mediating the effects of ASQ Positive and ASQ Negative on psychological well-being, is shown in Figure 4.3.
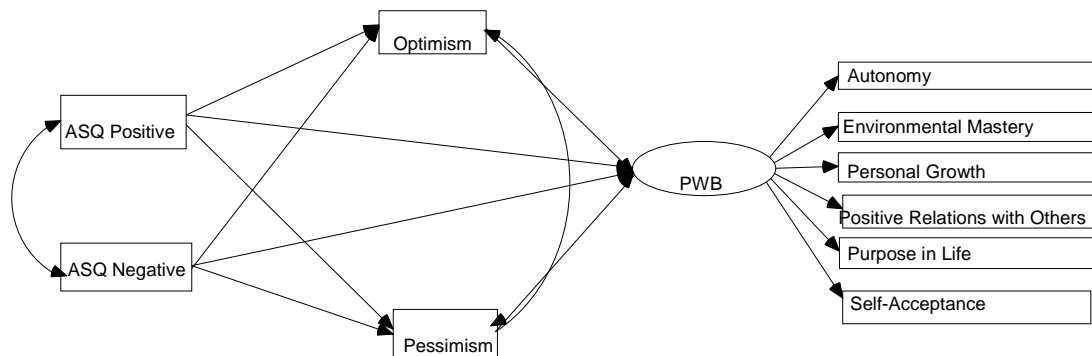
Figure 4.3: Proposal for an initial model with hypothesized mediating role of dispositional optimism between the relationship of explanatory style and psychological well-being.

Since SEM analysis to examine the possible associations among explanatory style, dispositional optimism, and psychological well-being has not been published previously, alternative models of the relationships among these three variables will also be explored. Specifically, the possibility that higher psychological well-being may lead to more positive expectations as suggested by Ferguson and Goodwin (2010) will be explored.

Correlational analyses will also be conducted. It is hypothesized that LOT-R Optimism and ASQ Positive will be positively related to all RSPW dimensions, and LOT-R Pessimism and ASQ Negative are expected to be negatively associated with dimensions of psychological well-being.

4.2 Samples and instruments

Sample

Sample 1 was involved in the analysis of this study (for detail of this sample, see 1.5.4 of Chapter 1).

Instruments

Attributional style was assessed using the Chinese ASQ (Zhang, 2006). Composite attributional styles were calculated separately for positive and negative events. Reliabilities (Cronbach's α) were acceptable 0.84 for the total and, for positive events 0.84; for negative events .77; for internality, .65; for stability, .76; and .80 for globality.

Dispositional optimism was measured using a Chinese version of the Life Orientation Test-Revised (Lai & Yue, 2000). Cronbach's α for the scale was 0.75; for optimism, .79; and, for pessimism, .75.

Psychological well-being was measured with a Chinese version of the Ryff Scales of Psychological Well-being (Chen, 2010). In the present sample, Cronbach's α coefficients for the psychological well-being total was 0.92 (for self-acceptance, α =.74; for positive relationships with other, α =.77; for personal growth, α =.78; for purpose in life, α =.83; for environmental mastery, α =.81; for autonomy, α =.75).

Analysis strategy

Descriptive statistics and correlational analyses were first calculated. Structural equation modelling (SEM) was then used to test a series of potential mediating models constructing the relationships among explanatory style, dispositional optimism, and psychological well-being using Amos 17.0 (Arbuckle, 2008). All analyses took advantage of raw data supporting estimation of models using full information maximum likelihood estimation.

The adequacy of model fit was assessed using the comparative fit index (CFI), Tucker-Lewis index (TLI) and the Root Mean Square Error of Approximation (RMSEA). For CFI and TLI, values > 0.95 were taken as indicating acceptable fit (Hu & Bentler, 1999). For the RMSEA, values of < .05 indicated acceptable fit (C. Y. Yu, 2002). Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) are reported to aid model comparison.

Criterion for mediating model

Four conditions must be met to establish an acceptable mediating model (Baron & Kenny, 1986). First, the predictor variable (explanatory style) is related to the outcome variable (psychological well-being). Second, the predictor variable (explanatory style) is related to the potential mediator (dispositional optimism). Third, the mediating factor (dispositional optimism) is related to the outcome variable (psychological well-being). Finally, the relation between the predictor variable (explanatory style) and the outcome variable (psychological well-being) significantly decreases once the mediator (dispositional optimism) is included in the model.

4.3 Results

Descriptive statistics

Table 3.1 shows the means, standard deviations, and Cronbach's alpha of the total samples. Reliabilities were acceptable.

Measures	Means	SD	Cronbach's Alpha
LOT-R Optimism	8.27	1.84	0.79
LOT-R Pessimism	3.85	1.99	0.75
LOT-R Total	16.42	3.01	0.75
ASQ Negative	12.90	1.78	0.84
ASQ Positive	15.28	1.91	0.77
ASQ Total	2.38	2.17	0.84
RSPWS1	33.05	5.46	0.75
RSPWS2	37.65	5.60	0.81
RSPWS3	41.77	5.31	0.78
RSPWS4	40.06	6.45	0.77
RSPWS5	38.45	6.36	0.83
RSPWS6	34.70	5.80	0.74
RSPW Total	225.68	25.82	0.92

Table 3.1: Means, standard deviations and Cronbach's alpha for all measures.

Note: Means for LOT-R dimensions are on a scale ranging from 1 to 5, ASQ dimensions range from 1 to 7, and RSPW dimensions from 1 to 6, with higher numbers indicating greater amounts of these qualities. RSPWS1, autonomy; RSPWS2, environmental mastery; RSPWS3, personal growth; RSPWS4, personal relations with others; RSPWS5, purpose in life; RSPWS6, self-acceptance (n = 452).

Correlational analyses

The first hypothesis tested was that explanatory style, dispositional optimism, and psychological well-being would correlate positively and significantly with each other. Table 3.2 shows the inter-correlations among the variables of interest.

As shown in Table 3.2, dispositional optimism was positively correlated with explanatory style for positive events and all RSPW dimensions; dispositional pessimism was negatively correlated with explanatory style for positive events and all RSPW dimensions; dispositional optimism was negatively correlated with explanatory style for negative events; and dispositional pessimism was positively correlated with explanatory style for negative events. Explanatory style for positive events was positively associated with all RSPW dimensions, while explanatory style for negative events was negatively associated with all RSPW dimensions. Finally, all RSPW dimensions were positively and significantly related to each other.

Measures	LOT-R Optimism	LOT-R Pessimism	ASQ Negative	ASQ Positive	ASQ Total	RSPW S1	RSPW S2	RSPW S3	RSPW S4	RSPW S5	RSPW S6
LOT-R Optimism	-										
LOT-R Pessimism	-0.24 **	-									
ASQ Negative	-0.13 **	0.11 *	-								
ASQ Positive	0.15 *	-0.18 **	0.31 **	-							
ASQ Total	0.23 **	-0.25 **	-0.54 **	0.63 **	-						
RSPW S1	0.28 **	-0.12 **	-0.27 **	0.03	0.25 **	-					
RSPW S2	0.37 **	-0.31 **	-0.33 **	0.13 **	0.39 **	0.44 **	-				
RSPW S3	0.28 **	-0.32 **	-0.12 **	0.18 **	0.26 **	0.30 **	0.44 **	-			
RSPW S4	0.37 **	-0.35 **	-0.23 **	0.11 *	0.29 **	0.30 **	0.55 **	0.54 **	-		
RSPW S5	0.28 **	-0.37 **	-0.21 **	0.13 **	0.29 **	0.38 **	0.47 **	0.55 **	0.50 **	-	
RSPW S6	0.46 **	-0.28 **	-0.25 **	0.15 **	0.33 **	0.41 **	0.58 **	0.33 **	0.52 **	0.44 **	-
RSPW Total	0.46 **	-0.40 **	-0.32 **	0.16 **	0.41 **	0.63 **	0.78 **	0.71 **	0.78 **	0.76 **	0.74 **

Table 3.2: Correlations between measures.

Note: RSPWS1, autonomy; RSPWS2, environmental mastery; RSPWS3, personal growth; RSPWS4, personal relations with others; RSPWS5, purpose in life; RSPWS6, self-acceptance. (n = 452)

* $p < 0.05$. ** $p < 0.01$.

Structural Equation Modelling

First, the proposed model in which dispositional optimism predicts RSPW factors (as shown in Figure 4.1) was tested.
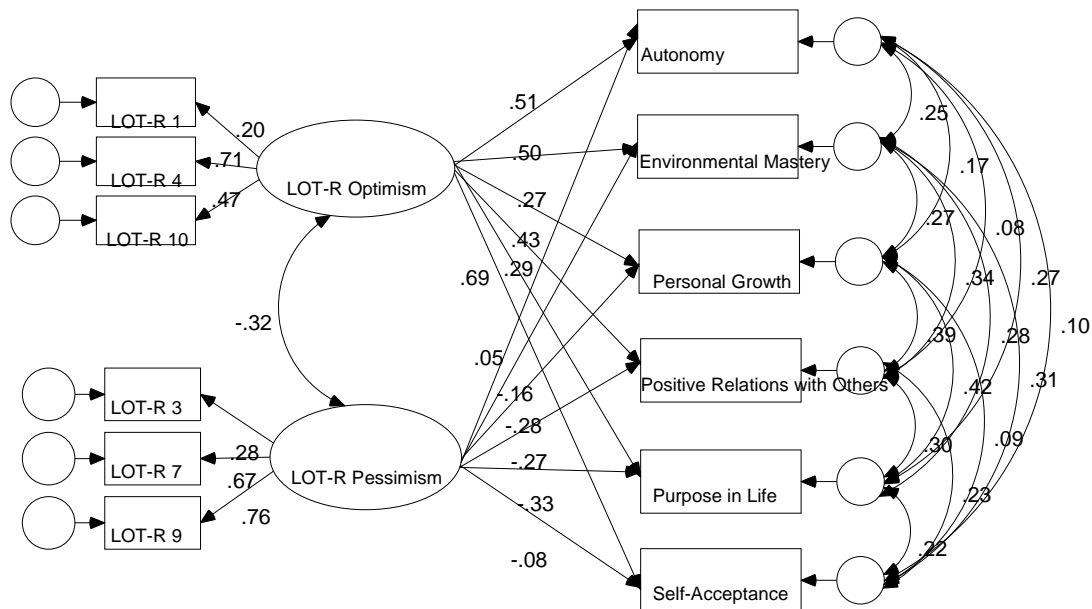
Figure 4.4: Standardized estimations for the initial model of dispositional optimism and psychological well-being.

For the initial base model, the fit was adequate (χ^2 (33) = 95.48 p < .001; CFI = 0.961; TLI = 0.919; RMSEA = 0.063; AIC = 181.406; BIC = 370.635). Standardized estimates of the original model are shown in Figure 4.4. Modifications were suggested that significantly improved model fit, and the resultant model fit reasonably well by all criteria (χ^2(28) = 44.80, p = .023; CFI = 0.988; TLI = 0.973; RMSEA = 0.036; AIC = 144.802; BIC = 350.486), as shown in Figure 4.5. The new

paths all had loadings of .24 or below, suggesting deviation from the theoretical model is minor (see Figure 2.4).

As shown in the figure, most direct paths in this model are significant except the path between LOT-R Pessimism and Autonomy, between LOT-R Pessimism and Environmental Mastery, and between LOT-R Pessimism and Self-Acceptance. As predicted, LOT-R Optimism and LOT-R Pessimism are negatively correlated (r = -.29). Six RSPW dimensions are predicted by LOT-R Optimism and three RSPW dimensions are predicted by LOT-R Pessimism.

Figure 4.5: Standardized estimations for the modified model of dispositional optimism and psychological well-being.

I next tested the proposed model in which explanatory style predicts psychological well-being factors (as shown in Figure 4.2). For the initial base model, the fit was adequate (χ^2 (30) = 82.44 p < .001; CFI = 0.970; TLI = 0.934; RMSEA = 0.062; AIC = 178.439; BIC = 375.896). Standardized estimates of the original model are shown in Figure 4.6.

Figure 4.6: Standardized estimations for the initial model of explanatory style and psychological well-being.

Although CFI or GFI values may be considered adequate, modifications were suggested and made to the original model to obtain a better fit according to the results. These modifications include five relationships between the residual variances of measured variables, for instance a relationship between the residual variance of Autonomy and ASQ Positive Global. The new paths all had loadings of .23 or below, suggesting deviation from the theoretical model is minor (see Figure 2.4). These modifications significantly improved model fit, and the resultant model fit reasonably well (χ^2 (25) = 41.31, p =.021; CFI = 0.991; TLI = 0.975; RMSEA = 0.038; AIC = 147.310; BIC = 365.336).

In this model, as predicted, three cognitive style factors (internality, stability, and globality) are correlated with event valences. ASQ Positive and ASQ Negative predict RSPW dimensions (except ASQ Positive and Autonomy).
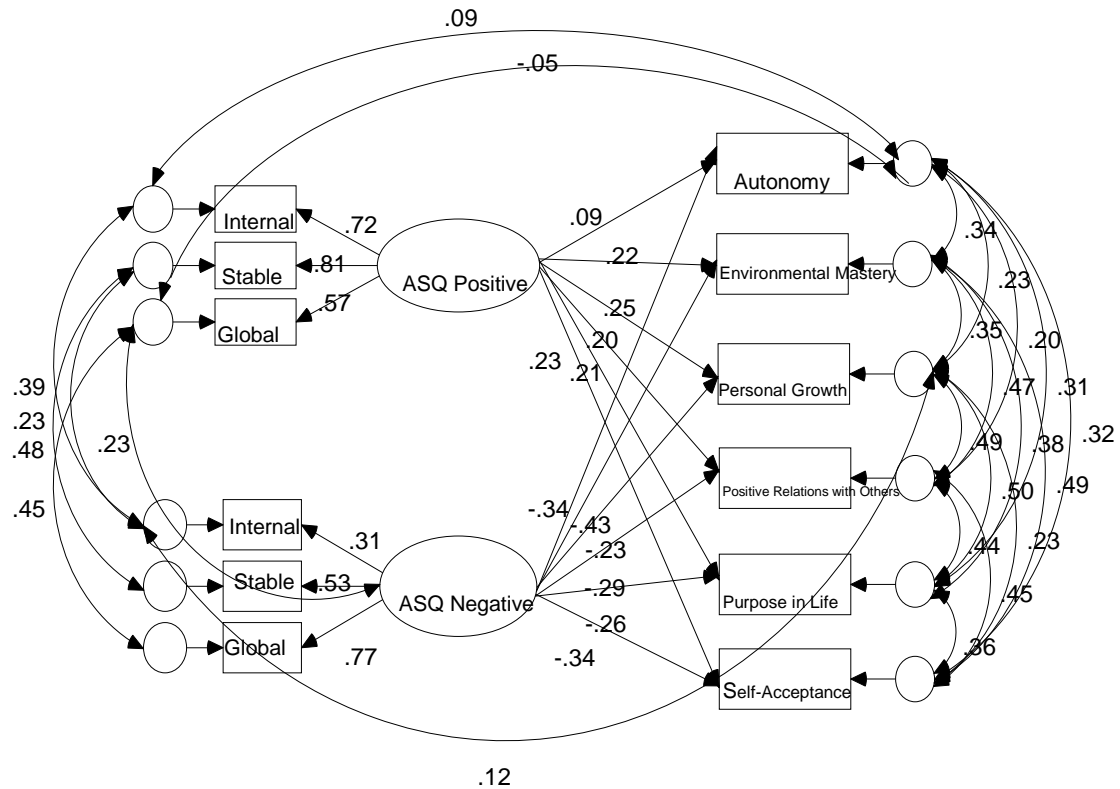
Figure 4.7: Standardized estimations for the modified model of explanatory style and psychological well-being.

Finally, I tested the preferred model, in which dispositional optimism acts as a potential mediator of the beneficial effects of optimistic explanatory style on psychological well-being (as shown in Figure 4.3). For the initial base model, CFI or GFI values may be considered acceptable (χ^2 (29) = 132.558, p < .001; CFI = 0.920; TLI = 0.875; RMSEA = 0.089; AIC = 184.558; BIC = 291.514). Standardized
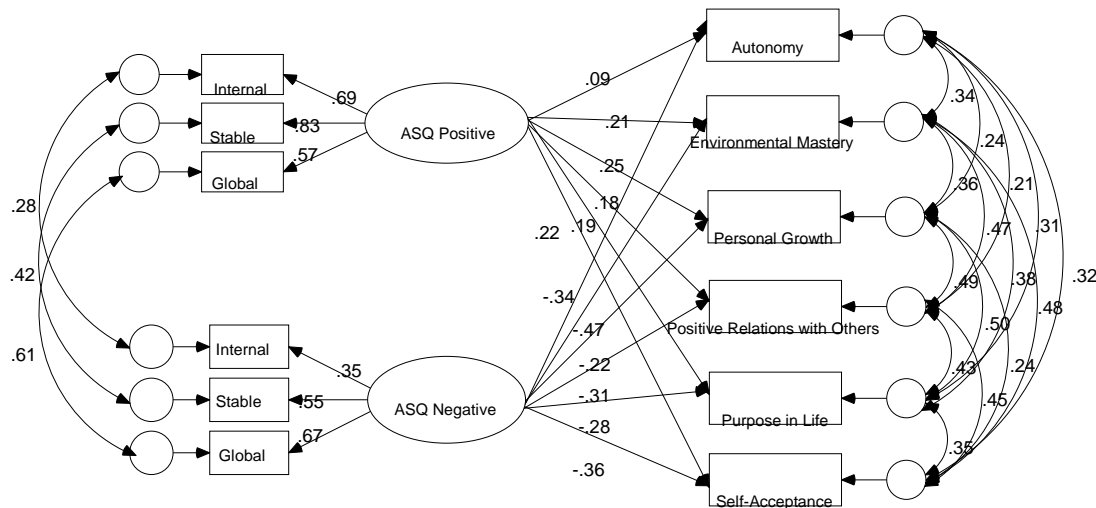
estimates of the original model are shown in Figure 4.8. Modifications were suggested, which significantly improved model fit, and the resultant model fit reasonably well by all criteria ($\chi^2(23)$ = 37.88, p = .026; CFI = 0.988; TLI = 0.977; RMSEA = 0.038; AIC = 101.880; BIC = 233.518) (see Figure 2.4).
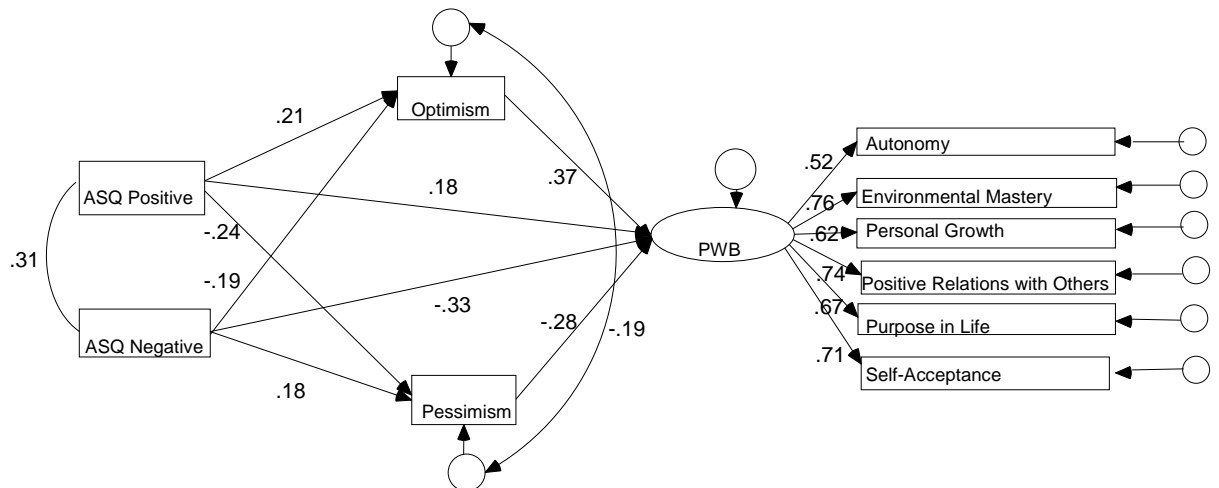
Figure 4.8: Standardized estimations for the initial meditating model.

As shown in Figure 4.9, all direct and indirect paths in this model are significant. This final modified model has a highly significant indirect path from explanatory style to dispositional optimism to psychological well-being. Additionally, the relationship between the predictor variable (ASQ Positive and ASQ Negative) and the outcome variable (psychological well-being) (r = .32 and r = -.47, respectively) significantly decreases (r = .17 and r = -.35, respectively) once the mediator (LOT-R Optimism and LOT-R Pessimism) is included in the model. Thus the relationship between explanatory style and psychological well-being was partially mediated by dispositional optimism as originally proposed.
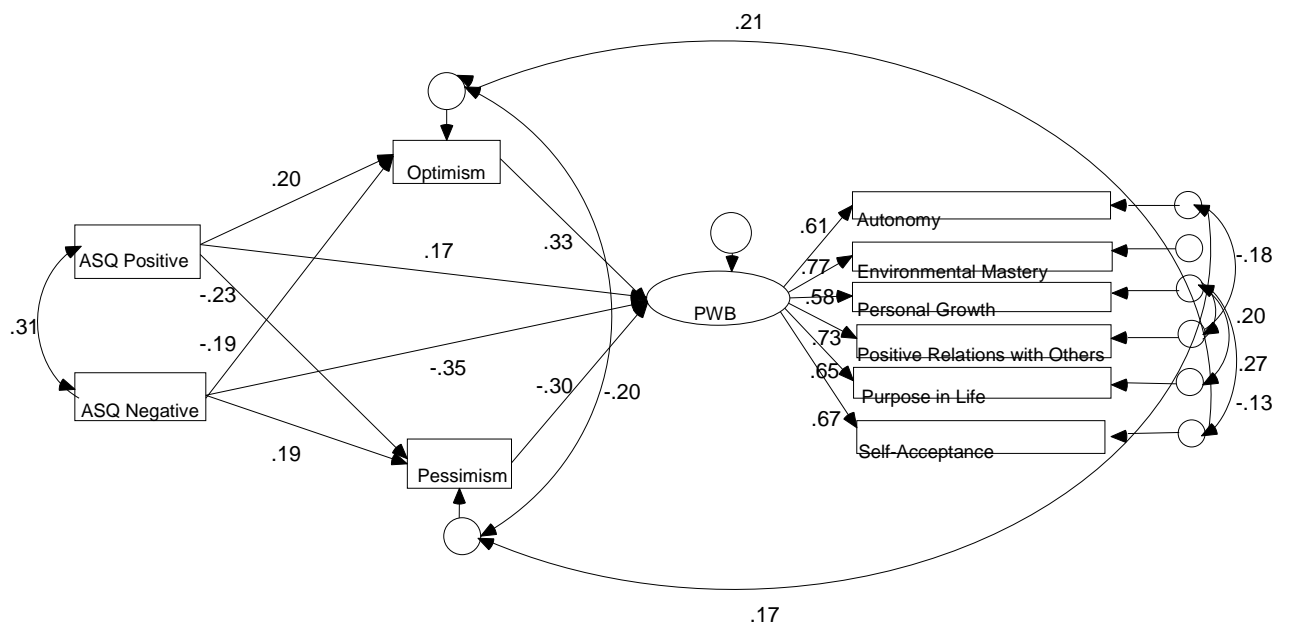
Figure 4.9: Standardized estimations for the modified meditating model.

4.4 Positive relationship between optimism and psychological well-being

My study provided empirical evidence of the correlational patterns between explanatory style, dispositional optimism, and psychological well-being in a non-Western sample. Both dispositional optimism and explanatory style are strong predictors of psychological well-being. The relationship between explanatory style and psychological well-being, however, is predominantly mediated by dispositional optimism and dispositional pessimism. The results were consistent with findings of previous research in Western samples. That is, explanatory style and dispositional optimism were weakly correlated (Forgeard & Seligman, 2012), but both of these two

constructs of optimism were moderately correlated with well-being (Carver et al., 2010).

Positive relationships were found between LOT-R Optimism and psychological well-being dimensions. More optimistic individuals reported a higher level of PWB, which is consistent with studies conducted in Western participants. That is, individuals who have positive expectation for the future are more likely to report high levels of psychological well-being. There is evidence that optimists can cope more adaptively with stress and, therefore, gain psychological benefits (Scheier & Carver, 1992). Similar results have been found in other studies (Carver et al., 2010). Inversely, negative correlations were found between LOT-R Pessimism and dimensions of psychological well-being. These findings correspond with results reported by Chang et al. (1997) and Mäkikangas and Kinnunen (2003).

Consistent with previous studies that individuals who have an optimistic explanatory style are more likely to report higher levels of psychological well-being than people with a pessimistic attributional style (Wise & Rosqvist, 2006), the current results revealed that scores on attributions for positive events were positively correlated with levels of all six dimensions of psychological well-being. Optimists are believed to face adversity and deal with negative situations more effectively than pessimists and, therefore, gain more psychological benefits. Optimistic explanatory style may serve as a protective factor for well-being. Additionally, dispositional optimism was positively correlated with explanatory style, which is consistent with some previous studies exploring the relationship between these two constructs.

The most important goal of the current study was to address whether dispositional optimism mediated the link between explanatory style and psychological well-being. The proposed mediating model was tested and supported. It indicated that an optimistic explanatory style was a strong predictor of psychological well-being, as

measured by the RSPW. However, the effect of explanatory style on psychological well-being was mediated by dispositional optimism as shown in the mediating model. Thus, this study provides conditional evidence for the mediating role of dispositional optimism in the relationship between attributional style and psychological well-being.

Myers and Diener (1995) suggested that the causal direction from traits to subjective well-being may be reversed. It might be similar for psychological well-being. Given the cross-sectional nature of these findings, the causal directions depicted in these models may be the reverse of what was predicted. Higher levels of psychological well-being, such as positive relations with others, may contribute to positive expectations. However, no empirical evidence with longitudinal studies for these reversed patterns has been carried out, as far as we know. Thus, despite a good statistical model fit for some models with pathways from psychological well-being to optimism (tested but not reported in Results), these models are less plausible than the final resultant meditating model, due to lack of evidence.

Overall, this study provided consistent evidence of, and further support for, the beneficial effects of both types of optimism on psychological well-being in a college student sample. Both dispositional optimism and optimistic explanatory style are strong predictors of psychological well-being. While both dispositional optimism and explanatory style have a direct effect on psychological well-being, the effect of explanatory style on psychological well-being was partially mediated by dispositional optimism in the final model. It is valuable to note that an optimistic explanatory style clearly contributes to enhancing individuals' psychological well-being.

Chapter 5: Cultural influence on optimism

5.1 Cultural issues: from the West to the East

Research shows that optimism as a whole has adaptive value in dealing with environmental risks and life challenges over the million or so years of evolution (Tiger, 1979). This adaptive advantage still works for people to achieve more in current life (Carver et al., 2010; Seligman, 2011). The universality of being optimistic (Michalos, 1988) and the prevalent positive associations among optimism, subjective well-being, and perceived physical health (Gallagher, Lopez, & Pressman, 2013), have been known for a long time.

Though benefits of being optimismtic are widely acknowledged, a crucial but often neglected concern in studying optimism is the examination of this important psychological concept across different cultural and ethnic groups. Optimism-related studies in recent years have been mainly conducted in Western cultures particularly, so the results do not necessarily apply to behaviours in other cultures. Is there any cultural difference concerning optimism-related properties? The answer may not be as simple as it seems. To make it clear scientifically, empirical studies must be carried out to examine whether cultural differences have considerable and meaningful effects on optimism. The following study set out to address this question and examine group differences on measures of dispositional optimism and explanatory style between Eastern and Western cultures.

It is assumed that most Eastern societies, such as those in China and India, miantain a collectivist or an interdependent self, whereas most Western societies, such as the U.S. and Canada, foster an individualistic or an independent self (Markus & Kitayama, 1991). These conceptions of self, in turn, may relate to an individual's explanation for events in their life and generalised different expectations for their future. To be specific, one of the distinctions between Eastern and Western cultures concerns the level of separation between the achivement domain and the interpersonal domain in life events (Higgins & Bhatt, 2001). It has been assumed that individuals from a collectivist culture may not differentiate these two domains as sharply, due to a lack of separation of self from others (Higgins & Bhatt, 2001).

To understand the influence of culture on optimism, it is critical to review recent findings associated with the examination of optimism between these two cultures.

5.2 Prior studies investigating cultural differences in optimism

Optimism studies conducted in both cultures

Within the broad and divergent culture frames of the East and West, differences in both dispositonal optimism and attributional styles have been examined by researchers from an cross-cultural perspective. J. G. Miller (1984) carried out one of the earlier studies about cultural influences on explanatory style within a group of Hindus and a group of Americans. He (or she) found that individuals in Western cultures emphasised the role of internal factors in causal explanations of events, whereas individuals in Eastern cultures tended to view the external factors as playing a determining role in causing various life events.

Lee and Seligman (1997) also investigated cultural influences on causal attributions. A sample of 257 white American undergraduates, a group of 312 mianland Chinese college students, and 44 Chinese-American students (32 subjects were American-born Chinese, the others were non-American-born Chinese but had stayed in the United States for 5.5 years on average) were recruited and completed the ASQ. The authors found that the White Americans had a more optimistic explantory style than Chinese-Americans, and Chinese-Americans were characterized with a more positive attributional style than mainland Chinese. Using the same scale, Higgins and Bhatt (2001) conducted a cross-cultural study within Indian (n = 195) and Canadian (n = 162) college students. They found that Indian students generated more contextual attributions for life events than did the Canadian students.

As discussed earlier in Chapter 1, attributional style has been examined along still another line − attributional bias, which overlaps with both the definition and

measurement of optimistic explanatory style. According to Higgins and Bhatt (2001, p. 55), both Westerners and Easterners showed "a self-serving tendency to explain negative events with external-uncontrollable causes and to explain positive events with internal-controllable causes". That is, both cultures showed an attributional bias, generating more external, uncontrollable causes to explain negative events and more internal, controllable causes to explain positive events.

This self-serving attributional bias, or an optimistic explanatory style, has been previously studied with a cross-culture perspective, and cultural effects were reported (e.g., Kashima & Triandis, 1986). For example, the study of Lee and Seligman (1997) indicated that Mainland Chinese attributed their success to others or circumstances and their failure to themselves more often than did White Americans. This idea was supported in a meta-analysis of 266 studies, including subjects from different cultural background. Mezulis et al. (2004) reported that Asian samples generally displayed significantly smaller attributional bias than U.S. or Western samples. That is, Westerners received higher scores on optimistic explanatory style than Easterners.

These studies came to the conclusion that individuals from Eastern cultures, or so-called collectivistic cultures, expressed less self-serving attributional bias than individuals from the West, or individualistic cultures (e.g., Higgins & Bhatt, 2001). This finding was consistent with traditional cultural differences that Westerners have more self-serving bias than Easterners (Lee & Seligman, 1997). However, there are discrepancies in the level of self-serving attributional bias even among countries with similar cultural backgrounds. For example, while both Americans and Finnish people showed a tendency to apply self-serving bias in attribution, American participants expressed a greater bias than Finnish subjects (Nurmi, 1992).

Using the dispositional optimism framework, Chang and colleagues investigated the potential mechanism underlying cultural influences on optimism and pessimism for Westerners and Easterners (Chang, 1996; Chang, Sanna, & Yang, 2003). In one of their earlier studies (Chang, 1996), 111 Asian-American and an equal number of White American students completed an adapted version of the

original LOT. The authors found that Asian-Americans scored significantly higher on pessimism than White-Americans, which was consistent with traditional images of Western-Eastern cultural differences. The results were partly replicated in another cross-cultural study by Sinha, Willson, and Watson (2000). College students from India (n = 198) and Canada (n = 344) were assessed on their level of dispositional optimism and several other psychological factors. The authors found that Indian students were more pessimistic than their Canadian counterparts.

Abdel-Khalek and Lester (2006) compared levels of dispositional optimism of Kuwaiti (n = 460) and American (n = 273) college students using an adapted version of the original LOT. Consistent with findings of Chang et al. (2003), the Easterners scored significantly higher on pessimism than their Western counterparts. However, they also found that Kuwaiti students were less optimistic than American students, which was not found in the study of Chang et al. (2003).

Cultural differences in optimism have been supported by some meta-analytic studies as well. For example, Nes and Segerstrom (2006) investigated the potential differences in optimism and coping between English-speaking and non-English-speaking countries. Looking at 50 studies, they found that participants involved in studies in the United States or in English-speaking countries showed stronger correlations between dispositional optimism and coping strategies than did participants from non-English-speaking nations.

Other studies have investigated age-related dipositional optimism across different cultures. For example, in samples including Americans and Hong Kong Mainland Chinese, You, Fung, and Isaacowitz (2009) reported that older Mainland Chinese displayed a lower level of dispositional optimism than did younger Mainland Chinese, whereas older Americans showed a higher level of dispositional optimism than their younger counterparts.

To summarize the findings to date, from the perspective of dispositional optimism, it is generally agreed that Westerners are more optimistic than Easterners. However, there is at least one exception. Chang et al. (2003) investigated the cultural

influence on the role of optimism in predicting life satisfaction and depressive symptoms. A sample of 294 South Korean and 320 European-American undergraduates were tested on optimism, depression and subjective well-being. Surprisingly, the South Korean students were found to be significantly less pessimistic than the European-American students. No significant group difference on levels of optimism between these two ethic groups was found.

The author stated that his findings were consistent with his earlier studies conducted between Asian Americans and European Americans. However, these groups were not strictly comparable. Further research is necessary to continue to explore the possibility of discrepancy between specific ethnic groups. Though research based on explanatory style has generally found that Westerners are more optimistic than Easterners, cultural comparisons in attributional style have led to mixed results, which suggest that cultural influences on explanatory style is not always consistent, at least for some dimensions.

Optimism studies conducted in Easterners

In addition to cross-cultural studies that directly compare the differences in optimism expression between Eastern and Western cultures, optimism-related research recently conducted only within Eastern cultures has provided some findings for better understanding of both dispositional optimism and explanatory style.

Yu and Seligman (2002) investigated associations between explanatory style and levels of depressive symptoms and other variables within a group of Chinese children (n = 185). The study replicated previous findings that pessimistic explanatory style was negatively associated with academic achievement and positively correlated with school conduct problems. Additionally, in their optimism intervention study conducted in a Chinese sampe of 220 students with depressive symptoms, the intervention group showed significantly fewer depressive symptoms than the control group, and this benefit continued at 3- and 6- month follow-ups.

More studies have been conducted in dispositional optimism than in explanatory style in Eastern cultures. One study using a Taiwanese sample (n = 381)

examined the potential mediating role of social support between dispositional optimism, subjective well-being (happiness and life satisfaction), and psychological well-being (personal growth and purpose in life). The authors found that dispostional optimism was positively associated with both subjective well-being and psychological well-being, which had been supported by many previous studies conducted in Western cultures (Tseng, 2007).

In another study, Ho, Cheung, and Cheung (2010) examined the role of optimism in promoting subjective well-being within 1,807 adolescents in Hong Kong. It showed that dispositional optimism was positively associated with life satisfaction ($r = .48$, $p < .05$) and was negatively associated with psychosocial problems ($r = -.72$, $p < .05$), which were consistent with previous findings in Western cultures (Wrosch & Scheier, 2003). Also, with a sample of 250 community-dwelling older Koreans, Ju, Shin, Kim, Hyun, and Park (2013) assessed the level of dispositional optimism, Meaning in Life and subjective well-being of the participants. The authors found that dispositional optimism was positively associated with both subjective well-being ($r = .50$) and meaning in life ($r = .75$) in one group of old adults.

5.3 The present study

Previous studies revealed cultural influences on different optimism expressions between Eastern and Western cultures, though some results were inconsistent. Because most published research in cultural differences on optimism has been conducted between Americans and some Eastern nations, and there are no published studies that have compared cultural influences on optimism between British White people and Eastern countries, we know very little about the potential cultural influence on optimisim within these two ethnic groups. Therefore, the goal of the present study was to extend the optimism literature by examining the differences in dispositional optimism and explanatory style between Mainland Chinese and British White people.

The main purposes of the present study were to (1) test whether the ASQ and the LOT scored within a group of White British people possess the same psychometric structures as explicated in the sample of Mainland Chinese in Chapter 2; (2) examine correlations between measures of dispositional optimism and explanatory styles among Easterners (Mainland Chinese) and Westerners (British White); (3) assess potential group differences on measures of dispositional optimism and explanatory styles between the two ethnic groups.

In agreement with the long-held perspective on cultural differences between Easterners and Westerners, it was expected that measures of dispositional optimism and explanatory style would be significantly intercorrelated with each other for both cultural groups. In addition, it was expected that both Mainland Chinese and British White groups would show an optimistically-biased attributional style, generating more external, unstable, and specific causes to explain negative events and more internal, stable and global causes to explain positive events. However, the relationship between these variables may not be identical given cultural differences between Easterners and Westerners. I did not generalize specific hypotheses regarding levels of pessimism and explanations since results in prior research were inconsistent, and the current study is the first to examine potential cultural differences on optimism between these two groups.

Modelling Analyses and analysis techniques

We first tested the ASQ model (three-factor model of negative events and positive events) described in Chapter 2 in the White British sample; and then replicated the two-factor model of the LOT-R described in Chapter 2 in the Western participants.

Structural equation modelling (SEM) was used to test these models using Amos 17.0 (Arbuckle, 2008). All analyses took advantage of raw data supporting estimation of models using full information maximum likelihood estimation. The adequacy of model fit was assessed using the comparative fit index (CFI), Tucker-Lewis index (TLI) and the Root Mean Square Error of Approximation (RMSEA). For CFI and TLI, values > 0.95 were taken as indicating acceptable fit (Hu & Bentler,

1999). For the RMSEA, values of $< .05$ indicated acceptable fit (C. Y. Yu, 2002). Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) are reported to aid model comparison.

5.3.1 Method

Participants

Data were collected from undergraduates in Mainland China and the United Kingdom. The Mainland Chinese sample consisted of 232 undergraduates in Sample 2. A total of 205 White British participants were included in Sample 3. See 1.5.4 of Chapter 1 for details of these two samples.

Materials

The original English version of the Life Orientation Test-Revised (LOT - R; Scheier et al., 1994) was used to measure dispositional optimism in the UK sample. A Mainland Chinese version of Life Orientation Test-Revised (CLOT-R; Lai et al., 1998) was used to measure dispositional optimism of the Mainland Chinese students.

The original English version of the ASQ (Peterson et al., 1982) was used to measure explanatory style of the UK students. Attributional Style of Mainland Chinese participants was measured using a Mainland Chinese version of the ASQ (Zhang, 2006).

Procedure

For the Mainland Chinese sample, participants were tested in groups of 30 to 50 by their teacher. Each teacher was trained on the administration of the task. After detailed instructions were provided, participants completed the paper-and-pencil questionnaires. Testing took around 20 minutes.

For the White British sample, two measures were administered to all 205 participants as part of one bigger survey that was completed in the form of paper-and-pencil questionnaires. Instructions to all participant groups were identical. Of the initial White British sample, three participants provided an incomplete set of surveys,

and thus left a total of 202 completed responses that were available for subsequent data analyses.

5.3.2 Results

Descriptive statistics

We first examined descriptive and summary statistics, and the standard composite explanatory style scores. Table 5.1 shows the descriptive statistics of the ASQ and the LOT-R in both groups. Reliabilities were acceptable.

Measures	Culture group					
	Mainland Chinese			White British		
	Means	SD	Cronbach's Alpha	Means	SD	Cronbach's Alpha
ASQ Total	2.12	2.24	0.83	1.26	2.21	0.83
ASQ Negative	12.98	1.92	0.79	12.21	1.83	0.78
ASQ Internal Negative	4.47	0.61	0.40	4.34	0.78	0.61
ASQ Stable Negative	4.33	0.89	0.69	4.03	0.83	0.70
ASQ Global Negative	4.18	0.96	0.73	3.84	0.89	0.74
Hopelessness	4.25	0.81	0.80	3.94	0.76	0.81
ASQ Positive	15.1	1.81	0.81	13.47	1.94	0.81
ASQ Internal Positive	4.87	0.69	0.63	4.58	0.88	0.71
ASQ Stable Positive	5.29	0.78	0.71	4.63	0.82	0.71
ASQ Global Positive	4.94	0.8	0.63	4.26	0.79	0.60
Hopefulness	5.12	0.69	0.78	4.45	0.7	0.76
LOT-R Optimism	8.37	1.93	0.46	7.02	2.38	0.57
LOT-R Pessimism	4.05	2.23	0.64	4.51	2.15	0.68

Table 5.1: Means, SDs and Cronbach's Alpha for the ASQ and the LOT-R scales.

Note: For Mainland Chinese, N=232. For White British, N=202. Correlations inside of parentheses are for White British. Hopelessness = stability + globality of the ASQ negative events; Hopefulness = stability + globality of the ASQ positive events.

Modelling

Following the study of Hewitt et al. (2004) and our analysis in Chapter 1, method (event) variance was accommodated using an MTMM structure in all modelling analysis. We first tested the hypothesis that the structure of explanations for the causes of negative events reflects three factors of internality, stability and globality which are correlated based on data of Sample 3.

The base model without modifications did not fit very well ($\chi^2(114) = 217.19$, $p < .001$; CFI = 0.88; TLI = 0.82; RMSEA = 0.067; AIC = 331.19; BIC = 519.77). After modifications, the fit was improved by all criteria ($\chi^2(98) = 122.38$, $p < .05$; CFI = 0.97; TLI = 0.95; RMSEA = 0.035; AIC = 268.38; BIC = 509.88). In this modified model, internality and stability factors correlated .20; stability and globality had an r of .66, internality and globality was uncorrelated (r = -.01). Thus, the data collected from Sample 2 didn't support the model previously reported by Hewitt et al. (2004) and the similar model found in Chapter 1. Here the corrected model of causal attributions for negative events emerged as different correlations between three factors (correlated internality-stability and correlated globality-stability but uncorrelated internality-globality). We next turned to see if this model would fit well for positive events.

A model for positive events was constructed in the same fashion as the baseline model for negative events. Fit measures for this model indicated a lack of adequate fit between model and data ($\chi^2(114) = 198.15$, $p < 0.001$; CFI = 0.91, TLI = 0.88, RMSEA = 0.061; AIC = 312.15; BIC = 500.72). But modifications were suggested and these modifications improved fit by all criteria ($\chi^2(104) = 133.66$, $p < .05$; CFI = 0.97; TLI = 0.96; RMSEA = 0.038; AIC = 267.66; BIC = 489.31). In the correlated factor model stability and globality correlated .63, internality and globality .34 and internality and stability .59 (See Figure 5.1).
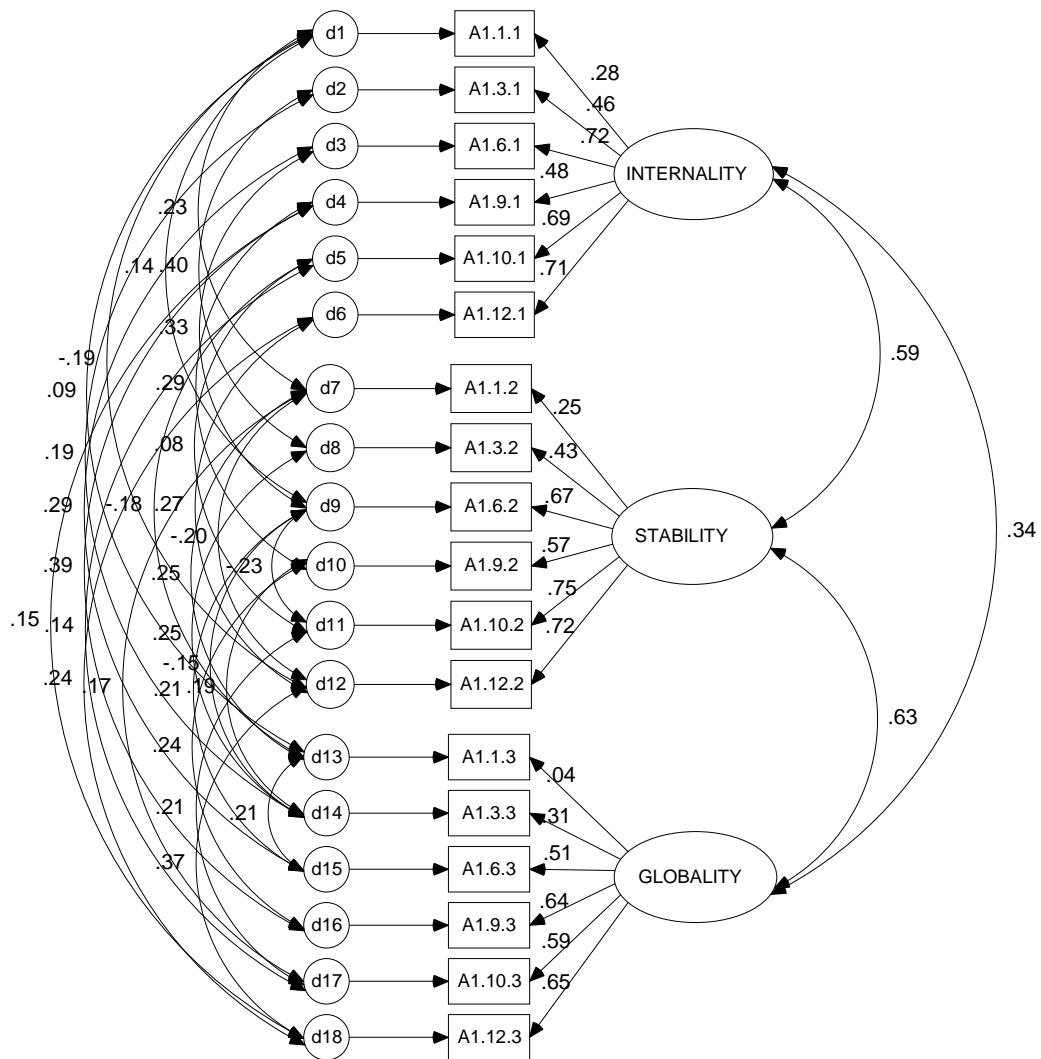
Figure 5.1: Well-fitting 3-factor model of attributional style for positive events.

As a result, as previously reported by Higgins et al. (1999) and in Chapter 1, a model of causal attributions for positive events in terms of three correlated factors of globality, stability, and internality adequately accounted for responses to these positive events in the ASQ.

Analyses of separate ASQ positive events and ASQ negative events, then, indicated that only ASQ scale of positive events was well accounted for by three

correlated factors of internality, stability, and globality. ASQ scale of negative events didn't support this three correlated-factor model.

Testing for measurement invariance of ASQ-Positive across cultures

Modelling analysis shows that only ASQ scale of positive events was well accounted for by three correlated factors of internality, stability, and globality across two cultures and ASQ scale of negative events didn't support this three correlated-factor model in the White British sample. Thus, to test measurement invariance of ASQ, only ASQ scale of positive events was tested using multi-group SEM. In addition to unconstrained base model, Measurement weights, Structural covariances, and Measurement residuals were used as constrained conditions in multi group analysis. The fit statistics for baseline comparisons of all models tested are laid out in Table 5.2. Table 5.2 shows that the unconstrained model fits best for the data. Three constrained models have similar fits as the unconstrained model. Thus, ASQ-Positive model is identical in measuring attributional style across two cultures.

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	△CFI
Unconstrained	.842	.788	.934	.908	.931	
Measurement weights	.836	.793	.934	.914	.932	. 001
Structural covariances	.828	.788	.928	.909	.926	-.005
Measurement residuals	.790	.775	.901	.893	.900	-.031

Table 5.2: Baseline comparisons for tested ASQ-Positive models

Structural equation modelling for the LOT-R

We first test the one-factor model; all six items were specified as indicators of a single factor. The unidimensional model fit poorly with the data, with (χ^2 (10) =

123.83, p < .001; CFI = 0.343; TFI = 0.015; RMSEA = 0.238; AIC = 145.828; BIC = 146.622).
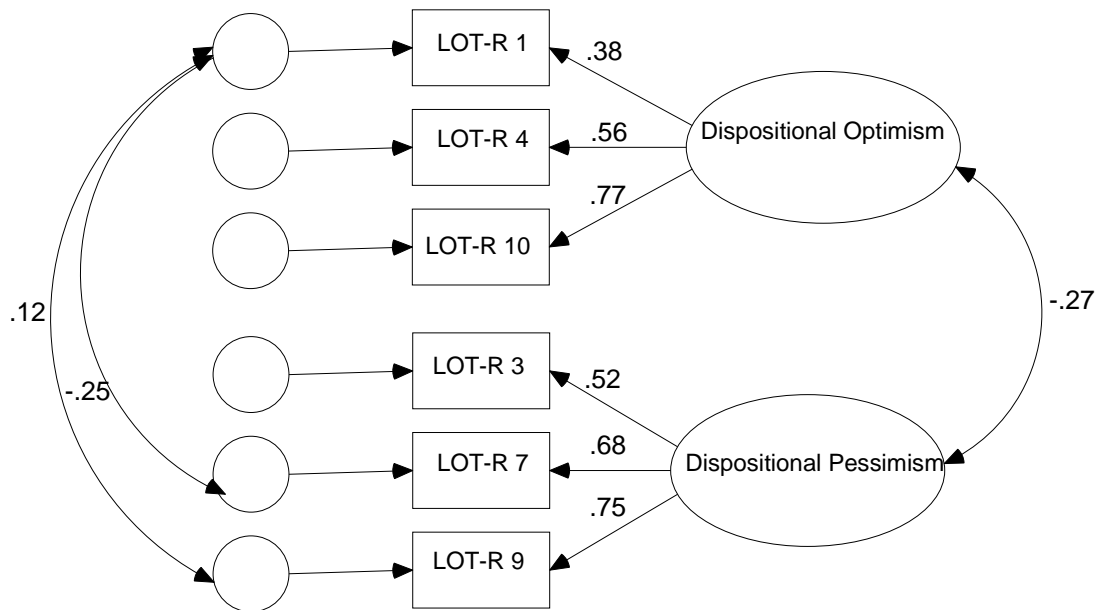
Figure 5.2 Standardized estimations for the two-factor model

We next turn to the two-factor model. Here the three positively worded items were specified as indicators of the Dispositional Optimism factor, and the three negatively worded items were specified as indicators of the Dispositional Pessimism factor. Compare with the one-factor model, the two-factor model fit much better with χ^2 (8, N = 202) = 21.387, p < .005; CFI = 0.923; TFI = 0.855; RMSEA = 0.091; AIC = 47.387; BIC = 90.394). From the modified index, we established relationships between the residual variance of Item 1 and Item 7, and between the residual variance of Item 1 and Item 9. These modifications improved fit by all criteria (χ^2 (6) = 6.86, p <0.5; CFI = 0.995; TLI = 0.988; RMSEA = 0.027; AIC = 36.860; BIC = 86.484). The correlation between the Dispositional Optimism factor and the Dispositional Pessimism factor was -.27 (p<.01). The factor loading ranged from .30 to .81 (See Figure 5.2).

Thus, as previously reported by many studies conducted in Western cultures, a two-factor model of dispositional optimism was supported by our study in this White British sample. That is, the LOT-R measured two negatively correlated and independent constructs. This result was consistent with previously reported analysis in Chapter 2.

Testing for measurement invariance of LOT-R across cultures

A two-factor model of dispositional optimism was supported in previous SEM analysis in Chapter 2.2.2. That is, the LOT-R measures two negatively correlated and independent constructs. Similarly, a two-factor model of dispositional optimism was supported in the White British sample as well. To test measurement invariance across cultures, multi-group SEM was conducted. In addition to unconstrained base model, Measurement weights, Structural covariances, and Measurement residuals were used as constrained conditions in multi group analysis.

Fit statistics of all models tested are laid out in Table 5.3. Table 5.3 shows that the unconstrained model fits best for the data. Among three constrained models, Measurement weights model and Structural covariances model have similar fits as the unconstrained baseline model. However, the absolute CFI value between Measurement residual model and the unconstrained model is bigger than .05. It means that for the unconstrained model, Measurement weights model and Structural covariances model, ASQ-Positive structure is identical in measuring attributional style across two cultures. However, for Measurement residual model, ASQ-Positive structure doesn't have cross-culture validity.

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	$\triangle$CFI
Unconstrained	.915	.841	.955	.912	.953	
Measurement weights	.893	.839	.941	.910	.940	-.013
Structural covariances	.872	.833	.927	.903	.926	-.027
Measurement residuals	.815	.809	.881	.877	.881	-.072

Table 5.3: Baseline comparisons for tested LOT-R models

Correlations between dispositional optimism, dispositional pessimism and explanatory styles in Mainland Chinese and White British groups

Correlations for all the measures are presented in Table 5.4 for Mainland Chinese (outside of parentheses) and White British (inside parentheses). As the table shows, the pattern and magnitude of associations between measures for Mainland Chinese and White British groups were quite similar. For example, dispositional optimism scores were positively and significantly correlated with ASQ Total scores for both Mainland Chinese (r = 0.13) and for White British (r = 0.17) groups; LOT-R Pessimism scores were negatively and significantly associated with ASQ Positive for both Mainland Chinese and for White British participants at the same level (r = -0.23).

However, of the 21 pairs of correlations between the two cultural groups, we still found some different patterns of correlations. For example, significantly weaker negative associations emerged for White British participants compared with their Mainland Chinese counterparts between dispositional optimism and dispositional pessimism (r = -0.16 vs. r = -0.22, respectively), and between hopelessness and ASQ Total scores (r = -0.63 vs. r = -0.54 respectively). More strikingly, while the association between LOT-R Pessimism and Hopefulness scores was positive for Mainland Chinese (r = 0.08), it was negative for White British (r = -0.05)

participants. Though neither of these correlations reached statistical significance, they partly represented different trends of associations between explanatory style and dispositional pessimism for these two ethnic groups. As a result, the association patterns between these study variables was not identical for Mainland Chinese and White British participants.

Measures	ASQ-Negative	ASQ-Positive	ASQ Total	Hopelessness	Hopefulness	LOT-R Optimism
ASQ Negative	-					
ASQ Positive	0.28** (0.31**)	-				
ASQ Total	-0.63** (-0.55**)	0.57** (0.62**)	-			
Hopelessness	0.95** (0.91**)	0.23** (0.23**)	-0.63** (-0.54**)	-		
Hopefulness	0.34** (0.34**)	0.94** (0.91**)	0.46** (0.52**)	0.32** (0.33**)	-	
LOT-R Optimism	-0.04 (-0.09)	0.12 -0.11	0.13* (0.17*)	-0.04 (-0.11)	0.11 -0.08	-
LOT-R Pessimism	-0.07 (-0.02)	-0.23** (-0.23**)	-0.25** (-0.18**)	0.08 (-0.05)	-0.17** (-0.16*)	-0.22** (-0.16*)

Table 5.4: Correlations for all measures

Note: For Mainland Chinese, N=232. For White British, N=202. Correlations inside of parentheses are for White British. Correlations outside parentheses are for Mainland Chinese. Hopelessness = stability + globality of the ASQ negative events; Hopefulness = stability + globality of the ASQ positive events.

* $p < 0.05$. ** $p < 0.01$.

Cultural differences in dispositional optimism, dispositional pessimism, attributional styles, and self-serving attributional bias between Easterners and Westerners

Table 5.5 presents the results of t-tests comparing differences in dispositional optimism, dispositional pessimism, Composite Negative Attributional Style (ASQ

Negative), Composite Positive Attributional Style (ASQ Positive), Composite Positive minus Composite Negative (ASQ Total), Internal Negative, Stable Negative, Global Negative, Internal Positive, Stable Positive, Global Positive, hopefulness, and hopelessness. There were 13 planned comparisons assessing differences between the two ethnic groups.

Measures	Culture group		t （432）
	Mainland Chinese	White British	
	Means (SD)	Means (SD)	
ASQ Total	2.12 (2.24)	1.26 (2.21)	4.02***
ASQ Negative	12.98 (1.92)	12.21 (1.83)	4.26***
ASQ Internal Negative	4.47 (0.61)	4.34 (0.78)	2.06**
ASQ Stable Negative	4.33 (0.89)	4.03 (0.83)	3.60***
ASQ Global Negative	4.18 (0.96)	3.84 (0.89)	3.72***
Hopelessness	4.25 (0.81)	3.94 (0.76)	4.18***
ASQ Positive	15.1 (1.81)	13.47 (1.94)	9.05***
ASQ Internal Positive	4.87 (0.69)	4.58 (0.88)	3.89***
ASQ Stable Positive	5.29 (0.78)	4.63 (0.82)	8.57***
ASQ Global Positive	4.94 (0.80)	4.26 (0.79)	8.82***
Hopefulness	5.12 (0.69)	4.45 (0.70)	9.97***
LOT-R Optimism	8.37 (1.93)	7.02 (2.38)	6.50***
LOT-R Pessimism	4.05 (2.23)	4.51 (2.15)	- 2.19**

Table 5.5: t-tests of ASQ and LOT-R between two cultural groups.

Note: For Mainland Chinese, N=232. For White British, N=202. Correlations inside of parentheses are for White British. Hopelessness = stability + globality of the ASQ negative events; Hopefulness = stability + globality of the ASQ positive events.

** $p < 0.01$. *** $p < 0.001$.

As shown in Table 5.5, Mainland Chinese participants reported significantly higher dispositional optimism scores than White British (M = 8.37 vs. M = 7.02, respectively), and significantly lower dispositional pessimism scores (M = 4.05 vs. M = 4.51, respectively). The former result was quite unexpected given previous findings obtained between Easterners and Westerners (Chang, 1996). But the difference of pessimism scores was consistent with at least one study (Chang et al., 2003).

Also as Table 5.5 shows, Mainland Chinese participants reported significantly higher ASQ Negative scores than White British participants (M = 12.98 vs. M = 12.21, respectively), indicating a more pessimistic explanatory style for negative events, which was consistent with previous findings (Lee & Seligman, 1997). At the same time, however, Mainland Chinese participants reported significantly higher ASQ Positive scores than White British participants (M = 15.10 vs. M = 13.47, respectively), indicating that Mainland Chinese participants had a more optimistic explanatory style for positive events than White British participants. This result seemed quite unexpected given most previous findings obtained with Asians and North Americans (e.g. Lee & Seligman, 1997), but it was consistent with our previous findings that individuals tend to have a similar cognitive style for both positive and negative events (see 2.1 in Chapter 2 for details). That is, people are inclined to explain life events using consistent cognitive style, such as attributing both positive and negative events to internal factors.

In spite of the difference of explanatory styles described above between these two culture groups, both ethnic groups reported that ASQ Total scores were above zero, indicating higher scores on positive events than on negative events (see Table 5.5). These results were consistent with previous findings reported by Higgins and Bhatt (2001).

To further investigate potential cultural differences in explanatory styles between these groups, t-tests were also conducted based on each of 12 ASQ events. As shown in Table 5.6, Mainland Chinese participants reported higher scores on all 12 ASQ events than White British participants, indicating a more optimistic

attributional style for positive events and a more pessimistic attributional style for negative events, which once again was consistent with the previous proposal of a compatible cognitive style in explaining life events.

Life events		Mainland Chinese		White British		Mean Difference
Positive events		Mean	SD	Mean	SD	
Achievement	Becoming very rich	15.39	3.04	13.94	3.14	1.45 ***
	Getting a position that you want very badly	16.00	2.71	13.72	2.89	2.28 ***
	Getting a raise	15.21	2.49	13.65	2.88	1.56 ***
Affiliation	Being complimented on appearance	13.63	2.84	11.84	2.88	1.79 ***
	Being praised for doing a project	15.34	2.71	13.67	2.91	1.68 ***
	Being treated more lovingly	15.03	2.95	14	3.24	1.03 **
Negative events						
Achievement	Having been failed to get a job for some time	13.35	2.74	12.51	3.1	0.84 **
	An important talk gets negative reactions	13.25	3.02	12.61	2.68	0.64 *
	Cannot meet expectations of others	13.53	2.81	12.42	2.58	1.12 ***
Affiliation	Not helping a friend who has a problem	12.47	3.32	11.63	2.98	0.83 **
	Being treated hostilely by a friend	12.61	2.92	12.03	2.47	0.58 *
	A date goes badly	12.65	2.84	12.04	2.63	0.61 *

Table 5.6: Mean scores of Negative and Positive Affiliation and Achievement event in two groups.

Note: For Mainland Chinese, N=232. For White British, N=202.

* $p < 0.05$.** $p < 0.01$. *** $p < 0.001$.

5.3.3 Are Chinese people more optimistic than British people?

The main purposes of the present study were fourfold. The first aim was to test whether the same psychometric structures of the ASQ (three-correlated-factor structure) and the LOT-R (two-factor structure) discussed in Chapter 2 were replicable in a White British sample. I found that a model of causal attributions in terms of three correlated factors of globality, stability, and internality adequately accounts for responses to positive ASQ events but not for negative events. For dispositional optimism, just as reported previously in most studies and in the SEM analysis in Chapter 2, a two-factor model of dispositional optimism was supported in this White British sample. That is, the LOT-R measured two negatively correlated and independent constructs.

Second, in my attempts to find potential differences in optimism correlations between two ethnic groups, the overall results revealed several critical points. First, the patterns of associations between optimism measures for Mainland Chinese and White British participants were quite similar. Fifteen out of twenty-one correlations were found to be statistically significant for both groups (see Table 6.2). In sum, ASQ Total was negatively correlated with LOT-R Pessimism and positively correlated with LOT-R Optimism. As expected, LOT-R Optimism and LOT-R Pessimism was negatively correlated. However, correlational patterns between measured variables were not identical for two cultural groups (such as a weaker negative association between LOT-optimism and LOT-pessimism for White British participants than for Mainland Chinese participants).

Finally, in attempting to examine potential group differences on dispositional optimism and explanatory style, I found that Mainland Chinese and White British students differ among a number of important outcome variables in optimism. Specifically, Mainland Chinese participants were significantly more optimistic and less pessimistic. Also, Mainland Chinese participants showed a more pessimistic explanatory style for explaining ASQ negative events than did their White British counterparts, which supported the proposal that Easterners tend to use more pessimistic attributions for negative events than Westerners. On the other hand,

although the difference in explaining ASQ positive events indicated a more optimistic attributional style for Mainland Chinese participants, which was seemingly inconsistent with some previous research, it supported the assumption that individuals tend to produce similar patterns of explanations based on cognitive style rather than on event type. Generally, these mixed results suggested that the cultural influence on optimism is not uniform for at least some of the differentiated dimensions.

The present findings demonstrate a trend of reversing traditional understanding in assuming that Easterners are basically more pessimistic than Westerners and Westerners are generally more optimistic than Easterners. These findings appear inconsistent with many previous studies in which greater pessimism was found in Easterners than Westerners. For example, Heine and Lehman (1995) reported that the Japanese sample were more pessimistic than their Canadian counterparts. Similarly, Lee and Seligman (1997) have also pointed to the greater pessimism of Asians compared to European Americans. Therefore, we didn't expect the opposite results. In spite of that, a few considerations may be helpful to account for the lower pessimism found among Mainland Chinese compared to White British. First, it has been argued that broader social factors should be taken into account in understanding optimism and pessimism (Lee & Seligman, 1997). Accordingly, these seemingly unexpected findings might be unique to this young Chinese population. The relatively recent fast economic growth of China may provide an explanation for Chinese people, especially as young generations feel more optimistic and confident than previously, therefore dimming previous cultural influences on optimism.

Secondly, as noted by some researchers, one of the major concerns in examing culture differences in optimism is that it might be a problem for Easterners to get the exact meaning of LOT-R items since this questionnaire has been developed on the basis of Western cultures (Anderson, 1999). Hence, it is possible that there are slight gaps in understanding the meaning of optimism and pessimism. At the very least, this is in line with some results from previous research, as discussed earlier, that found no group differences in optimism across cultures (Chang et al., 2003), or differences that were more nuanced (Chang, 1996).

Finally, in spite of differences in explanatory style between these two cultural groups, the universality of the self-serving bias in causal explanations was supported by the data. Both these ethnic groups reported positive ASQ Total scores, indicating no matter what their cultural background was, individuals tend to explain positive events with more internal, stable and global causes than negative events. This conclusion is consistent with previous cross-cultural evidence (e.g., Higgins & Bhatt, 2001), revealing that there is a universal trend of positive bias in causal attributions. We'd better bear in mind that though some specific patterns of optimism expression are carved with potential cultural difference, it is generally true that being optimistic means better psychological adjustment and is associated with higher levels of happiness.

Chapter 6: Extending thoughts on attributional bias

6.1 What we know and what we don't know about attributional bias

One of the prevailing ideas in psychology is that individuals have an inherent and pervasive tendency to provide explanations for the behaviour and events that they encounter (Peterson, 2000a). As one of the most important psychosocial systems of optimism, attributional style has been in attention of a large body of research, which provides consistent evidence for the linkage between attributional style and many other psychological traits. Such attributions can be functional and adaptive and may serve psychological and social purposes when attributional bias applies (Mezulis et al., 2004; Sanjuan & Magallares, 2014).

Attributional bias is argued to manifest itself in two related but distinct forms. One is self-serving attributional bias (Mezulis et al., 2004). This refers to the tendency of individuals to attribute positive situations to causes that are more internal, stable and global than to causes for negative situations. The second form is self-versus-other attributional bias – the tendency of individuals to attribute their own behaviours to situational or environmental causes, while attributing behaviours of others to dispositional or inherent causes (Ashkanasy, 1997). The literature focusing on these two attributional biases are reviewed below.

Self-serving attributional bias

The original theoretical basis of self-serving attributional bias was that it derives from the interaction between motivation and cognition certainty, suggesting that people tend to "accept responsibility for positive behavioural outcomes and to deny responsibility for negative behavioural outcomes" (Bradley, 1978, p. 59). Prior studies addressing self-serving attributional bias used to focus solely on the dimension of internality by assuming that individuals exhibit more internal attributions for positive events than for negative events (Greenberg et al., 1982; Nurmi, 1992). This concept was broadened by two facts. One is the development of a widely-accepted three-dimensional measure for attributions – the ASQ. The other is

the rising debate of insufficient information for establishing a self-serving pattern in attributions based only on the internality dimension. Consequently, the dimensions of stability and globality have been incorporated, and self-serving attributional bias is conceptualized as the tendency of people to attribute positive situations to more internal, stable and global causes than they do for negative situations (Mezulis et al., 2004).

Past studies have linked self-serving attributional bias to different aspects of well-being. Sanjuan and Magallares (2014) reported positive relations between self-serving attributional bias and two significant markers of well-being, subjective well-being (r = .35) and adaptive coping strategies (r = .31). One of the earlier studies found that depressed individuals were immune from self-serving attributional bias while non-depressed subjects expressed apparent self-bias in causal attributions (Greenberg, Pyszczynski, Burling, & Tibbs, 1992). Self-serving attributional bias has also been implicated in the decision-making process, indicating that the preference of attributing positive performance to internal causes increases confidence of financial managers, and thus improve future performance as a result (Libby & Rennekamp, 2012).

In addition to research interested in the adaptive nature of self-serving attributional bias in promoting well-being, psychologists have also investigated potential influences of age, gender, and culture on this bias (Higgins & Bhatt, 2001; Mezulis et al., 2004; Nurmi, 1992). Findings of these studies were basically consistent with traditional understanding of culture differences between the East and the West.

Though it is still not very clear what the inherent cognitive mechanism of self-serving attributional bias is, evidence from an fMRI study has identified that this type of bias is correlated with activation of the anterior portion of the precuneus (Cabanis et al., 2013). This finding provides evidence for the physiological basis of self-serving attributional bias.

Self-serving attributional bias and optimistic explanatory style

Comparing the definitions of optimistic explanatory style and self-serving attributional bias, it is not difficult to see that both concepts share a favourable attributional style involving both negative and positive situations. Similarity between these two notions is strengthened by their methods of measurement. While a more optimistic attributional style for a domain means higher scores for positive events and a lower score for negative events for that domain (Forgeard & Seligman, 2012), a self-serving attributional bias represents a positive score when attributions for negative outcomes are subtracted from attributions for positive outcomes (Sanjuan & Magallares, 2014).

Self-serving attributional bias in most current studies represents the positive tendency in people's causal attributions, and refers to an optimistic explanatory style, which shows a cognitive bias in preference of an optimistic explanatory style, and reflects a broad self-serving bias in attribution.

Prior research along both lines of optimistic explanatory style and self-serving attributional bias are consistent in their finding of beneficial effects on well-being (Forgeard & Seligman, 2012; Mezulis et al., 2004). For reasons of consistency, here in my study of positive bias in attributions, the tendency of holding an optimistic explanatory style and the tendency of expressing a self-serving attributional bias are equal notions, both referring to the tendency for individuals to explain positive situations through internal, stable and global causes, and negative situations to external, unstable and specific causes.

Reflected in the ASQ, two composite scores, the ASQ Negative and the ASQ Positive, were used to calculate a self-serving attributional bias (Sanjuan & Magallares, 2014) or an optimistic explanatory style (Peterson et al., 1982). If the subtraction score of the ASQ Negative from the ASQ Positive is positive, it represents a self-serving attributional bias or an optimistic explanatory style, reflecting stronger attributions along internal, stable and global causes for positive than for negative events. On the other hand, if the subtraction score of the ASQ

Negative from the ASQ Positive is negative, it then stands for the lack of a self-serving attributional bias or an optimistic explanatory style, reflecting weaker attributions for positive than for negative events.

Self-versus-other bias in attribution of causality

Self-versus-other bias in attributions emerges when individuals attribute their own performance outcomes to situational factors, and attribute others' performance outcomes to dispositional or internal factors (Ashkanasy, 1997). This notion of self-versus-other attributional bias was originally developed based on Jones and Nisbett (1972)'s proposition of actor-observer discrepancies or the actor-observer asymmetry. Jones and Nisbett (1972) proposed in their theoretical analyses that based on differences of information available for decision-making and different perspectives on understanding personality of self and of others, individuals tend to attribute their own behaviours to situational or environmental cause while attribute dispositional or inherent causes for behaviours of others. This self-versus-other bias in attributions of causality has become a common research topic in both psychology and sociology (see Ashkanasy, 1997; Malle, 2006; Medway & Lowe, 1976; Teglasi & Fagin, 1984; Watson, 1982). It has been connected to many potentially influential factors, such as achievement (Medway & Lowe, 1976), social anxiety (Teglasi & Fagin, 1984), psychosis (Wiffen et al., 2013), and perception of others (Ashkanasy, 1997).

The self-other view might also be viewed as an application of the self-serving attributional bias, assuming that people tend to attribute their own success using more internal causes than others' success, and explain their own failure more externally than others' failure (Ashkanasy, 1997). Similar to assessment of self-serving bias, the method of providing explanations for positive and negative outcomes has been used widely in assessing self-versus-other attributional bias (Malle, 2006). The outcome valence (positive-negative) has been taken as one of the moderators of the self-other bias: Malle (2006) reported in his meta-analysis that the self-other biased view is detectable in the case of explaining negative events but not for positive events.

The moderating effect of interpersonal perception of the other has been investigated. For example, Ashkanasy (1997) reported that when another individual was seen to be similar to self, participants gave more internal causes to academic success for others than they did for themselves, and gave more external causes to academic failure for others than they did for themselves.

Though theory of self-versus-other bias in causal attributions has been developed and assessed in some studies, there is no widely accepted definition and measure so far since specific measurement for situational and dispositional causes haven't been developed.

6.2 Attributional evaluation system and possible attributional models

Attributional evaluation system and attributional models

If we are to understand the mechanism of attributional features, and to systematically evaluate the potential relationship between two forms of attributional bias, it is important that we systemically consider all components in the complex admixture of attributions including subjects (self vs other), valences (positive vs negative events), and causes (traits vs states) (see Table 6.1). Here, traits refer to inherent or fixed aspects of causal attributions − internality, stability, and globality. Additionally, states mean external or changeable features of attributions, representing the dimensions of externality, instability, and locality. The possibility of modelling self-serving bias and self-other bias in causal attributions jointly raises the possibility of addressing the question whether attributions regarding the causes of positive and negative events could be differentiated between self and other, i.e., do individuals give more optimistic explanations for themselves than for others when both positive and negative events apply?

Although theoretically positive or negative events could be attributed to either traits or states independently, at least two extreme attributional styles, one of which features attributing both good and bad situations to traits (see Table 6.1; system 1 and

system 5), and the other attributing both positive and negative outcomes to states (see Table 6.1; system 4 and system 8), could be plausibly excluded. Moreover, previous research has tested and confirmed self-serving attributional bias. As a result, my understanding of causal attributions of self has predominately focused on models of attributing positive events to traits of self, and attributing negative events to states of self (see Table 6.1; system 3). For self-other attributional bias, based on previous evidence of self-other attributional bias in at least the internality dimension (Ashkanasy, 1997), we predicted that individuals would provide more biased attributions for their own situations than they do for those of others.

Subject		Valence	
		Attributions for Positive events	Attributions for Negative events
Self	System 1	traits of self	traits of self
	System 2	states of self	traits of self
	System 3	traits of self	states of self
	System 4	states of self	states of self
Other	System 5	traits of other	traits of other
	System 6	states of other	traits of other
	System 7	traits of other	states of other
	System 8	states of other	states of other

Table 6.1: Computational structure of the attributional evaluation systems.

Thus, two attributional models were created to describe potentially true evaluation patterns of causal attributions on the basis of analysis of the attributional evaluation systems. The first model combines attributional evaluation system 3 and system 6 (see Table 6.1); featuring two entirely opposite attributional styles between self and other (Model A, see Figure 6.1). In this reversed model, individuals attribute their own positive events to traits of self, and attribute other's positive events to states of other people; simultaneously, individuals tend to attribute their own negative events to states of self, and attribute other's negative events to traits of other

people. The second model stands for similar attributional patterns between self and other (see Table 6.1, system 3 and system 7), but also features biased self-other attributions. In this model, in addition to self-other discrepancy in causal attributions, individuals are supposed to apply similar trends of optimistically-biased attributions no matter what events occur to themselves or to other people (Model B, see Figure 6.2). That is, individuals tend to attribute positive events to traits and attribute negative events to states both for themselves and for other people, though they tend to give more credit for attributing their own behaviours.
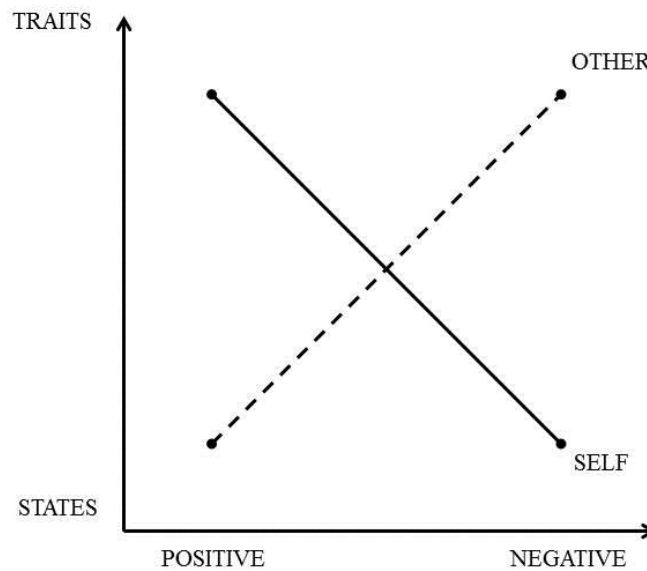

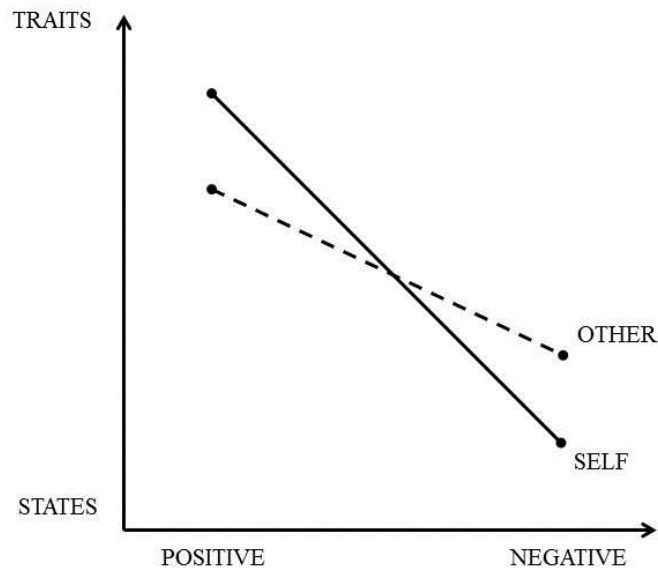Figure 6.1: Model A – reversed attributional model for self and for other.

Figure 6.2: Model B – more optimistic attributional model for self than for other.

Both models may reveal the truth, indicating that individuals tend to attribute their own positive situations to more internal, stable and global causes than they did for others in the same situations, while they tend to attribute more external, unstable and local causes to themselves than they do for other people when negative situations apply. Our aim was to test which model was the best attributional model when individuals were asked to attribute the same events to themselves and other people.

Measuring issues

To investigate the possible attributional style in perception of others, we needed to instruct participants to give attributions for themselves and others based on the same events. So we administered a rewritten version of the ASQ, the ASQ-Other, asking subjects what attributions they would make should these events occur to a fictional character "Wang Chen". Here "Wang Chen" is described as being a healthy undergraduate with average intelligence. Subjects were asked to imagine each of a

series of events occurring to "Wang Chen". The same 12 events were used as the original ASQ.

6.3 Psychometric structure of the ASQ-Other

Before comparing causal attributions for the self and for the other, we first investigated the psychometric structure of the ASQ-Other.

Participants in sample 1 (N = 452; for details, see 1.5.4 of Chapter 1) were instructed to complete the ASQ-Other.

Analysis strategy

Descriptive statistics and correlational analyses were calculated first. Structural equation modelling (SEM) was then used to test potential structural models of the ASQ-Other using Amos 17.0 (Arbuckle, 2008). All analyses took advantage of raw data supporting estimation of models using full information maximum likelihood estimation.

Descriptive statistics

We first examined descriptive and summary statistics, and the standard composite explanatory style scores. Table 6.2 shows the descriptive statistics. Reliabilities were acceptable.

Measures	Means	SD	Cronbach's Alpha
Positive Events	14.93	1.81	0.82
Internal Positive	4.45	0.69	0.54
Stable Positive	5.33	0.82	0.79
Global Positive	5.15	0.84	0.79
Negative Events	13.97	1.74	0.79
Internal Negative	4.04	0.65	0.48
Stable Negative	5.10	0.87	0.81
Global Negative	4.83	0.89	0.79
ASQ-Other Total	0.96	1.27	0.89

Table 6.2: Means, standard deviations and Cronbach's Alpha for all measures of the ASQ-Other. (n = 452)

Modelling

The hypothesised three-factor model for negative events was tested using an MTMM structure. The base model fitted reasonably well (χ^2 (114) = 225.59, p < .001; CFI = 0.94; TLI = 0.92; AIC = 339.59; BIC = 344.61; RMSEA = 0.047), but modifications were suggested. The resultant model was a good fit by all criteria (χ^2 (109) = 168.58, p <.001; CFI = 0.97; TLI = 0.96; AIC = 292.58; BIC = 547.63; RMSEA = 0.033), as shown in Figure 2.4. Thus, as reported in the ASQ model earlier, a model of causal attributions for negative events in terms of three correlated factors of globality, stability, and internality adequately accounted for responses to these events in the ASQ-Other as well. In this correlated factor model, stability and globality correlated .58, internality and globality had an r of .27, and internality and stability factors correlated .23.
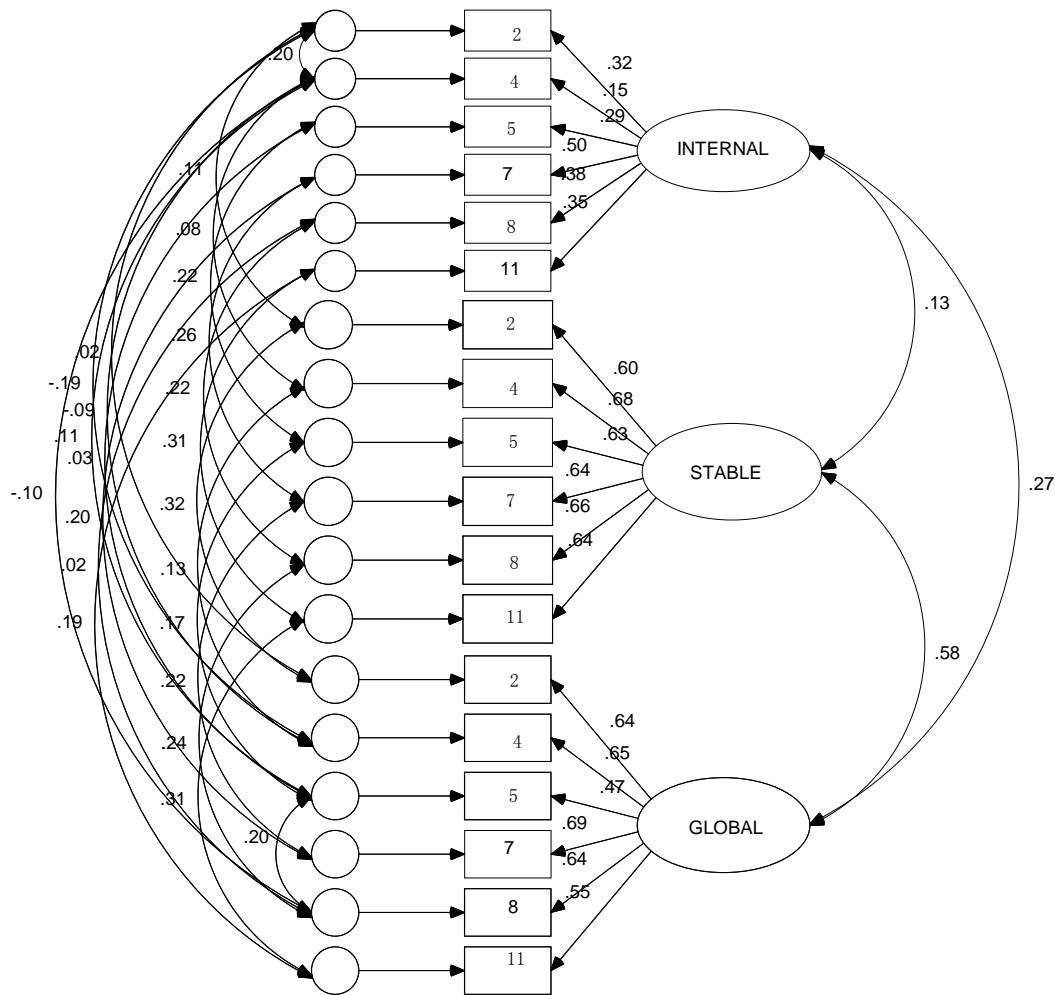
Figure 6.3: Well-fitting 3-factor model of attributional style for others for negative events.

Thus, a model of causal attributions for others for negative events in terms of three correlated factors of globality, stability, and internality adequately accounted for responses to these negative events in the ASQ-Other. This three-correlated-factor model is also applicable in attributions of negative events when considering another person being in the same situation, compared to attributions made when considering the self in that situation.

A model for positive events was constructed in the same fashion as the baseline model for negative events using the same MTMM structure (see Figure 2.5). Fitted measures for the base model indicated adequate fit between model and data (χ^2 (114) = 239.21, p < 0.001; CFI = 0.94; TLI = 0.93; AIC = 353.21; BIC = 587.69; RMSEA = .049), but modifications were suggested. The resultant model was a good fit by all criteria (χ^2 (109) = 185.48, p <.001; CFI = 0.97; TLI = 0.95; AIC = 309.48; BIC = 564.53; RMSEA = 0.039). In the correlated factor model stability and globality correlated .65, internality and globality .26 and internality and stability .43, considerably higher than was the case for negative events.

Analyses of ASQ-Other positive and of ASQ-Other negative events, then, indicated that these scales were well accounted for by three correlated factors of internality, stability, and globality. That is, attributions regarding events that occurred to others were well accounted for by the same three-correlated-factor structure as the attributional style for explaining events occurred to self.
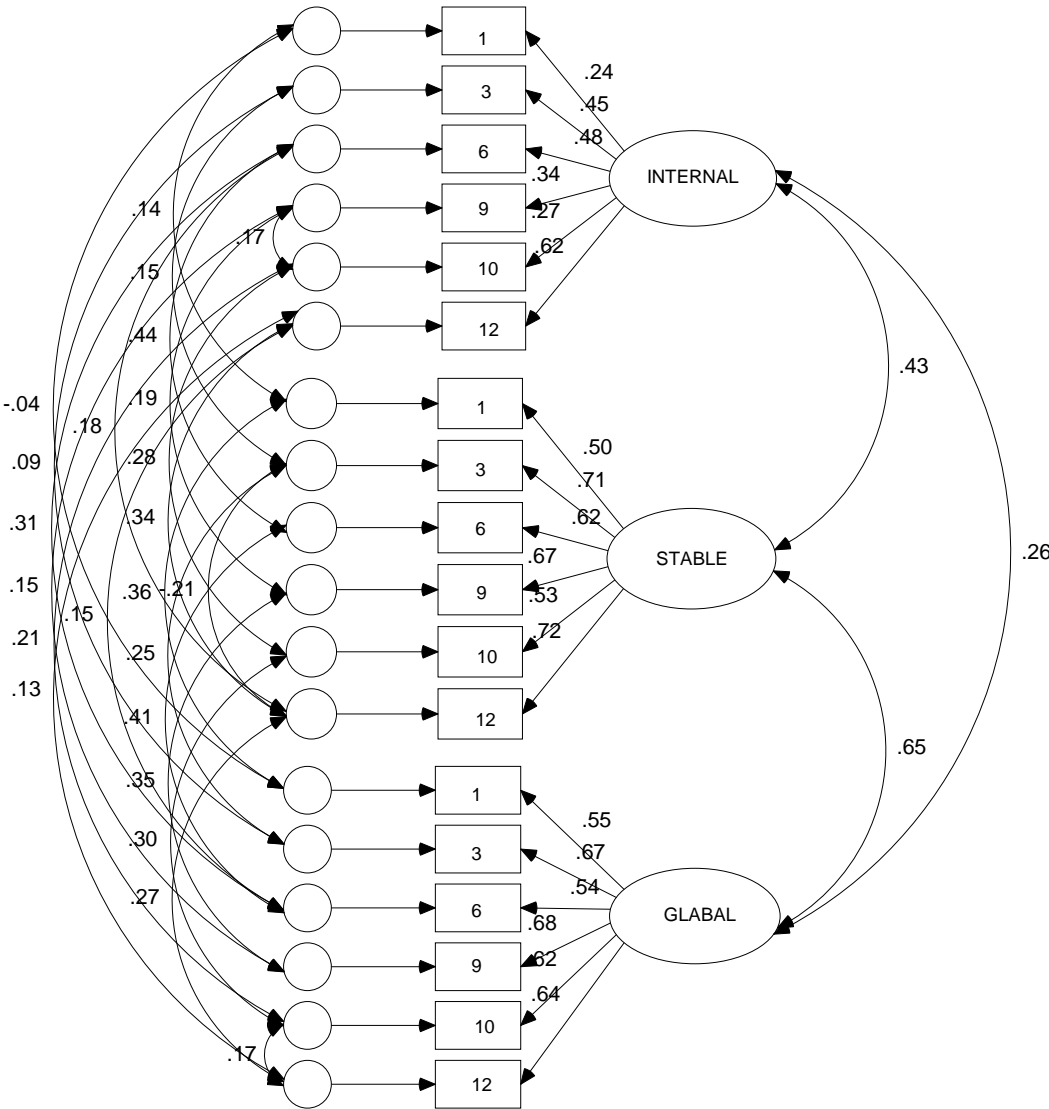
Figure 6.4 Well-fitting 3-factor model of attributional style for others for positive events

6.4 Study 1: testing attributional models using ASQ and ASQ-Other

Participants in sample 1 were instructed to complete the ASQ and the ASQ-Other (N = 452; for details, see 1.5.4 of Chapter 1).

Measures

Attributional style was assessed using the Chinese ASQ (Zhang, 2006). Attributional style for others was measured using the ASQ-Other.

Procedure

Participants were tested in groups of 30 to 50 by their teacher. Each teacher was trained on the administration of the task. After detailed instructions were provided, participants completed the paper-and-pencil questionnaires. For the ASQ, participants were instructed to make causal attributions for each of the 12 events based on imaging that it occurs to them in real life. For the ASQ-Other, students were asked to give explanations for the same life event when it occurred to other people. Testing took around 30 minutes in total.

Scoring

Calculation of self-serving attributional bias followed the assessment method used in Sanjuan and Magallares (2014).

Calculation of self-versus-other bias in attributions adapted a similar assessment method to the ASQ. Specifically, if the subtraction score of the ASQ positive from the ASQ-Other Positive is positive, it represents a self-other attributional bias, reflecting stronger attributions along internal, stable and global causes for self than for other for the same positive events. On the other hand, if the subtraction score of the ASQ-Other Negative from the ASQ negative is positive, it also stands for a self-other attributional bias, revealing a more optimistic explanatory style for self than for other for the same negative events.

Results

Descriptive and summary statistics and the standard composite attributional style scores of the ASQ are shown in Table 6.3. See Table 6.2 for the descriptive statistics of the ASQ-Other for the total sample.

Measures	Means	SD	Cronbach's Alpha
Negative Events	12.9	1.78	0.84
Internal Negative	4.45	0.67	0.49
Stable Negative	4.33	0.85	0.73
Global Negative	4.12	0.9	0.73
Positive Events	15.28	1.91	0.77
Internal Positive	5.03	0.7	0.65
Stable Positive	5.36	0.78	0.75
Global Positive	4.9	0.85	0.71
ASQ Total	2.38	2.17	0.84

Table 6.3: Means, SDs and Cronbach's Alpha for the ASQ scales.

As shown in Table 6.3, all dimensions for ASQ positive events, including ASQ Positive, Internal Positive, Stable Positive, and Global Positive, scored higher than the four corresponding dimensions for negative events. As a result, the subtraction score of the ASQ Negative from the ASQ Positive is positive. Similarly, as shown in Table 6.2, all measuring dimensions for ASQ-Other positive events, including ASQ-Other Positive, Internal Positive, Stable Positive, and Global Positive, scored higher than four corresponding dimensions for negative events. As a result, the subtraction score of the ASQ-Other Negative from the ASQ-Other Positive is positive.

In order to test self-other attributional bias, t-tests were conducted and mean differences revealed that there were significant differences between scores of all dimensions measured in the two questionnaires (see Table 6.4). The results show that

participants had significantly higher composite scores on positive events of ASQ than on positive events of ASQ-Other, and participants scored significantly lower on ASQ negative than they did on ASQ-Other negative.

Dimensions		ASQ		ASQ-Other
		Means (S.D.)		Means (S.D.)
Positive Events	Internal Positive	5.03 (0.70) ***	>	4.45 (0.69)
	Stable Positive	5.36 (0.78) ***	>	5.33 (0.82)
	Global Positive	4.90 (0.85)	<	5.15 (0.84) ***
	Total	15.28 (1.91) ***	>	14.93 (1.81)
Negative events	Internal Negative	4.45 (0.67) ***	>	4.04 (0.65)
	Stable Negative	4.33 (0.85)	<	5.10 (0.87) ***
	Global Negative	4.12 (0.90)	<	4.83 (0.89) ***
	Total	12.90 (1.78)	<	14.00 (1.74) ***

Table 6.4: t-tests between ASQ and ASQ-Other for attributional style.

*** $p < 0.001$.

Mixed results emerged with regard to specific dimensions of the ASQ and ASQ-Other. For positive events, participants scored significantly higher on internality and stability but significantly lower on globality of the ASQ than they did on corresponding dimensions of ASQ-Other; for negative events, participants scored significantly lower on stability and globality but higher on internality of the ASQ than they did on corresponding dimensions of ASQ-Other.

This self-other discrepancy of causal attributions was also generalized along with three attributional dimensions: for Internality, participants showed significantly higher scores for both ASQ positive and negative events than they did for ASQ-Other positive and negative events; for Stability, subjects reported significantly higher ratings for ASQ positive events than they did for ASQ-Other positive events

but significantly lower ratings for ASQ negative events than for ASQ-Other negative events; for Globality, participants scored significantly lower for ASQ positive events than for ASQ-Other positive events but significantly higher for ASQ negative events than for ASQ-Other negative events.

Finally, self-serving attributional bias and self-other attributional bias were combined (see Figure 6.5). Participants scored higher in attributions for positive events than for negative events when these events occurred to themselves, and they scored significantly lower in attributions for negative events than they did for other people for the same events.
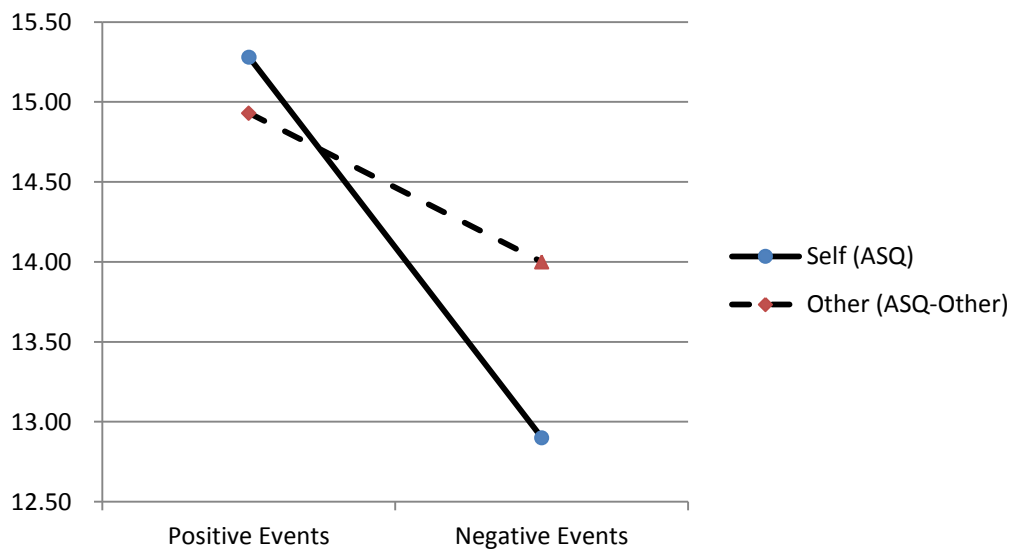
Figure 6.5: Attributions for positive and for negative events, for self and for other.

Discussion

As expected, results indicated that positive self-serving bias was displayed in each of the three attributional dimensions across event valence. When individuals attribute causal explanations for life events, they prefer to give more internal, stable and global causes for positive events than they do for negative events. For negative

situations, individuals have the tendency to attribute those situations to more external, unstable and specific causes than they do for positive events. A self-serving attributional bias is manifested in the ASQ, reflecting optimistically biased attributions with internal, stable and global causes.

Turning to the hypothesis that the subject would show a self-other attributional bias, results indicated that individuals tend to have a more optimistic explanatory style for similar situations with themselves than with other people for both positive and negative events. That is, people tend to explain events in their own best interest. While people explain their own positive outcomes using more favourable internal causes, they attribute others' positive outcomes to external variables. Similarly, people also tend to see their own negative situations to be externally caused than others.

However, caution should be taken when applying this tendency for specific dimensions of attributional style. Though generally ASQ Positive scores were higher than ASQ-Other positive scores, which was also the case for dimensions of internality and stability, participants scored lower on globality of the ASQ than they did on corresponding dimensions of ASQ-Other. Similarly, participants scored significantly lower on composite ASQ Negative than they did on ASQ-Other Negative, which was also applicable for dimensions of stability and globality, but the dimension of internality was not consistent with this trend. These two exemptions have no much influences on the general conclusion that individuals show a self-other bias in causal attributions, because we should bear in mind that it is recommended in ASQ scoring that the composite scores (ASQ Positive and ASQ Negative) values much more than individual dimension scores (Peterson et al., 1982).

Model B (see Figure 6.2), which represents similar attributional trends between the self and the other but also features a more optimistic attributional style for the self than for the other, was supported by the data. Individuals provide more optimistic explanations for positive outcomes than they do for negative events for their own behaviours. At the same time, they hold a more optimistic explanatory style when the same event is explained for themselves than for others, no matter if it

is for positive or negative events. Data analysis supported the validity of Model B, though we found that there are bigger discrepancies between ASQ Negative and ASQ-Other Negative than differences between ASQ Positive and ASQ-Other Positive (see Figure 6.5). Why is there less discrimination among attribution scores for positive events than for negative events? Peterson et al. (1982, p. 295) explained it as "perhaps people make fewer distinctions among good events since they may not spend as much time ruminating over them as they do over bad events, and may attend more to the causes of bad events".

The results of this study suggest that attributions, whether for the self or for the other, are optimistically biased. That is, individuals tend to attribute positive events to inherent or fixed causes (traits) and attribute negative events to external or changeable causes (states) both for themselves and for other people. One unanswered question from this study is whether this optimistic bias holds equally for positive and negative events, i.e., do we have a general tendency to be more optimistically biased for attributing positive events than we are for attributing negative events? If this is the case, then the next question is whether our attributions for self or for other people are closer to this generally optimistically biased tendency. To address these questions, we conducted a second study.

6.5 Study 2: testing event-focused attibutional style using ASQ-General

We have re-written the ASQ into a novel adapted version, the ASQ-General, asking subjects what attributions they would make should these events occur to 'someone', which could be themselves or any other person. Based on findings of a general tendency of attributional biases in both the ASQ and the ASQ-Other in the first study, it was predicted that this optimistically biased attributional style would also be applicable in the ASQ-General. That is, when there are no specific subjects designated to possible life events, individuals will tend to attribute positive situations to causes that are more internal, stable and global than to causes for negative situations.

Subjects

Participants in sample 4 were instructed to complete the ASQ-General (N = 117; for details see 1.5.4 of Chapter 1).

Measure

The original ASQ is based on explanations for events (positive and negative) imagined as occurring to the subject themselves. To investigate the possible attributional style in general, the standard ASQ was modified as the ASQ-General, asking subjects what attributions they would make should these events occur to "someone" who represents not just the subject but all people. The same 12 events were used as the standard ASQ: six positive (e.g. *someone does a project that is highly praised*) and six negative (e.g. *someone has been looking for a job unsuccessfully for some time*) events. Rating and scoring of the ASQ-General was the same as the standard ASQ.

Procedure

Participants were tested in groups of around 30 by their teacher. Each teacher was trained on the administration of the task. After detailed instructions were provided, participants completed the paper-and-pencil questionnaires. Students were instructed to "Write down one thing you think most commonly causes this situation (on average for all people, not just you)". Testing took around 20 minutes in total.

Analysis and results

We first examined descriptive and summary statistics, and the standard composite attributional style scores. Table 6.5 shows the descriptive statistics of the ASQ-General for the total sample. Reliabilities were acceptable.

In order to test attributional bias in general situations, t-tests were conducted and mean differences revealed that there were significant differences among scores of all the ASQ-General dimensions (see Table 6.6). The results showed that participants had significantly higher composite scores on positive events than composite scores on negative events, and had significantly higher scores on all three specific dimensions of the ASQ-General.

	Means	SD	Cronbach's Alpha
ASQ-General Positive	14.96	1.91	0.82
ASQ-General Internal Positive	4.69	0.73	0.59
ASQ-General Stable Positive	5.17	0.85	0.76
ASQ-General Global Positive	5.1	0.84	0.71
ASQ-General Negative	13.92	2.08	0.83
ASQ-General Internal Negative	4.49	0.72	0.56
ASQ-General Stable Negative	4.75	0.86	0.73
ASQ-General Global Negative	4.68	0.98	0.78
ASQ-General Total	1.04	1.78	0.89

Table 6.5: Means, SDs and Cronbach's Alpha for the ASQ-General scales.

Dimensions	Means (SD)		
	Positive Events		Negative Events
Internality	4.69 (0.73) ***	>	4.49 (0.72)
Stability	5.17(0.85) ***	>	4.75 (0.86)
Globality	5.10 (0.84) ***	>	4.68 (0.98)
Total	14.96 (1.91) ***	>	13.92 (2.08)

Table 6.6: t-tests between ASQ-General dimensions.

*** $p < 0.001$.

Putting the results of the two studies together (see Figure 6.6) showed that the ASQ-Other and the ASQ-General almost overlap, while the ASQ was clearly differentiated from the other two.
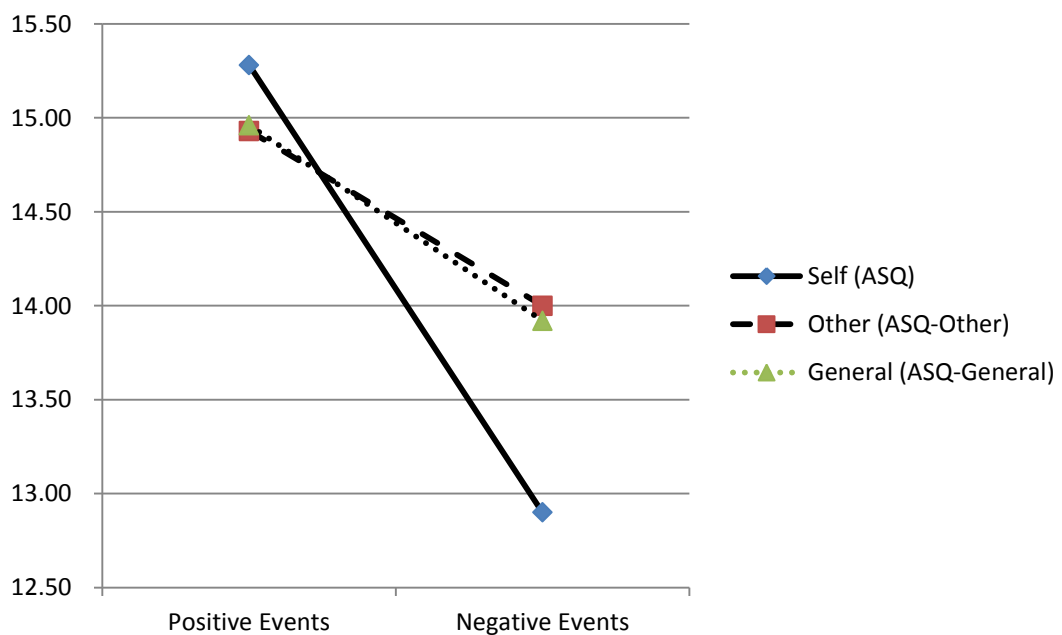

Figure 6.6: Attributions for positive and for negative events, for self, other and general

Discussion

Results from the second study showed higher composite scores on the ASQ-General positive events than composite scores on ASQ-General negative events, as well as higher scores on all three specific dimensions of the ASQ-General positive events than for negative events. These results suggest that optimistically biased attributions are also applicable in general situations. Individuals generated attributional style on the basis of judgment for features of those events (positive or negative). No matter whom was the subject experiencing these events, themselves or other people, individuals showed a general attributional bias, indicating more internal, stable, and global attributions for positive events than they did for negative events.

Comparing scores of the ASQ-General with the two measures in the first study, we found that individuals show more positive bias towards themselves than for other people or a general population in causal attributions, especially for negative events.

6.6 Attributional biases in reality

There has been widespread recognition that attributional bias plays an important role in the causal attributions that people make across event valence (positive vs negative outcomes) and across perception (self vs other), and categorise them as self-serving attributional bias and self-other attributional bias, respectively. Though these two forms of attributional biases are theoretically connected (Ashkanasy, 1997), research testing attributions for the causes of events occurring to others has been separated from studies of attributional bias regarding the self, with no research including both into a constructed evaluation system.

Prior research examining attributional bias has taken into account subjects (self vs other), valences (positive vs negative events), or causes (traits vs states). Not all of these components have been systemically reviewed in one single study. We combined these critical components into the complex admixture of causal attributions, generating eight potential attributional systems and two potential

attributional models. Using the most widely used assessment for causal attributions, the ASQ, and a rewritten novel version of this instrument, the ASQ-Other, I first tested which of the two models was the best attributional model when individuals were asked to attribute the same events when they happened to themselves and to other people.

Findings of the first study demonstrated that causal attributions about life events possess self-protection features, as suggested by Heider (1958). Individuals tend to maximise positive and minimise negative future outcomes in making attributions, thus showing a self-protective bias in causal explanations for personal outcomes or situations. As expected, I found that positive self-serving bias manifested in each of the three attributional dimensions across event valence. When individuals attribute causal explanations for life events, they prefer giving more internal, stable and global causes for positive outcomes than for negative outcomes. For unfavourable situations, individuals have the tendency of attributing those situations to external, unstable and specific causes. Confirmation of self-serving attributional bias in this Eastern sample provided further evidence to the universality of this positive bias (Mezulis et al., 2004). It appears that there may be a universal tendency for individuals to protect themselves against negative feelings by using an optimistic attributional style.

Regarding self-versus-other bias in attributions of causality, results supported the idea that individuals do have biased attributions for what happens to themselves and to others. This optimistically biased tendency applies to both positive and negative events. While individuals attribute their own positive outcomes to dispositional factors and attribute their own negative outcomes to situational factors, they tend to attribute other peoples' positive outcomes to situational factors and other people's negative outcomes to dispositional factors. As a result, in the two proposed potential attributional models, Model B (see Figure 6.2) was supported with more biased attributions for negative events than for positive events between the self and the other.

The first study suggests that attributions are optimistically biased for both the self and the other. Individuals apply similar trends of optimistically biased attributions no matter what events occur to themselves or to other people. This raised

the question whether this optimistic bias holds equally for positive and negative events, i.e., are individuals more optimistically biased for attributing positive events than they are for attributing negative events with a general tendency. This question was tested in Study two using another rewritten version of the ASQ, the ASQ-General. Results revealed that the optimistically-biased tendency in causal attributions were generally applicable when there is no specific subject was designated. People tend to attribute internal, stable, and global attributions for positive events while they generate external, unstable, and specific explanations for negative events no matter whether the subject is themselves or other people. In summary, individuals generally show an optimistically biased attributional style towards positive outcomes than they do for negative outcomes.

Previous studies examined either just one type of attributional bias or investigated only the dimension of internality concerning self-other bias. My study made it possible to combine self-serving bias and self-versus other bias in attributions in a widely-accepted three-dimensional model of causal attributions. It revealed that explanations for causes of positive events and negative events could be differentiated between self and other. Individuals gave more optimistic explanations for themselves than they did for others. This self-versus-other bias existed in people's attributions for both positive events and negative events.

Chapter 7: Depression, positive psychology and optimism interventions

According to a report from the World Health Organization (2012), over 250 million people are affected worldwide by depression, which is believed to lead to the suicide of approximately 1 million people every year. Unfortunately, less than half of the population affected by depression receive any effective physical or psychological treatments. This figure is even less than 10 percent in some underdeveloped countries. Insufficient information available for diagnosis can cause delays and improper treatment for depression, and there is a lack of effective intervention resources that are low cost and easily accessible (Sin et al., 2011).

Over the past 15 years, research in the field of positive psychology has shown that psychological well-being can be cultivated and promoted through brief interventions aimed at developing positive feelings, behaviours, or cognitions (Layous et al., 2011; Seligman et al., 2006; Sin & Lyubomirsky, 2009). Diverse positive psychology interventions have emerged and have provided empirical evidence for the happiness-enhancing effect of individual strengths and resources. Unsurprisingly, positive interventions can be particularly useful for the amelioration of depressive symptoms, since depressed individuals will likely benefit from increases in positive emotions (Sin et al., 2011).

Since optimism has been identified as having the strongest link to well-being in the identified 24 character strengths in positive psychology (Park et al., 2004), and has been shown to be beneficial in decreasing depressive symptoms (Sin et al., 2011), I also wanted to look at the application of optimism interventions to depression treatment, testing whether optimism manipulations could alleviate depressive symptoms in the group of first-year college students. To understand mechanisms

underlying optimism interventions, I first reviewed several traditional treatments for depression, and then turned to theoretical background and practical manipulations of optimism interventions, which have been included into the increasing development of positive psychology therapy.

7.1 Traditional treatments for depression

Currently, there are two main approaches to treating depression: physical and psychological treatment. The main physical treatment is anti-depressant medication, which addresses the neuro-transient of the chemical process underlying depression in the brain. The molecular and biochemical origins of depression are still not fully understood. It is not surprising, then, that current medication is suboptimal. For example, for mild to moderate depression, there is no significant difference between the effect of a treatment pill and a placebo, with more than 80% of the effect of the anti-depressant drug accounted for by placebo effects (Kirsch, Moore, Scoboria, & Nicholls, 2002). Another problem with anti-depressant treatment is the high risk of relapse following the cessation of treatment (Layous et al., 2011)

There are a number of psychological treatments for depression that show evidence of working well, such as Cognitive Behavioural Therapy and problem-solving therapy. Cognitive Behavioural Therapy enables patients to correct false self-beliefs that can lead to certain negative emotions and behaviours (Rupke, Blecke, & Renfrow, 2006). American psychologist Aaron Beck is regarded as a pioneer in cognitive therapy. Through his working with depressed patients, he found that negative moods and behaviours were usually caused by distorted thoughts and beliefs (Beck, 1976).

Three cognitive aspects – automatic thoughts, emotional responses, and behavioural responses, have been identified as the cognitive view of human functioning. It has long been debated that the spontaneous and immediate judgement of a situation may be crucial in eliciting and shaping a person's emotional and behavioural responses to that situation. On the basis of this, Beck (1976) developed the Cognitive Therapy (CT) for psychopathological treatment of depression. The fundamental assumption behind CT is that a thought precedes a mood, and that both thought and mood are interrelated with environment, physical reaction, and subsequent behaviour. In this sense, the way people feel is related to the way in which they explain and think about an event. The event itself does not directly determine how they feel; their emotional response is mediated by their perception of the event (J. S. Beck & Beck, 2011).

CT and interpersonal treatment have been shown to be effective for mild and moderate depression. A meta-analysis of 15 studies on psychological treatments on adult depression showed a standardised mean effect size of psychological treatment versus control groups of 0.31 (Cuijpers, Van Straten, Van Schaik, & Andersson, 2009). Another more recent meta-analysis covering 1,036 studies on the effects of psychotherapy for adult depression had a mean effect size of 0.42 after adjustment for publication bias (Cuijpers, Smit, Bohlmeijer, Hollon, & Andersson, 2010).

Taken together, current medication treatments are criticised for their high financial costs, potential side-effects, and limited effect (Layous et al., 2011). By contrast, traditional psychological treatments have been shown to be effective in reducing acute distress in depressed individuals and more preferable to drug therapy among all but the most depressed people. However, these traditional psychological treatments focus on alleviating depressive symptoms, and assume that mental health equate to the absence of mental illness. This assumption makes traditional

psychological treatments vulnerable to newly-rising positive psychotherapy (Sin et al., 2011). New treatments that can balance the advantages and deficits of medication therapy and traditional psychology treatments are needed.

7.2 Rising of positive psychology interventions

According to the learned helplessness theory (Abramson et al., 1978) and its later version, the hopelessness theory of depression (Abramson et al., 1989), depression is conceptualized as an overabundance of negative moods and negative cognition. It is the tendency to attribute internal, stable, and global causes to negative events that results in hopelessness and thus depression. Depression treatments developed on the basis of these ideas then predominantly focused on fixing and alleviating negative feelings behaviours. Positive psychology grew from the recognition that a positive state or trait is not necessarily the obverse of negative experiences and traits; and, positive emotions and behaviours stand for a completely separate psychological process that functions via an isolated neural mechanism (Duckworth et al., 2005).

If traditional depression treatment aims to cure mental illness by fixing negative feelings and negative thoughts, positive psychotherapy strives to ameliorate depressive symptoms by promoting positive affect and positive thoughts, such as savouring (Bryant & Veroff, 2007), practicing forgiveness (Reed & Enright, 2006), using signature strengths (Linley et al., 2010), and expressing optimism and gratitude (Lyubomirsky et al., 2011). This has been shown to boost positive emotions, positive thoughts, positive behaviours, and alleviating depressive symptoms (Layous et al., 2011; Seligman et al., 2006; Sin & Lyubomirsky, 2009).

Positive psychology includes many traits that are associated with indices of well-being. Twenty-four character strengths have been identified, in which optimism

was found to have the strongest link to life satisfaction – one of three significant marks of well-being (Park et al., 2004). Additionally, numerous cross-sectional and longitudinal studies have revealed that optimism is strongly correlated with a host of psychological variables, such as self-esteem, academic achievement, coping strategy, and positive emotions, and perhaps most importantly, predicts psychological and physical well-being both in the presence and absence of stressors (Carver & Scheier, 2014; Carver et al., 2010; Forgeard & Seligman, 2012; Scheier & Carver, 1992). Taken together, research suggests that optimism is associated with various indices of positive functioning in a wide variety of stressful situations. To fully understand the mechanisms underlying the beneficial effects of cultivating optimism in relationship to depressive symptoms, I next turn to the theoretical background of the optimism-depression relationship.

7.3 Optimism and depression

As stated in previous chapters, optimism has been conceptualized and measured in different ways, among which dispositional optimism and optimistic explanatory style are regarded as the two main contrasting approaches (Carver et al., 2010; Forgeard & Seligman, 2012). No matter how optimism is conceptualized and measured, research is uniform in indicating that optimism is bonded with beneficial characteristics: happiness, achievement, health, and persistence. Considering all the direct and indirect associations between optimism and personal and social benefits, it is not surprising that optimism is reported to be relevant to clinical psychology. Results of optimism interventions for depression have been both involved in the whole frame of positive psychotherapy and taken as single treatment. The strength of optimism in ameliorating depressive symptoms has received substantial empirical support (Csillik, Aguerre, & Bay, 2012; Seligman et al., 2005; Sin et al., 2011).

7.3.1 Attributional style in depression

To understand presumptions behind the relationship between optimism and depression and to find out the mechanisms under which optimism interventions works for depression treatment, it's necessary to first illustrate the theoretical assumptions of related optimism theories.

Attributional models of depression

The causes and consequences of depression have long occupied the attention of psychologists and clinical practitioners. Before the application of Seligman's (1976) learned helplessness model of depression, most theories and research had been developed by clinical psychologists. Based on findings in psychological experiments on animals, Maier and Seligman (1976) developed principles of "learned helplessness", assuming that helplessness occurs when there is an expectation of uncontrollable events. In humans, only certain individuals respond pessimistically after being exposed to uncontrollable aversive events.

To account for these findings, the learned helplessness model was refined into the reformulated learned helplessness theory (Abramson et al., 1978), in which the dimensions of attributional style – internal-external (Heider, 1958), stable-unstable (Weiner, 1974), and global-specific (Abramson et al., 1978) (especially for negative events) – were emphasised. An internal attribution explains the cause of a negative event to factors inside the self, whereas an external attribution explains the cause in self-referent terms. The more internal one's attribution for lack of control is, the more self-esteem will be lowered. A stable attribution assigns the causes of a negative event with constant and perpetual factors across time, whereas an unstable attribution explains the event in terms of momentary and time-limited factors.

Similarly, attributions may also vary in their degree of globality. A global attribution assigns pervasive factors to causes of a negative event across different situations, whereas a specific attribution explains a negative event in terms of exceptional and situational factors. Accordingly, individuals who explain causes of negative events with internal, stable, and global factors will be more vulnerable to depression than those who provide attributions in terms of external, unstable, and specific factors. Thus, the traditional study in depression was extended to the domains of social and personality psychology, taking individual differences in attributional style into account.

Within attributional models of depression, the attributions are seen to cause distinct behavioural responses. For instance, low self-esteem is agreed to be linked with internal attributions regarding negative events, while chronic depression may result from stable attributions for negative events (Haugen & Lund, 1998; Peterson et al., 1982). In this learned helplessness model, depression emerges as a consequence of experience with uncontrollable negative events (Abramson et al., 1978).

To expand earlier concepts, the hopelessness theory of depression was developed from the reformulated learned helplessness theory. In addition to the original presumption of helplessness, the expectation for the occurrence of negative outcomes was added to construct the core concept of hopelessness. According to the hopelessness theory of depression, hopelessness is conceptualized as the expectancy that future outcomes will be stable, global, and will negatively influence many aspects of an individual's life regardless of his or her efforts (Abramson et al., 1989). As a result, hopelessness about the future constitutes a sufficient and proximal cause of a subtype of depression, called hopelessness depression (Abramson et al., 1989). This attributional model of depression has accumulated substantial evidence from empirical studies (e.g. Vazquez et al., 2001).

Though originally this depressive attributional style was applied mainly to negative events, Seligman, Abramson, Semmel, and Von Baeyer (1979) suggested that it might also play a part in explaining positive events. The authors found that depressed students attributed good outcomes to more external and unstable factors than did non-depressed students, and attributed more internal, stable, and global causes to negative events than non-depressed students.

Studies on the attribution-depression relationship

Studies examining associations between attributional style and depression have been conducted both from a cross-sectional perspective and a prospective approach, involving adults, children, and adolescents. Cross-sectional studies propose that a pessimistic attributional style is correlated with hopelessness and thus depression. On the other hand, an optimistic explanatory style has been linked to protection from depression. A pessimistic explanatory style predicts increases in depression over time in different populations, such as lower-class women, children, and depressed patients (Peterson & Seligman, 1984). Peterson and Vaidya (2001) reported that hopelessness positively correlated with depression in their study with a group of college students ($r = .20$).

In an earlier meta-analytic review, Sweeney, Anderson, and Bailey (1986) reviewed 100 studies involving nearly 15,000 subjects. They found that attributions to external, unstable, and specific causes for positive events and attributions to internal, stable, and global factors for negative events were correlated with depression (average $r = -.15$ and average $r = .27$ respectively). Haugen and Lund (1998) also reported a negative correlation between ASQ Positive and depression ($r = -.27$), and a positive correlation between ASQ Negative and depression ($r = .20$).

Subsequent studies have incorporated structural equation modelling (SEM), allowing a better understanding of the relationship between attributional style and depression by contrasting competing theoretical models. For instance, Ledrich and Gana (2013) reported a SEM analysis of the attribution-depression relationship in 334 participants. EASQ was used to measure attributional style. The correlation between pessimistic attributions for negative events and depression was .36. In addition to the composite score, each of the three attributional dimensions, internality (r = .15), stability (r = .19), and globality (r = .28) also positively correlated with depressive mood.

Prospective studies collect longitudinal data to analyse the attribution-depression relationship, which has been shown to be persistent over time (for a review, see Wise & Rosqvist, 2006). For instance, Iacoviello, Alloy, Abramson, Whitehouse, and Hogan (2006) examined whether cognitive style predicts the future development of depression. One hundred and fifty-nine college students were divided into a high-risk group and a low-risk group based on their scores of attributional style and dysfunctional attitudes at baseline, and then were assessed for their depressive symptoms every six weeks across a period of 2.5 years. This study showed that cognitive high-risk participants experienced more episodes of depression, more severe episodes, and more chronic courses than low-risk participants. The results suggested that negative attributional style may confer risk for the development of depressive symptoms.

Further, attributing life events along the dimension of globality may play a significant part in predicting depression. For example, in a recent 10-month follow-up study (n = 3500), Pearson et al. (2015) found that attributions to global factors for negative events clearly correlated with future depressed mood in young adults. This

effect was independent of the other two dimensions of causal attribution, internality and stability.

If it is true that a pessimistic attributional style interacts with adversity to predict depression in the long run, does it mean that an optimistic explanatory style interacting with positive events could reduce depressive symptoms? Haeffel and Vargas (2011) tried to answer this question by asking 128 college students to complete measures for depression, attibutional style (CSQ), and life events at baseline and then reassessing them with the same questionnaires four weeks later. Results indicated that participants with a pessimistic attributional style who experienced a high ratio of stressful life events reported the greatest level of depressive symptoms. However, they were buffered from depression and displayed similar levels of depression with participants without a pessimistic explanatory style if they also possessed an optimistic attributional style or had experienced many positive events. These findings suggest that having an optimistic attributional style and experiencing positive events may play a protective role against depressive symptoms.

Potential mediating roles of attributional style between depression and some physical variables have been investigated. For instance, 23 depressed patients and 31 never-depressed controls completed the ASQ and a measure of sleep over a period of seven days (P. L. Haynes, Ancoli-Israel, Walter, & McQuaid, 2012). Among the three individual dimensions of attributional style, globality was found to mediate the relationship between sleep disturbance (poor sleep continuity, delayed morning wake time, and increased total time spent in bed) and depression.

The prospective relationship between attributional style and depression has been reported in clinical settings as well. For instance, Sanjuán, Arranz, and Castro (2012) conducted a two-wave longitudinal study in a group of 99 patients with coronary heart disease. An adaption version of the original ASQ which contains only

six negative events was used to assess attributional style. The globality dimension was associated with both Time 1 and Time 2 depressive symptoms (r = .26 and r = .34 respectively), while the stability dimension was only correlated with Time 2 depression (r = .20). For the dimension of internality, no significant correlations with either Time 1 or Time 2 depressive symptoms were found. Additionally, global attributions predicted persistence of depressive symptoms eight weeks later. These results suggested that attributing negative events to pervasive and global causes lead to increased depressive symptoms.

Using both a cross-sectional approach and a prospective design, Fresco, Alloy, and Reilly-Harrington (2006) examined the relationship between causal attributions and depression across a period of four weeks. Two hundred and thirty-nine undergraduates were divided into either a currently depressed/anxious group or a normal control group, and completed self-reported measures of attributional style, depression, life events, and mood disorders, as well as structured diagnostic interviews in two time slots. Results showed that participants in the depressed group scored higher in attributions for positive events than their counterparts in control group. Attributional style moderated the relationship between the occurrence of life events and changes in depressive symptoms from Time 1 to Time 2.

Studies conducted in children and adolescents support the attribution-depression relationship as well. For instance, 295 secondary school students were instructed to complete measures of attributional style, self-esteem, and depression (Kurtovic, 2012). This study indicated that attributing academic failure to stable and global causes correlated with higher depression (r = .17 and r = .20 respectively), while attributing academic success along stable dimension correlated with lower levels of depression (r = .15). Additionally, hopelessness correlated significantly with depression (r = .58). In a meta-analytic review of attribution-depression studies

conducted in children and adolescents (27 studies, 4,000 subjects), Joiner and Wagner (1995) reported that attributional style scores clearly correlated with both self-reported depression and with clinical depression (for overall composite scores, average r = -.50; for positive events, average r = -.38; for negative events, average r = .35).

7.3.2 Dispositional optimism and depression

Dispositional optimism has also been shown to be associated with depression. According to the theory of dispositional optimism, being optimistic means having favourable generalized expectations and continuing goal-pursuit for the future (Scheier & Carver, 1993). Optimists expect good outcomes, which result in more positive feelings and affections, while pessimists expect bad outcomes, and this yields a relatively negative mix of feelings, such as anxiety, sadness, disappointment, and anger (Scheier & Carver, 1992). Depression and distress sometimes occur due to these negative feelings.

In a meta-analytic review of 56 studies (Andersson, 1996), the average weighted correlation between dispositional optimism and depressive symptoms was -.45. Peterson and Vaidya (2001) also reported that expectations (measured by the LOT) were significantly correlated with depressive symptoms (r = -.55). Isaacowitz (2005) addressed this issue in a wider range with three age groups (100 young, 86 middle-aged, and 94 older adults). The study reported that LOT optimism negatively correlated with depressive symptoms across all three age groups (r = -.34, r = -.32, and r = -.31 respectively), and LOT pessimism positively correlated with depression in the middle-aged group (r = .29) and older adults group (r = .41). No significant association between LOT pessimism and depressive symptoms of young adults was found.

Stressful life changes may play a role in the relationship between dispositional optimism and depression. One study examined the relationship between dispositional optimism and depression in a small group of postnatal women (n = 75). The results showed that LOT optimism was inversely correlated with depression both in initial assessment (r = -.41) and three weeks later (r = -.43) (Carver & Gaines, 1987).

Armbruster, Pieper, Klotsche, and Hoyer (2015) examined whether dispositional optimism reliably predicts depression across a period of five years. Participants (n = 4,046) were divided into five age groups (18-44, 45-54, 55-64, 65-74, and 75-84). They were instructed to complete the LOT-R and a measure of depression at three time points (baseline, 1-year follow-up, and 4-5 year follow-up). The authors found that LOT optimism baseline scores could predict depression at both follow-ups in the first four younger-age groups. LOT-R pessimism predicted depression at the two follow-ups in the first three younger-age groups.

The genetic and environmental origins of the links between dispositional optimism and depression have been investigated in some studies. For instance, Plomin et al. (1992) administered measures of dispositional optimism, depression, and life satisfaction in 500 twins (72 pairs of identical twins reared apart, 126 pairs of identical twins reared together, 178 pairs of fraternal twins reared apart, and 146 pairs of fraternal twins reared together). It showed that both LOT optimism and LOT pessimism were significantly associated with depression (r = -.31 and r = .44 respectively).

7.4 How to manipulate optimism?

Optimism-enhanced manipulations have been developed on the basis of the main optimism approaches and implemented in numerous studies both in normal populations and in clinical settings. Given the strong association between optimism and depression, optimism interventions have been developed to promote optimistic explanatory style and favourable expectations.

CBT-based optimism intervention: attributional retraining (AR)

In addition to Peterson et al. (1982)'s theory of attributional style, several other attribution theories have been proposed. For example, the causal attribution theory of Weiner (1985) specifically analyses the attributional style of students who are vulnerable when searching for explanations of academic success and failure within themselves, especially for negative events. According to Weiner's proposal, all attributions can be made along three dimensions: internality, stability, and controllability. This 2 × 2 × 2 taxonomy offers eight possible causal attributions in which any given explanation can be classified (Weiner, 1985).

Based on Weiner's theory, attributional retraining (AR) has been developed to help people to alter their maladaptive attributional style, reframe the way they think about positive and negative life events, and develop more adaptive and self-helping explanations for success and failure (Haynes, Perry, Stupnisky, & Daniels, 2009). Most of the recent studies on AR have been conducted with college students, in whom AR was found to have beneficial effects on cognition and academic performance (for a review, see Haynes et al., 2009).

Self-administered optimism training (SOT)

In addition to mainstream AR manipulations, Fresco et al. (2009) developed self-administered optimism training (SOT) based on traditional Cognitive Behavioural Therapy (Beck, 1976), the reformulated learned helplessness theory (Abramson et al., 1978), and the AR protocols, aiming to reduce current levels of pessimistic explanatory style which are believed to predict depressive symptoms (Metalsky et al., 1993). Theoretically, SOT represents an AR intervention that emphasizes a person's attention to daily life events and their explanations for these events by means of daily writing (Fresco et al., 2009).

During a typical SOT session designed by Fresco et al. (2009), participants are instructed to spend around 10 minutes each day for a week to identify 5 positive and 5 negative events in their life, finding initial causes along the dimensions of internality, stability, and globality for each event, then revise and reassess alternatives and more adaptive attributions for these events along the same three dimensions after reflection. The process is completed within 28 days. The SOT was found to be effective in building an optimistic explanatory style and reducing depressive symptoms in at least some college students who scored high in attributions for negative events (Fresco et al., 2009).

Other CBT-based optimism intervention techniques

In addition to AR techniques, a variety of other CBT-based optimism interventions have been developed. For example, Burns (1980) proposed the anti-pessimism sheet technique, which targets the specific expectations an individual holds for a relevant situation.

Riskind and colleagues (1996) contributed several optimism interventions designed specifically to decrease pessimism or increase optimism. One such

intervention helps the client to identify negative thinking and adopt a more adaptive positive view. Positive visualization, which instructs the client to visually rehearse attaining a positive outcome for a chosen negative event, was proposed as an alternative technique for increasing optimism. The silver lining technique which was described in this paper can be implemented more easily. Clients are instructed to identify one genuinely positive element in one problematic situation. The technique of pump priming was developed based on the principle of cognitive priming. This technique aims to increase an individual's ability to think and define situations optimistically by priming the instantaneous approachability to working memory of cognitive divisions that are demanded for optimism.

Positive writing and Best Possible Self （BPS）

King (2001) conducted a pioneering study in which participants were asked to "imagine that everything has gone as well as it possibly could" (the Best Possible Self condition, the BPS) and write about it for 20 minutes each day for four consecutive days. This manipulation has been shown to be beneficial for promoting subject well-being and has been replicated in two follow-up studies (Burton & King, 2004, 2008). Within a group of third-year medical school students, the beneficial effects of writing about emotions and goals were reported as well (Austenfeld et al., 2006).

Based on King's study, the BPS imaginary exercise has been further used in later studies of optimism intervention by many psychologists, with some alterations. In the BPS intervention, participants normally are instructed to imagine and write down some features (such as in the professional domain) that their future best possible self should have. The interventions vary in time (from four days to four weeks), style (writing or talking), administration (self-conducted or supervised by administrators), and form (face-to-face or online).

Theoretically, the BPS manipulation aims to (temporarily) increase positive expectations for the future by means of an experimental manipulation, which is related to the beneficial effects of dispositional optimism (Meevissen et al., 2011). The mechanism underlying the beneficial effects of BPS on well-being was assumed to be the optimists' tendency to generate more vivid positive mental images of future events than pessimists (Blackwell et al., 2013). Evidence from the neurobiological study of optimism partly supports this assumption. Brain images reveal that optimism is associated with greater activation of a brain area that is related to positive imagery of future events (Sharot, Riccardi, Raio, & Phelps, 2007).

Semantic optimism priming

Semantic optimism priming was used to temporarily manipulate generalized expectations in one study conducted by Fosnaugh et al. (2009). Participants were given a packet of scrambled sentence tests including 15 items (11 of which were related to optimism), and told to build a sentence with four of the five words contained in each item. It was assumed that this manipulation would activate optimistic thinking unconsciously. It revealed that this optimism intervention is effective in promoting dispositional optimism.

7.5 Empirical studies of optimism interventions

Optimism has long been seen as a simple yet powerful way for a person to cope more adaptively with stress (Nes & Segerstrom, 2006; Scheier & Carver, 1992). Though optimism interventions have been mainly integrated with other positive activities in most previous practices, single optimism-enhanced manipulations have been conducted both in non-clinical populations and in clinical settings. Generally, research has shown that optimism interventions are effective in enhancing well-being and

reducing negative emotions (Austenfeld et al., 2006; Burton & King, 2004; Fosnaugh et al., 2009; Littman-Ovadia & Nir, 2014; Meevissen et al., 2011).

7.5.1 Optimism interventions in nonclinical samples

Perry and colleagues have conducted a series of AR studies in college students focusing on academic achievement (Haynes, Ruthig, Perry, Stupnisky, & Hall, 2006; Perry, Hechter, Menec, & Weinberg, 1993; Perry & Penner, 1990; Ruthig, Perry, Hall, & Hladkyj, 2004). In one of these studies (Ruthig et al., 2004), attribution retraining was designed to improve academic motivation and achievement striving. The authors found that the AR treatment group exhibited significantly lower test anxiety and greater persistence in college courses than the control group. These types of studies have shown that AR treatments are effective in fostering adaptive attibutional thinking, positive academic motivation, and good academic performance (Haynes et al., 2009). Riskind et al. (1996) introduced several AR-similar optimism training methods and conducted these techniques in their study. They found that the optimism training group reported more optimistic explanations, higher problem-solving self-efficacy, and more positive cognition than the control group.

Because AR has been designed primarily to enhance student persistence following possible academic failures, it has long been used to cultivate students' more adaptive attributions. The typical AR intervention instructs children to make a more adaptive attribution, like lack of effort, instead of more pessimistic ones, like a lack of ability, to their failure on academic tasks (Cecil & Medway, 1986). Most attribution retraining techniques are more accessible to younger children compared with CBT-based interventions, since they are much less cognitively demanding than cognitive restructuring tasks. AR conducted in children has benefits in enhancing children's persistence in math problem-solving (Okolo, 1992), social competence (Aydin, 1988), and reading tasks (Fowler & Peterson, 1981). However, the long-term effect of AR is

unknown; positive attributions may be hard to maintain if children are frequently faced with failures.

In addition to AR, other optimism manipulations have also been applied in normal populations. For example, The benefits of positive writing life goals was compared with expressive talking about life goals in one study (Harrist, Carlozzi, McGovern, & Harrist, 2007). Comparing with the control group, both intervention groups reported less negative emotions, and writing intervention was more effective in enhancing positive emotions. Sheldon and Lyubomirsky (2006) revealed that the BPS intervention is more beneficial than the gratitude treatment for increasing and maintaining positive emotions.

Peters and colleagues adapted the original BPS technique and conducted a series of studies of BPS intervention. Their studies employed a random-assignment, placebo-controlled design, in which participants in the optimism intervention condition imagined and wrote about their future best possible self in a personal, a relational, and a professional domain, for five-minute intervals per day over a period of two weeks. Participants in the control group imagined and wrote down their daily activities (Peters, Flink, Boersma, & Linton, 2010). In one study (Peters et al., 2010), the BPS group exhibited larger increases in positive affect and positive future expectations compared with the control group. BPS imagery caused a boost in optimism, and the effects remained two weeks after the intervention ended. This result was replicated in another study conducted by Meevissen & Peters (Meevissen et al., 2011).

The benefits of thinking and writing optimistically were also replicated in longer-term follow-up studies. For example, in one eight-month-long experimental study, participants imagined and wrote their future BPS for 15 minutes a week over a period of eight weeks. Individuals in the control condition listed what they did in the

previous seven days for 15 minutes a week. Notably, significant differences in happiness between the intervention and comparison groups remained even six months later (Lyubomirsky et al., 2011).

Evidence from BPS conducted online also supports its benefits in improving psychological well-being. For example, Shapira and Mongrain (2010) conducted an on-line intervention study, in which participants were randomly allocated into three groups (BPS was one of the two intervention groups). The results showed that individuals in the optimism condition were less depressed for up to three months and were happier up to six months later compared to participants in the control condition.

Even self-administered optimism-cultivation activity is beneficial in reducing negative emotions. For example, Littman-Ovadia and Nir (2014) adapted the three-good-thing intervention to a brief daily self-administered optimism intervention, which instructed the participants to "Think of three good things (items, people or events) waiting for you tomorrow. Write them down. Choose one of them and try to experience and maintain the sincere heart-felt feelings associated with it for five minutes". The intervention group did this practice for six consecutive days. This daily optimism intervention effectively reduced pessimism, negative affect, and emotional exhaustion at post-test and one month follow-ups.

In a study with undergraduate students, two different optimism manipulations, optimistic orientation and optimism priming, were examined. It was found that both interventions produced modest increases on a dispositional optimism measure and a situational optimism measure, unlike in the control group (Fosnaugh et al., 2009).

7.5.2 Optimism intervention in clinical settings

Optimism intervention studies for alleviating depressive symptoms

Though diverse optimism interventions have been shown to be effective in promoting positive emotions and reducing pessimism, very few optimism cultivation studies have been conducted to directly decrease depressive symptoms. In the following three rare examples, Self-Administered Optimism Training (SOT) and Attibutional Retraining (AR), which have been developed based on the attributional theory of depression, have demonstrated promising results in treating depression. In addition, an adapted online optimism intervention study has also shown that positive optimism-enhanced activities are effective in reducing depressive symptoms.

Fresco et al. (2009) randomly assigned 112 participants with a pessimistic explanatory style and depressive symptoms (measured by BDI) into a SOT experimental group or a no-treatment control group. Individuals in the intervention group received 10 minutes of instruction concerning self-administering of optimistic explanatory style, and then engaged in self-administered optimism training every day for 28 days, while participants in the control condition were not involved in any tasks. Participants in the intervention group reported a significant drop in their depressive symptoms.

Sharifi, Hajiheidari, Khorvash, and Mirabdollahi (2013) examined the effectiveness of a six-week attributional retraining intervention (two sessions per week, forty-five minutes per session) on reducing depression and anxiety in 32 women who suffered from miscarriage. Participants were randomly assigned to either an intervention group or a control group. Depression and anxiety were assessed at three time points: pre-test, post-test, and five-week follow-up. Results demonstrated

that participants in the intervention group scored lower in depressive symptoms than their counterparts in the control group both in the post-test and the follow-up.

Optimism interventions conducted online have also been shown to be beneficial in ameliorating depressive symptoms. Sergeant and Mongrain (2014) conducted an online optimism intervention over a period of three weeks and collected two-month follow-up data. Participants (n = 466) were randomly assigned to the optimism intervention group or the control group. Participants in the intervention group were instructed to perform several optimism techniques, including "listing five things that made them feel like their life was enjoyable, enriching, and/or worthwhile", listing "three things that could help them see the bright side of a difficult situation", and describing briefly a goal that "they would like to achieve in the next day or two" with "steps they would like to meet this goal". By contrast, participants in the control condition were asked to describe their daily activities. Depression, dispositional optimism, and happiness were measured. Results indicated that online optimism cultivation practice was effective in decreasing depressive symptoms and promoting happiness immediately and in the one- and two-month follow-ups, especially for pessimists.

Optimism interventions in other clinical samples

Stanton et al. (2002) carried out a pioneering study on the written expression of positive emotions within a group of breast cancer patients. The participants were instructed to join a four-session writing task, including writing about their "positive thoughts and feelings regarding their experience with breast cancer". Patients who wrote about the positive consequences of their experience had significantly fewer negative physical symptoms and fewer medical appointments for cancer-related morbidities at three months than did the control group. This finding was duplicated in

a later study conducted within another group of breast cancer patients (Low, Stanton, & Danoff-Burg, 2006).

7.5.3 Optimism interventions in children and adolescents

Most studies on optimism intervention are conducted on adults, though there are still some attempts in cultivating optimism and preventing depression in childhood and adolescence. One such attempt, the Penn Resiliency Program (PRP), (Jaycox, Reivich, Gillham, & Seligman, 1994) is comprised of cognitive-behavioral based interventions targeting early adolescence (11-14 years old). Teachers and counselors at school deliver this program. Intervention techniques have been adapted from adult CBT (Beck, 1976), including self-disputing, goal setting, assertiveness, and negotiation training. All these intervention techniques aim to help children to learn to challenge their pessimistic explanatory style and develop adequate problem solving skills in social life (Gillham & Reivich, 2004).

PRP has been shown to be effective in reducing moderate to severe depressive symptoms after a two year follow-up (Gillham, Reivich, Jaycox, & Seligman, 1995). Children who had completed the PRP were more inclined to show an optimistic attributional style and less likely to be depressed compared with the control group (Gillham & Reivich, 2004; Gillham et al., 1995). Results of several studies conducted in Chinese samples also support the beneficial influence of the PRP in reducing depressive symptoms and cultivating optimistic explanatory style in children (Yu & Seligman, 2002). However, the effectiveness of the PRP has been challenged, since some of the participants (one of the three schools) reported no significant decrease in depressive symptoms after a three-year follow-up (Gillham et al., 2007). Cultivating optimism techniques should be conducted with caution, considering the potential influences of other individual and social factors.

Summary

Taken together, a diverse amount of optimism interventions have emerged to provide possible answers to the question, how does one enhance well-being and relieve suffering? AR and SOT were designed and developed based on attributional theories. Generally, AR has been mainly conducted in academic backgrounds and has shown beneficial effects on academic performance. By contrast, SOT aims to reduce current levels of pessimistic attributional style that characterise depression. The BPS aims to increase positive expectations which can be effective in boosting positive emotions and in turn decreasing depressive symptoms.

7.6 Research questions

Using optimism interventions to decrease depressive symptoms

Traditionally, Cognitive Behavioural Therapy emphasised the influence of specific beliefs and thoughts instead of focusing on broad cognitive biases such as explanatory style and dispositional optimism, without examining the possibility of individual differences in optimism (Pretzer & Walsh, 2001). The situation has recently changed since psychologists began to understand optimism from a cognitive perspective, and therefore including the approach of attributional style and dispositional optimism.

Previous research has shown that both SOT and BPS are effective in promoting psychological well-being and reducing depressive symptoms. Applications of these two optimism manipulations in empirical studies have yielded positive results confirming the benefits of optimism interventions on enhancing well-being. However, very little systematic work has been done to investigate the advantageous effects of optimism interventions on psychotherapy applications in concrete settings. The

question of how to convert the benefits of optimism interventions to systematic and effective activities diminishing depressive symptoms has not been addressed adequately. Optimism intervention studies aimed particularly at decreasing depressive symptoms and those clinically diagnosed with depressive disorders are needed.

Additionally, manipulating optimism has been conducted separately, aimed at addressing general expectations or attributional style. There is no research including both kinds of optimism interventions conducted so far to my knowledge. Since previous research has shown that both optimism techniques are effective in promoting psychological well-being and reducing depressive symptoms and theoretical connections between attributional style and dispositional optimism have been found in our early-stage analysis, the possibility of combining both SOT and BPS in one optimism intervention study raises the possibility of fully understanding the effectiveness of optimism interventions in depression treatment.

Participants: first-year college students

For my study of optimism interventions, young adults entering their first year of university were chosen as targeted participants. Maladaptation of freshmen to university life has been given much attention recently. Starting college is a challenging time for first-year students and is often characterized by negative emotions, such as depression and anxiety, which can negatively affect quality of life and academic performance. First-year students typically experience a stressful life due to a variety of causes, such as the challenges of living in a different and unfamiliar environment (Negovan & Bagana, 2011). This life transition from late adolescence to early adulthood may bring a series of difficult situations to deal with.

All these factors may increase first-year students' vulnerability to depression. Brandy, Penckofer, Solari-Twadell, and Velsor-Friedrich (2015) reported that 45% of

students demonstrated greater than average levels of stress and 48% reported clinically significant depressive symptomology in one freshmen sample (N = 188). In a sample of veterinary medical students (N = 240), data showed that 49%, 65%, and 69% of the participants reported depression levels at or above the clinical cut-off across their first three semesters of study. Results indicated that transitional stress predicted increased depression and anxiety symptoms and decreased life satisfaction (Reisbig et al., 2012).

Some research has begun to investigate the role of optimism in psychological adjustment during life transitions such as this. For example, Brissette et al. (2002) reported that higher levels of dispositional optimism, assessed at the beginning of the first semester of university, was prospectively associated with smaller increases in stress and depression over the course of the first semester. Chemers et al. (2001) found that LOT scores were strongly correlated with academic performance and personal adjustment in a sample of first-year university students (N = 256). Similarly, in a much larger sample of college freshmen (n = 2,189), L. S. Nes et al. (2009) found that optimistic students had better psychological adjustment and motivation than pessimists in the period of college transition. Students with a higher level of dispositional optimism were more likely to return to school for the second year, with increased motivation and decreased distress.

Though there is no single study that has directly examined the relationship between attributional style and depression in first-year college students, it has been reported that students who had pessimistic attributions for their academic failure received lower exam scores than their freshmen counterparts who held an optimistic attributional style in explaining academic failure (Peterson & Barrett, 1987). Academic stress has been found to be a strong predictor of depression and anxiety in a group of veterinary medical students during their first three semesters (Reisbig et al.,

2012). Based on these findings concerning the influences of attributional style and dispositional optimism on academic performance, depression, and psychological adjustment in first-year college students, interventions targeting cultivating optimism in this specific group should be considered for decreasing depressive symptoms to enhance their college experience.

My aim was to test whether manipulations based on optimism theories might alleviate depressive symptoms in first-year college students. I hypothesised that optimism interventions can produce stronger and lasting benefits on psychological well-being, especially in reducing depressive symptoms of participants in the experimental condition than in the control condition.

Chapter 8: Optimism interventions for depression in first-year college students

8.1 Study 1: individual optimism interventions with depression

8.1.1 Intervention designs

Corresponding respectively to dispositional optimism and explanatory style, two optimism manipulation techniques were adopted in my interventions for depression. One is the Best Possible Self (BPS) technique adapted from several previous BPS studies. As in the BPS intervention, participants normally are instructed to imagine and write down some aspects (such as professional domain) that their future best possible self should have. The interventions were variant in time (from 4 days to 4 weeks), style (writing or talking), administration (self-conducted or supervised by administrators), domains of writing (three or more), and form of intervention (face to face or online). Borrowing from Lyubomirsky et al. (2011)'s BPS paradigm, students in my study were instructed to write about their best possible future in each of the 7 domains (romantic life, educational attainment, hobbies or personal interest, family life, career situation, social life, and physical/mental health). Instead of doing BPS every week, students were asked to do these positive writings on a daily basis across a week, similarly to the BPS study of Peters, Meevissen, and Hanssen (2013).

The other optimism activity is the self-administered optimism training (SOT) adapted from Fresco et al. (2009). In their SOT study, participants were instructed to spend around 10 minutes each day for a week to identify five positive and five negative events in their life, finding initial causes along the dimensions of internality, stability, and globality for each event, then revising and reassessing alternative and more adaptive attributions for these events along the same three dimensions after some reflection. The whole procession of SOT is completed within 28 days. We adapted Fresco et al. (2009)'s SOT into a shorter version of 7 days. Instead of identifying five positive and five negative events in their life each day, participants are asked to identify three positive and three negative events.

Previously, SOT was applied in one study aiming at reducing depressive symptoms, and BPS was adopted only in intervention studies of nonclinical samples to my knowledge. In addition to SOT and BPS, face-to-face individual psychotherapy was conducted in my study on the basis of individual positive psychotherapy with mild-to-moderate depression (Seligman et al., 2006). In total, the whole intervention consisted of three sessions, in which each consists of a 45-minutes face-to-face individual counselling.

The first session is SOT practice. Before SOT, every participant in the intervention group receives an individual counselling, in which the counsellor introduces basic theory of attributional style, and gives instructions of the SOT procedure. Then the participant is asked to do homework. The homework contains approximately 15 minutes of SOT every day in the following week. The daily SOT is completed following three steps: (a) self-monitoring daily 3 negative and 3 positive events; (b) identifying the initial cause, and rating that cause along the dimensions of internality, stability and globality; (c) brainstorming additional or alternate causes; and (d) arriving at a revised cause that was also rated along the dimensions of internality, stability, and globality.

The second session is BPS exercise. Similar as SOT session, every participant in the intervention group receives a 45-minute individual counselling, in which the counsellor helps the participant identify their core values, they were asked to "think about how they wanted to be remembered at the end of their lives by their loved ones" (Peters et al., 2013). Home work is assigned at the end of the individual counselling. The participant is asked to imagine and write about his or her life if everything unfolded as he or she wanted. The participant is instructed to envisage that perhaps he or she has worked diligently and achieved his or her most important dreams. Once this image had been invoked, the participant wrote about this future for 15 minutes in one of 7 aspects, including best possible future romantic life, educational attainment, hobbies or personal interest, family life, career situation, social life, and physical/mental health. These tasks were required to be completed on a daily basis in the following week.

The third session is for summary and post-intervention test. The counsellor and the participant review progress of intervention and discuss gains and maintenance of these two positive activities. At the end, the participant completes measures of depression, attributional style, dispositional optimism, and subjective well-being (life satisfaction).

Hypotheses

Our first hypothesis concerned the beneficial effects of optimism intervention on depressive symptoms. I predicted that participants in the experimental group would experience lower levels of depression outcomes by the end of the intervention than the control group, and that these beneficial effects might even be maintained at the one-month and three-month follow-ups.

Similarly, our second hypothesis was that for the intervention group, a decrease in depressive symptoms would be accompanied by the corresponding improvement in optimistic explanatory style, especially for attributions of negative events, not only immediately after the manipulations, but also the following three months after the interventions had ended.

Also, I predicted that positive activities would bolster subjective well-being (life satisfaction) and dispositional optimism and decrease dispositional pessimism immediately after the intervention, and these improvements might last in the follow-up periods.

8.1.2 Method

Participants

Fifty-two undergraduate students in Sample 5 (see Chapter 1.5.4 for details) took part in this study. All participants were native Chinese speakers with ages ranging from 17 to 21 (M = 18.50, SD = 0.71). They were randomly divided into one of the two conditions: an experimental group (n = 26) and a control group (n = 26). There were no significant differences in gender, age, ethnicity, and year of education between these two conditions.

Not all participants completed the whole procedure. Three participants dropped out of the intervention group and two dropped out of the control group. As a result, there were 23 participants in the intervention group and 24 participants in the control group available for the final data analysis (M = 19.07, SD = 0.86; 19 males and 28 females). There were no significant differences in gender, age, ethnicity, years of education, or pre-test measures between those who remained in this study and those who left.

Measures

Attributional style was measured using a Chinese version of the ASQ (Zhang, 2006). The ASQ takes on average 15 minutes to complete. Composite attributional styles were calculated separately for positive and negative events. Higher scores for positive events and a lower score for negative events on any area demonstrates a more "optimistic" attributional style for that domain, i.e., more external, temporary and specific for negative events, and more internal, stable and global for positive events. Cronbach's α of the pre-test for the scale was 0.85 for negative events and 0.66 for positive events; for the post-test, 0.82 for negative events and 0.89 for positive events; and for the three-mohth follow-up, 0.86 for negative events and 0.86 for positive events.

Dispositional optimism was measured using a Chinese version of the Life Orientation Test-Revised (Lai & Yue, 2000). Subjects were scored for two separate composite scores, LOT-R Optimism and LOT-R Pessimism. Cronbach's α for the pre-test was 0.74 for dispositional optimism and 0.62 for dispositional pessimism; for the post-test, 0.47 for LOT-R Optimism and 0.72 for LOT-R Pessimism; for the one-month follow-up, 0.74 for LOT-R Optimism and 0.62 for LOT-R Pessimism; and for the three-month follow-up, 0.62 for LOT-R Optimism and 0.52 for LOT-R Pessimism.

Subjective well-being was assessed using a Chinese version of Satisfaction with Life Scale (SWLS; Chen & Zhang, 2004). Subjects were scored for total

optimism scores. Cronbach's α for the pre-test was 0.82; for the post-test, 0.83; for the one-month follow-up, 0.85; and for the three-month follow-up, 0.80.

A Chinese version of the Beck Depression Inventory (BDI; Chan & Tsoi, 1984) was used to measure depression. Cronbach's α for the pre-test was 0.83; for the post-test, 0.82; for the one-month follow-up, 0.87; and for the three-month follow-up, 0.83.

Procedure

Recruiting participants. To conduct the present optimism intervention pilot study, a general sample was recruited from all 980 freshmen in China Youth University of Political Studies. To test mental health of first-year students, Self-Reporting Inventory 90 (SCL-90; Derogatis & Cleary, 1977; Derogatis, S, Covi, & Rickeis, 1973) was conducted in the end of the first month of their entry into the university. According to the generally accepted criterion of SCL-90, a total score of 160 and above or a score of 2 and above for any single dimension was seen as indicators of possible mental illness. Accordingly, a total SCL-90 score of 160 or above and a score of 2 or above in depression were utilized in selecting eligible participants. A total of 85 students were selected as a general sample based on the criterion above and were contacted by teachers of the University Consulting Centre. The research was presented as a study involving activities designed to develop personal strength and psychological well-being. Finally, 52 students agreed to take part in this study.

Baseline assessment. Participants completed the first set of questionnaires at their convenience within a week. Baseline assessments included a consent form, demographic questions, and measures of depression, attributional style, dispositional optimism, and SWB (life satisfaction). The consent form informed students of their rights as participants in this study. They then were asked to provide general background information, such as gender, ethnicity, age, and married status. Three days after completion of the baseline questionnaires, participants began the intervention.

Optimism interventions. Students were randomly assigned to either an experimental condition or a control condition for a period of up to three weeks.

For the experimental condition, optimism interventions took place over three sessions (each session lasts for about 40 minutes) over three consecutive weeks. Individual face-to-face counselling was conducted by three qualified counsellors in the University Consulting Centre. They followed the intervention manual to conduct all the intervention sessions. A notebook was assigned to participants in the intervention group in the first session for completing their homework. The homework can be written down on the notebook or be printed out. In the intervention period, participants in the control group were not involved in any tasks related to this study.

Time 1, time 2, and time 3 assessments. Optimism intervention participants completed the measure battery in the final session, and control participants were scheduled a similar time for their Time 1 measure. Then participants in both conditions were scheduled a time to return for their Time 2 (one-month follow-up), and Time 3 (three-month follow-up) packet of self-report measures. Because of the length of time it took to take the questionnaire (approximately 15 minutes), the ASQ was only re-administered at Time 1 and Time 3.

8.1.3 Results

Baseline descriptive

An independent samples t-test on baseline scores between the intervention group and control group revealed no significant differences between the two groups on any of the measures (LOT-R Optimism, LOT-R Pessimism, ASQ Negative, ASQ Positive, SWLS, and BDI), indicating that randomization was successful.

Table 8.1 shows the descriptives and correlations of baseline scores for the whole sample on the LOT-R, ASQ, SWLS, and BDI. In line with at least one previous finding (Isaacowitz & Seligman, 2002), both ASQ Negative and ASQ Positive did not significantly correlate either LOT-R Optimism or LOT-R Pessimism, indicating that explanatory style of life events may be uncorrelated to general

expectancies of future events. As expected, the LOT-R Pessimism was positively correlated with BDI ($r = 0.29$) and negatively correlated with SWLS ($r = -0.41$), and BDI was negatively correlated with SWLS ($r = -0.38$).

Measures	Descriptives		Correlations				
	Mean	SD	1	2	3	4	6
1. BDI	20.60	8.73					
2. LOT-R Optimism	6.28	2.50	-0.25				
3. LOT-R Pessimism	5.20	2.22	0.29*	-0.41**			
4. SWLS	15.66	6.10	-0.38**	0.13	-0.19		
5. ASQ Negative	13.64	2.06	-0.07	0.06	0.24	0.09	
6. ASQ Positive	15.15	1.42	0.28	-0.05	0.24	-0.17	0.07

Table 8.1: Descriptives and intercorrelations between measures at baseline.

* $p < 0.05$. ** $p < 0.01$.

Intervention effects: immediate and longer term changes

Means and standards deviations for all measures for both two conditions from baseline to post-interventions, as well as to one-month follow-up and three-month follow-up are presented in Table 8.2. Changes for all measures for both groups in four time-points are illustrated in Figures 8.1-8.6 (based on standardized scores).

Measures	Pre-test		Post-test		1-month Follow-up		3-month Follow-up	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Intervention group								
BDI	20.09	8.90	11.39	6.82	11.57	6.85	11.00	4.94
LOT-R Optimism	6.26	2.61	8.09	1.78	7.91	2.25	7.57	1.16
LOT-R Pessimism	5.17	2.25	4.48	1.75	4.43	1.85	4.65	1.56
SWLS	15.61	6.29	19.70	4.95	21.39	5.68	19.35	6.03
ASQ Negative	13.59	1.86	12.99	1.88			12.64	2.20
ASQ Positive	15.31	1.44	16.11	1.45			15.49	1.69
Control group								
BDI	21.08	8.72	21.58	5.56	17.33	8.05	18.04	8.30
LOT-R Optimism	6.29	2.44	7.29	2.05	6.92	2.06	7.08	1.79
LOT-R Pessimism	5.42	2.22	5.33	2.24	5.25	1.98	4.92	1.86
SWLS	15.71	6.05	18.33	6.65	19.67	6.95	18.42	4.66
ASQ Negative	13.69	2.28	13.82	1.75			14.22	1.80
ASQ Positive	14.99	1.42	14.64	2.09			14.85	1.94

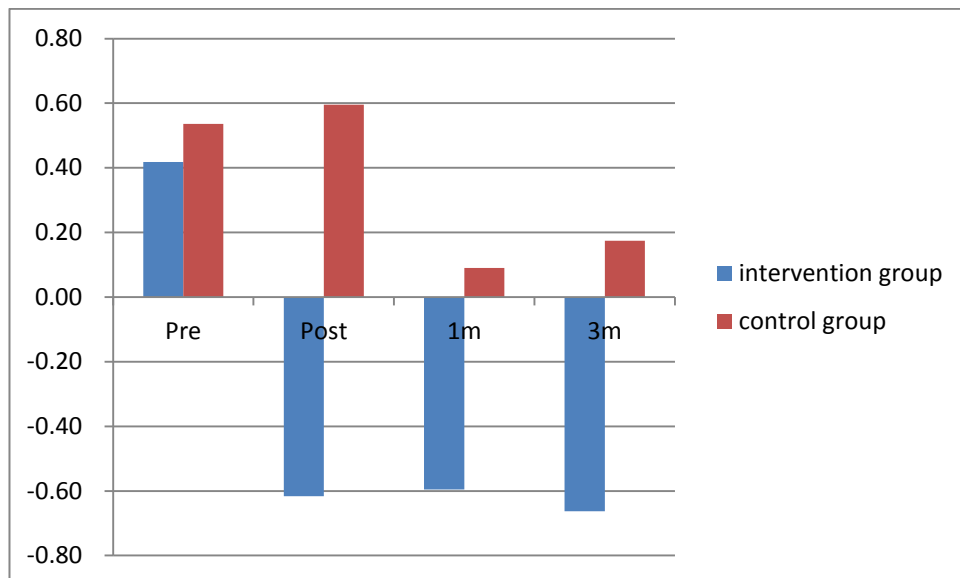Table 8.2: Means and Standard Deviations of outcome measures by condition at all time-points.

Figure 8.1: Depression as measure by the BDI at baseline, at post-intervention, 1-month follow-up, and 3-month follow-up per condition.
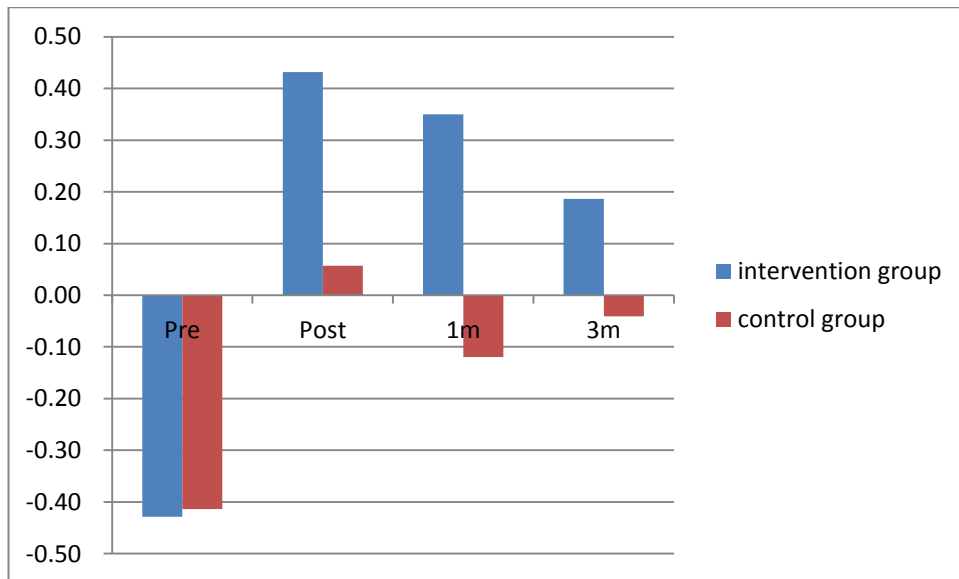
Figure 8.2: Dispositional Optimism as measure by the LOT-R at baseline, at post-intervention, 1-month follow-up, and 3-month follow-up per condition.
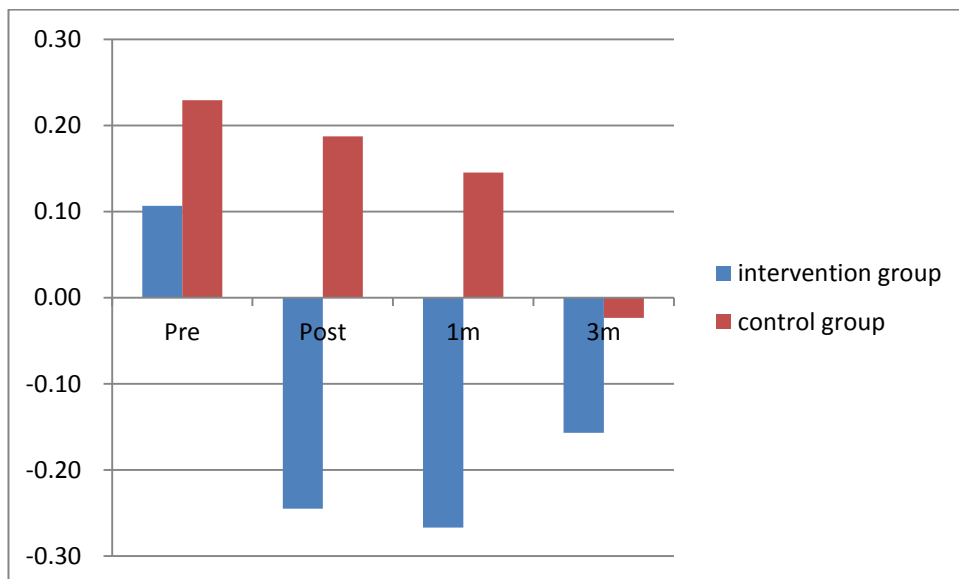

Figure 8.3: Dispositional Pessimism as measure by the LOT-R at baseline, at post-intervention, 1-month follow-up, and 3-month follow-up per condition.
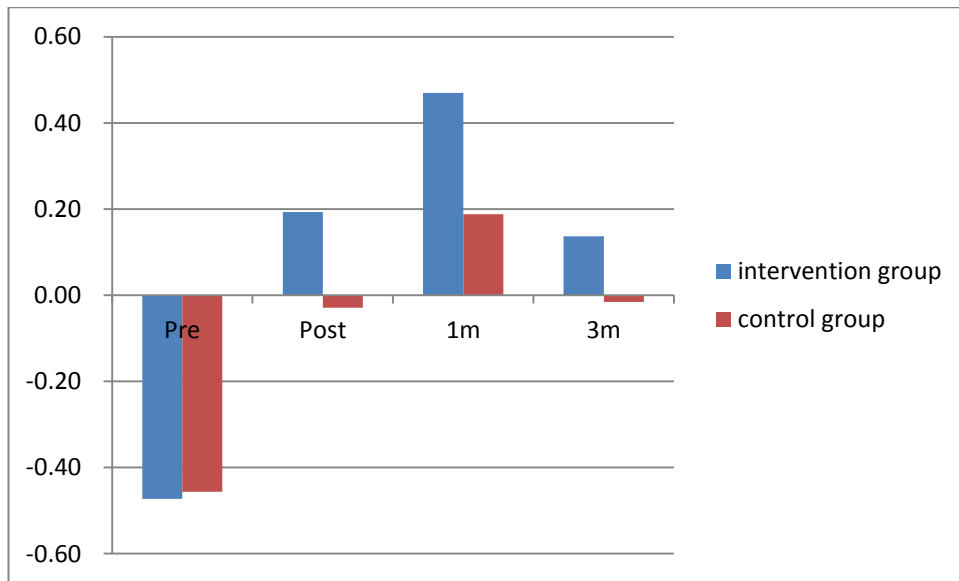
Figure 8.4. Subjective well-being as measure by the SWLS at baseline, at post-intervention, 1-month follow-up, and 3-month follow-up per condition.
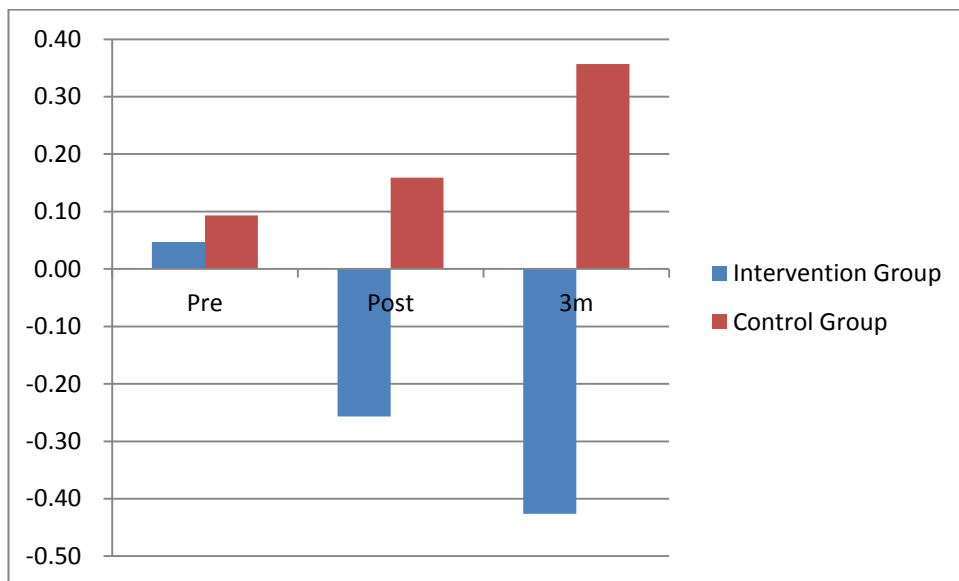

Figure 8.5. Attributional style for negative events as measure by the ASQ at baseline, at post-intervention and 3-month follow-up per condition.
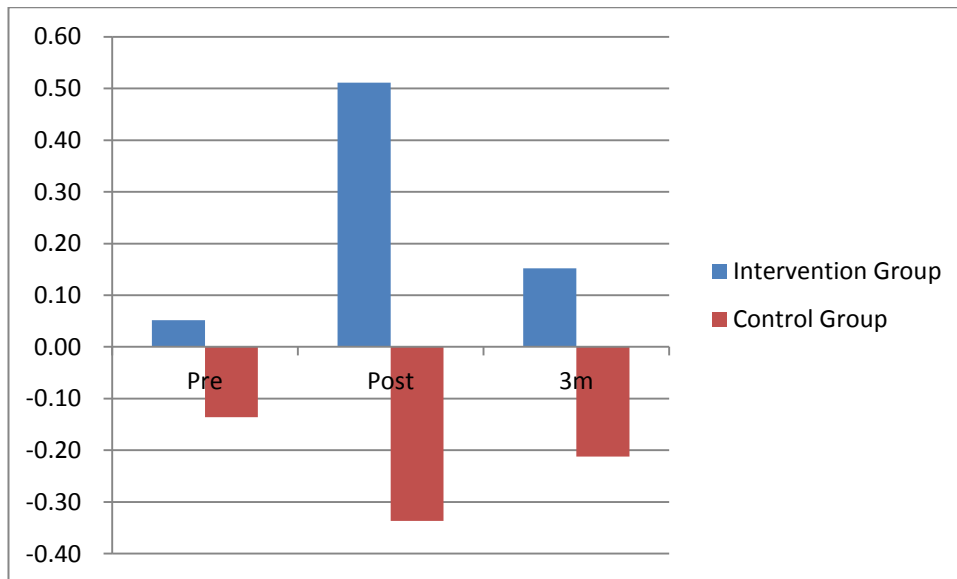
Figure 8.6: Attributional style for positive events as measure by the ASQ at baseline, at post-intervention and 3-month follow-up per condition.

Immediate post-intervention

Right after the completion of the three-week intervention, supporting our first hypothesis, students in the experimental group reported a greater decrease in depressive symptoms relative to students in the control group (see Figure 8.1), $t(45) = -5.63$, $p < .001$. However, although participants in the intervention group displayed a tread toward a greater increase in LOT-R Optimism and a greater decrease in LOT-R Pessimism relative to the control group right after the intervention (see Figure 8.2 and Figure 8.3), two-tailed t tests showed that the experimental group and the control group did not significantly differ on either LOT-R Optimism or LOT-R Pessimism. Similarly, as displayed in Figure 8.4, although intervention group participants were still showing a trend toward greater subjective well-being gains compared with the control group, it was not significant.

Participants in the experimental group reported a greater increase in explanatory style for positive events relative to participants in the control group (see Figure 8.6), $t(45) = 2.79$, $p = .008$. However, comparison of the ASQ-negative

contrasting the intervention group with the control group failed to reach statistical significance, though participants in the experimental group displayed a trend toward a decrease in explanatory style for negative events while the control group displayed a trend toward increase (see Figure 8.5).

Follow-ups

As expected, again supporting our most important prediction, depression scores of the intervention group were much lower than those in the control group, $t(45) = -2.64$, $p = .01$, though depressive symptoms in the control group also experienced a trend of slight decrease (see Figure 8.1); and this significant difference was even bigger three months after the intervention had ended, $t(45) = -3.52$, $p = .001$.

The comparison of LOT-R Optimism, LOT-R Pessimism, and SWLS contrasting the experimental group with the control group failed to reach statistical significance in either the one-month follow-up or the three-month follow-up. Although participants who had completed the optimism intervention displayed a trend toward greater increases in life satisfaction relative to the control group, one month after the intervention had ended (see Figure 8.4), this difference did not reach statistical significance. For LOT-R Optimism, students in the intervention group showed trend of decreas one month and also three months after the intervention had ended, while their counterparts in the control group were showing a trend of losses in the one-month follow-up and then a trend of gains in the three-month follow-up. That is, the optimism scores of the control group in the one-month follow-up was lower than in post-intervention, then the level of optimism increased in the three-month follow-up compared with the one-month follow up. (see Figure 8.2). however, scores of LOT-R Pessimism in the one-month follow-up were lower than in post-intervention for both the experimental group and the control group. For the three-month follow-up, the intervention group showed an increase in LOT-R Pessimism scores, while the control group showed an increase (see Figure 8.3). The changes and differences in both LOT-R Optimism and LOT-R Pessimism were not significant.

Explanatory style as measured by the ASQ showed different changing patterns for positive and negative events three months after the optimism intervention. Specifically, for the ASQ-Negative, students in the experimental group showed decreased scores, while the control group students showed an increase (see Figure 8.5), and as a result the intervention group participants reported more optimistic explanatory styles for negative events than their counterparts in the control group, $t(45) = -2.68$, $p = .01$. However, a comparison between the intervention group and the control group on the ASQ-positive failed to reach statistical significance. It showed that participants in the experimental group displayed a trend toward decreased scores, while the control group displayed a trend of slightly increased scores (see Figure 8.6). Different changing patterns between explanatory style for positive and negative events were consistent with previous findings of the ASQ structure; attributional biases to positive events and to negative events emerged as uncorrelated in the joint model (see Chapter 2.1).

8.1.4 Discussion

Results provided partial confirmatory support for the hypotheses. They indicate that at post-intervention, one month and three months following the intervention, individuals in the optimism condition were less depressed than those in the non-treatment control condition. This provides preliminary evidence of the effectiveness of optimism manipulations on reducing depressive symptoms. Data analysis also revealed that positive activities in optimism were beneficial in developing optimistic explanatory styles, especially for attributions for negative events. Overall, these results are in line with previous findings that optimistic thinking can have advantageous psychological benefits (Fresco et al., 2009; King, 2001). The results indicate that these positive activities can lead to sustained increase in optimism and decrease in depressive symptoms. Moreover, the effects remained one month and three months later after the intervention had ended.

A number of potential active elements in the positive, future-oriented optimism intervention may have contributed to these positive outcomes, such as the feeling of

attentive communication, positive re-evaluation of life events, and active arousal of expectations.

Participants in the intervention group did not experience higher levels of dispositional optimism or life satisfaction following the intervention period. There are several possible reasons for this.

First, the sample size was rather small in total (N = 47). The results showed that participants who had completed the optimism intervention generally displayed a trend toward greater increases in dispositional optimism and life satisfaction relative to the control group immediately and one month after the intervention, but the differences did not reach statistical significance. Second, the general sample was selected based on a total SCL-90 score of 160 or above and a score of 2 or above in depression. Since depression and psychological dysfunction were utilized in selecting eligible participants, it is possible that the optimism interventions may be more effective for decreasing depressive symptoms than for increasing positive feelings and general expectations, though benefits in decreasing depression have been gained though boosting positive affections. Finally, it has been theoretically and empirically widely accepted in positive psychology that relieving negative feelings and increasing positive feelings are two separate endeavours (Seligman & Csikszentmihalyi, 2000; Seligman et al., 2005).

Altogether, the current investigation indicated that optimism manipulations over a period of two weeks led to significantly larger improvements in depressive symptoms and increase in optimistic explanatory style compared to not receiving any treatment. A different pattern emerged for short-term and long-term effects, such that a relatively large reduction in depressive symptoms occurred immediately after the intervention period, whereas the one-month and three-month follow-ups featured stable levels of depression.

Further questions

In this pilot study, instead of conducting group optimism interventions that have been mainly applied in previous research, an individual approach with face-to-face counselling sessions was used. As results have shown, this individual intervention was effective in decreasing depressive symptoms and in enhancing optimistic attributional style. However, the way in which self-administered positive activities and individual counselling were combined made it unclear what might be the cause of those benefits. Whether it was the self-administered optimism interventions or the individual consulting session is an unresolved question.

Additionally, the possibility of social desirability and demand effects when students were keen on making good impressions to the counsellors might also be a factor that should be considered. Moreover, though no-treatment control design has been used in previous studies, it is more plausible to apply 'placebo'-treatment control design in intervention studies.

8.2 Study 2: group optimism interventions with depression

8.2.1 Intervention designs

Considering the unresolved questions from Study 1, I conducted a second study in which purely self-administered optimism interventions were applied in first-year college students with mild-to-moderate depressive symptoms. Two changes were made in Study 2. The first was that the individual counselling sessions were excluded in the experimental condition. The second change was that participants in the control condition were asked to list their daily activities instead of doing nothing.

As in Study 1, optimism interventions in Study 2 consisted of two optimism manipulation techniques, namely BPS and SOT. Participants were instructed to complete SOT in the first week, and then complete BPS in the second week on a self-administered basis.

Hypothesis

My first hypothesis concerned the beneficial effects of the optimism intervention on depressive symptoms. I predicted that participants in the experimental group would have lower levels of depression outcomes by the end of the intervention, and that these beneficial effects might even be maintained at the one-month and three-month follow-ups.

Similarly, my second hypothesis was that for the intervention group, a decrease in depressive symptoms would be accompanied by a corresponding improvement in optimistic explanatory style, especially for attributions of negative events, not only immediately after the manipulations, but also following three months after the interventions had ended.

Also, I predicted that our positive activities would bolster SWB (life satisfaction) and dispositional optimism immediately and decrease dispositional pessimism after the intervention and these improvements might last in the follow-up periods.

8.2.2 Method

Participants

Participants in Sample 6 were involved in this study (see Chapter 1.5.4 for details).

Measures

Attributional style was measured using a Chinese version of the ASQ (Zhang, 2006). Two composite scores, ASQ Negative and ASQ Positive, were calculated to assess attributional style for negative and positive events respectively. Cronbach's α for the pre-test for the scale were 0.73 for negative events and 0.84 for positive events; for the post-test, 0.86 for negative events and 0.88 for positive events; and for the three-month follow-up, 0.72 for negative events and 0.83 for positive events.

Dispositional optimism was measured using a Chinese version of the Life Orientation Test-Revised (Lai & Yue, 2000). Subjects were scored for two separate

composite scores, LOT-R Optimism and LOT-R Pessimism. Cronbach's α for the pre-test for the scale was 0.50 for LOT-R Optimism and 0.53 for LOT-R Pessimism; for the post-test, 0.47 for LOT-R Optimism and 0.59 for LOT-R Pessimism; for the one-month follow-up, 0.61 for LOT-R Optimism and 0.64 for LOT-R Pessimism; and for the three-month follow-up, 0.43 for LOT-R Optimism and 0.56 for LOT-R Pessimism.

Subjective well-being was assessed using a Chinese version of the Satisfaction with Life Scale (SWLS; Chen & Zhang, 2004). Subjects were scored for total optimism scores. Cronbach's α for the pre-test for the scale was 0.79; for the post-test, 0.74; for the one-month follow-up, 0.76; and for the three-month follow-up, 0.80.

Depression was measured using a Chinese version of the Beck Depression Inventory (BDI; Chan & Tsoi, 1984). Cronbach's α for the pre-test for the scale was 0.79; for the post-test, 0.75; for the one-month follow-up, 0.70; and for the three-month follow-up, 0.49.

Procedure

Participant recruiting and baseline assessment were the same as in Study 1.

Optimism interventions. Students were randomly assigned to either an experimental condition or a control condition for a period of 2 weeks.

For the experimental condition, participants were instructed to apply SOT in the first week, and then apply BPS in the second week. Participants reported to small group (5-6 people per group) training sessions, which consisted of approximately 10 minutes of instructions on how to apply SOT and BPS in the beginning of the first week and the second week. Participants were asked to complete their homework on a self-administered basis (the same as in Study 1).

For the comparison control condition, participants were asked to spend 15 minutes per day listing what they did during that day. A notebook was assigned to students for writing down their daily activities.

Time 1, time 2, and time 3 assessments. Optimism intervention participants completed the measure battery in the following three days after they completed the intervention sessions, and control participants were scheduled a similar time for their Time 1 measure. Then participants in both conditions were scheduled a time to return for Time 2 (one-month follow-up), and Time 3 (three-month follow-up) packet of self-report measures. The ASQ was only re-administered at Time 1 and Time 3 due to its length.

8.2.3 Results and analysis

An independent samples *t*-test on baseline scores between intervention group and control group revealed no significant differences between the groups on any of the measures (LOT-R Optimism, LOT-R Pessimism, ASQ Negative, ASQ Positive, SWLS, and BDI). The descriptives and correlations of baseline scores for the whole sample on the LOT-R, ASQ, SWLS, and BDI are shown in Table 8.3.

As shown in Table 8.3, BDI was negatively correlated with SWLS (r = -.35); LOT-R Optimism was negatively correlated with LOT-R Pessimism (r = -.33) and positively correlated with ASQ Positive (r = .30); and ASQ Negative was negatively correlated with SWLS (r = -.31).

Measures	Descriptives		Correlations				
	Mean	SD	1	2	3	4	5
1. BDI	21.81	7.40	-				
2. LOT-R Optimism	8.19	1.76	-0.13	-			
3. LOT-R Pessimism	4.41	1.58	0.23	- 0.33*	-		
4. ASQ Negative	12.74	1.60	0.07	-0.14	-0.04	-	
5. ASQ Positive	14.07	1.90	-0.23	0.30*	-0.20	-0.03	-
6. SWLS	16.22	5.76	- 0.35**	0.12	-0.21	- 0.31*	0.13

Table 8.3: Descriptives and intercorrelations between measures at baseline.

* $p < 0.05$. ** $p < 0.01$.

Intervention effects: immediate and longer term changes

Means and standards deviations for all measures for both conditions from baseline to post-interventions, as well as to one-month follow-up and three-month follow-up are presented in Table 8.4.

Changes for all measures for both groups in four time-points are illustrated in Figures 8.7-8.12 (based on standardized scores).

Measures	Pre-test		Post-test		1-month Follow-up		3-month Follow-up	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Intervention group								
BDI	21.43	7.44	17.47	6.03	16.27	5.04	16.63	3.80
LOT-R Optimism	8.17	1.90	9.13	1.04	9.17	1.53	8.80	1.58
LOT-R Pessimism	4.27	1.53	3.87	2.16	3.90	2.32	4.10	1.92
SWLS	16.13	5.89	19.53	4.47	20.20	4.78	19.60	3.66
ASQ Negative	12.59	1.72	11.83	1.88	-	-	11.68	1.51
ASQ Positive	14.13	1.73	14.83	1.38	-	-	15.04	1.88
Control group								
BDI	22.21	7.46	21.10	6.12	19.48	5.16	18.90	4.93
LOT-R Optimism	8.21	1.63	8.24	2.28	8.34	1.42	8.31	1.65
LOT-R Pessimism	4.55	1.64	4.69	1.93	4.62	1.52	4.59	1.68
SWLS	16.31	5.73	17.59	4.08	18.24	5.14	19.07	5.59
ASQ Negative	12.90	1.49	12.95	2.13	-	-	12.76	1.66
ASQ Positive	14.01	2.08	14.40	2.98	-	-	14.31	1.96

Table 8.4: Means and Standard Deviations of outcome measures by condition at all time-points.
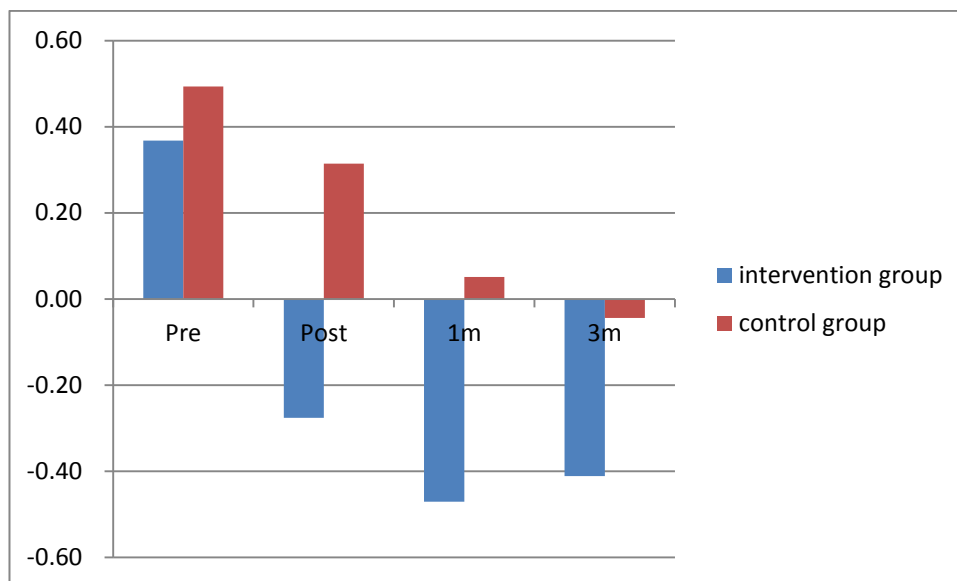

Figure 8.7: Depression as measure by the BDI at baseline, at post-intervention, 1-month follow-up, and 3-month follow-up per condition.
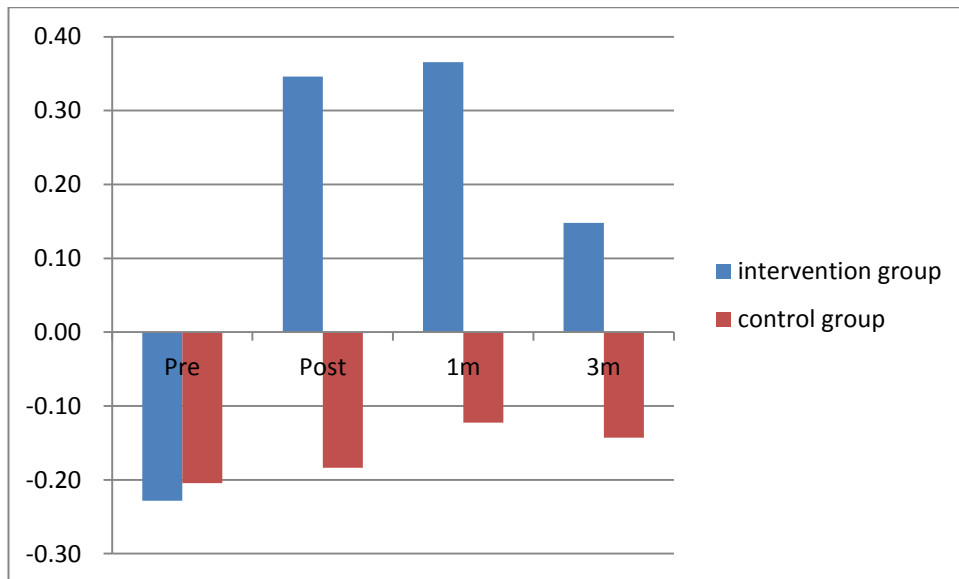
Figure 8.8: Dispositional Optimism as measure by the LOT-R at baseline, at post-intervention, 1-month follow-up, and 3-month follow-up per condition.
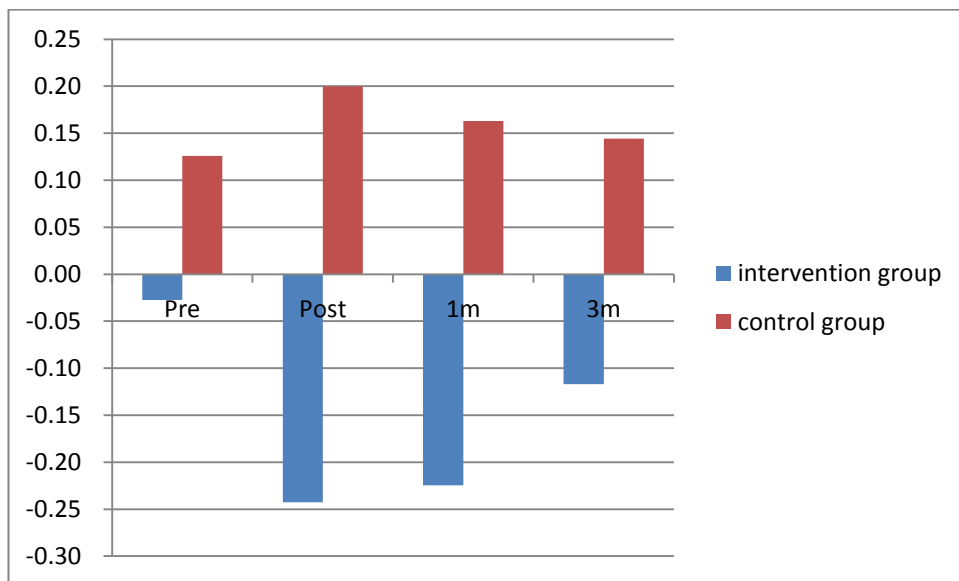

Figure 8.9: Dispositional Pessimism as measure by the LOT-R at baseline, at post-intervention, 1-month follow-up, and 3-month follow-up per condition.
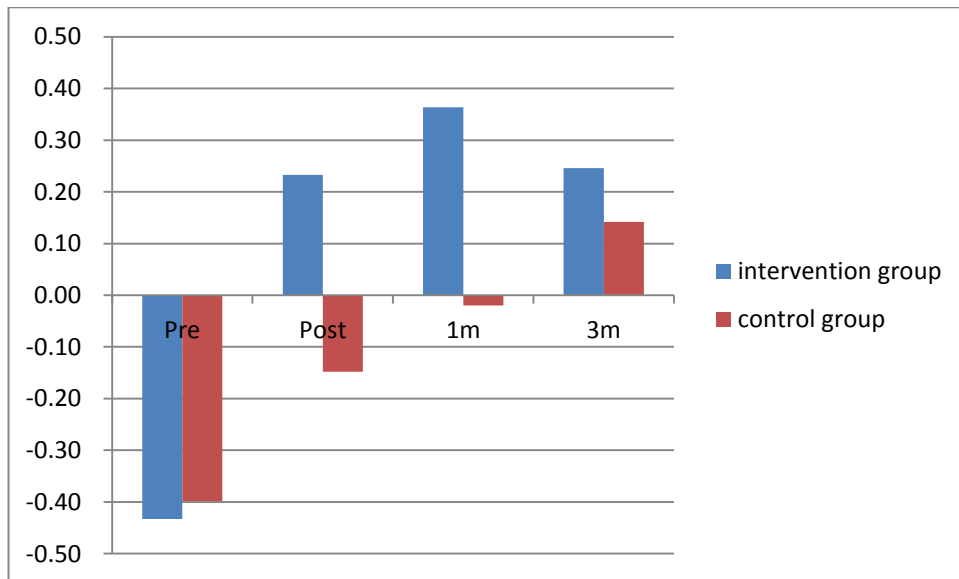
Figure 8.10: Subjective well-being as measure by the SWLS at baseline, at post-intervention, 1-month follow-up, and 3-month follow-up per condition.
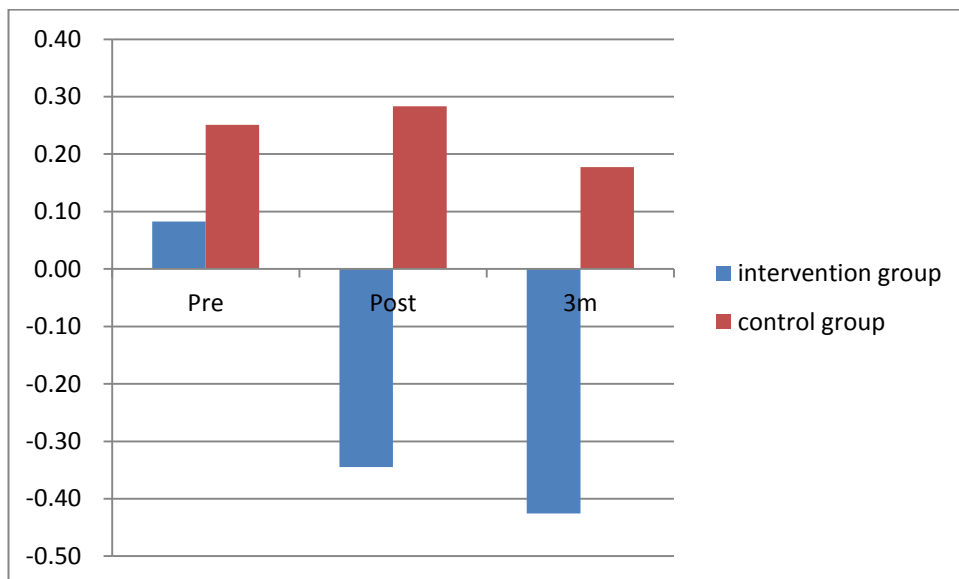

Figure 8.11: Attributional style for negative events as measure by the ASQ at baseline, at post-intervention and 3-month follow-up per condition.
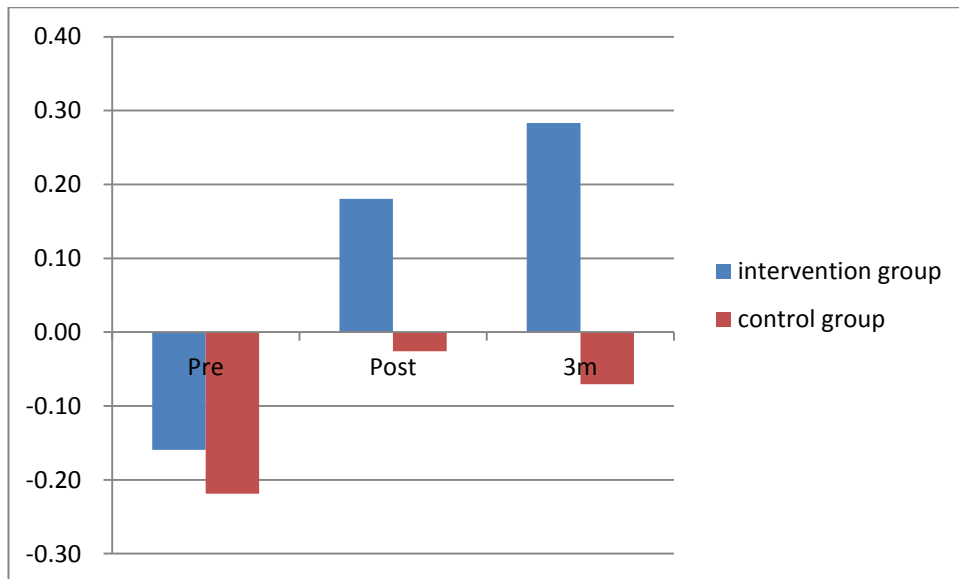
Figure 8.12: Attributional style for positive events as measure by the ASQ at baseline, at post-intervention and 3-month follow-up per condition.

Immediate post-intervention

Right after the completion of the two-week intervention, supporting the first hypothesis, students in the experimental group reported a greater decrease in depressive symptoms relative to students in the control group (see Figure 8.7), $t(57)$ = -2.30, p = 0.025. However, although participants in the intervention group displayed a trend toward an increase in LOT-R Optimism and a decrease in LOT-R Pessimism relative to the control group right after the intervention (see Figure 8.8 and Figure 8.9), two-tailed t tests showed that the experimental group and the control group did not significantly differ on either LOT-R Optimism ($t(57) = 1.95$, $p = 0.057$) or LOT-R Pessimism ($t(57) = -1.54$, $p = 0.129$). Similarly, as displayed in Figure 8.10, although intervention group participants were still showing a trend toward greater subjective well-being gains compared with the control group, it was not significant ($t(57) = 1.75$, $p = 0.086$).

For explanatory style measured by the ASQ, participants in the experimental group reported a greater decrease in ASQ-Negative relative to participants in the

control group (see Figure 8.11), $t(57) = -2.16$, $p = 0.035$. However, a comparison of the intervention group with the control group on the ASQ-Positive failed to reach statistical significance, though participants in the experimental group displayed a trend toward an increase in ASQ-Positive (see Figure 8.12).

Follow-ups

As expected, again supporting our most important prediction, BDI scores of the intervention group were lower than those in the control group, $t(57) = -2.42$, $p = 0.019$, though depressive symptoms in the control group also experienced a trend toward decreasing one month after the intervention (see Figure 8.7). This difference was kept three months after the intervention had ended but did not reach statistical significance, $t(57) = -1.98$, $p = .053$.

A comparison of LOT-R Optimism, LOT-R Pessimism, and SWLS contrasting the experimental group with the control group in the one-month follow-up or the three-month follow-up failed to reach statistical significance, with one exception. LOT-R Optimism scores for the intervention group were significantly lower than those in the control group one month after the intervention had ended, $t(57) = 2.13$, $p = 0.037$, though LOT-R Optimism in the control group also experienced a trend toward increasing (see Figure 8.8). For life satisfaction, although participants who had completed the optimism intervention displayed a trend toward greater increases relative to the control group one month after the intervention had ended, this difference did not reach statistical significance (see Figure 8.10).

As expected, three months after the intervention had ended, ASQ-Positive and ASQ-Negative showed beneficial changing patterns, though only the differences and changes of ASQ-Negative reached statistical significance. Specifically, for the ASQ-Negative, participants in the experimental group decreased their scores while the control group kept a relatively stable level (see Figure 8.11), and as a result the intervention group participants reported lower ASQ-Negative scores than their counterparts in the control group, $t(57) = -2.62$, $p = .011$. For ASQ-Positive, participants in the experimental group displayed a trend toward increasing their

scores, while the control group slightly decreased their scores. The difference of ASQ-Positive scores between the intervention group and the control group in the three-month follow-up was even bigger than the difference between these two groups in post-intervention (see Figure 8.12). However, this difference failed to reach statistical significance.

8.2.4 Discussion

The current investigation demonstrated that minimally supervised and self-administered optimism interventions for a two-week period could result in decreases in depressive symptoms and pessimistic explanatory style and enhance dispositional optimism. Although participants in the experimental group did not significantly decrease dispositional pessimism and significantly increase subjective well-being, findings indicate that increases in dispositional optimism and decreases in pessimistic explanatory style were associated with decreases in depressive symptoms.

Moreover, the benefits in decreasing depression in the intervention group continued one month and three months after the intervention. These results indicate that a brief and self-monitored intervention is effective in reducing symptoms of depression and enhancing well-being.

8.3 General discussion

Both studies shared similar and slightly different trends in changes of depressive symptoms in LOT-R Optimism, LOT-R Pessimism, ASQ Positive, ASQ Negative, and subjective well-being of experiment groups. They generally showed a greater increase in LOT-R Optimism, ASQ Positive, and subjective well-being and a greater decrease in depressive symptoms, LOT-R Pessimism, and ASQ Negative for participants in the intervention group than their counterparts in the control group, though not all of these changes and differences reached statistical significance. For example, though LOT-R Optimism showed a greater increase in post-intervention for the intervention group in both studies, it produced differential increases between the intervention condition and the control condition only in the one-month follow-up in Study 2. This finding was unexpected given that previous findings showed that

writing about and imagining a BPS leads to an immediate increase in dispositional optimism (Meevissen et al., 2011; Peters et al., 2010; Peters et al., 2013). Given that previous studies of BPS had only been applied in non-clinical settings and participants in my studies were first-year college students with mild-to-moderate depressive symptoms, the failure of significant increases in LOT-R Optimism might not be so unexpected.

I should point out, though, that the level of depression reduction of the intervention group in Study 2 was lower as compared to the level of depression reduction for the intervention group in Study 1. Two considerations may be helpful to account for the smaller difference found between the experiment group and the control group in Study 1 than in Study 2. First, it has been argued that individual positive psychotherapy is effective in reducing depressive symptoms (Seligman et al., 2006). Accordingly, since three individual counselling sessions were included in Study 1 in addition to SOT and BPS exercises, and these individual counselling sessions were excluded in Study 2, differences in reduction of depressive symptoms between these two studies could be expected. Secondly, as noted by some researchers, one of the major concerns in psychological assessment is the possibility of social desirability and demand effects. The social desirability bias might be larger if students were keen on making good impressions to the counsellors. Hence, it is possible that participants in the intervention group in Study 1 were more obviously affected by social desirability than in Study 2.

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Chapter 9: Understanding optimism

Thinking rosy futures is as biological as sexual fantasy. Optimistically calculating the odds is as basic a human action seeking food when hungry or craving fresh air in a dump. Making deals with uncertainty marks us [as a species] as plainly as bipedalism. – Tiger (1979, p. 35)

Tiger's quotation suggests that the trait of being optimistic or pessimistic has biological origins as similarly stated by evolutionary hypotheses, which assume that something genetic underlies the trait that is selected. Basically, evolutionary psychology focuses on general traits, and provides interpretations for distal causes of these traits relative to other species in terms of the environmental risks faced by the species and of their physical properties in dealing with these challenges.

Optimism has had a profound influence in the fields of counselling, psychology, and sociology. The psychological accounts of optimism have long been involved in the pursuit of a more adaptive life for human beings. No matter what the appoach in defining and measuring optimism, it has been widely accepted that being optimistic represents the tendency and desire to maintain positive and adaptive thinking, leading to positive emotions and behaviors, for promising expectations and optimisitc attributions in life (Alarcon, Bowling, & Khazon, 2013; Andersson, 1996; Carver & Scheier, 2014; Carver et al., 2010; Forgeard & Seligman, 2012).

Two main approaches of optimism, dispositional optimism and optimistic explanatory style, were the core variables in my research of understanding optimism. In a series of studies I investigated several aspects concerning these two traits, including their psychometric structures, the relationship between dispositional optimism and explanatory style, associations of optimism with psychological well-being and personality, and potential cultural influences on optimism between two ethnic groups. In addition, I conducted two pilot studies in the field of attributional

style, including the exploration of attributional style in others, and an examination of the potential self-serving attributional bias in self- and other-settings. Finally and importantly, after examining what optimism is and how we measure it, I explored the possibility of optimism interventions on depressive symptoms.

Most of the studies involved Chinese undergraduate samples, except the cross-cultural study of optimism. Findings in these studies are helpful to improve the understanding of optimism in non-English speaking countries. In the first part of this chapter, I reviewed and summarized the main findings concerning the psychometirc structure of the basic measures in my study: the ASQ for explanatory style and the LOT-R for dispostional optimism. Additionally, correlations between dimensions of these two measures and two important psychogical variables, which include psychological well-being and the FFM, were also briefly reported.

9.1 Summary of main findings

ASQ: three valence-independent cognitive styles

Explanatory style or attributional models of optimism, as measured by the ASQ, focus on three aspects of attributions for the causes of positive and negative events: internality, stability, and pervasiveness. These three aspects are assumed to cluster within each valence forming explanatory-style factors and these in turn are predicted to correlate negatively. Optimistic explanatory styles are associated with the belief that the causes of negative events are external, unstable, and pervasive, while a pessimistic attributional style assigns negative events as brief, affecting more than one aspect of life, and internally caused (Forgeard & Seligman, 2012). However, several empirical studies reported positive and negative events being uncorrelated (Philip J. Corr & Jeffrey A. Gray, 1996; Peterson et al., 1982). With a non-Western sample, I carried out the first test of the full structure of attributions controlling for response non-independence.

Both negative and positive event attributions fit a three-dimensional structure just as reported by Hewitt et al. (2004) and Higgins et al. (1999). However, the joint modelling analysis of positive and negative events revealed that attributional biases to positive and negative events were uncorrelated (see Figure 2.8). This model was successfully replicated in an independent sample. Cognitive styles emerged as an important influence on responding: valence-independent cognitive styles accounted for 85 percent of variance in the latent-factor model. This suggests that subjects apply consistent cognitive styles independent of event-valence, with personal tendencies to explain events as, for instance, global or local independent of event valence. Subjects rating negative events as global tended also to describe positive events in terms of pervasive attributions, and likewise for the other two styles. In conclusion, attributions may be best viewed as reflecting large differences in cognitive style (independent of event valence), and smaller independent positive– and negative-event biases.

LOT-R: separating dispositional optimism from dispositional pessimism

As the most frequently used measure of dispositional optimism, the LOT or its revised version, the LOT-R, has been applied widely in numerous studies. Though dispositional optimism was originally presumed to be a bipolar dimension, as measured by the LOT or LOT-R (Scheier & Carver, 1985; Scheier et al., 1994), a debate concerning the dimensionality of this variable has begun. More and more evidence indicates that the LOT or LOT-R may reflect a two-factor model of dispositional optimism. The positively and negatively phrased items in the measure split into two factors, namely "optimism" and "pessimism", representing two distinct traits (Chang et al., 1997; L. Chang & McBrideChang, 1996; Creed et al., 2002; Roysamb & Strype, 2002). Structural modelling of the LOT-R in my study corresponded with previous findings that this measurement is better to be explained as a two-dimensional structure scale.

Additionally, correlations between dispositional optimism and explanatory style were examined. LOT-R optimism was positively correlated with ASQ Total and ASQ Positive, but the correlation was lower than it has been reported by earlier

studies. Moreover, LOT-R optimism was positively correlated with Stable Positive and negatively correlated with Stable Negative, but had no significant correlation either with ASQ Negative or with any three dimensions of negative events. No significant correlation was found between ASQ Pessimism and any ASQ dimensions. Because only a general correlation between the LOT-R and ASQ composite has been reported in most previous studies, results in this study provided at least some benefits to better understanding the relationship between dispositional optimism and explanatory style.

Furthermore, my study provided empirical evidence of the correlational patterns between explanatory style and dispositional optimism in a non-Western sample. The results were generally consistent with findings of previous research in Western samples. That is, explanatory style and dispositional optimism are weakly correlated (Forgeard & Seligman, 2012).

Optimism and the Five-Factor Model of personality

Optimism has been identified as thoughts and beliefs people hold for life and the future. Both attributional style and dispositional optimism have been assessed largely through their linkage to traditional personality traits, especially the FFM.

For explanatory style, attributions for negative events has been found to be negatively correlated with Conscientiousness (Musgrave-Marquart et al., 1997). Correlational analyses between ASQ and FFM dimensions in my study supported this finding. Attributional styles for negative and positive events have been found to have different correlational patterns with the FFM. While the ASQ Negative is positively correlated with Neuroticism, and is negatively correlated with Extraversion and Conscientiousness, ASQ Positive is positively related to four of the five NEO-PI-R dimensions, excepting Neuroticism. Though attributions for positive and negative events may reflect differentiated cognitive styles, these results suggest that Conscientiousness may be considered as an important predictor of attributional style.

For dispositional optimism, its bidimensional structure has been further supported in an SEM model correlating LOT-R and the FFM. An initial base model that incorporates two differentiable but related factors (LOT-R Optimism and LOT-R Pessimism) through their links to the FFM was proposed and supported by data. Based on these findings, dispositional optimism may be best viewed as reflecting two distinct traits, which are reflected in LOT-R Optimism items and LOT-R Pessimism items.

Additionally, associations among the LOT-R, ASQ, and NEO-PI-R scales provide at least some evidence of the related but distinct relationship between the two optimism structures. Though LOT-R Optimism and ASQ Positive both had strong associations with the same four FFM factors, Neuroticism was only significantly correlated with LOT-R Optimism but not ASQ Positive. In addition, Openness only significantly correlated with LOT-R Pessimism but not with ASQ Negative.

Mixed correlational patterns emerged when gender differences were taken into account in analysing the relationship between optimism and personality. Results showed that Agreeableness was the critical factor in differentiating attributional styles of men and women. Specifically, Agreeableness was correlated with ASQ Positive for men but not women, while it was correlated with ASQ Negative for women but not men. For associations between LOT-R and NEO-PI-R scales, gender differences presented a more complicated pattern. While Agreeableness was correlated with dispositional pessimism for men but not for women, Openness was correlated with both dispositional optimism and dispositional pessimism for women but not for men.

Moreover, in the correlational analysis on optimism and specific facets of each FFM factor, results demonstrated the positive correlations between optimism (both high levels of dispositional optimism and optimistic explanatory styles) and psychological well-being, such as lower depression scores and higher levels of positive emotions.

Optimism: a strong predictor of psychological well-being

Dispositional optimism and explanatory style have been consistently related to health and well-being. Previous investigations have shared two primary limitations. They either have exclusively assessed only one construct of optimism (attributional style or dispositional optimism) or merely measured one approach of well-being (subjective well-being or psychological well-being). Even in studies where the two fundamental constructs of optimism have both been assessed, the potential mediating model linking all these constructs has not been examined. My study used SEM models to construct relationships between optimism and psychological well-being.

Results from my study indicate that more optimistic individuals report a higher level of psychological well-being, which is consistent with studies conducted in Western participants. That is, individuals who have positive expectations for the future are more likely to report high levels of psychological well-being. Optimistic explanatory style may serve as another protective factor for well-being. There is evidence that optimists tend to face adversity and deal with negative situations more effectively than pessimists and can cope more adaptively with stress and, in turn, gain more psychological benefits (Scheier & Carver, 1992).

Also, consistent with previous studies that individuals who have an optimistic explanatory style are more likely to report higher levels of psychological well-being than people with a pessimistic attributional style (Wise & Rosqvist, 2006), the current results revealed that higher scores on ASQ Positive and lower scores on ASQ Negative were significantly correlated with higher levels of psychological well-being dimensions. Optimistic explanatory style may serve as a protective factor for well-being.

The proposed mediating role of dispositional optimism between explanatory style and psychological well-being was supported in the study. Results from structural equation modelling indicated that explanatory style, dispositional optimism, and PWB are positively associated with each other; dispositional optimism and optimistic explanatory style are predictors of psychological well-being; and

dispositional optimism acts as a mediator between explanatory style and psychological well-being.

Overall, this study provides consistent evidence of, and further support for, the beneficial effects of both two types of optimism on psychological well-being in a college student sample. Both dispositional optimism and optimistic explanatory style are strong predictors of psychological well-being. Explanatory style and dispositional optimism are weakly correlated (Forgeard & Seligman, 2012), though both constructs are moderately correlated with well-being (Carver et al., 2010). Overall, these findings are consistent with previous research in Western samples.

9.2 Does culture make a difference

Several studies investigated the universality of optimism using large sample sizes. Fischer and Chalmers (2008) examined levels of dispositional optimism using a meta-analytic approach, and reported that overall cultural differences in dispositional optimism were small. The study involved a sample of 89,138 participants (more than half American) from 22 countries. The optimism scores on average were found to be significantly higher than the midpoint of LOT responses. Later, Gallagher et al. (2013) examined the cross-cultural effects in optimism using a much larger sample (n = 150,048) collected in the first wave of the Gallup World Poll involving participants from 148 countries. They found that dispositional optimism was significantly correlated with subjective well-being and perceived physical health both at the country and the individual level, though the associations varied across countries.

Cultural differences in optimism have been found in cross-cultural studies as well. Michalos (1988) conducted one of the very first studies examining the worldwide optimism level using the Gallup Report data. Participants from 31 countries were asked a single question: "So far as you are concerned, do you think that 1987 will be better or worse than 1986?" Participants who gave the positive answer to this question were classified as being optimistic for the future. Results

revealed that the optimism level of most countries and most individuals was not promising, with only an average of 32 percent of participants in all countries expecting a better future for the next year. The fact that some countries (such as Canada and the U.S.) had a higher ratio of optimistic people than average indicated potential cultural differences in optimism.

Still, in a meta-analytic study of the relationship between dispositional optimism and coping style, Nes and Segerstrom (2006) reported that stronger correlations between optimism and coping were found among participants in English-speaking countries than their counterparts in non-English-speaking countries. The results indicated that culture and language may have impacts on the optimism-coping relationship.

The universality of the self-serving bias in causal explanations was supported by the data in my study. Both ethnic groups (Mainland Chinese and White British) reported positive ASQ Total scores, indicating a universal trend of holding an optimistic explanatory style or a self-serving bias in causal attributions no matter what the cultural background.

Admittedly, culture still plays a part in labelling different patterns and merits of optimism, including both dispositional optimism and explanatory style. My study concerning potential cultural differences on these two optimism approaches tested several hypotheses. The first aim was to test whether similar psychometric structures were applicable for the White British sample as in the Mainland Chinese sample. the results revealed that a model of causal attributions for positive events in terms of three correlated factors of globality, stability, and internality adequately accounted for responses to these positive but not negative events in the ASQ. For the LOT-R construct, a similar two-factor model of dispositional optimism was supported by my study in the White British sample.

Results revealed several basic points concerning potential cultural differences in optimism between the two ethnic groups. First, they were found to differ among a number of important outcome variables in optimism. For example, Mainland Chinese

showed a more pessimistic explanatory style for explaining ASQ negative events than their White British counterparts, which supported the proposal that Easterners tend to use more unfavourable attributions for negative events than Westerners. For explanations of ASQ positive events, unexpected patterns emerged. Mainland Chinese expressed a more optimistic attributional style than White British in attributing positive events, which was inconsistent with some previous research. However, the results were consistent with our analysis that individuals tend to produce similar patterns of explanations based on cognitive style rather than on event type. These mixed results suggest that the cultural influence on optimism is not uniform for at least some of the differentiated dimensions.

Additionally, the associational patterns between measuring scores of optimism dimensions was quite similar for the two ethnic groups concerned, for example, positive correlations between LOT-R-optimism and optimistic explanatory style were found for both Mainland Chinese and White British. Discrepancies between these two ethnic groups exist, however. For example, there was a weaker negative association between LOT-R-optimism and LOT-R-pessimism for White British than for Mainland Chinese, indicating a potential cultural or linguistic effect on optimism measuring outcomes.

One aspect worth noting was the change in tendency of traditional discrepancies in optimism between Easterners and Westerners found in my study. The Mainland Chinese sample in this study expressed higher levels of LOT-R-optimism and lower levels of LOT-R-pessimism than their White British counterparts. In addition, Mainland Chinese also reported a more optimistic explanatory style for positive events than White British. All these results are inconsistent with traditional views of cultural discrepancies between the East and the West. However, these findings are not as unexpected as they may seem, if two factors are considered. First, it has been argued that broader social factors should be taken into account in understanding optimism and pessimism (Lee & Seligman, 1997). Accordingly, these seemingly unexpected findings might be unique to this young Chinese population. The relatively recent fast economic growth of China may provide an explanation for Chinese people, especially as young generations feel more

optimistic and confident than previously, therefore dimming previous cultural influences on optimism.

Secondly, as noted by some researchers, one of the major concerns in examing culture differences in optimism is that it might be a problem for Easterners to get the exact meaning of LOT-R items since this questionnaire has been developed on the basis of Western cultures (Anderson, 1999). Hence, it is possible that there are slight gaps in understanding the meaning of optimism and pessimism. At the very least, this is in line with some results from previous research, as discussed earlier, that found no group differences in optimism across cultures (Chang et al., 2003), or differences that were more nuanced (Chang, 1996).

It should also be bear in mind that both these ethnic groups reported positive ASQ Total scores in spite of differences in explanatory style between these two cultural groups. This result indicated taht no matter what their cultural background was, individuals tend to explain positive events with more internal, stable and global causes than negative events. This conclusion is consistent with previous cross-cultural evidence (e.g., Higgins & Bhatt, 2001), revealing that there is a universal trend of positive bias in causal attributions.

9.3 Do people exhibit bias in attributing causes to events happening to others?

Though self-serving bias and self-versus other bias in causal attributions are theoretically linked to each other, these two attributional biases have been studied separately in prior literature. Unlike self-serving attributional bias that is mainly assessed by the three-dimensional ASQ, self-versus other bias in causal attributions has been restricted to the dimension of internality using diverse measures. To include both self-serving bias and self-other bias in attributions into the widespread three-dimensional model, I combined these two biases systematically across subjects (self and other), valences (positive and negative events), and causes (traits and states) by

using the ASQ and a rewritten novel version of this measure (ASQ-Other), in which participants generated attributions for events occurring to others.

Data and modelling analysis supported a model of causal attribution in terms of three correlated factors of internality, stability, and globality accounting for responses to both positive and negative events in the ASQ-Other, just as in the ASQ. In particular, the ASQ-Other scale appears to be a valid and reliable measure, and should be used in future studies to measure how people attribute others' life events outcomes.

The ASQ and the ASQ-Other were then used to assess self-serving attributional bias and self-other attributional bias respectively. For self-serving attributional bias, findings demonstrated that individuals tend to maximise positive and minimise negative future outcomes in making attributions, thus show a self-protective bias in causal explanations for personal outcomes or situations. This self-serving bias manifested in each of the three attributional dimensions across event valence. When individuals assign causal explanations for life events, they prefer giving more internal, stable and pervasive causes for positive outcomes than for negative outcomes. For unfavourable situations, individuals have the tendency of attributing those situations to external, unstable, and specific causes.

For self-versus-other bias, results showed that people have more optimistic explanatory styles for similar situations for themselves than for other people. This self-versus-other bias exist in people's attributions for both positive and negative events. While individuals attribute others' positive situations to external variables, they explain their own positive outcomes using more favourable internal causes. The opposite is true for negative situations. In summary, explanations for causes of positive and negative events can be differentiated between self and other. Individuals give more optimistic explanations for themselves than they did for others.

Additionally, results revealed that participants tend to attribute internal, stable, and global attributions for positive events while they generate external, unstable, and specific explanations for negative events no matter whether the subjects are

themselves or other people. Though people tend to have a more optimistic explanatory style in events for themselves than for others, they expressed an optimistic-biased attribution in explaining the causes of life events for other people.

Since prior studies in attributional bias have mainly been conducted in Westerners, results confirming the existence of two forms of attributional biases in an Eastern sample provided further evidence to prior findings. It appears that there may be a universal tendency for individuals to protect themselves against negative feelings by using an optimistic attributional style.

In summary, the results show that consistent with prior studies, these two cognitive biases in causal attribution, or a tendency to hold an optimistic explanatory style, also exist in at least the ,non-Western group in this study. Findings in the current study demonstrated that causal attributions about life events possess a self-protection feature, as suggested by Heider (1958). That is, individuals tend to maximize positive and minimize negative future outcomes in making attributions, thus showing a self-protective bias in causal explanations for personal outcomes or situations.

9.4 Effective optimism interventions for depression

Due to diverse causes pf life transitions, such as challenges of living in a different and unfamiliar environment, first-year undergraduate students have often been found vulnerable to negative feelings, such as depression and anxiety, which can negatively affect quality of life and academic performance (Brandy et al., 2015; Negovan & Bagana, 2011). Previous studies have indicated that dispositional optimism and attributional style may play an important role in psychological adjustment during the first year in university (Brissette et al., 2002; Chemers et al., 2001; Peterson & Barrett, 1987; Reisbig et al., 2012).

Previous research has shown that the effortful practice of imagining one's best possible future self and figuring out optimistic attributional styles for life events lead to improved well-being and decreased negative feelings (Fresco et al., 2009;

Lyubomirsky et al., 2011; Peters et al., 2013). Although a number of studies have explored the impact of BPS and SOT, no extensive study has tested their effectiveness for treating depression has yet, to my knowledge, been conducted. I applied these two forms of optimism interventions in two studies to evaluate the feasibility of these interventions in depressed first-year college students. According to previous findings concerning the influences of attributional style and dispositional optimism have on academic performance, depression, and psychological adjustment, the current investigations aimed to evaluate the feasibility of a prophylactic optimism intervention in reducing depressive symptoms and improving psychological well-being. Specifically, I sought to examine the beneficial effects of practicing SOT and BPS daily on depressive symptoms, subjective well-being, dispositional optimism, and explanatory style in a non-Western population.

The first pilot study combined an individual counselling session and self-administered optimism manipulations to investigate the potential benefits of optimism intervention. Results showed that individuals in the experimental condition were less depressed than those in the control condition at post-intervention and two follow-ups. Study 1 also showed that optimism interventions were beneficial in developing optimistic explanatory styles, especially for attributions for negative events. Extending previous findings that imagining and writing about a BPS leads to an decrease in negative feelings (Shapira & Mongrain, 2010) and that practicing optimistic attributions results in a reduction of depressive symptoms (Fresco et al., 2009), the first study showed that daily practice of BPS an SOT for two weeks can lead to sustained decrease in depression. In comparison with participants of the control group, results revealed that individuals who practiced the BPS and SOT techniques experienced less depressive symptoms and generated more optimistic explanatory styles.

Though Study 1 has demonstrated that supervised and self-monitored optimism interventions results in greater decreases in depressive symptoms in the experimental condition, it raised the concern that this beneficial effect might be due to the individual face-to-face counselling sessions in the interventions. To test whether self-

directed and self-administered optimism interventions could result in similar benefits for decreasing depression, a second study was conducted.

The second study demonstrated that minimally supervised and self-administered optimism interventions for a two-week period could result in decreases in depressive symptoms and pessimistic explanatory styles and enhance dispositional optimism. Although participants in the experiment group did not show a significantly greater decrease in dispositional pessimism or a significantly greater increase in subjective well-being, findings indicated that increases in dispositional optimism and decreases in pessimistic explanatory style were associated with decreases in depressive symptoms. Moreover, the benefits in decreased depression in the intervention group was continued one month and three months after the intervention. the results indicated that a brief and self-monitoring intervention is effective in reducing symptoms of depression and enhancing well-being.

In general, both studies found evidence that a best possible self (BPS) imagery intervention and self-administered optimism training in attributional style (SOT) reduces the incidence of episodes of mild-to-moderate depression compared to a control condition.

9.5 Deeper understanding of optimism: theoretical contributions to optimism literature and future directions

Although it is still not clear what the exact relationship between explanatory style and dispositional optimism is, findings from the literature are mostly consistent. Attributional style is related to a variety of psychological and physical health indices, including academic achievement, depression, and physical illness (Wise & Rosqvist, 2006). Peterson and Seligman (1984) reviewed a variety of evidence showing that a pessimistic attributional style predicts increases in depression over time in different populations, such as lower-class women, children, and depressed patients. Similarly, dispositional optimists report fewer depressive symptoms and fewer physical health

problems than pessimistic people (Carver & Scheier, 2014; Carver et al., 2010; Scheier & Carver, 1987, 1992). These associations between the tendency to maintain positive expectations for the future and improved well-being have been widely recognized (Gallagher et al., 2013). My studies have replicated findings of a positive relationship between optimism and well-being.

Previous studies have tried to identify optimism within a broad personality domain, and it has been suggested that optimism represents a blend of Neuroticism and Extraversion (Marshall et al., 1992). However, later work tends to support the view that optimism also has some overlap with other Big Five Factors (Kam & Meyer, 2012; Poropat, 2002; Sharpe et al., 2011). Findings in my study also support this view.

In summary, optimism is a personality trait that can be related to nearly every aspect of people's life. It is clear that for encouraging people in general to be more hopeful about the future, optimism interventions related to both attributional style and dispositional optimism are worth further exploration. Though this stage of research is focused on several aspects of feasibility, such as manual development, pilot testing, and psychometric evaluation, the current investigation in my studies supports the feasibility of prophylactic optimism intervention in reducing depressive symptoms. The results indicate that positive interventions using optimism may be suitable to study and establish effective early intervention for decreasing depressive symptoms.

In recent years, the effects of positive thinking and behaviour have received growing attention by psychologists, sociologists, anthropologists, clinicians, and health professionals. With the increase in popularity of positive psychology, optimism has gained more attention from the field of positive social science, and allows for an examination of more aspects in life outcomes, such as the domain of social relationships. It has been reported that optimism is linked to greater social network size, and greater social support than pessimism (Carver & Scheier, 2014). Given the accumulation of evidence, it is clear that optimism is an individual difference variable that plays a central role in human experience in positive

psychology. Psychologists interested in optimism tend to correlate it with many other psychological constructs, for instance those related to explanatory style and dispositional optimism.

Although our findings provide some insight into the intricate covariations frequently observed between certain psychological traits and optimism, a few methodological and sampling limitations of my studies must be mentioned. First, all the samples involved are consisted of college students, which might have specific characteristics in optimism. Previous studies have shown that older people may have different characteristics comparing with younger people. For example, in samples including Americans and Hong Kong Mainland Chinese, You et al. (2009) reported that older Mainland Chinese displayed a lower level of dispositional optimism than did younger Mainland Chinese, whereas older Americans showed a higher level of dispositional optimism than their younger counterparts. However, there is no concrete evidence supporting this view in explanatory style in Chinese samples as far as I know. Second, all the participants are undergraduates studying in the cities. The level of optimism and correlations between optimism and other psychological constructs, like psychological well-being, might vary to backgrounds of rural/urban or different social economic status (Heinonen et al., 2006; MacLeod & Conway, 2005). Accordingly, further investigations and future studies would link optimism variation to samples of several age groups, with different social backgrounds and other features that might have influences on optimism. Third, it should be kept in mind that SEM does not allow one to many any confident causal inferences about relationships between variables. A model that fits the data well can only explain part of the true correlations but not the whole truth. Thus, my conclusions got though SEM modelling remain tentative. Additional work on these relations will strengthen inferences regarding some pathways that have not been previously reported.

Fourth, though the two intervention studies have both supported effectiveness of optimism intervention in promoting psychological well-being, especially in decreasing depressive symptoms, they were only pilot studies with relatively small samples of college students. It should be very cautious to generalize these findings in people with wide backgrounds and varieties. Another possible limit was the use of

self-report surveys in assessing variables involved in all my studies. As discussed, people's self-reporting perceptions of optimism-related traits may be greatly affected by social desirability. Data from multiple perspectives, such as reports from friends and family members, might improve findings' validity and reduce problems of shared method variance.

9.6 Is optimism always good? Is pessimism always bad? The evolutionary explanations for optimism and pessimism

Having a different approach in dealing with people and happenings in the surrounding world, in attempts to solve problems encountering in life, in attributional styles to explain good or bad life events, in coping strategies facing difficult situations, and even in attitudes dealing with social relationships, optimists and pessimists behave differently in many core psychological and social processes, which undoubtedly have substantial impacts on every aspect of their lives. Basically, optimism and pessimism have been taken as inherent aspects of human nature and also as individual differences in both theoretical discussions and empirical investigations. Diverse benefits of optimism and concomitant drawbacks of pessimism have been documented by a number of researches in psychology and other social fields.

It has long been believed that positive thinking is linked to promising feeling. Such an assertion has been examined over the last 35 years, with much solid scientific evidence provided by psychologists through numerous empirical studies. In addition to the benefits of being optimistic on physical health, it also has to be made clear that positive thinking is linked to physical well-being only through a complex process that involves intertwined biological, emotional, cognitive, and social elements (Peterson & Bossio, 2001), but does not directly determine how well people feel about their physical health.

The evidence reviewed in the prior sections suggests that being optimistic seems like holding the keys to a rich and fulfilling life. Optimism is such an adaptive feature that it is positively correlated with promising results in various contexts.

Conversely, pessimism is such an unfavourable trait that it indicates passivity, failure, social estrangement, mortality, and depression.

Generally speaking, lines of research in optimism and pessimism are surprisingly uniform, so much so that a popular trend of optimism has been created, within psychology as well as the general public. Then one question comes: Why pessimism has not been entirely abandoned in the life of human being? To answer this question properly, we have to first entangle the relationship of optimism and pessimism from an evolutionary view, and also review some concrete evidence of the downside optimism and upside of pessimism.

Optimism has long been taken as an inherent aspect of human nature and one of the most defining and adaptive characteristics of human being (Tiger, 1979). From an evolutionary view, Tiger speculated that optimism first appeared when people began to think about the future concerning dire consequences, which their own mortality was included. To counteract the fear and powerlessness that these anticipations might involve, something entailing hope had to be developed. Then optimism came as an inherent and nature part of human nature.

To think about the evolutionary nature of optimism, we have to deal with the relationship of optimism and pessimism. Are there effects of optimism above and beyond those of the absence of pessimism? This intriguing question has to be investigated first. Optimism and pessimism are usually taken as mutually exclusive, but there is evidence that they are not. Taking one of the most popular measuring tools of optimism, the LOT, as example, optimism was constructed reflecting a bipolar construct (Scheier & Carver, 1985). That is, there is plentiful possibility that some people expect both good things and bad things. Optimism and pessimism are not exclusively independent of one another.

Similarly, though explanatory style was originally differentiated as two independent categories, which assigns people an optimistic or a pessimistic explanatory style. An optimistic explanatory style consists of explaining positive events as enduring, global and internally generated, while also explaining negative events as unstable, specific, and externally caused (Forgeard & Seligman, 2012). Concept of attributional style also predicts that the three types of explanation are correlated each other within at least within each event valence. Subsequent

researches have resolved in findings that are somewhat counterintuitive. For instance, P.J. Corr and J.A. Gray (1996) investigated the factor structure of the ASQ in two independent samples and found that positive and negative explanatory styles were independent. The study of Bunce and Peterson (1997) also revealed that there is no correlation between explanations for positive and negative events. This independence was reported in my SEM analysis of ASQ in two Chinese samples as well. Along these lines, as already noted, explanatory style derived from attributions about negative events and explanatory style based on attributions about positive events may be not as independent as originally thought. It might be best to view explanatory style as a strategy of excuse making (Snyder et al., 1996). For most individuals, mixed attributional styles should be expected: such as optimistic explanations for negative events and pessimistic attributions for positive events.

Within attributional models of depression, the attributions are seen to cause heavy distinct behavioural consequences. For instance, low self-esteem is agreed to be linked with internal attributions regarding negative events, while chronic depression is suggested to result from stable attributions for negative events (Haugen & Lund, 1998; Peterson et al., 1982). In this learned helplessness model, depression emerges as a consequence of experience with uncontrollable negative events (Abramson et al., 1978).

From the underlying assumption of positive psychology, psychological well-being cannot be simply seen as the absence of distress and negative emotions. Positive states or traits are not necessarily the obverse of negative experiences and traits; and positive emotions and behaviours are described by a completely separate psychological process that functions via an isolated neural mechanism (Duckworth et al., 2005). Along these lines, dispositional optimism is not necessarily the obverse of dispositional pessimism; and optimistic explanatory style is not exclusively absence of pessimistic explanatory style.

In addition to the evolutionary explanations and theoretical origins of optimism and pessimism, evidence from some empirical studies has proven that optimism in some circumstances can have drawbacks and costs. Researchers have begun to look for these qualifying conditions in various contexts. It is proposed that optimists may have worse experiences in confronting negative outcomes than

pessimists due to their disconfirmed promising expectations (Gibson & Sanbonmatsu, 2004). Accordingly, a question has then been raised virtually from the inception of research on the optimism structure：Are there certain contexts or situations in which optimism can potentially result in undesirable outcomes?

Some studies have tried to answer this question with concrete evidences. For example, Gibson and Sanbonmatsu (2004) investigated relationships between dispositional optimism and gambling expectations and behaviours. They reported that optimists had more positive expectations for gambling than did pessimists, and were more likely to maintain their betting even after poor outcomes. These findings suggest that too much confidence and persistence might be counterproductive at least in certain kinds of contexts, such as gambling.

Also, it has been suggested that optimism might not have the same protective benefits as pessimism because optimists tend to see only what they want to see and might ignore information of potential health threats (Norem & Chang, 2002). For example, Luo and Isaacowitz (2007) examined how optimists process health-related information regarding skin cancer. Their results indicated that pessimists paid more attention to negative health-related information than optimists in certain kinds of situations, though optimists were more likely to perform adaptive health-promoting behaviours. These results suggest the possibility of different information-processing methods between optimists and pessimists.

In another study, Hmieleski and Baron (2009) reported a negative relationship between entrepreneurs' optimism and their performance, defined as revenue and employment growth of their new ventures. This negative relationship suggests that optimists often hold unrealistic expectations and are overconfident, which was assumed to lead to poor decision-making in processing negative information. In a very recent study, Lau et al. (2014) did not find a positive relationship between optimism and positive affect. Instead, pessimism showed beneficial effects on positive affect and feelings of success when optimism and internal attribution were disentangled.

Though these rare findings of potential adverse effects of optimism seem small in comparison with the vast beneficial effects of being optimistic, they should be taken into account when considering the effects of optimism, at least in certain

kinds of contexts and situations. It should be kept in mind that pessimism is an independent trait that has its own evolutionary origin and theoretical meaning. Optimism and pessimism are not the absence of each other.

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