Longitudinal reciprocal relationships between core self-evaluations and job satisfaction

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Abstract

This study aims to understand change in core self-evaluations by investigating dynamics of CSE and life experiences as indicated by job satisfaction with a multilevel perspective in terms of within- and between-individual change. Core self-evaluations have been proposed as static personality traits that influence individuals' life experiences from the dispositional perspective. However, core self-evaluations were derived from and can also be influenced by life experiences from the contextual perspective. Based on the corresponsive principle of personality development, this study incorporated both dispositional and contextual perspectives of personality to examine longitudinal reciprocal relationships between core self-evaluations and job satisfaction with changes operating in within-person and between-person process. Longitudinal data from the British Household Panel Survey from 1997 to 2006 were used. A total of 5,827 participants are selected in the database (48.6% are males and 51.4% are females). Issues relating to within- and between-person change phenomena of core self-evaluations and job satisfaction were first addressed. Then, latent difference score models and cross-lagged models were used to examine the longitudinal reciprocal relationship between core self-evaluations and job satisfaction for within- and between-person changes, respectively. In general, results revealed that there is a longitudinal reciprocal relationship between core self-evaluations and job satisfaction both at within- and between-person change process. The current findings suggested core self-evaluations as a whole is a dynamic construct that continues interact with life experiences, rather than a static personality trait.

Contents

List of Tables

List of Figures

Chapter 1. Introduction

The interaction between self and environment is an ongoing process throughout life. This mutual influence of person-and-environment is a part of triadic reciprocal causation in Bandura's (1999) social cognitive theory, which proposes that internal personal factors, behavioral patterns, and environmental influences influence one another bidirectionally. Accordingly, individuals not only influence their environment, but also are shaped by the experiences derived from the environment. In this thesis, I focus on these self-environment dynamics by investigating how core self-evaluations (CSE) influence and are shaped by an individual's experience at work using job satisfaction as the indicator of work experience.

Core self-evaluations (CSE), which include self-esteem, generalized self-efficacy, locus of control, and emotional stability (or neuroticism), are appraisals of an individual's worthiness, effectiveness, and capability (Judge, Erez, Bono, & Thoresen, 2003). Because CSE was introduced as a dispositional construct, most studies have adopted a dispositional perspective to describe how perceptions of the self can shape the experiences individuals seek, and the processes through which traits influence attitudes, behaviour, and well-being. In line with this perspective, CSE has been shown to influence various psychological reactions and behaviours, such as job satisfaction (see Judge, 2009 for a review), job performance (e.g., Bono & Judge, 2003), career success (Judge & Hurst, 2008), and stress and coping (e.g., Best, Downey, & Stapleton, 2005).

The dispositional perspective assumes that CSE is stable and does not include the possibility that these evaluations are themselves dynamic and shaped by the context in which individuals experience events. However, a number of theoretical perspectives propose that self-evaluations are derived from social experience. For

example, Bandura (1999) proposed that self-efficacy, a self-evaluation in ability in performing a specific behavior, is constructed from life experiences, including mastery experiences, vicarious experiences, social persuasion, and physical and emotional states. Leary (1999) proposed self-esteem, a global self-evaluation, is embedded in social relationships and experiences. In brief, he proposed that self-esteem is a sociometer of social relationships and changed as the function of social inclusion and exclusion. This contextual perspective suggests that CSE is shaped by life experiences and also provides an opportunity to explore the role of life experiences or situational characteristics in personality development and change (see Caspi, Roberts, & Shiner, 2005, for a review). Taking these two perspectives together, CSE can thus be regarded as a dynamic construct that interacts with external experiences.

In this thesis, I integrated the dispositional and contextual perspectives to provide a more dynamic picture of the reciprocal relationship between CSE and life experiences. Previous studies of CSE have focused primarily on the unidirectional impact of CSE on job performance or career success (e.g., Bono & Judge, 2003; Judge & Hurst, 2008). Similarly, the few studies addressing the reverse path, such as the impact of failure experiences on CSE (e.g., Schinkel, Van Dierendonck, & Anderson, 2004), have also incorporated only unidirectional effects. To date, the reciprocal relationship between CSE and life experiences over time remains largely unexplored. To address this issue, I examined the reciprocal relationship between CSE and job satisfaction over a ten year period in a nationally representative sample of employees in the United Kingdom.

I examined the longitudinal reciprocal relationship as a process of within-person change and between-person change. Past studies on CSE have usually relied on individual differences to examine the mechanisms associated with CSE and have

implicitly assumed that the same mechanisms also applied to an intra-individual process. However, Borsboom, Mellenbergh, and Van Heerden (2003) have clarified that accounting for individual differences is not equal to explaining an individual's experiences. This caution applies to the change phenomena as well. That is, the difference between individuals in their levels of a construct over time (between-person change) is not the same as individual change in his/her level on a construct over time (within-person change). Therefore, I aimed to test the longitudinal reciprocal relationship between CSE and job satisfaction both in terms of within-person and between-person change.

In the following chapters, literature for the concepts and relationships of job satisfaction and CSE was first reviewed in Chapter 2. The hypotheses for the longitudinal reciprocal relationship between CSE and job satisfaction were provided in Chapter 3. Next, Chapter 4 presents the research method in this thesis, and Chapter 5 presents the empirical results in analysis. Finally, the general discussion was provided in Chapter 6.

Chapter 2. Literature Review

In this chapter, I first explained why job satisfaction can be used as an indicator of success experience at work. Next, I introduced the concept of CSE and elaborated the changeability of CSE. Further, the dispositional and contextual perspectives of the relationship between CSE and job satisfaction were reviewed. I then proposed that both the dispositional and contextual perspectives can be integrated using the corresponsive principle of personality development (Caspi et al., 2005), which guides the examination of the longitudinal reciprocal relationship between CSE and job satisfaction. Finally, the concept of change was introduced to provide the basis of change analysis in this thesis.

2.1 Job satisfaction and growth of job satisfaction as indicators of work success

In this study, job satisfaction was used to capture individual's success experiences at work (Erdogan & Bauer, 2005; Judge & Hurst, 2008). Job satisfaction reflects success experiences at work because it is "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (Locke, 1976, p. 1304). In addition, scholars from different areas have indicated that satisfaction evaluations involve a discrepancy judgment between what the individual wants and what he/she perceive himself/herself as getting (e.g., Diener, Emmons, Larsen, & Griffin, 1985; Locke, 1969; Michalos, 1985). According to this discrepancy perspective on satisfaction evaluations, job satisfaction can thus be regarded as an evaluative outcome of an individual's achievement in reducing the have-want discrepancies of his/her job from the discrepancy perspective of satisfaction judgement (e.g., Bussing, 1992; Locke, 1969).

The view of discrepancy perspective on satisfaction evaluation has been supported by various studies on life satisfaction. For example, in Cohen's (2000) study,

participants were asked to ‘consider your present life in comparison to your wants and aspirations’ and to ‘rate your own life right now in terms of your life approaching what you want’ on a 7-point scale (from 1 = not at all to 7 = matches or is better than what you want) for life as a whole and for 11 area-specific items, including Health, Finances, Family Relations, Paid Employment, Friendships, Housing, Life Partner, Recreational Activity, Religion, Transportation, and Education. In addition, participants also rated their satisfaction with a whole life and 11 items on 7-point scale (ranging from 1 = terrible to 7 = delighted). In his study, the results showed that the have-want discrepancies scores were positively correlated with the satisfactions scores for a whole life and for 11 items. The correlations ranged from 0.51 to 0.79. Similar findings were also reported in other studies (e.g., Solberg, Diener, Wirtz, Lucas, & Oishi, 2002; Wu, 2009; Wu & Yao, 2006, 2007). In the domain of job experiences, the discrepancy perspective on satisfaction evaluation was also supported (e.g., McFarlin, Coster, Rice, & Coopper-Alison, 1995; McFarlin & Rice, 1992; Mobley & Locke, 1970; Rice, Gentile, & McFarlin, 1991; Rice, Markus, Moyer, & McFarlin, 1991). That is, a larger have-want discrepancy at work leads to a lower job satisfaction.

In addition to showing that a satisfaction evaluation is related to have-want discrepancy, Wu (2008) recently provided evidence to show that a satisfaction evaluation does involve an implicit comparison between ‘‘have status’’ and ‘‘want status’’. Specifically, Wu (2008) examined the relationships between direct have-want discrepancy, amount, and satisfaction measures, which vary in their degree of explicitness in have-want comparison. For example, the have-want discrepancy measure explicitly asks respondents to rate the discrepancy between what they have and what they want (e.g., ‘‘Compared to what you currently have, do you want more, less, or the same opportunity for promotion on your job?’’). The amount measure, proposed by Locke and Latham (1990), is less direct, usually consisting of questions

like ‘‘How much opportunity for promotion do you have on your job’’ Responding this question requires thinking about the amount of discrepancy between what one has and what one wants, but does not explicitly ask about that. Finally, the satisfaction measure (e.g., ‘‘Are you satisfied with your opportunity for promotion?’’) incorporates a component of the have-want comparison but does not ask respondents to consider such a comparison in the question. Correlation analysis showed that satisfaction has a closer relation with amount than have-want discrepancy. In addition, mediation models showed that have-want discrepancy measures predicted amount measures first, which then predicted satisfaction measures in the end, revealing that satisfaction measures involve an implicit have-want comparison. Thus, his finding suggests that the transformation of have-want status comparison into satisfaction evaluation occurs via an intermediate stage during which the have-want status comparison is made indirectly, supporting that a satisfaction evaluation does involve an implicit comparison between ‘‘have status’’ and ‘‘want status’’. Accordingly, from the discrepancy perspective, higher satisfaction can be regarded as a success or an adaptation in reducing the have-want discrepancy through promoting the present condition or demoting the want standard (Bussing, 1992; Wu, 2009).

The success meaning embedded in job satisfaction will be more prominent when the change of job satisfaction is considered over a time period. Judge and Hurst (2008) proposed that the trajectory of job satisfaction across time can be used to indicate an individual’s career success. They suggested “someone who has experienced an upward trend in job satisfaction would evaluate his or her career more positively than someone who has had less growth, declining satisfaction, or many fluctuations in job satisfaction over the years.” (p. 850). In addition, drawing on prospect theory (Kahneman, & Tversky, 1984), Chen, Ployhart, Cooper-Thomas, Anderson, and Bliese (in press) proposed that the prior satisfaction level provides a referent point in

interpreting the meaning of later satisfaction level, which strengths the importance of satisfaction. For example, a person who achieves his/her satisfaction level at point 5 on a five-point scale from point 1 would perceive great success him/herself and have a strong psychological impact, comparing to a person who achieves his/her satisfaction level at point 5 from point 4 at the same scale. Moreover, a greater growth of job satisfaction over time also helps an individual to perceive him/herself as approaching his/her standards and also engenders positive affect from the great speed in approaching goals (Carver & Scheier, 2000). Accordingly, job satisfaction can be used to indicate an individual's work success, especially when its change in a time period was considered.

2.2 Concept of core self-evaluations (CSE)

Drawing on the dispositional explanation of job satisfaction, Judge, Locke, and Durham (1997) proposed the concept of CSE to explain the individual differences in job satisfaction. In their article, they proposed that job satisfaction, an affective evaluation regarding job experiences, is rooted from and influenced by core evaluations that are related to an individual's belief system. Accordingly, they identify traits which are qualified for the criteria of core self-evaluations: (1) evaluation-focused, (2) fundamental and basic, and (3) broad and encompassing.

The first criterion is considered because job satisfaction is an evaluative construct, thus, evaluation-focused traits can explain more variance of job satisfaction. In addition, drawing on the concept of source traits and surface traits (Cattell, 1965), Judge et al. (1997) proposed that source traits will strongly affect job satisfaction because these traits are basic traits that underlie the surface traits. For example, energetic, outgoing, and talkative can be regarded as surface traits related to the more basic source trait of extraversion, a tendency to interact with the external

world. Hence, source traits which are evaluation-focused are expected to have stronger impacts on job satisfaction. Finally, drawing on the concept of cardinal traits and secondary traits (Allport, 1961), Judge et al. (1997) proposed that cardinal traits, which dominate an individual's personal characteristics and relate to other traits, attitude, and behaviour with a broader scope will have stronger impacts on job satisfaction then secondary traits, which often exhibit in certain situations.

Four traits are selected based on the three criteria. They are self-esteem, generalized self-efficacy, locus of control, and emotional stability (or neuroticism). Self-esteem is a favourable or unfavourable attitude towards the self (Rosenberg, 1965). It is a global evaluation toward self with regard to worthiness. Generalized self-efficacy is a trait-like generality of self-efficacy. It is defined as "individuals' perception of their ability to perform across a variety of different situations" (Judge, Erez, & Bono, 1998, p.170). Locus of control refers to generalized expectancies for internal versus external control of reinforcement (Rotter, 1966). People with internal control will think outcomes can be determined by self forces, whereas those with external control will think outcomes are determined by other forces. Finally, emotional stability (or neuroticism), as one dimension in Big-five personality framework, refers to "the tendency to experience negative, distressing emotions and to possess associated behavioral and cognitive traits" (Costa & McCrae, 1987, p.301). In summary, Judge et al. (2003) proposed that CSE defined by these four traits refers to a basic appraisal of an individual's worthiness, effectiveness, and capability.

Regarding the measure of CSE, because the four traits of CSE are highly correlated, Judge, Erez, Bono, and Thoresen (2002) proposed a reflective measurement model on the relationship between the four traits and CSE. That is, CSE is a superordinate latent construct indicated by the four traits. Based on this viewpoint, Judge et al. (2003) further developed a direct measure of CSE with 12 items. These

12 items are not differentiated themselves in terms of the four traits, but are aimed to assess the concept of CSE directly. They also used usefulness analysis to demonstrate that the higher CSE construct can explain more variance in predicting criterion variables than each trait. However, the reflective measurement model of CSE has been challenged. Dormann, Fay, Zapf, and Frese (2006) compared different models on the relationship between the four traits and CSE in predicting job satisfaction and found that treating CSE as an aggregated latent construct combined by the four traits results in better model fit, suggesting a formative measurement model is more desirable. Moreover, considering there are different mechanisms underlying each trait, Johnson, Rosen, and Levy (2008) also suggesting using a formative model to treat CSE as an aggregate construct when the focus is to predict job satisfaction. Nevertheless, the measurement model between the four traits and core self-evaluations is still in debate and most empirical studies used reflective model in assessing CSE (Johnson et al., 2008).

In the current literature, the role of CSE has been discussed in various topics, such as job satisfaction (e.g., Judge et al., 1998, 2000), job performance (Bono & Judge, 2003; Erez & Judge, 2001), job search (Wanberg, Glomb, Song, & Sorenson 2005), career success (Judge & Hurst, 2008), job stress (Brunborg, 2008), life satisfaction and happiness (Piccolo, Judge, Takahashi, Watanabe, & Locke, 2005), coping process (Kammeyer-Mueller, Judge, & Scott, 2009), coping with organizational change (Judge, Thoresen, Pucik, & Welbourne, 1999), feedback effects (Bono & Colbert, 2005; Schinkel et al., 2004), fairness reactions to personnel selection techniques (Nikolaou & Judge, 2007), work-family satisfaction (Boyar & Mosley, 2007), health (Tsaousis, Nikolaou, Serdaris, & Judge, 2007), test anxiety (Chamorro-Premuzic, Ahmetoglu, Furnham, 2008), emotional intelligence (Kluemper, 2008), burnout (Best et al., 2005), commitment (Creed, Lehmann & Hood, in press) and popularity of employees (Scott

& Judge, 2009). All these research also demonstrate the wide influence of CSE on various psychological mechanisms.

In brief, the existing studies have showed that there is a stable effect of CSE on job satisfaction and other outcomes. Based on the current literature, it seems that issues associated with CSE have been widely examined and understood. However, the issue of stability and changeability of CSE was rarely discussed. Previous studies usually treated CSE as the static dispositional construct and simply inferred that this dispositional construct will influence outcomes in a unidirectional way. In fact, Judge (2009; Judge & Hurst, 2007) has mentioned the possibility of change of CSE across time by indicating that "Because evaluations of our self-concept are intimately tied to our environment, it stands to reason to expect that CSE will show both short-term and long-term variability" (Judge, 2009, p.61). Judge and Kammeyer-Mueller (2004) even have already outlined the interplay of experiences and CSE to show how CSE can be enhanced by previous success experiences in an attributional model. Unfortunately, research on change in CSE did not receive much attention. In the following section, the changeability of CSE is further discussed.

2.3 Changeability of CSE

Core self-evaluations, as a personality trait (Judge et al., 1997), are assumed as relative stable across situations and times. However, it is not unchangeable against the life experiences. Several studies has indicated that life experiences have impacts on change of personality traits (e.g., Agronick & Duncan, 1998; Costa, Herbst, McCrae, & Siegler, 2000; Neyer & Asendorpf, 2001; Roberts, 1997; Vaidya, Gray, Haig, & Watson, 2002; Pals, 2006). There is no exception for CSE. Evidence in the existing literature does suggest the changeability of CSE.

Self-esteem, as one of the component of CSE, is subject to change according to life events. Kernis (2005) has addressed the stability of self-esteem in his theory of fragile versus secure high self-esteem. Stability of self-esteem refers to "the magnitude of short-term fluctuations that people experience in their current, contextually based feelings of self-worth" (Kernis, 2005, p 1572). In his theory, fragile high self-esteem refers to people with higher level but fluctuated self-esteem, whereas secure high self-esteem refers to people with higher level but stable self-esteem. In his review, people with fragile high self-esteem are heightened to react to life events. In other words, life events can influence the level of self-esteem, especially for people with a fragile view of themselves. The changeability of self-esteem is elucidated more apparently in the contingencies of self-worth model (Crocker & Wolfe, 2001), which contends that "the importance of self-esteem lies in domains people they lies in what people believe they need to be or do to have worth as a person" (Crocker & Knight, 2005). Accordingly, events in domains that constitute the basis of contingencies of self-worth will have more impact on the change of self-esteem. Moreover, Leary's (1999) sociometer theory also proposed that an individual's self-esteem was embedded in his/her social relationships and experiences. In supporting this view, Leary, Tambor, Terdal, and Downs (1995) have reported that self-esteem is influenced by the experience of social inclusion and exclusion by others. Their findings not only showed that participants decrease their self-esteem when they are excluded by others in a short-term, but also reported that trait self-esteem is negatively related to the perceived inclusionary-exclusionary status in general, suggesting that the sociometer function of self-esteem can be operated at both state and trait levels. In sum, these malleable views of self-esteem suggest that self-esteem is tied to social environment and changed as a function of life experiences.

Generalized self-efficacy, although it was conceptualized as the general perception of ability to perform across situations, is also changeable. Its changeability depends on the sources of it. Bandura (1999) proposed self-efficacy beliefs are constructed from four sources, including mastery experiences, vicarious experiences, social persuasion, and physical and emotional states. All these four sources are rooted in life experiences. That is, experiences shape the self-efficacy belief, and accordingly, change of experiences can result in the change of belief in self-efficacy. For example, Bandura indicated that mastery experiences are influenced by the successes and failures events; vicarious experiences are associated with models who are observed; social persuasion depends on the encountered persuaders; and finally, physical and emotional states as means to judge one's capabilities is contingent to responses to life events, such as fatigue or anxiety in an over-load task. Thus, generalized self-efficacy, although it is proposed as a trait concept, is still changeable when the sources constructing that belief are changed by different life experiences.

Locus of control is also associated with life events. Although locus of control can be a stable tendency of an individual to think whether they can influence outcomes, it is not always at the same level when confronting different life events, especially stressful events. Based on transactional theory of stress of coping (Lazarus & Folkman, 1984), not all events will be appraised in the same way, and accordingly, no one coping strategy can be applied to all stressful events. Drawing on this perspective, coping flexibility, which refers to the fit between stressful events and coping strategies (Cheng, 2001, 2003), illustrates how an individual should chose appropriate coping strategy according to his/her perception of control in a situation. In brief, Cheng (2003, 2005; Cheng, & Cheung, 2005; Cheng, Hui, & Lam, 1999, 2000) indicated that people who are flexible in using problem-focus coping strategy in controllable situation and using emotional-focus coping strategy in uncontrollable situation have a

better psychological and physical well-being. Conversely, people who fix themselves in evaluating stress events in the same way and habituate to use one kind of coping strategies tend to have physical problems (e.g., functional gastrointestinal disorders). Thus, research on coping flexibility illustrates that people who have better adaptation should recognize their (un)controllability in different situations. In other words, people would have different levels of control on the continuum of internal-external control in different situations, suggesting the changeability of control perception.

Life experiences also influence the level of emotion stability (or neuroticism). Costa et al. (2000) investigated how life change and life events impact the stability of big-five personality traits and found that neuroticism increased over six years among (1) people who reported their lives are getting worse in family, social, and work lives and economic status over six years, (2) people who were fired, and (3) men who got divorced. Their findings also reveal that neuroticism decreased over six years among woman who got married. Neyer and Asendorpf (2001) also found that neuroticism decreased among individuals who begun to enter a partnership. Vaidya et al. (2002) also indicated that negative events result in an increase of neuroticism over 2.5 years.

In addition to the changeability of each trait, Schinkel et al. (2004) reported that CSE will be changed as a whole when an individual received performance feedback with a negative selection decision. In their study, participants were told to image they are participating in a job application and were asked to complete tests. After completing tests in the experiment, participants in experiment group received performance feedback on their tests and also a rejection notice, but participants in control group only received the rejection notice. Schinkel et al. (2004) found that, generally, participants in experiment group have a decreased CSE compared to participants in control group, revealing that explicit feedback in a failure event will result in a threat in CSE. Interestingly, when procedure fairness is taken into account,

participants in experiment group have decreased CSE no matter procedure fairness is high or low. However, participants in control group have increased CSE when their perceived procedure fairness is low and have stable CSE when their perceived procedure fairness is high. The researchers interpreted that the increased CSE among participants in control group with low perceived procedure fairness exhibits a self-serving bias by attributing the failure to the unfair procedure. As a result, it can be seen that CSE are changeable and in different ways based on different experiences and interpretations of events.

In summary, both literature on each trait and Schinkel et al.'s (2004) research on CSE suggest that CSE is subject to change based on different life experiences. Although as a trait concept, CSE are relative sable, it still can be influenced and attenuated by life experiences. Thus, both dispositional perspective addressing the stability of a personality and contextual perspective addressing the changeability of personality should be considered together in understanding the nature of CSE.

Accordingly, both dispositional and contextual perspectives were applied in this thesis to understand the relationship between CSE and job satisfaction. In the following two sections, effect of CSE on job satisfaction is first reviewed from the dispositional perspective, because most empirical studies involving CSE take this viewpoint. Then, the possible effect of job satisfaction on CSE is elaborated from the contextual perspective.

2.4 Effect of CSE on job satisfaction and growth of job satisfaction

Adopting the dispositional perspective, Judge et al. (1997) proposed CSE as a relative stable and fundamental personality trait which has a profound impact on job satisfaction. This dispositional perspective is rooted from the tradition of trait theory

of personality, which suggests that traits (especially the big-five traits) are stable and not influenced by environments (McCrae et al., 2000; see also Caspi et al., 2005, for a review). Following this notion, studies on the relationship between CSE and job satisfaction theoretically treated CSE as the static dispositional construct and simply inferred that this dispositional construct will influence job satisfaction in a unidirectional way.

For example, in a meta-analytic research, Judge and Bono (2001) addressed this dispositional perspective to show that the four traits in CSE are positively correlated with job satisfaction and suggested that people scored higher on these traits will have higher job satisfaction. The positive relationship and the dispositional interpretation between CSE and job satisfaction have been replicated and restated in many empirical studies when a latent construct or an overall scale score is used for CSE (e.g., Best et al., 2005; Dormann et al., 2006; Judge et al., 2000, 2005; Judge, Locke, Durham, & Kluger, 1998; Piccolo et al., 2005). The dispositional influence of CSE on job satisfaction is more apparent in a state-trait analysis of job satisfaction (Dormann et al., 2006). Dormann et al. (2006) decomposed the trait and state variance in job satisfaction using a longitudinal data and used CSE to account for the trait variance of job satisfaction. Their results showed that treating CSE as a collective set of the four traits can explain 84% trait variance of job satisfaction. This strong predictive effect of CSE on job satisfaction is also showed when big-five personality, and positive and negative affectivity, the another two personality taxonomies, are also included to predict job satisfaction. Judge, Heller, and Klinger (2008) found that when these three sets of personality taxonomies are used to predict job satisfaction, CSE account more variance of job satisfaction than the other two personality taxonomies. Therefore, CSE have a stable positive effect on job satisfaction and are powerful personality constructs in predicting job satisfaction.

Beyond the positive relationship between CSE and job satisfaction, several mechanisms are also provided to explain their relationship from the dispositional perspective. First, drawing on self-verification theory (Swann, Rentfrow, & Guinn, 2002), Judge, Locke, et al. (1998) and Judge et al. (2000) proposed that people with higher CSE tend to seek positive feedback to maintain or reinforce their positive self-concept. With this motivation, people with higher CSE tend to focus on positive side of a work and thus, have a positive perception of their work, which in turn, results in higher job satisfaction. Consistent with this mediation hypothesis, Judge, Locke, et al. (1998) found a partial mediation effect of perceived intrinsic job characteristics on the positive relationship between CSE and job satisfaction. Specifically, their results showed that CSE is positively related to perceived job characteristics that can lead to higher job satisfaction proposed by job characteristic model (i.e., autonomy, task identity, skill variety, task significance, and task feedback), and which in turn, results in higher job satisfaction. Judge et al. (2000) further incorporated an objective measure of job complexity to show that people with higher CSE not only have a positive perception of their job characteristics, but also hold complex jobs in reality, which means that people with higher core self-evaluation tend to chose complex jobs and appreciate intrinsic job characteristics of their job to reach higher job satisfaction.

Second, drawing on self-concordance model (Sheldon & Elliot, 1999), Judge et al. (2005) proposed that people with higher CSE, because of their positive self-regard in terms of worthiness, capability, and competence, tend to chose goals according to their personal interests and identification (which is termed self-concordant goals), and tend not to chose goals because of external or introjected pressures. Because self-concordant goals are in line with individuals' self interests, they will receive sustained effort over time and become more attainable, and finally, lead to well-being (Sheldon & Elliot, 1999). Accordingly, Judge et al. (2005) hypothesized that people

with higher CSE will have a higher self-concordance level in goal setting and stronger goal attainment, which in turn, results in a higher life or job satisfaction. In their study, they did find that self-concordance partially mediated the CSE–satisfaction link, supporting the self-concordance goal processing behind the relationship between CSE and job satisfaction.

Third, stress process was also proposed to explain the relationship between CSE and job satisfaction. Drawing on conservation-of-resources theory (Hobfoll, 1989), Best et al. (2005) hypothesized that people with higher CSE tend not to perceive organizational constraints and have less experiences of resources loss, because they have a positive look toward their work environments. This tendency will prevent themselves from being burnout, and which in turn, lead to higher job satisfaction. In their empirical finding, their result showed that there is a partial significant mediation effect of burnout between CSE and job satisfaction.

Above studies only show that CSE can predict between-individual differences in job satisfaction, and the proposed mediation processes are also focus on the context of between-individual differences. However, not only do influence the between-individual differences in job satisfaction, CSE also influence the within-individual growth of job satisfaction across years. Judge and Hurst (2008) recently proposed that people with higher CSE tend to capitalize their positive experience and have greater satisfaction from their success. Accordingly, they hypothesized that CSE are positively related to the growth of job satisfaction across time because of their tendency in enhancing their well-being from life experiences. In their study, they found that people with higher CSE have increased job satisfaction over 26 years. Furthermore, they reported that the effect of CSE on growth of job satisfaction is partially mediated by the pursuit of higher education and less health problem interfering with work across time. Thus, CSE are involved with both

between- and within-individual differences of job satisfaction.

In summary, the existing studies have showed that there is a stable and positive relationship between CSE and job satisfaction and this relationship can be partially explained by the perception process of job characteristic, goal-setting process and stress process of burnout. Judge and Hurst's (2008) also revealed that CSE is positive related to the growth of job satisfaction in an intraindividual analysis and this relationship is partially explained by the pursuit of education and health interference process. However, as discussed previously, CSE are subject to change when different life experiences are encountered. Unfortunately, past studies did not pay attention to how CSE can be changed from previous job-related experiences. The following section will discuss this issue from the contextual perspective.

2.5 CSE are derived from life experiences

In this section, I adopted a contextual perspective to propose that job satisfaction can also influence CSE. Self-evaluations are not made without experiences. Judge (2009) noted that "evaluations of our self-concept are intimately tied to our environment, it stands to reason to expect that CSE will show both short-term and long-term variability" (p.61), implying that experiences in environment can influence the level of CSE. In fact, the importance of life experiences in making self-evaluations has been highlighted by several researchers (e.g., Bandura, 1999; Kammeyer-Mueller, Judge, & Piccolo 2008; Leary, 1999). For example, as mentioned previously, Bandura (1999) stressed that an individual's self-efficacy beliefs are constructed by mastery experiences relating to successes and failures events, vicarious experiences associating with models who are observed, social persuasion depending on the encountered persuaders and physical and emotional

responses to life events, such as fatigue or anxiety in an over-load task. Hence, one's self-efficacy beliefs are shaped by life experiences. Leary's (1999) sociometer theory also proposed that an individual's self-esteem, a general form of self-evolution, was embedded in his/her social relationships and experiences. Alternatively, drawing on self-identity theory, Kammeyer-Mueller et al. (2008) proposed that self-esteem can be influenced by extrinsic career success in terms of occupational prestige, income and education, because people can use their extrinsic career success to define their social status and derive self-worth from the higher perceived status.

A radical contextual perspective of personality stresses the role of life experiences or context in personality development and implies that personality is subject to change (see Caspi et al., 2005, for a review; Lewis, 2001). Based on this perspective, personality is context-dependent and the stability of personality is rooted in the stability of context (Lewis, 2001). Although this extreme viewpoint on personality would not be the case for all personality constructs, it does highlight the importance of context in shaping an individual's personality. The call for contextualisation of personality has been successfully incorporated in the cognitive-affective personality system approach (Mischel & Shoda, 1998), which proposes that individual differences lie in "the chronic accessibility or activation levels of the particular mental representations available to them" and "the distinctive organization of relationships among the cognitions and affects available in the system" (p. 239). Context is incorporated in this personality system because situational feature is the key to activate the system. The relationship between context and the cognitive-affective personality system is described in a "if…then…" relation. In other words, when situations changed, the responses changed. However, the stability of personality is still existed in the stable situation-cognition-affects-behaviour relationships, but not in the cross-situational consistency of response (behaviour).

Based on the cognitive-affective personality system approach, people chronically high in CSE can easily and frequently activate corresponding mental representations regarding positive self-evaluations. The activation of these mental representations can result from the external features of situations and also self-generated internal feedback, such as anticipation, thoughts or affective states (Mischel & Shoda, 1998). Accordingly, the cognitive-affective personality system provides a possibility to see and explain the change of amount of CSE due to life experiences. If we applied this perspective to the results obtained by Schinkel et al. (2004), it can be said that the participants receiving performance feedback and rejection notice decreased their CSE because this negative event with the personal feedback signals the failure due to their personal reasons, and which in turn, activates the representations associated with self-evaluations, and results in a negative evaluation toward self. In this case, participants in this group share the same if…then… signature, that is, if failure is caused by me, then, I will have a negative attitude toward myself.

In fact, Judge and Kammeyer-Mueller (2004) have already outlined the interplay of experiences and CSE in their attributional model. In brief, they proposed that, in the beginning, the trait CSE set the level of state CSE at time 1 that will influence success in a specific context, and then, the success in that context will in turn influence the level of state CSE at time 2. In their model, other paths are also included to mediate or moderate this state change of CSE from experiences. Their state vs. trait conceptualisation of CSE can nicely fit to the cognitive-affective personality system such that for some people they tend to easily activate the positive representations of self, which result in trait-like CSE; however, the activation of these representations also depends on external life experiences and internal personal interpretations in the cognitive-affective system, which result in a state-like CSE. Also, the sequential chain from state to state core self-evaluation through the effect of life experiences proposed by Judge and

Kammeyer-Mueller can be transferred into a simple if…then… relation, that is, if success (failure), then, CSE will increase (decrease).

Given that the reviewed perspectives suggest that CSE are influenced by life experiences, I expected that CSE can also be influenced by job satisfaction. I base my reasoning on discrepancy theories (e.g., Bandura, 1989; Carver & Scheier, 2000; Higgins, 1987) and Bem's self-perception theory (1967) in making self-evaluations. Specifically, theories from discrepancy perspective propose that self-evaluations are made by comparing one's actual performance with a certain standard. Accordingly, feedback from life experiences influences the degree of discrepancy from current performance to a certain standard and therefore influences the level of self-evaluation. Although there is no specific standard to be used as a criterion in self-evaluation, experience itself can be used as information to guide self-evaluation. The self-perception theory (Bem, 1967) proposes people can infer and develop their attitudes by observing their behaviours. From this perspective, life experience itself provides the information on which to base a positive or negative attitude toward self.

Drawing on these two perspectives, I proposed that higher job satisfaction can lead to higher CSE because the success embedded in job satisfaction may allow individuals with higher job satisfaction to perceive a smaller discrepancy to the self-standard and make a more positive self-evaluation. Even though there is no clear self-standard, an individual can still make a higher self-evaluations because the positive feelings elicited from job satisfaction through affect-as-information process (see Schwarz & Clore, 2007, for a review), which then contributes to positive self-evaluations. This effect of this experience should be stronger when the growth of job satisfaction is considered, because the prior satisfaction level provides a referent point in interpreting the meaning of later satisfaction level (Chen et al., in press), a greater growth of job satisfaction over time would then help an individual to perceive

him/herself as approaching his/her standards and also engender positive affect from the great speed in approaching goals (Carver & Scheier, 2000).

Life experiences can influence CSE in the short term or long term. Schinkel et al.'s (2004) study, for example, has demonstrated a short-term influence of an event on change in CSE. In addition to this short-term or state-like change, I also expected that CSE can also have a long-term or trait-like change when life experiences having enduring psychological impacts are encountered. For example, a life event that makes a dramatic change in life may have a strong and enduring impact on self-evaluations. Supporting this argument, life events such as entering a partnership, getting married or divorced, and being fired, have been found to be associated with a long-term change on neuroticism, one component in CSE (Neyer & Asendorpf, 2001; Costa et al., 2000). In addition, the perception of life changes over a long time period may also lead to a trait-like change on self-evaluations, because meaning of upgrading or downgrading in the trend of life change provides more profound impact on self-evaluations than a specific success or failure experience. For example, Costa et al. (2000) have found that people who reported their lives were getting worse in family, social, and work lives and economic status over six years also reported increased neuroticism. Hence, I expected that job satisfaction could result in a state-like or trait-like change on CSE depending on the intensity and duration of work success it conveys. For example, weekly job satisfaction levels or the growth of job satisfaction over a week might result in a short-term state-like change in CSE, whereas yearly job satisfaction levels or growth of job satisfaction over several years might result in a trait-like change in CSE. In summary, the perspective reviewed above suggests that CSE can be influenced by life experiences over a short or long term.

2.6 Longitudinal reciprocal relationship between CSE and job satisfaction

I next developed hypotheses about how dispositional and contextual forces work together in shaping the dynamic relationship between CSE and life experience. I draw on the corresponsive principle of personality development that seeks to explain how life experiences influence the personality traits that lead people to find these experiences in the first place (Caspi et al., 2005). Specifically:

> "The corresponsive principle links two mutually supportive life-course dynamics: 'social selection,' wherein people select environments that are correlated with their personality traits, and 'social influence,' wherein environmental experiences affect personality functioning. According to longitudinal data, the traits that 'select' people into specific experiences are the traits that are most 'influenced' in response to those experiences…That is, life experiences do not impinge themselves on people in a random fashion causing widespread personality transformations; rather, the traits that people already possess are changed (i.e., deepened and elaborated) by trait-correlated experiences that they create" (Caspi et al., 2005, p. 470).

The corresponsive principle of personality development has been supported in several longitudinal studies (Harms, Roberts, & Winter, 2006; Roberts, Caspi, & Moffitt, 2003; Roberts & Robins, 2004). For example, Roberts et al. (2003) reported that personality traits assess at age 18 can predict work experiences at age 26 and also those work experiences at age 26 can predict the change of those personality traits over eight years in the same period. In a four year longitudinal study, Roberts and Robins (2004) also observed that students with less agreeable or neurotic fit better with the university environment and, in turn, fitting with the environment was associated with decreased agreeableness and neuroticism over four years. Similarly, in another sample, Harms et al. (2006) found that openness to experiences plays more important

role in predicting person-environment fit, which in turn, associates with increased openness to experiences in the same time period. Thus, all these results support the corresponsive principle that life experiences influence the personality traits that leads people to those experiences in the first place (Caspi et al., 2005).

The theoretical mechanisms currently proposed to link CSE and life experiences are consistent with the corresponsive principle of personality development. First, in their attributional model, Judge and Kammeyer-Mueller (2004) proposed that CSE leads to better performance and success at first stage, and then, the success experience subsequently results in a higher CSE at second stage. Similarly, as implied by self-verification theory (Swann et al., 2002) that high CSE people tend to seek positive feedback to maintain their higher level of CSE (Judge, Locke et al., 1998; Judge et al., 2000), high CSE people tend to be active in creating and seeking positive experiences and then use these positive experiences to foster their high CSE subsequently. These two models are in line with the statement of the corresponsive principle of personality development that life experiences (i.e., success) influence the personality traits (i.e., CSE) that leads people to those experiences (i.e., success) in the first place. Accordingly, I unpacked the longitudinal reciprocal relationships between CSE and job satisfaction based on the corresponsive principle of personality development.

Because the examination of longitudinal reciprocal relationships between CSE and job satisfaction relies on the changes in CSE and job satisfaction, in the next section I provided a review on the level of change to clarify the process of within-person change and between-person change, both of which will be used to test the longitudinal reciprocal relationships between CSE and job satisfaction.

2.7 Level of change

Changes in a construct over time can be realized at a within-person level and a between-person level. At the within-person level, changes in a construct over time were usually referred to individuals' change scores or trajectories over time on a specific construct. At the between-person level, changes in a construct over time were usually referred to rank-order changes. That is, individuals change their relative positions among a population over time on a specific construct. These two kinds of changes have different meanings and cannot be treated as the same phenomena.

In order to clarify the between-person change and within-person change, I used a figure to differentiate their differences. Figure 2-1a presents data from four persons (A, B, C, & D) who provide their scores on a construct at two time points. When we only consider the scores of each person, then, it can be seen that Person A decreased his/her level a lot over time, Person D increased his/her level a lot over time, Person B increased his/her level slightly over time, and Person C did not change his/her level over time. When we consider the relationships among these four persons over time, it can be seen that the rank orders of these four persons are changed. For example, the scores of Person A become lower than Person B, C, and D over time. As a result, the between- and within-person changes are different phenomena.

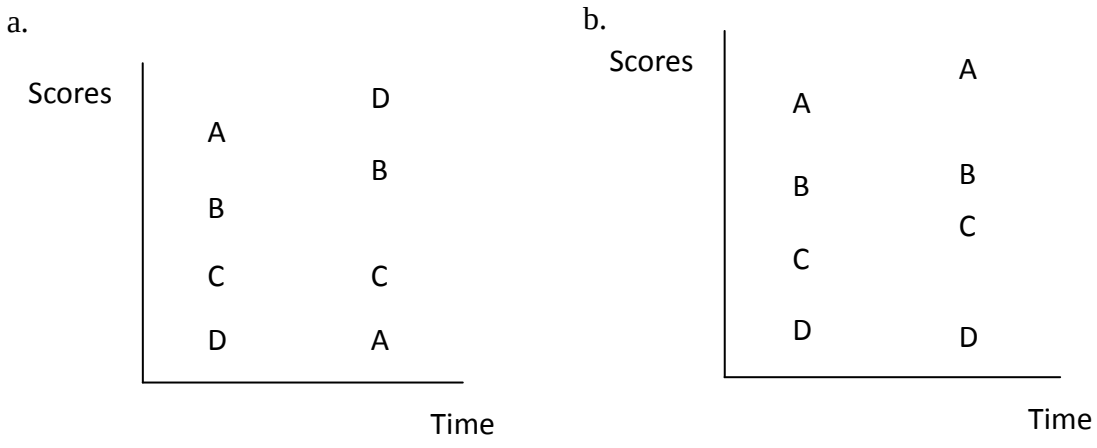

Figure 2-1. Four persons' scores on the same measure over time.

Although it is true that that if people change their rank orders on a construct over time, they also change their within-person levels over time, changing within-person levels over time does not necessarily result in the changes in rank orders. For instance, persons can have within-person changes without having rank-order differences over time, such as the plot presented in Figure 2-1b. The four persons have the same ranks, but the level of each person is different over time. Therefore, the meaning of change should be noted when the specific concept of change was referred. The differences between within-person change and between-person change re-emphasize the multilevel perspective for psychological studies as mentioned by Borsboom et al. (2003) that accounting for individual differences is not equal to explaining an individual's experiences.

Because of the different meanings between within-person and between-person changes, the analysis method should also be modified when different change levels are focused. Regarding the within-person changes, personal change scores or growth trajectories are desirable to examine the degree to which a person changes his/her levels on the same construct over time. Regarding the between-person changes, a test-retest correlation is desirable to examine the degree of rank-order stability, which gauges the stability of relative positions of individuals within a population. As a result, change scores or growth trajectories represent the degree of personal mean change over time, but a test-retest correlation represents the level of rank-order stability for a population as a whole. With respect to this difference, different analysis should be taken when the longitudinal reciprocal relationships between CSE and job satisfaction were examined with within-person change or between-person change.

In brief, latent difference scores (LDS) model (e.g., McArdle, 2009) or latent growth curve (LGC) model (e.g., Duncan, & Duncan, 2004) is desirable to test the longitudinal reciprocal relationships between CSE and job satisfaction with

within-person change phenomena, because LDS or LGC model create personal change variables or growth factors to represents individuals' change trajectories. In contrast, a cross-lagged (CL) model (e.g., Burkholder & Harlow, 2003) is desirable to test the longitudinal reciprocal relationships between CSE and job satisfaction with between-person change phenomena, because CL model focuses on how prior measures influence later measures of the same and different constructs over time based on rank orders stability. In order to illustrate these two approaches, simple LDS, LGC and CL models were introduced to provide a general view for the analysis models in this thesis.

First, Figure 2-2 presents a LDS model for two occasional data on CSE and job satisfaction. For simplicity, the measurement models for CSE and job satisfaction were ignored here. The LDS model creates two latent change scores for CSE and job satisfaction respectively from the two occasional data. Specifically, in this model, CSE at Time 2 is first predicted by CSE at time 1 and the loading of predictive path is set to 1. Next, a latent factor is created by influencing CSE at Time 2 and its factor loading is set to 1 as well. By these two specifications, CSE at Time 2 is then the combination of the effect of CSE at Time 1 and the effect of change of CSE between Time 1 and Time 2. As a result, the latent factor created by these specifications represents the within-person change on CSE over time. Similarly, a latent change score on job satisfaction can also be created.

With these two latent change scores, we can further gauge if people with different levels of CSE and job satisfaction initially have different degrees of personal changes on CSE and job satisfaction over time. That is, we can use initial CSE and job satisfaction to predict the two latent change scores in the LDS model. Moreover, we also can test if there is a positive relationship between within-person changes of CSE and job satisfaction by correlating the two latent change scores.

Finally, we can also test the relationship between CSE and job satisfaction measured at the initial time, which denotes the correlation between individual's rank orders on CSE and job satisfaction at one time.

Therefore, with respect to the concept of within-person change, a LDS model can help us to examine (1) whether CSE at one time can predict the within-person change of job satisfaction over time, (2) whether job satisfaction at one time can predict the within-person change of CSE over time, and (3) whether the within-person change of CSE is related to the within-person change of job satisfaction.

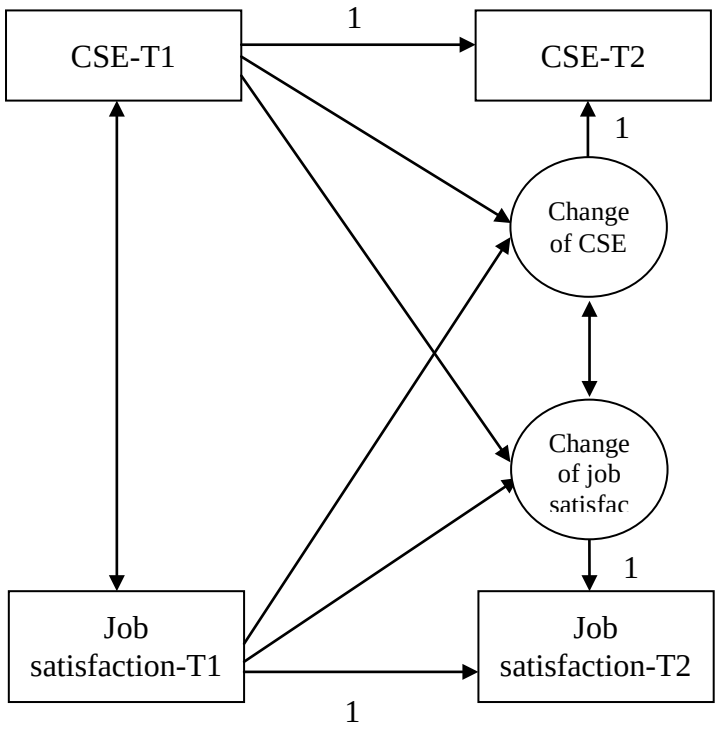

Figure 2-2. A latent difference score model for two occasional data on CSE and job satisfaction.

When the observed data were obtained for three occasions or above, then a parallel LGC model can be used to test the same relationships examined in the LDS

model. Figure 2-3 presents a parallel LGC model for CSE and job satisfaction with three occasional data. Regarding CSE, a LGC model specifies an intercept factor and a growth factor for the three occasional data. Factor loadings on the intercept factor of CSE are all set to 1, and factor loadings on the growth factor of CSE are set as 0, 1 and 2 from Time 1 to Time 3 in assuming that CSE scores were linearly increased over time. The factor loadings on the growth factor can be changed to different values when other growth patterns were assumed. With the current specifications, the intercept factor of CSE represents the level of CSE at time 1 and the growth factor of CSE represents the degree of personal change over time. Similarly, an intercept factor and a growth factor of job satisfaction can also be specified in the same way. With the two intercept factors and the two growth factors, we can predict the two growth factors both by the two intercept factors to see if people with different levels of CSE and job satisfaction initially have different degrees of personal changes on CSE and job satisfaction over time. Moreover, we also can test if there is a positive relationship between within-person changes of CSE and job satisfaction by correlating the two growth factors. Finally, we can also test the relationship between intercepts of CSE and job satisfaction, which denotes the correlation between individual's rank orders on CSE and job satisfaction at one time. Therefore, with respect to the concept of within-person change, a LGC model can help us to examine the same relationships that were tested in the LDS model when more occasional data were obtained.

In fact, the parallel LGC model will become a LDS model when only two occasional data were used. For example, when the data at Time 3 were deleted from Figure 2-3, the two intercept factors will then become the CSE and job satisfaction at Time 1 and the growth factors will then become the two latent change scores in Figure 2-2. Therefore, with this regard, the LDS or LGC model provide the same

examinations of the longitudinal reciprocal relationship between CSE and job satisfaction in terms of within-person change. Nevertheless, it should be noted that both LDS and LGC models can be more complex than the model illustrated in Figure 2-2 and Figure 2-3, and provides different information on the longitudinal within-person change process. In other words, LDS and LGC models are not always provide the same information in all situations. More discussion on the LDS and LGC models and other structural equation models for longitudinal data can be found in McArdle's (2009) review. Because only two occasional data of CSE were obtained in this thesis, the reason to provide illustrations of LDS and LGC model here is to show that these two models are the same when two occasional data were applied, which provides the reason why the LDS model was relied on in the following analysis when within-person changes are focused.

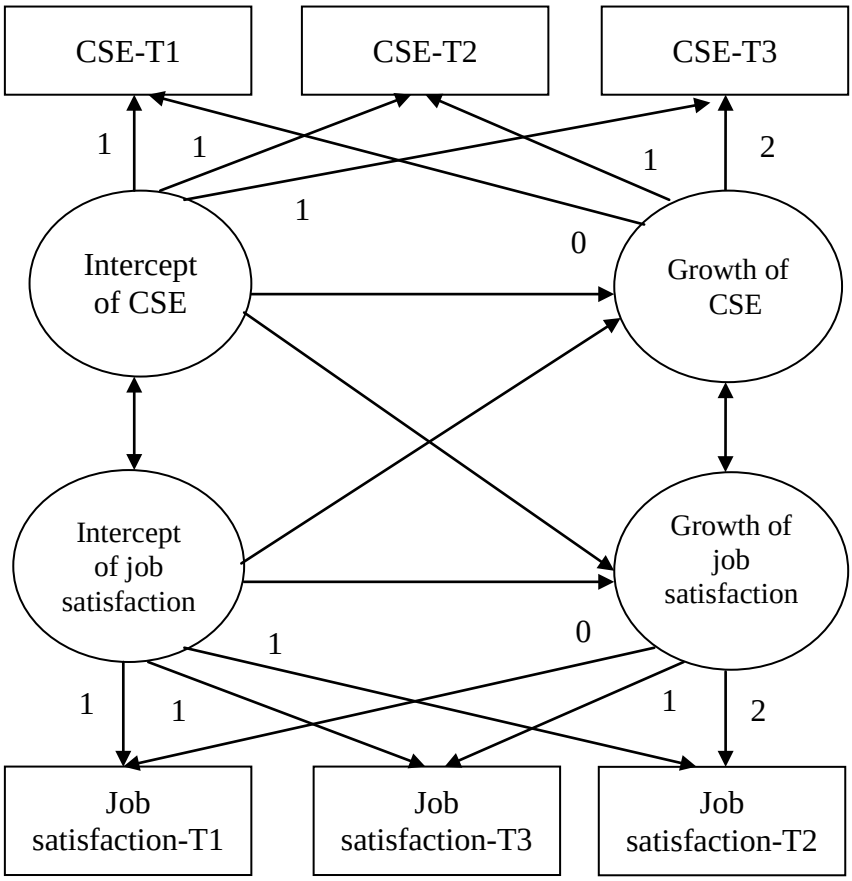

Figure 2-3. A parallel latent growth curve model for three occasional data on CSE and job satisfaction.

Regarding the between-person change phenomena, a CL model was used. Figure 2-4 presents a CL model for two occasional data on CSE and job satisfaction. For simplicity, the measurement models for CSE and job satisfaction were ignored here. This CL model contains autoregressive effects, cross-lagged effects, and relationships between these two constructs at the same time. Autoregressive effects refer to the effect of CSE at Time 1 on the CSE at Time 2, and the effect of job satisfaction at Time 1 on the job satisfaction at Time 2. Cross-lagged effects refer to the effect of CSE at Time 1 on the job satisfaction at Time 2, and the effect of job satisfaction at Time 1 on the CSE at Time 2. All these effects focused on the between-person changes on CSE and job satisfaction over time because effect of initial CSE and job satisfaction has been controlled for CSE and job satisfaction at Time 2 with the autoregressive effects directly, which renders the differences in individual's rank orders among the population over time. Thus, the cross-lagged effects can then be regarded as the effect of initial CSE on the between-person change of job satisfaction over time and effect of initial job satisfaction on the between-person change of CSE over time. Regarding the relationship between these two constructs, the relationship between CSE and job satisfaction at Time 1 simply represents the correlation between individuals' rank orders on CSE and job satisfaction among the population, but the relationship between CSE and job satisfaction at Time 2 denotes the correlation between rank-order changes of CSE and job satisfaction, because effect of initial CSE and job satisfaction has been controlled in the model.

Therefore, with respect to the concept of between-person change, a CL model can help us to examine (1) whether CSE at one time can predict the between-person change of job satisfaction over time, (2) whether job satisfaction at one time can predict the between-person change of CSE over time, and (3) whether the

between-person change of CSE is related to the between-person change of job satisfaction.

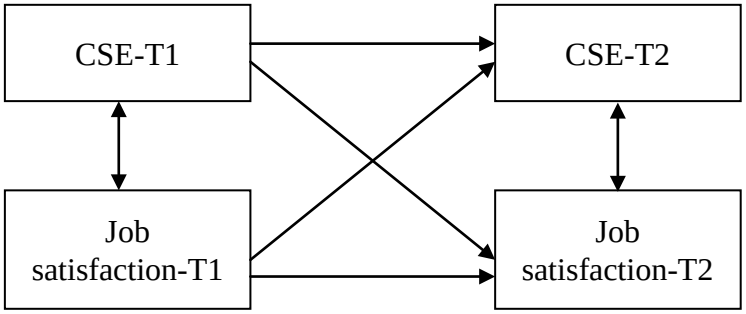

Figure 2-4. A cross-lagged model for two occasional data on CSE and job satisfaction.

In summary, within-person and between-person changes not only have their different meanings, but also need different analysis to capture their characteristics. In this thesis, both of within-person and between-person changes were relied on to test the longitudinal reciprocal relationships between CSE and job satisfaction. Based on the corresponsive principle, I expected CSE and job satisfaction will display a reciprocal relationship over time involving both between-person change and within-person change. To build understanding of this reciprocal relationship, I develop a series of hypotheses regarding reliability of change, within-person change processes and between-person change processes, which were provided in the next chapter.

Chapter 3. Hypotheses

Before hypothesizing the longitudinal reciprocal relationships between CSE and job satisfaction in terms of between-person and within-person changes, I first addressed the reliability of change in a construct over time.

After eliminating the factor of measurement error, different factors can produce change in a construct over time, including true change (i.e., Alpha change), scale re-calibration (i.e., Beta change), and construct re-conceptualization (i.e., Gamma change) (Golembiewski, Billingsley, & Yeager, 1976; Sprangers & Schwartz, 1999). True change occurs when only the amount or level of a construct changes, whereas Beta change occurs when there is change in the internal standards of measurement, such as the meaning of scale intervals. Gamma change occurs when there is change in the content of the target construct. Accordingly, only true change should be included in testing the reciprocal relationships between constructs over time, because it gauges the change of the target construct. Thus, examining the true change of CSE and job satisfaction is the first step to unpack the longitudinal reciprocal relationships between them.

If there is true change in CSE and job satisfaction, I expected these two measures would display longitudinal factor invariance in two constructs over time. Invariance of factor loadings and item intercepts within the same constructs over time is necessary to show that participants have the same interpretations of items and the same perceptions of scales at each time point. Accordingly, an examination of longitudinal factor invariance (e.g., Martinez, Black, & Starr, 2002; Oort, 2005; Wu, Chen, & Tsai, 2009) was first conducted.

In longitudinal factor invariance analysis, a baseline model needs to be established prior to any invariance constraints to see if patterns of factor structures at different times are the same (configural invariance). Thus, the first step is to build a

model to test configural invariance across time. If the baseline model (configural invariance) is supported, further restrictive constraints can then be imposed on the model. First, factor loadings are constrained to be equal across time to test invariance of factor loadings. Factor loadings represent the degrees of influence of a latent factor on the observed items. Thus, equality of factor loadings of the same time over time suggests that an item involves the same meaning of the latent construct over time. Therefore, the test of equality of factor loadings aims to examine the possibility of construct re-conceptualization (i.e., Gamma change) over time. If this loading-constrained model is supported by showing that factor loadings of the same item are invariant across time, then, the examined measure satisfying weak invariance.

Further, based on the weak invariance model, item intercepts are constrained to be equal across time. Item intercepts represents the value of an observed item when the impact of the corresponding factor is zero. Thus, equality of item intercepts of the same time over time suggests that an item involves the same scale interpretation over time. Therefore, the test of equality of item intercepts aims to examine the possibility of scale re-calibration (i.e., Beta change) over time. If this intercept-constrained model is supported by showing that intercepts of the same item are invariant across time, then, the examined measure satisfying strong invariance. Thus, if both factor loadings and item intercepts were invariant over time, then, we can rely on the changes of latent factor as the true change and test the longitudinal reciprocal relationships between constructs. Therefore, hypotheses on the reliability of changes in CSE and job satisfaction are:

Hypothesis 1: After controlling for measurement error, factor loadings and item intercepts, the items assessing CSE will show longitudinal invariance over time.

Hypothesis 2: After controlling measurement for error, factor loadings and item intercepts, the items assessing job satisfaction will show longitudinal invariance over time.

I next focused on within-person change in CSE and job satisfaction. A necessary requirement for reciprocal causation is within-person changeability of constructs. If an individual does not change his/her level of a construct, this construct cannot influence or be influenced by other constructs over time. There are good reasons to expect within-person change in both CSE and job satisfaction. For CSE, Judge and Kammeyer-Mueller (2004) indicated that an individual can enhance CSE following the experience of success. In addition, Schinkel et al.'s (2004) result that failure experiences decreased CSE suggests that an individual's CSE can be increased or decreased depending on the encountered events. Regarding job satisfaction, studies focusing on intra-individual process have indicated that an individual's job satisfaction can increase or decrease depending on mood at work (Judge & Ilies, 2004; Scott & Judge, 2006), justice at work (Loi, Yang, & Diefendorff, 2009), and job change (Boswell, Boudreau, & Tichy, 2005). These findings support the within-person changeability in both CSE and job satisfaction.

Hypothesis 3: An individual's level of CSE will change over time.

Hypothesis 4: An individual's level of job satisfaction will change over time.

Although an individual might change his/her level of a construct over time, if all individuals display the same amount of change then within-person change cannot be

related to other constructs. Therefore, it is important to consider individual differences in within-person changes of CSE and job satisfaction. Regarding CSE, studies on self-esteem have indicated that some people tend to easily change their levels of self-esteem compared to others (e.g., Kernis, 2005). Drawing on sociometer theory (Leary, 1999) and attachment theory (Bowlby, 1969), Srivastava and Beer (2005) further indicated that people high in anxious attachment tend to have a larger fluctuation in self-evaluations according to others' liking. These findings directly supported that there are individual differences in within-person change of CSE. For job satisfaction, I expected that different experiences over time will produce inter-individual differences in the way job satisfaction changes. For example, some individuals will change or lose their jobs for reasons beyond their immediate control such as economic downturn. These different job experiences will lead to individual differences in within-person change of job satisfaction. Supporting this view, Judge and Hurst (2008) have found that people have different rates of change in their job satisfaction over time.

Hypothesis 5: Individuals will display different amounts of change in CSE over time.

Hypothesis 6: Individuals will display different amounts of change in job satisfaction over time.

Next, hypotheses about mutual influence of within-person change in both constructs were developed. I proposed that people with higher CSE will have a larger within-person change in job satisfaction over time. By motivating engagement in positive experiences, CSE can lead to a positive within-person change of job

satisfaction over time by motivating activities that can advance one's career, sustain further success in a job position, and receive greater satisfaction from success (Judge & Hurst, 2008). This positive within-person change of job satisfaction over a time period will then lead to a higher CSE subsequently, because according to discrepancy theories (e.g., Bandura, 1989; Carver & Scheier, 2000; Higgins, 1987), people will perceive a smaller gap between current and self-standards which leads to better self-evaluations over time. Moreover, the positive within-person change of job satisfaction over a time period will also generate more positive feelings because of the positive progression. The positive feelings will then contribute to a higher CSE subsequently as well, because it can be served as positive information when people making self judgement according to affect-as-information theory (Schwarz & Clore, 2007).

Similarly, drawing on discrepancy theories (e.g., Bandura, 1989; Carver & Scheier, 2000; Higgins, 1987) and affect-as-information theory (Schwarz & Clore, 2007), I also proposed that people with higher job satisfaction will have a larger within-person change in CSE over time. It is because higher job satisfaction allows an individual to perceive a small gap between current and self-standards which leads to more positive feelings and better self-evaluation over time. Consequently, because changes of CSE and job satisfaction can result in changes of the other constructs, I also hypothesized that there is a positive relationship between within-person changes of CSE and job satisfaction in the same time period.

In order to test these hypotheses, longitudinal data with multiple observations of CSE and job satisfaction over time are needed, because only longitudinal data can help to unpack the change phenomena. In addition, in order to test the change at the intra-individual level, within-person changes scores of CSE and job satisfaction should be constructed as the target variable in analysis. Accordingly, latent difference

model (LDS), which can help to construct latent within-person change scores of CSE and job satisfaction, should be used to test hypotheses related to intra-individual change phenomena.

Hypothesis 7: People with higher CSE will subsequently show a larger within-person change in job satisfaction over time.

Hypothesis 8: People with larger within-person changes in job satisfaction over time will subsequently show a higher level of CSE.

Hypothesis 9: People with higher job satisfaction will subsequently show a larger within-person change in CSE over time.

Hypothesis 10: The within-person change of CSE over time is positively related to the within-person change of job satisfaction in the same time period.

The above hypotheses regarding within-person change do not clarify whether individuals high in CSE at a given time, compared those low in CSE, will have higher job satisfaction subsequently compared to others, or vice versa. That is, they do not address how between-person changes are influenced by reciprocal causation. Between-person change requires rank-order differences of individuals in constructs over time. If individuals maintain the same rank order on a construct over time, we cannot rely on individual differences variance to gauge the relationships of the construct with other constructs. Based on the aforementioned phenomena that there are individual differences in within-person change of CSE and job satisfaction over time, I expected that individual differences will result in between-person changeability

in CSE and job satisfaction over time. In other words, individuals will change their rank orders on the level of each construct because they have different patterns of change in their own levels of a construct over time. Therefore, I proposed the following hypotheses about between-person change in both CSE and job satisfaction.

Hypothesis 11: Individual rank order on the level of CSE will change over time.

Hypothesis 12: Individual rank order on the level of job satisfaction will change over time.

Given between-person changeability in both CSE and job satisfaction, I expected that people high in CSE, compared to those low in CSE, would have higher subsequent job satisfaction. This is because studies focused on individual differences in CSE have found that people high in CSE are more likely to perceive intrinsic job characteristics (Judge et al., 1998, 2000), achieve self-concordance goal (Judge et al., 2005), and are less likely to experience stress resulting from perceiving organizational constraints (Best et al., 2005), which would contribute to higher job satisfaction subsequently. I also expected that people high in job satisfaction, compared to those low in job satisfaction, would have higher CSE subsequently, because they may perceive a smaller gap to the self-standard and experience positive feelings that help to make a better evaluation toward self, as implied by discrepancy theories (e.g., Bandura, 1989; Carver & Scheier, 2000; Higgins, 1987) and affect-as-information theory (Schwarz & Clore, 2007). These hypotheses can be expressed as the cross-lagged relationship for CSE and job satisfaction over time.

Similarly, in order to test these hypotheses, longitudinal data with multiple observations of CSE and job satisfaction over time are needed. In order to test the

change at the inter-individual level, studies would need to conduct analyses that rely on rank order changes in CSE and job satisfaction. Accordingly, the cross-lagged (CL) model, which captures the time-to-time relationships among variables, would test hypotheses related to inter-individual change phenomena.

Hypothesis 13: People with higher CSE tend to have higher job satisfaction subsequently.

Hypothesis 14: People with higher job satisfaction tend to have higher CSE subsequently.

Chapter 4. Method

4. 1 Participants and Procedure

Data from the British Household Panel Survey (BHPS) were used in the current study. The BHPS is an annual survey with a nationally representative sample recruited in 1991. To date, it comprises 17 waves from 1991 to 2007. Job satisfaction has been assessed at each wave while core self-evaluation constructs were assessed in 2001 and 2006. To investigate the relationship between CSE and job satisfaction, I used data from 1997 to 2006 which results in two five-year periods of satisfaction measures (1997 to 2001 and 2002 to 2006) with the two CSE measures at the end of each time period.

Participants were selected based on the following criteria: (1) participants are all employees (self-employed participants are not included), (2) participants had at least two data points in each five-year period in order to construct the growth effect of job satisfaction in that period, (3) participants had completed demographic data on sex, age and averaged annual income in order to control the demographic variables in the models. Based on these three criteria, 5,827 participants were selected and used in the following analysis. In this sample, 2,831 were males (48.6%) and 2,996 were females (51.4%). Their ages were from 13 to 73 at 1997, with the mean of 34.61 and the standard deviation of 11.70. There were 443 (7.6%) participants were under 18 (13 to 17) in 1997. I included these participants because they began to provide job satisfaction data after they were 16-year old and had a paid job experience. Only 18 participants were older than 65 at 1997 in the sample.

4. 2 Measures

Job satisfaction. Job satisfaction was measured by five available items across ten years in BHPS database from 1997 to 2006. The five items were overall job

satisfaction, satisfaction with total pay, satisfaction with security, satisfaction with work itself and satisfaction with work hours. The mean of five items are used to indicate the level of job satisfaction in each year. Participants used seven-point scales from 1 (not satisfied at all) to 7 (completely satisfied) to rate these items. Cronbach's alpha coefficients for these five items were higher than .75 for all years (see Table 1).

Core self-evaluations. Because there is no standard measure of CSE in the BHPS database, following Judge and Hurst (2008), I selected items that best represented the construct of CSE. The same six items were selected to measure CSE at Year 5 (2001) and Year 10 (2006). Four items were selected from the General Health Questionnaire (GHQ-12) (Gldberg & Williams, 1988) and two items are selected from the quality of life measure, CASP-19 (Wiggins, Netuveli, Hyde, Higgs, & Blane, 2008). The four items from the GHQ-12 were "Have you recently been able to face up to problems?" (for self-efficacy), "Have you recently been feeling unhappy or depressed?" (for neuroticism), "Have you recently been losing confidence in yourself?" (for self-efficacy), "Have you recently been thinking of yourself as a worthless person?" (for self-esteem). Participants used four-point scales with different descriptors to indicate their answers to these questions. The two items from the CASP-19 were "I feel that what happens to me is out of my control" (for sense of control) and "I feel left out of things" (for sense of control). Participants used four-point scales from 1 (often) to 4 (never) to rate themselves on these two items. Cronbach's alpha coefficient for these six items was .78 and .80 for each year. In order to show that the used items were similar to the existing instruments for assessing CSE, Table 4-1 listed the used items here and the items used by Judge et al., (2003) and Judge and Hurst (2008).

Table 4-1 Items for CSE Used in the Current Study and Past Studies

Items used in the current study
1. Have you recently been able to face up to problems?
2. Have you recently been feeling unhappy or depressed? (r)
3. Have you recently been losing confidence in yourself? (r)
4. Have you recently been thinking of yourself as a worthless person? (r)
5. I feel that what happens to me is out of my control. (r)
6. I feel left out of things. (r)
Items in the CSE scale (Judge et al., 2003)
1. I am confident 1 get the success I deserve in life.
2. Sometimes I feel depressed. (r)
3. When I try, I generally succeed.
4. Sometimes when I fail I feel worthless. (r)
5. I complete tasks successfully.
6. Sometimes, I do not feel in control of my work. (r)
7. Overall, I am satisfied with myself.
8. I am filled with doubts about my competence. (r)
9. I determine what will happen in my life.
10. I do not feel in control of my success in my career. (r)
11. I am capable of coping with most of my problems.
12. There are times when things look pretty bleak and hopeless to me. (r)
Items used by Judge and Hurst (2008)
1. I have little control over the things that happen to me.
2. There is little I can do to change many of the important things in my life.
3. I feel that I am a person of worth, on an equal basis with others.
4. I feel that I have a number of good qualities.
5. All in all, I am inclined to feel that I am a failure.
6. I feel I do not have much to be proud of.
7. I wish I could have more respect for myself.
8. I've been depressed.
9. I've felt hopeful about the future.
10. What happens to me in the future mostly depends on me.
11. What happens to me is of my own doing.
12. When I make plans, I am almost certain to make them work.

r denotes the reversed item in assessing CSE.

4. 3 Data Analysis

I tested hypotheses with a ten-year longitudinal data frame from the BHPS. The data set included job satisfaction items in each of the ten years and CSE items only in years 5 and 10. With this data structure, I first examined the reliability of change and

longitudinal factor invariance in CSE items with the CSE data in years 5 and 10 using a two-factor confirmatory factor analysis. I also examined the reliability of change and longitudinal factor invariance in job satisfaction items with the job satisfaction data in all ten years using a ten-factor confirmatory factor analysis.

Next, I examined the longitudinal reciprocal relationship between CSE and job satisfaction both for within-person and between-person change with three approaches. In the first approach, I used CSE and job satisfaction data at Years 5 and 10 only, constituting a dataset with two time-points. These two time-points allowed a preliminary test of the longitudinal reciprocal relationship between CSE and job satisfaction. Based on this data structure, I estimated a latent difference score (LDS) model (McArdle, 2009) and a cross-lagged (CL) model to examine the longitudinal reciprocal relationship between CSE and job satisfaction for within-person and between-person change, respectively.

I have proposed above that job satisfaction which conveys success experiences that have a more enduring impact on defining one's success at work, can has a stronger impact on self-evaluation. Thus, in order to strengthen the impact of job satisfaction, in the second approach, the two years data of CSE and ten years data of job satisfaction were all used. Based on the state-trait model (Steyer, Schmitt, & Eid, 1999), I built a latent state-trait (LST) model for job satisfaction in which latent variables with a meaning of five-year job satisfaction were extracted from years 1 to 5 and years 6 to 10, respectively. Then, I used the two latent CSE variables and two latent five-year job satisfaction variables to assess the longitudinal reciprocal relationship between CSE and job satisfaction for both within-person and between-person change. For within-person change, a LDS-LST model was used to test the reciprocal link between CSE and the five-year job satisfaction and for between-person change, a CL-LST model was used.

In the third approach, the growth process of job satisfaction was introduced in the dynamic mechanism between CSE and job satisfaction to strengthen the meaning of job satisfaction by incorporating the impact of personal growth trajectories in job satisfaction. The two years data of CSE and ten years data of job satisfaction were all used. Based on this data structure, I introduced a growth process of job satisfaction into the models to examine the longitudinal reciprocal relationship between CSE and job satisfaction. In brief, I introduced a piecewise latent growth curve (PLGC) model (e.g., Chou, Yang, Pentz, & Hser, 2004; Duncan & Duncan, 2004) into the LDS model and the CL model with growth trajectories of job satisfaction in the first and last five years, forming the LDS-PLGC model and CL-PLGC model, respectively.

All models were estimated using Mplus (Muthén & Muthén, 2007). To take into account non-normality of data and missing data, a maximum likelihood estimator with robust standard errors using a numerical integration algorithm (MLR estimator in Mplus) was used. This estimator generates robust estimation to non-normality and non-independence of data and also can deal with missing data in estimation based on the missing at random assumption (Muthén & Muthén, 2007). In all models, the first loading of each latent factor was set as 1 to fix the latent factor scale. Because the sample size is very large, I relied on four fit indices (CFI, TLI, RMSEA, and SRMR) suggested by Hu and Bentler (1999) to evaluate models. Two incremental fit indices, the non-normed fit index (NNFI) and the comparative fit index (CFI), were chosen for use in this study. A value of NNFI and CFI exceeding 0.95 indicates a good fit, while a value between 0.90 and 0.95 represents an adequate fit for a model (Bentler, 1990; Hoyle, 1995). Recently, Hu and Bentler (1999) suggested a more stringent cutoff of 0.95 or above on the NNFI and CFI. In addition, two absolute fit indices, the standardized root mean squared residual (SRMR) and the root mean squared error of approximation (RMSEA), were also used. For RMSEA, a well-fitting model

should be at or below 0.05 and at or below 0.08 for a model with reasonable fit (Browne & Cudeck, 1993). Hu and Bentler (1999) suggested a cutoff value of 0.06 for a well-fitting model. For SRMR, Hu and Bentler (1999) suggested SRMR should be at 0.08 or less for a good fit. In addition, they also recommended using a cutoff value close to 0.95 for CFI in combination with a cutoff value close to 0.09 for SRMR to evaluate model fit (CFI $\geq$ 0.95; SRMR $\leq$ 0.09).

Finally, except for models for CSE or job satisfaction only, sex, age and average annual income were included in all models as time-invariant control variables. Income was not treated as time-varied control variable because annual income only had non-significant or trivial effects on job satisfaction in a preliminary analysis when it was treated as time-varied variable, and treating income as time-invariant variable also reduced the number of parameters in the model. Given that effects of sex, age and average annual income were small and they were not main concerns in this study, I did not report their specific effects in the results.

Chapter 5. Results

5. 1 Descriptive analysis

Table 5-1 presents means, standard deviations, and correlations among variables, including job satisfaction for each of the ten years, and CSE assessed at Year 5 and Year 10.

5. 2 Measurement model of CSE

Figure 5-1 presents the measurement model of CSE, in which the six items for CSE in each year were influenced by a latent CSE factor. Four items for CSE were assessed with the specific time-frame wording (i.e., have you recently…). In order to focus on CSE at trait-like construct, I used a method factor to reduce the impact of specific time-frame effect on the latent CSE factor. That is, in addition to the general CSE factor for all items, I also introduced a method factor indicated by the four items with the specific time-frame wording. Drawing on the correlated trait-correlated method minus one [CT-C(m-1)] model (Eid, Lischetzke, Nussbeck, & Trierweiler, 2003), this specification helps to define the latent CSE factor as a general, trait-like construct. The two latent CSE factors were allowed to be related and the two method factors were allowed to be related, but CSE factors were not allowed to be related to the two method factors. Finally, errors of items were allowed to be correlated among the same item to capture the reliable item-specific variance across time.

Table 5-1 Descriptive Statistics of Research Variables

Variable		*n*	*M*	*SD*	*Correlations*														
					1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
1.	Sex	5827	--	--	--														
2.	Age at Year 1	5827	34.61	11.70	-.01	--													
3.	Average annual income [a]	5827	17959.29	11645.83	-.34	.16	--												
4.	Job satisfaction (Year 1)	3212	5.24	1.05	.10	.02	.00	.77											
5.	Job satisfaction (Year 2)	3420	5.26	0.99	.10	.01	.01	.58	.77										
6.	Job satisfaction (Year 3)	5028	5.24	1.04	.10	.04	.01	.48	.52	.77									
7.	Job satisfaction (Year 4)	5421	5.26	0.97	.10	.02	-.01	.44	.49	.50	.75								
8.	Job satisfaction (Year 5)	5432	5.30	0.98	.11	.03	.02	.39	.41	.41	.55	.77							
9.	Job satisfaction (Year 6)	5308	5.28	0.99	.11	.02	.00	.37	.39	.38	.47	.53	.78						
10.	Job satisfaction (Year 7)	5287	5.27	0.99	.12	.03	-.01	.36	.37	.34	.40	.45	.54	.78					
11.	Job satisfaction (Year 8)	4976	5.32	0.98	.11	.06	.01	.33	.35	.33	.39	.40	.47	.52	.77				
12.	Job satisfaction (Year 9)	4907	5.33	0.97	.10	.04	.01	.30	.33	.30	.36	.38	.40	.46	.54	.78			
13.	Job satisfaction (Year 10)	4650	5.34	0.96	.10	.03	.01	.32	.32	.30	.33	.36	.37	.41	.46	.54	.78		
14.	Core self evaluations (Year 5)	5641	3.19	0.44	-.11	-.01	.06	.12	.15	.14	.17	.26	.19	.16	.17	.15	.15	.78	
15.	Core self evaluations (Year 10)	4939	3.16	0.46	-.10	.00	.09	.12	.15	.13	.12	.14	.16	.17	.18	.19	.27	.46	.80

Note. Correlations among variables are based on pairwise deletion of missing data. Diagonal components in the correlation matrix are Cronbach's alpha coefficient. a: Income variable is normalized in correlation analysis.

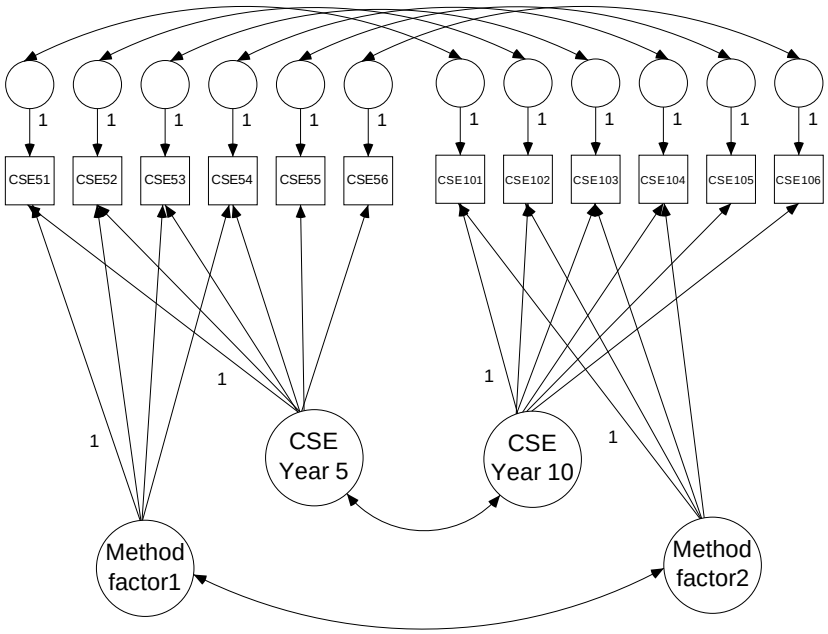

Figure 5-1. Measurement model of CSE. CSE51 means the first item at the fifth year of CSE. CSE101 means the first item at the tenth year of CSE. Other items are in the same notation rule.

The measurement model of CSE was acceptable (MLR-χ^2 = 303.47, *df* = 38; CFI = .99; TLI = .98; RMSEA = .035; SRMR = .022). All estimates were significant at $p < .01$. Based on this model, I further tested the longitudinal invariance of theitems for CSE. I first constrained the equality of factor loadings on the CSE factors for the same items across time. The model with equality of factor loadings on the CSE factors had similar model fit (MLR-χ^2 = 311.56, *df* = 43; CFI = .99; TLI = .98; RMSEA = .033; SRMR = .023), supporting the equality of factor loadings. Next, I imposed equality constraints for item intercepts of the same items over time. The model with equality of item intercepts had good model fit as well (MLR-χ^2 = 347.98, *df* = 49; CFI = .98; TLI = .98; RMSEA = .033; SRMR = .026), revealing that these items capture the same meaning of the latent CSE construct and also have the same intercepts over time, supporting H1. Model fit of these three models were summarized in Table5-2.

Estimates of the measurement model with equality of factor loadings on latent CSE factors and item intercepts of CSE were shown in Table 5-3. In this strong

invariance model (i.e., equality of factor loadings on latent CSE factors and item intercepts), the correlation between the two latent CSE factors was .63, indicating that people changed their rank orders on the levels of CSE across five years, supporting H11.

Table 5-2 Summary of Model Fit for Measurement Models of CSE

Model	*MLR-χ^2*	*df*	*CFI*	*TLI*	*RMSEA*	*SRMR*
1. Baseline model without constraints	303.47	38	.99	.98	.035	.022
2. Model with equality of factor loadings on latent CSE factors	311.56	43	.99	.98	.033	.023
3. Model with equality of factor loadings on latent CSE factors and item intercepts	347.98	49	.98	.98	.033	.026

5. 3 Measurement model of job satisfaction

Five items for job satisfaction assessed in the same year were influenced by a latent factor for that year, which resulted in ten factors for the ten-year data. The ten factors were allowed to be correlated. Except for the global job satisfaction item[1], errors of items were allowed to be correlated among the same item to capture the reliable item-specific variance across time. Figure 5-2 presents the measurement model of job satisfaction over ten years.

Overall fit indices showed that this measurement model was acceptable (MLR-χ^2 = 2469.10, *df* = 950; CFI = .98; TLI = .98; RMSEA = .017; SRMR = .037). All estimates were significant at $p < .01$. I also further constrained the equality of

1. Negative correlations among errors for the global job satisfaction item over time were found when errors of the global job satisfaction item were allowed to be related over time. Thus, the error correlations among the global job satisfaction items were excluded in the model.

Table 5-3 Estimates of the Measurement Model with Equality of Factor Loadings on Latent CSE Factors and Item Intercepts of CSE

Items	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Item intercept at Year 5		Item intercept at Year 10	
	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
1. Have you recently been able to face up to problems?	1.00	0.25	1.00	0.25	1.00	0.42	1.00	0.49	2.99	6.38	2.99	6.32
2. Have you recently been feeling unhappy or depressed? (r)	3.24	0.48	3.24	0.49	2.00	0.49	2.00	0.55	3.11	3.89	3.11	3.94
3. Have you recently been losing confidence in yourself? (r)	3.31	0.54	3.31	0.53	2.43	0.62	2.43	0.69	3.35	4.63	3.35	4.48
4. Have you recently been thinking of yourself as a worthless person? (r)	2.80	0.52	2.80	0.52	1.86	0.57	1.86	0.61	3.61	5.66	3.61	5.54
5. I feel that what happens to me is out of my control. (r)	4.04	0.59	4.04	0.61	--	--	--	--	2.97	3.67	2.97	3.75
6. I feel left out of things. (r)	4.91	0.72	4.91	0.74	--	--	--	--	3.00	3.75	3.00	3.74

Factor correlations

Factors	CSE factor at Year 5	CSE factor at Year 10	Method factor at Year 5	Method factor at Year 10
CSE factor at Year 5	--			
CSE factor at Year 10	.63	--		
Method factor at Year 5	--	--	--	
Method factor at Year 10	--	--	.31	--

All estimates were significant at $p < .01$. Unstd. is unstandardized estimates and Std. is standardized estimates. Results involving errors were skipped for simplicity.

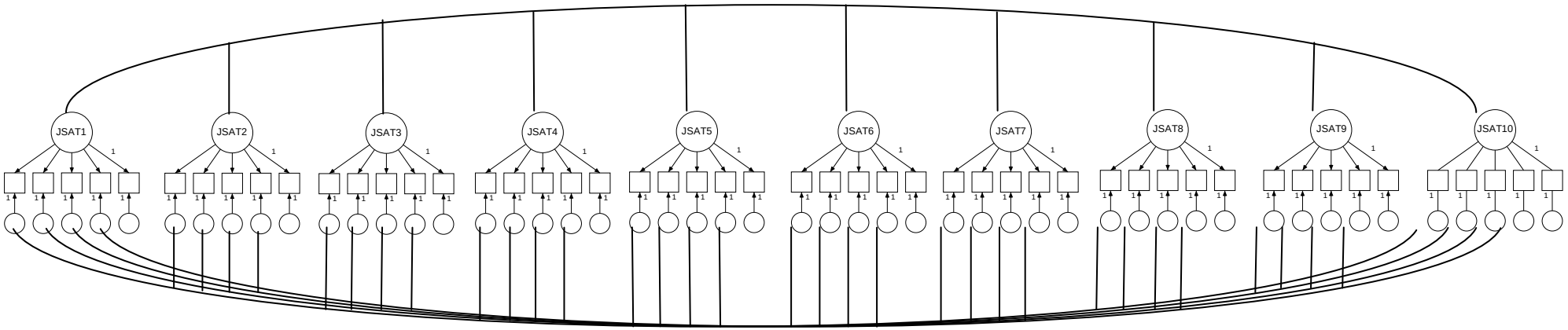

Figure 5-2. Measurement model of job satisfaction over ten year.

factor loadings for the same items over time. The model with equality of factor loadings had similar model fit (MLR-χ^2 = 2513.58, *df* = 986; CFI = .98; TLI = .98; RMSEA = .016; SRMR = .037). Next, I additionally imposed the equality of item intercepts for the same items over time. The model with equality of item intercepts had similar model fit as well (MLR-χ^2 = 2960.42, *df* = 1031; CFI = .98; TLI = .97; RMSEA = .018; SRMR = .038), revealing that these items capture the same meaning of the latent job satisfaction construct and also have the same intercepts over time, supporting H2. Model fit of these three models were summarized in Table 5-4.

Estimates of the measurement model with equality of factor loadings on latent CSE factors and item intercepts of CSE were shown in Table 5-5. In this strong invariance model, the correlations between job satisfaction factors ranged from .25 to .57 with a mean of .39, indicating that people changed their rank orders on the levels of job satisfaction across years, supporting H12. In addition, the correlations between job satisfaction factors with a five-year time period ranged from .30 to .33 with a mean of .32, which was lower that of latent CSE (.63).

Table 5-4 Summary of Model Fit for Measurement Models of Job Satisfaction

Model	*MLR-χ^2*	*df*	*CFI*	*TLI*	*RMSEA*	*SRMR*
1. Baseline model without constraints	2469.10	950	.98	.98	.017	.037
2. Model with equality of factor loadings	2513.58	986	.98	.98	.016	.037
3. Model with equality of factor loadings	2960.42	1031	.98	.97	.018	.038

Table 5-5 Estimates of the Measurement Model with Equality of Factor Loadings and Item Intercepts of Job Satisfaction

Items	JSAT1		JSAT2		JSAT3		JSAT4		JSAT5		JSAT6		JSAT7		JSAT8		JSAT9		JSAT10	
Factor loadings	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
1. Satisfaction with total pay	1.00	0.48	1.00	0.51	1.00	0.49	1.00	0.48	1.00	0.50	1.00	0.51	1.00	0.51	1.00	0.50	1.00	0.51	1.00	0.51
2. Satisfaction with security	0.86	0.44	0.86	0.44	0.86	0.43	0.86	0.43	0.86	0.44	0.86	0.46	0.86	0.46	0.86	0.46	0.86	0.46	0.86	0.45
3. Satisfaction with work itself	1.33	0.76	1.33	0.75	1.33	0.75	1.33	0.74	1.33	0.75	1.33	0.76	1.33	0.77	1.33	0.77	1.33	0.75	1.33	0.76
4. Satisfaction with work hours	1.06	0.57	1.06	0.56	1.06	0.55	1.06	0.54	1.06	0.56	1.06	0.57	1.06	0.57	1.06	0.56	1.06	0.57	1.06	0.57
5. Overall job satisfaction	1.57	0.93	1.57	0.93	1.57	0.88	1.57	0.90	1.57	0.91	1.57	0.90	1.57	0.90	1.57	0.90	1.57	0.90	1.57	0.90
	JSAT1		JSAT2		JSAT3		JSAT4		JSAT5		JSAT6		JSAT7		JSAT8		JSAT9		JSAT10	
Item intercepts	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
1. Satisfaction with total pay	4.97	3.08	4.97	3.47	4.97	3.25	4.97	3.38	4.97	3.46	4.97	3.46	4.97	3.48	4.97	3.45	4.97	3.59	4.97	3.62
2. Satisfaction with security	5.48	3.62	5.48	3.80	5.48	3.64	5.48	3.90	5.48	3.92	5.48	4.01	5.48	4.04	5.48	4.00	5.48	4.09	5.48	4.08
3. Satisfaction with work itself	5.43	4.02	5.43	4.19	5.43	4.06	5.43	4.32	5.43	4.27	5.43	4.23	5.43	4.28	5.43	4.33	5.43	4.34	5.43	4.43
4. Satisfaction with work hours	5.21	3.62	5.21	3.75	5.21	3.60	5.21	3.75	5.21	3.81	5.21	3.83	5.21	3.84	5.21	3.79	5.21	3.94	5.21	3.98
5. Overall job satisfaction	5.36	4.15	5.36	4.34	5.36	4.00	5.36	4.38	5.36	4.36	5.36	4.23	5.36	4.23	5.36	4.27	5.36	4.36	5.36	4.41

Factor correlations

Factors	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
JSAT1										
JSAT2	.57									
JSAT3	.45	.52								
JSAT4	.40	.46	.51							
JSAT5	.33	.37	.40	.55						
JSAT6	.31	.35	.38	.46	.54					
JSAT7	.29	.32	.32	.38	.42	.55				
JSAT8	.26	.32	.30	.36	.38	.47	.51			
JSAT9	.25	.28	.27	.33	.35	.37	.43	.52		
JSAT10	.28	.29	.29	.30	.33	.35	.38	.45	.54	

All estimates were significant at $p < .01$. Unstd. is unstandardized estimates and Std. is standardized estimates. Results involving errors were skipped for simplicity.

5. 4 Analysis involving within-person change

The longitudinal reciprocal relationships between CSE and job satisfaction was first examined in terms of within-person changes. Three approaches were used. The first one used two-time point data with a latent difference score (LDS) model. That is, only CSE and job satisfaction data at Year 5 and Year 10 were used. The second one used all available CSE and job satisfaction data with a LDS model combined with a latent state-trait (LST) model for job satisfaction, which is noted as the LDS-LST model. Finally, the third approach used all available CSE and job satisfaction data with a LDS model combined with a piecewise latent growth curve (PLGC) model for job satisfaction, which is noted as the LDS-PLGC model.

Latent Difference Score (LDS) model. I first used CSE and job satisfaction data at Year 5 and Year 10 to build a LDS model. Based on the strong invariance measurement model of CSE specified previously, a second-order factor was constructed as a latent difference score between the two latent CSE factors by (1) regressing the later CSE factor on the previous CSE factor and set the path loading as 1 and (2) specifying the second-order factor influences the later CSE factor with a factor loading as 1. This specification represented the later CSE factor as the previous CSE factor plus the difference between CSE factors over the two time points. Similarly, based on the strong invariance measurement model of job satisfaction, a second-order factor was constructed as a latent difference score between the two latent job satisfaction factors. Regarding the structural part, CSE and job satisfaction at Year 5 were allowed to be related. I predicted the two latent difference scores both by initial CSE and job satisfaction at Year 5. Finally, the two latent change scores were allowed to be related. The two method factors for CSE were allowed to be related, but they were not related to other latent variables. Figure 5-3 presents this LDS model.

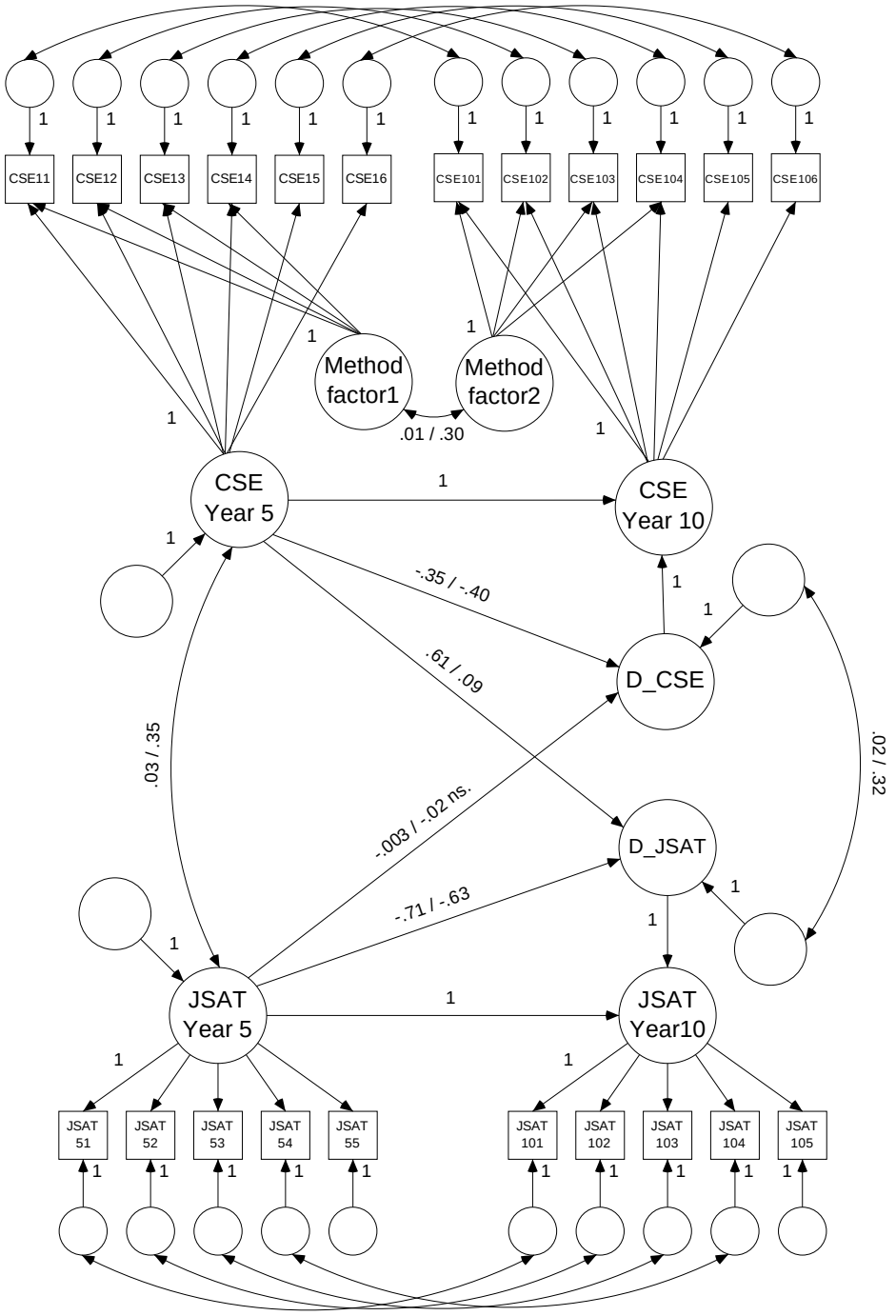

Figure 5-3. Latent difference score model between CSE and job satisfaction (JSAT). Effects of sex, age and income were skipped for simplicity. In the structural part, values before a slash line were unstandardized estimates, whereas values after a slash line were standardized estimates. All displayed estimated were significant at $p < .05$, except for the path noted with ns., which indicated a non-significant effect. CSE51 means the first item at the fifth year of CSE. CSE101 means the first item at the tenth year of CSE. Other items are in the same notation rule. JSAT51 means the first item at the fifth year of job satisfaction. JSAT101 means the first item at the tenth year of job satisfaction. Other items are in the same notation rule. D_CSE and D_JSAT are the difference score of CSE and job satisfaction.

I first examined the model that only specified correlated relationships among initial and latent change scores to see if the basic within-person change phenomena were supported. Overall fit indices showed that this model was acceptable (MLR-χ^2 = 1798.48, *df* = 250; CFI = .96; TLI = .95; RMSEA = .033; SRMR = .032). Results showed that the mean of latent change scores of CSE (unstandardized μ = .002; standardized μ = .014, p > .05) and job satisfaction (unstandardized μ = .036; standardized μ = .042, p > .05) were not significant, but their variances were significant (unstandardized variances were .01 and .71, and both standardized variances were 1, respectively, *p*s < .01), revealing the within-person changeability of CSE and job satisfaction (supporting H3 and H4), and substantial individual differences in within-person changes of CSE and job satisfaction (supporting H5 and H6).

Based on these findings, I introduced the directional relationship among initial and latent change scores. Overall fit indices showed that this model was acceptable (MLR-χ^2 = 1785.99, *df* = 250; CFI = .96; TLI = .95; RMSEA = .032; SRMR = .032). Results of this model can be found in Figure 5-3 and Table 5-6.

Results on the reciprocal relationship between CSE and job satisfaction showed that (1) CSE at Year 5 had a positive effect on the latent difference score of job satisfaction (unstandardized β =.61, standardized β= .09, p < .01), supporting H7, (2) job satisfaction at Year 5 did not have significant effect on the latent difference score of CSE (unstandardized β = -.00, standardized β = -.02, p > .05), failing to support H9, and (3) the latent difference scores of CSE and job satisfaction were positively related (unstandardized ψ = .02, standardized ψ = .32, p < .01), supporting H10.

Finally, the results also showed that the CSE and job satisfaction at Year 5 were positively related (unstandardized ϕ=.03, standardized ϕ= .35, p < .01), consistent with past findings that CSE is positively related to job satisfaction. CSE at Year 5 had

Table 5-6 Estimates of the Latent Difference Score Model

Items/Factors	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Job satisfaction at Year 5		Job satisfaction at Year 10		Latent different score of CSE		Latent different score of job satisfaction	
Items	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
Have you recently been able to face up to problems?	1.00	0.27	1.00	0.27	1.00	0.40	1.00	0.47	--	--	--	--	--	--	--	--
Have you recently been feeling unhappy or depressed? (r)	3.16	0.50	3.16	0.52	1.98	0.46	1.86	0.52	--	--	--	--	--	--	--	--
Have you recently been losing confidence in yourself? (r)	3.16	0.55	3.16	0.55	2.50	0.65	2.26	0.67	--	--	--	--	--	--	--	--
Have you recently been thinking of yourself as a worthless person? (r)	2.67	0.53	2.67	0.53	1.88	0.55	1.74	0.59	--	--	--	--	--	--	--	--
I feel that what happens to me is out of my control. (r)	3.79	0.59	3.79	0.62	--	--	--	--	--	--	--	--	--	--	--	--
I feel left out of things. (r)	4.37	0.69	4.37	0.71	--	--	--	--	--	--	--	--	--	--	--	--
Satisfaction with total pay	--	--	--	--	--	--	--	--	1.00	0.52	1.00	0.52	--	--	--	--
Satisfaction with security	--	--	--	--	--	--	--	--	0.89	0.47	0.89	0.47	--	--	--	--
Satisfaction with work itself	--	--	--	--	--	--	--	--	1.28	0.74	1.28	0.75	--	--	--	--
Satisfaction with work hours	--	--	--	--	--	--	--	--	1.08	0.58	1.08	0.59	--	--	--	--
Overall job satisfaction	--	--	--	--	--	--	--	--	1.52	0.93	1.52	0.91	--	--	--	--
CSE factor at Year 10	--	--	--	--	--	--	--	--	--	--	--	--	1.00	0.85	--	--
Job satisfaction at Year 10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.00	1.17

Factor relationships

Factors	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Job satisfaction at Year 5		Job satisfaction at Year 10		Latent different score of CSE		Latent different score of job satisfaction	
	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
CSE factor at Year 5	--	--	--	--	--	--	--	--	0.03	0.35	--	--	--	--	--	--
CSE factor at Year 10	1.00	0.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Method factor at Year 5	--	--	--	--	--	--	0.01	0.30	--	--	--	--	--	--	--	--
Method factor at Year 10	--	--	--	--	0.01	0.30	--	--	--	--	--	--	--	--	--	--
Job satisfaction at Year 5	0.03	0.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Job satisfaction at Year 10	--	--	--	--	--	--	--	--	1.00	1.04	--	--	--	--	--	--
Latent different score of CSE	-0.35	-0.40	--	--	--	--	--	--	-0.00 [a]	-0.02	--	--	--	--	0.02	0.32
Latent different score of job satisfaction	0.61	0.09	--	--	--	--	--	--	-0.71	-0.63	--	--	0.02	0.32	--	--

Except that the value denoting a is not significant, all other estimates were significant at $p < .01$. Unstd. is unstandardized estimates and Std. is standardized estimates. Results involving intercepts and errors were skipped for simplicity.

a negative effect on the latent differences score of CSE (unstandardized β = -.35, standardized β = -.40, p < .01), and job satisfaction at Year 5 had a negative effect on the latent difference score of job satisfaction (unstandardized β = -.71, standardized β = -.63, p < .01), revealing that people with higher CSE/job satisfaction had lower changes in CSE/job satisfaction across five years.

In summary, results of the LDS model showed that (1) individuals with higher CSE tend to have greater within-person changes in job satisfaction over time, (2) individuals with higher job satisfaction do not have greater within-person changes in CSE over time, and (3) individuals with greater within-person changes in CSE also have greater within-person changes in job satisfaction over time.

Latent Difference Score - Latent State-Trait (LDS-LST) model. In the previous LDS model, the contextual effect of job satisfaction on the change of CSE was not found. This non-significant finding may suggest that job satisfaction at a specific time point might not have an impact on one's trait-like self-evaluation, especially after five years. However, job satisfaction conveys success experiences over a long period of time may have a more enduring impact on defining one's success at work, which can then have a stronger impact on self-evaluation. Accordingly, based on the state-trait model (Steyer, Schmitt, & Eid, 1999), a LST model was built for job satisfaction to create two job satisfaction factors for five years from Year 1 to Year 5 and from Year 6 to Year 10. These two five-year job satisfaction factors were then used in the LDS model to test the longitudinal reciprocal relationships between CSE and job satisfaction in terms of within-person changes. In order to provide a clear description of the LDS-LST model, the part of LST model for job satisfaction was first examined, and then the full LDS-LST model.

Regarding the LST model for job satisfaction, based on the strong invariance model of job satisfaction over ten years, I extracted two five-year job satisfaction

factors from job satisfaction data over first and last five years to represent the level of work success in a given time period. In brief, the first five years (Year 1 to Year 5) and the last five years (Year 6 to Year 10) were chosen as the two time periods to match the time of CSE measures, and constructed the common job satisfaction measure in each time period. Specifically, items assessed in the same year were first influenced by the same first-order factor, resulting in 10 first-order factors. Then, the first five first-order factors were further influenced by a second-order factor representing the level of job satisfaction over the first five years, whereas the last five first-order factors were further influenced by a second-order factor representing the level of job satisfaction over the last five years. Based on the strong invariance model of job satisfaction over ten years, the first-order factor loadings and item intercept of the same items were constrained as equal over the ten years. The two five-year job satisfaction factors were allowed to be related. Figure 5-4 presents this LST model. The LST model was acceptable (MLR-χ^2 = 3731.03, *df* = 1065; CFI = .97; TLI = .97; RMSEA = .021; SRMR = .044). Correlation between the two five-year job satisfaction factors was .75, which is much higher than the correlations among yearly job satisfaction, revealing that job satisfaction over a long time period is more stable. However, it also showed that people changes their rank orders on the five-year job satisfaction over different time period. Estimates of this LST model were presented in Table 5-7.

Based on the LST model for job satisfaction, the full LDS-LST model was further built. In the LDS-LST model, the same strong invariance model of CSE and latent difference score of CSE presented in previous section was specified. For job satisfaction, the same LST model was specified and a latent difference score between the two five-year job satisfaction factors was created by the same specification method illustrated previously to represent the change of job satisfaction over two

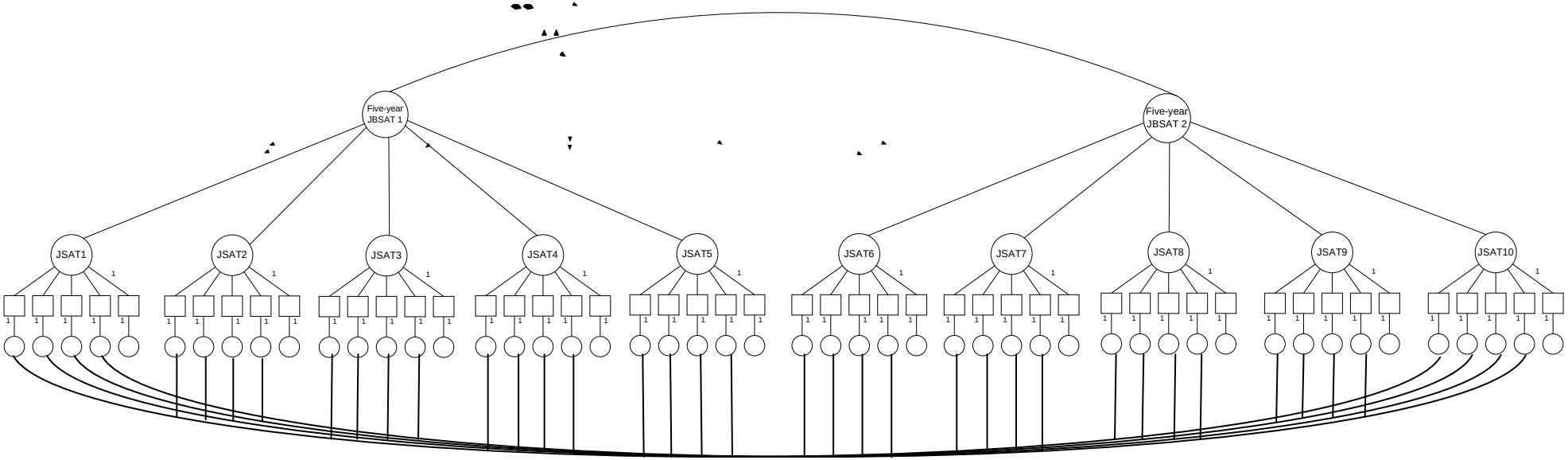

Figure 5-4. Latent state-trait model for job satisfaction.

Table 5-7 Estimates of the Latent State-Trait Model with Equality of Factor Loadings and Item Intercepts for Job Satisfaction

Items/Factors	JSAT1		JSAT2		JSAT3		JSAT4		JSAT5		JSAT6		JSAT7		JSAT8		JSAT9		JSAT10	
First-order factor loadings	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
1. Satisfaction with total pay	1.00	0.48	1.00	0.51	1.00	0.49	1.00	0.47	1.00	0.50	1.00	0.50	1.00	0.51	1.00	0.50	1.00	0.51	1.00	0.50
2. Satisfaction with security	0.86	0.44	0.86	0.44	0.86	0.43	0.86	0.43	0.86	0.44	0.86	0.46	0.86	0.46	0.86	0.45	0.86	0.45	0.86	0.44
3. Satisfaction with work itself	1.34	0.76	1.34	0.75	1.34	0.74	1.34	0.74	1.34	0.75	1.34	0.75	1.34	0.76	1.34	0.77	1.34	0.75	1.34	0.76
4. Satisfaction with work hours	1.07	0.57	1.07	0.56	1.07	0.55	1.07	0.53	1.07	0.56	1.07	0.57	1.07	0.57	1.07	0.56	1.07	0.57	1.07	0.56
5. Overall job satisfaction	1.58	0.93	1.58	0.93	1.58	0.88	1.58	0.90	1.58	0.91	1.58	0.90	1.58	0.90	1.58	0.90	1.58	0.90	1.58	0.90
	JSAT1		JSAT2		JSAT3		JSAT4		JSAT5		JSAT6		JSAT7		JSAT8		JSAT9		JSAT10	
Item intercepts	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
1. Satisfaction with total pay	4.97	3.09	4.97	3.47	4.97	3.25	4.97	3.39	4.97	3.47	4.97	3.47	4.97	3.49	4.97	3.46	4.97	3.60	4.97	3.63
2. Satisfaction with security	5.48	3.63	5.48	3.81	5.48	3.65	5.48	3.91	5.48	3.92	5.48	4.02	5.48	4.04	5.48	4.01	5.48	4.10	5.48	4.08
3. Satisfaction with work itself	5.44	4.03	5.44	4.19	5.44	4.07	5.44	4.32	5.44	4.28	5.44	4.24	5.44	4.28	5.44	4.33	5.44	4.36	5.44	4.45
4. Satisfaction with work hours	5.22	3.63	5.22	3.76	5.22	3.60	5.22	3.76	5.22	3.82	5.22	3.84	5.22	3.85	5.22	3.80	5.22	3.94	5.22	3.99
5. Overall job satisfaction	5.36	4.14	5.36	4.34	5.36	4.00	5.36	4.38	5.36	4.35	5.36	4.24	5.36	4.23	5.36	4.27	5.36	4.36	5.36	4.42

	Job satisfaction over the first five years		Job satisfaction over the last five years	
Second-order factor loadings	Unstd.	Std.	Unstd.	Std.
JSAT1	1.00	0.61	--	--
JSAT2	1.05	0.68	--	--
JSAT3	1.05	0.66	--	--
JSAT4	1.11	0.75	--	--
JSAT5	1.05	0.69	--	--
JSAT6	--	--	1.00	0.71
JSAT7	--	--	1.00	0.71
JSAT8	--	--	1.00	0.71
JSAT9	--	--	0.90	0.66
JSAT10	--	--	0.82	0.61

All estimates were significant at $p < .01$. Unstd. is unstandardized estimates and Std. is standardized estimates. Results involving errors were skipped for simplicity.

time periods. Regarding the structural part, because CSE was measured in the last year of each time period, initial CSE at Year 5 was predicted by the first five-year job satisfaction. The two latent difference scores were both predicted by initial CSE and job satisfaction in the first time period. Finally, the two latent change scores were allowed to be related. The two method factors for CSE were allowed to be related, but they were not related to other latent variables.

I first examined the model that only specified correlated relationships among initial and latent change scores to see if the basic within-person change phenomena were supported. Overall fit indices showed that this model was acceptable (MLR-χ^2 = 6630.33, *df* = 1876; CFI = .96; TLI = .95; RMSEA = .021; SRMR = .041). Results showed that the mean of latent change scores of CSE (unstandardized μ = .00; standardized μ = .00, $p > .05$) and five-year job satisfaction (unstandardized μ = -.03; standardized μ = -.07, $p > .05$) were not significant, but their variances were significant (unstandardized variances were .01 and .11, and standardized variances were .83 and .85, respectively, *p*s < .01), revealing the within-person changeability of CSE and five-year job satisfaction (supporting H3 and H4), and substantial individual differences in within-person changes of CSE and five-year job satisfaction (supporting H5 and H6).

I further introduced the directional relationship among initial and latent change scores. Overall fit indices showed that the specified model was acceptable (MLR-χ^2 = 6630.33, *df* = 1876; CFI = .96; TLI = .96; RMSEA = .021; SRMR = .041). Figure 5-5 and Table 5-8 present results of this model.

Results on the reciprocal relationship between CSE and job satisfaction showed that (1) the initial CSE had a positive effect on the latent difference score of five-year job satisfaction (unstandardized γ =.24, standardized γ = .08, $p < .01$), supporting H7, (2) the initial five-year job satisfaction had a positive effect on the latent difference

score of CSE (unstandardized β = .01, standardized β = .06, p = .01), supporting H9, and (3) the latent difference scores of CSE and job satisfaction were positively related (unstandardized ψ = .01, standardized ψ = .25, p < .01), supporting H10.

Finally, it was also found that initial five-year job satisfaction had a positive effect on initial CSE (unstandardized β =.09, standardized β = .37, p < .01). Initial CSE had a negative effect on the latent difference score of CSE (unstandardized φ = -.38, standardized φ= -.43, p < .01), and the initial five-year job satisfaction had a negative effect on the latent difference score of five-year job satisfaction (unstandardized φ = -.29, standardized φ= -.42, p < .01), revealing that people with higher CSE/five-year job satisfaction had lower changes in CSE/five-year job satisfaction.

In summary, results of LDS-LST model showed that (1) individuals with higher CSE tend to have greater changes in five-year job satisfaction over time, (2) individuals with higher five-year job satisfaction tend to have greater changes in CSE over time, and (3) individual with greater changes in CSE tend to have greater changes in five-year job satisfaction over time.

Latent difference score – Piecewise latent growth curve (LDS-PLGC) model. So far only the level of job satisfaction was considered in the longitudinal reciprocal relationships between CSE and job satisfaction. As mentioned previously, growth of job satisfaction may represent an individual's success experiences at work by denoting the increase of job satisfaction over time, which may have a stronger impact on self-evaluations in the dynamic of CSE and job satisfaction. Thus, in this section, the growth process of job satisfaction was included to examine the longitudinal reciprocal relationships. Similarly, CSE data at Year 5 and Year 10 and job satisfaction data in all years were used. In order to introduce the growth process of job satisfaction to the examination of the longitudinal reciprocal relationships between CSE and job

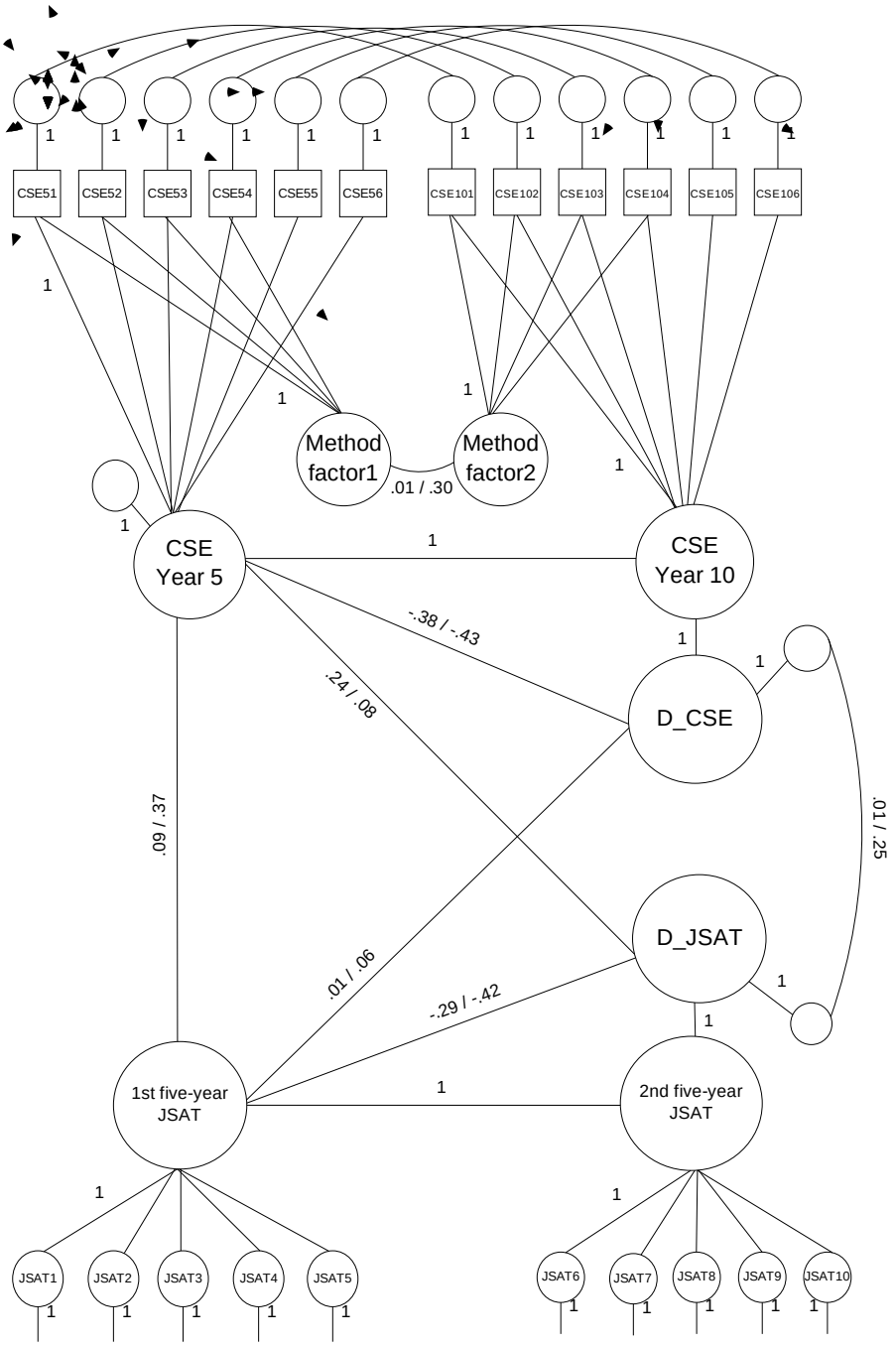

Figure 5-5. Latent difference score model between CSE and five-year job satisfaction (JSAT). Effects of sex, age and income were skipped for simplicity. In the structural part, values before a slash line were unstandardized estimates, whereas values after a slash line were standardized estimates. All displayed estimated were significant at $p < .01$. CSE51 means the first item at the fifth year of CSE. CSE101 means the first item at the tenth year of CSE. Other items are in the same notation rule. JSAT1 means the job satisfaction at the first year. Other first-order job satisfaction factors are in the same notation rule. The 1st five-year job satisfaction is the common job satisfaction factor in the first time period. The 2ed five-year job satisfaction is the common job satisfaction factor in the second time period. D_CSE and D_JSAT are the difference score of CSE and five-year job satisfaction.

Table 5-8 Estimates of the Latent Difference Score-Latent State-Trait Model

Items/Factors	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Job satisfaction over the first five years		Job satisfaction over the last five years		Latent different score of CSE		Latent different score of five-year job satisfaction	
Items	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
Have you recently been able to face up to problems?	1.00	0.26	1.00	0.26	1.00	0.41	1.00	0.48	--	--	--	--	--	--	--	--
Have you recently been feeling unhappy or depressed? (r)	3.24	0.48	3.24	0.50	1.99	0.48	1.88	0.54	--	--	--	--	--	--	--	--
Have you recently been losing confidence in yourself? (r)	3.27	0.54	3.27	0.54	2.46	0.65	2.25	0.68	--	--	--	--	--	--	--	--
Have you recently been thinking of yourself as a worthless	2.76	0.52	2.76	0.52	1.86	0.56	1.74	0.60	--	--	--	--	--	--	--	--
I feel that what happens to me is out of my control. (r)	4.02	0.60	4.02	0.62	--	--	--	--	--	--	--	--	--	--	--	--
I feel left out of things. (r)	4.74	0.71	4.74	0.72	--	--	--	--	--	--	--	--	--	--	--	--
JSAT1	--	--	--	--	--	--	--	--	1.00	0.64	--	--	--	--	--	--
JSAT2	--	--	--	--	--	--	--	--	1.00	0.68	--	--	--	--	--	--
JSAT3	--	--	--	--	--	--	--	--	0.95	0.65	--	--	--	--	--	--
JSAT4	--	--	--	--	--	--	--	--	1.00	0.73	--	--	--	--	--	--
JSAT5	--	--	--	--	--	--	--	--	1.01	0.71	--	--	--	--	--	--
JSAT6	--	--	--	--	--	--	--	--	--	--	1.00	0.69	--	--	--	--
JSAT7	--	--	--	--	--	--	--	--	--	--	0.98	0.68	--	--	--	--
JSAT8	--	--	--	--	--	--	--	--	--	--	1.03	0.71	--	--	--	--
JSAT9	--	--	--	--	--	--	--	--	--	--	0.98	0.68	--	--	--	--
JSAT10	--	--	--	--	--	--	--	--	--	--	0.95	0.66	--	--	--	--
CSE factor at Year 10	--	--	--	--	--	--	--	--	--	--	--	--	1.00	0.85	--	--
Job satisfaction over the last five years	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.00	0.71

Factor relationships

Factors	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Job satisfaction over the first five years		Job satisfaction over the last five years		Latent different score of CSE		Latent different score of five-year job satisfaction	
	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
CSE factor at Year 5	--	--	--	--	--	--	--	--	0.09	0.37	--	--	--	--	--	--
CSE factor at Year 10	1.00	0.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Method factor at Year 5	--	--	--	--	--	--	0.01	0.30	--	--	--	--	--	--	--	--
Method factor at Year 10	--	--	--	--	0.01	0.30	--	--	--	--	--	--	--	--	--	--
Job satisfaction over the first five years	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Job satisfaction over the last five years	--	--	--	--	--	--	--	--	1.00	1.02	--	--	--	--	--	--
Latent different score of CSE	-0.38	-0.43	--	--	--	--	--	--	0.01[a]	0.06[a]	--	--	--	--	0.01	0.25
Latent different score of five-year job satisfaction	0.24	0.08	--	--	--	--	--	--	-0.29	-0.42	--	--	0.01	0.25	--	--

Except that the value denoting a is significant at $p < .05$, all other estimates were significant at $p < .01$.Unstd. is unstandardized estimates and Std. is standardized estimates. Results involving first-order factor structure for job satisfaction, item intercepts, and errors were skipped for simplicity.

satisfaction, a PLGC model for job satisfaction was built. The PLGC model creates two growth factors and two intercepts for job satisfaction, which were then used to test the longitudinal reciprocal relationships between CSE and job satisfaction in the full LDS-PLGC model. In order to provide a clear description of the LDS-PLGC model, and understand the nature of growth of job satisfaction in the current data, the part of PLGC model for job satisfaction was first examined, and then the full LDS-PLGC model.

In the PLGC model for job satisfaction, the composite score of job satisfaction in each year was used, because when item scores were used, the PLGC model cannot be estimated to obtain a solution. Because items for job satisfaction are longitudinal invariant, computing a composite score of job satisfaction for each year is appropriate and using composite scores is also help to reduce the model size.

In the PLGC model with composite scores, the five job satisfaction composite scores in the first five years were influenced by an intercept factor and a slope factor, whereas the five job satisfaction composite scores in the later five years were influenced by an intercept factor and a slope factor. Factor loadings on the two intercept factors were set as 1. In order to facilitate the examination of the reciprocal relationship between within-person changes of CSE and job satisfaction over the same time period in the full LDS-PLGC model, job satisfaction at Year 5 and Year 10 were deliberately set as the reference points of the growth process as the intercepts for each time period. Accordingly, the first and the fifth factor loadings of the two slope factors were set as -1 and 0, whereas factor loadings for other three years of the two slope factors were freely estimated to capture the growth pattern in the data. Intercept factors and slope factors were correlated in the PLGC model. This model was presented in Figure 5-6.

An estimation problem was encountered when the PLGC model was estimated

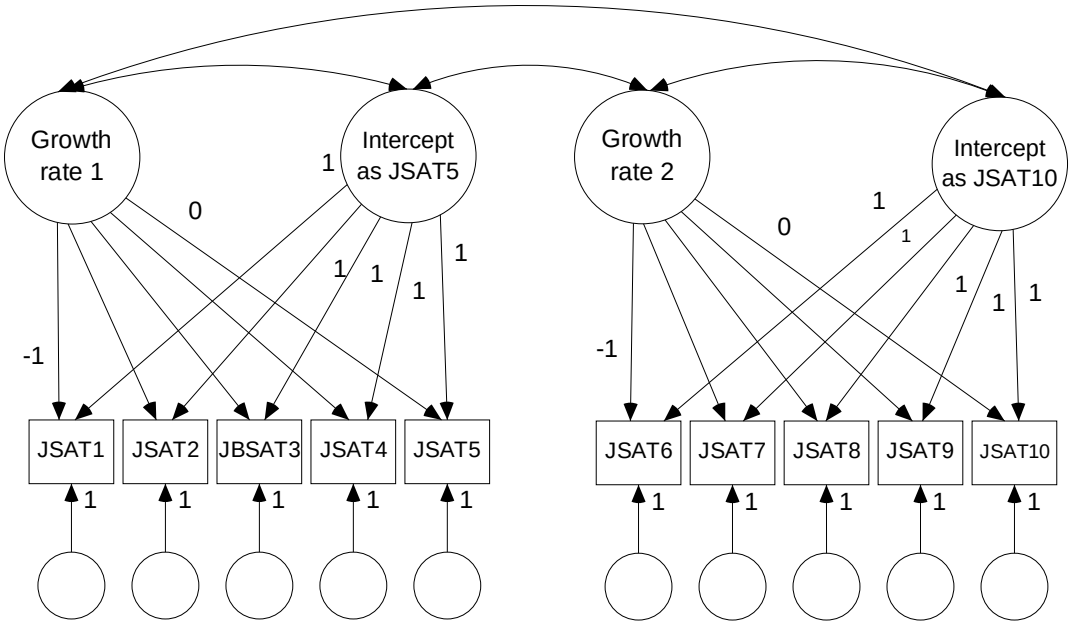

Figure 5-6. Piecewise latent growth curve model for job satisfaction. JSAT1 indicates the composite score of job satisfaction at the first year. Other job satisfaction scores are in the same notation rule.

directly. I then used two steps to obtain estimates. First, in order to obtain the estimable model, the pattern of factor loadings of the two slope factors were first set from 0 to 1 by setting job satisfaction at Year 1 and Year 6 as the two intercepts. With this specification, the model can be estimated and has good model fit (MLR-χ^2 = 125.65, *df* = 35; CFI = .99; TLI = .99; RMSEA = .021; SRMR = .027). The factor loadings on the two slope factors were [0, 0.016, 0.209, 0.581, 1] and [0, 0.410, 0.722, 1.024, 1] respectively, revealing increasing monotonic, but not linear, patterns of growth of job satisfaction in each time period.

After obtaining the estimates of loadings on the two slope factors, I then set job satisfaction at Year 5 and Year 10 as the two intercepts and converted the pattern of factor loadings of the two slope factors into -1 to 0 and fixed them in the model. That is, factor loadings of the two slope factors were [-1, -0.984, -0.791, -0.419, 0] and [-1, -0.590, -0.278, 0.024, 0] respectively with the job satisfaction at Year 5 and Year 10 as the two intercepts. These factor loadings of the two slope factors were always fixed in

the models containing the PLGC model for job satisfaction. This transformation only changes the reference point from Year 1 and Year 6 to Year 5 and Year 10, and reserves the same growth patterns estimated from the data in the first step. Overall fit indices revealed that the PLGC model setting job satisfaction at Year 5 and Year 10 as the two intercepts was acceptable (MLR-χ^2 = 119.99, *df* = 41; CFI = .99; TLI = .99; RMSEA = .018; SRMR = .027). Table 5-9 presents results of this model. The unstandardized means of two intercepts were 5.29 and 5.33 (*p*s < .01), which are the means of job satisfaction at Year 5 and Year 10. The unstandardized means of the two slope factors were .05 and .05 (*p*s < .01), which suggested that, overall, participants slightly increased their job satisfaction over years in each time period. Variances of the two intercept and two slope factors were all significant (*p*s < .01), revealing substantial individual differences in job satisfaction scores at Year 5 and Year 10, and growth of job satisfaction in the two time periods.

Regarding their relationships, the two intercepts were positively correlated (*r* = .61, *p* < .01). The intercept factor was positively related to the slope factor in each time period (*r* = .46 in the first time period, and *r* = .30 in the second time period, *p*s < .01), revealing that people with higher growth of job satisfaction tend to reach higher job satisfaction in the end of each time period. The first slope factor was positively related with the intercept factor (job satisfaction at Year 10) in the second time period (*r* = .10, *p* < .01), but negatively related with the slope factor in the second time period (*r* = -.23, *p* < .01). Finally, the intercept factor (job satisfaction at Year 5) in the first time period was negatively related with the slope factor in the second time period (*r* = -.33, *p* < .01). These findings, in general, revealed that people who have higher job satisfaction and growth of job satisfaction in the prior time period tend to have less growth of job satisfaction in the later time period.

Next, the full LDS-PLGC model was built to examine the longitudinal reciprocal relationships between CSE and job satisfaction. CSE data at Year 5 and Year 10 and job satisfaction data in all years were used to build the LDS-PLGC model.

Table 5-9 Estimates of the Latent Piecewise latent growth curve Model for Job Satisfaction

Items/Factors	Intercept as JSAT5		Intercept as JSAT10		Growth rate 1		Growth rate 2	
Items	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
JSAT1	1	0.75	--	--	-1.00	-0.64	--	--
JSAT2	1	0.80	--	--	-0.98	-0.67	--	--
JSAT3	1	0.75	--	--	-0.79	-0.51	--	--
JSAT4	1	0.81	--	--	-0.42	-0.29	--	--
JSAT5	1	0.80	--	--	0.00	0.00	--	--
JSAT6	--	--	1	0.72	--	--	-1.00	-0.65
JSAT7	--	--	1	0.72	--	--	-0.59	-0.38
JSAT8	--	--	1	0.74	--	--	-0.28	-0.18
JSAT9	--	--	1	0.73	--	--	0.02	0.02
JSAT10	--	--	1	0.75	--	--	0.00	0.00

Factor correlations

Factors	Intercept as JSAT5	Intercept as JSAT10	Growth rate 1	Growth rate 2
Intercept as JSAT5	--			
Intercept as JSAT10	.61	--		
Growth rate 1	.46	.10	--	
Growth rate 2	-.33	.30	-.23	--

All estimates were significant at $p < .01$.Unstd. is unstandardized estimates and Std. is standardized estimates. Results involving first-order factor structure for job satisfaction, item intercepts, and errors were skipped for simplicity.

In the LDS-PLGC model, the same strong invariance model of CSE and latent difference score of CSE presented previously was specified. The PLGC model for job satisfaction was also specified, which sets job satisfaction scores at Year 5 and Year 10 as two intercepts and extracts two growth factors over first and last five years. These two growth factors represent changes of job satisfaction from Year 1 to Year 5 and from Year 6 to Year 10, respectively. I also created a latent difference score of the two intercepts, which represents the within-person change between job satisfaction scores at Year 5 and Year 10.

Regarding the structural part of the LDS-PLGC model, CSE and job satisfaction at Year 5 were predicted by the growth of job satisfaction in the first five years, because both CSE and intercept was measured in the end of the first time period. The two latent difference scores were predicted both by CSE and job satisfaction at Year 5. The latent difference score of job satisfaction was also predicted by the growth of job satisfaction in the second time period. Growth of job satisfaction in the second time period was predicted by CSE at Year 5. It was also predicted by job satisfaction at Year 5 and growth of job satisfaction in the first time period to account for the autoregressive relationships in the growth process of job satisfaction. Finally, the two latent change scores were allowed to be related. The two method factors for CSE were allowed to be related, but they were not related to other latent variables. Figure 5-7 presents the LDS-PLGC model.

Overall fit indices showed that this LDS-PLGC model was acceptable (MLR-χ^2 = 1453.21, *df* = 247; CFI = .97; TLI = .96; RMSEA = .029; SRMR = .053). Figure 5-7 and Table 5-10 present results of this model. Results on the reciprocal relationship between CSE and job satisfaction showed that (1) CSE at Year 5 did not predict the latent difference score of job satisfaction between Year 5 and Year 10 (unstandardized γ = .02, standardized γ = .00, p > .05), but positively predicted the growth of job satisfaction in the second time period (unstandardized γ = .69, standardized γ = .13, p < .05), thus, H7 was still supported, (2) growth of job satisfaction in the first time period positively predicted CSE at Year 5 (unstandardized β = .08, standardized β = .35, p < .01), supporting H8, (3) job satisfaction at Year 5 positively predict the latent difference score of CSE (unstandardized γ = .02, standardized γ = .09, p < .01), supporting H9, and (3) the latent difference scores of CSE and job satisfaction were positively related (unstandardized ψ = .01, standardized ψ = .26, p < .01), supporting H10.

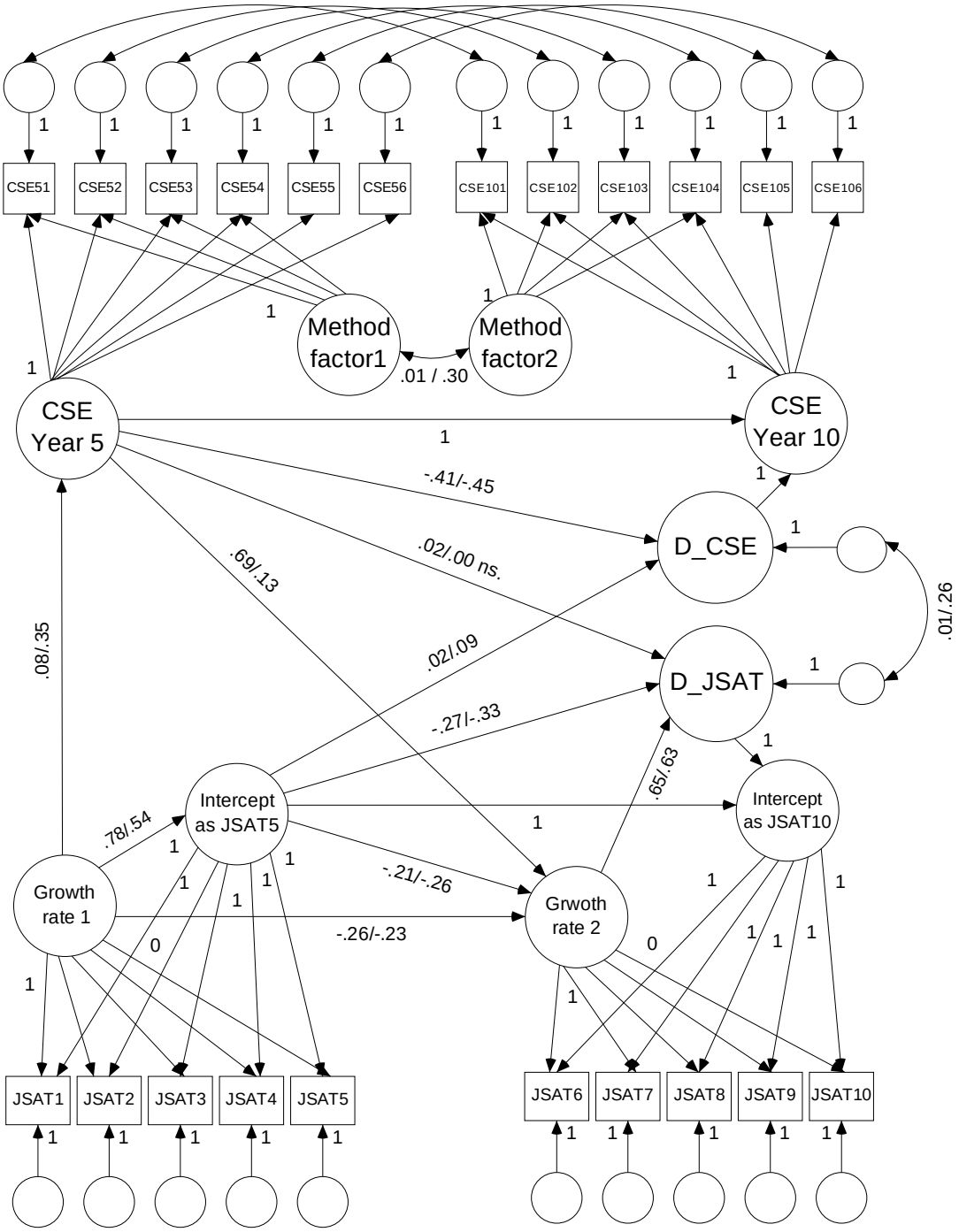

Figure 5-7. Latent difference score model between CSE and job satisfaction (JSAT) with a piecewise latent growth curve model for job satisfaction. Effects of sex, age and income were skipped for simplicity. In the structural part, values before a slash line were unstandardized estimates, whereas values after a slash line were standardized estimates. All displayed estimated were significant at $p < .05$, except for the path noted with ns., which indicated a non-significant effect. CSE51 means the first item at the fifth year of CSE. CSE101 means the first item at the tenth year of CSE. Other items are in the same notation rule. JSAT1 means the composite score of job satisfaction at the first year. Other composite scores of job satisfaction are in the same notation rule. D_CSE and D_JSAT are the difference score of CSE and job satisfaction.

Table 5-10 Estimates of the Latent Difference Score- Piecewise Latent Growth Curve Model

Items/Factors	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Intercept as JSAT5		Intercept as JSAT10		Growth rate 1		Growth rate 2		Latent different score of CSE		Latent different score of intercept	
Items	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
Have you recently been able to face up to problems?	1.00	0.26	1.00	0.26	1.00	0.41	1.00	0.48	--	--	--	--	--	--	--	--	--	--	--	--
Have you recently been feeling unhappy or depressed? (r)	3.20	0.49	3.20	0.50	2.01	0.48	1.88	0.54	--	--	--	--	--	--	--	--	--	--	--	--
Have you recently been losing confidence in yourself? (r)	3.22	0.54	3.22	0.53	2.50	0.66	2.26	0.68	--	--	--	--	--	--	--	--	--	--	--	--
Have you recently been thinking of yourself as a worthless person? (r)	2.73	0.52	2.73	0.52	1.88	0.56	1.74	0.60	--	--	--	--	--	--	--	--	--	--	--	--
I feel that what happens to me is out of my control. (r)	3.98	0.60	3.98	0.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
I feel left out of things. (r)	4.68	0.71	4.68	0.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
JSAT1	--	--	--	--	--	--	--	--	1.00	0.79	--	--	-1.00	-0.54	--	--	--	--	--	--
JSAT2	--	--	--	--	--	--	--	--	1.00	0.84	--	--	-0.98	-0.57	--	--	--	--	--	--
JSAT3	--	--	--	--	--	--	--	--	1.00	0.78	--	--	-0.79	-0.42	--	--	--	--	--	--
JSAT4	--	--	--	--	--	--	--	--	1.00	0.83	--	--	-0.42	-0.24	--	--	--	--	--	--
JSAT5	--	--	--	--	--	--	--	--	1.00	0.80	--	--	0.00	0.00	--	--	--	--	--	--
JSAT6	--	--	--	--	--	--	--	--	--	--	1.00	0.71	--	--	-1.00	-0.64	--	--	--	--
JSAT7	--	--	--	--	--	--	--	--	--	--	1.00	0.71	--	--	-0.59	-0.38	--	--	--	--
JSAT8	--	--	--	--	--	--	--	--	--	--	1.00	0.73	--	--	-0.28	-0.18	--	--	--	--
JSAT9	--	--	--	--	--	--	--	--	--	--	1.00	0.74	--	--	0.02	0.02	--	--	--	--
JSAT10	--	--	--	--	--	--	--	--	--	--	1.00	0.72	--	--	0.00	0.00	--	--	--	--
CSE factor at Year 10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.00	0.87	--	--
Intercept as JSAT10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.00	0.93

Factor relationships

Factors	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Intercept as JSAT5		Intercept as JSAT10		Growth rate 1		Growth rate 2		Latent different score of CSE		Latent different score of intercept	
	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	--	--	--	--
CSE factor at Year 5	--	--	--	--	--	--	--	--			--	--	0.08 [b]	0.35	--	--	--	--	--	--
CSE factor at Year 10	1.00	0.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Method factor at Year 5	--	--	--	--	--	--	0.01	0.30	--	--	--	--	--	--	--	--	--	--	--	--
Method factor at Year 10	--	--	--	--	0.01		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Intercept as JSAT5	--	--	--	--	--	--	--	--	--	--	--	--	0.78	0.54	--	--	--	--	--	--
Intercept as JSAT10	--	--	--	--	--	--	--	--	1.00	1.14	--	--	--	--	--	--	--	--	--	--
Growth rate 1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Growth rate 2	0.69	0.13	--	--	--	--	--	--	-0.21	-0.26	--	--	-0.26	-0.23	--	--	--	--	--	--
Latent different score of CSE	-0.41	-0.45	--	--	--	--	--	--	0.02	0.09	--	--	--	--	--	--	--	--	0.01	0.26
Latent different score of intercept	0.02[a]	0.00	--	--	--	--	--	--	-0.27	-0.33	--	--	--	--	0.65	0.63	0.01	0.26	--	--

Except that the value denoting a is not significant, and b is significant at $p < .05$, all other estimates were significant at $p < .01$.Unstd. is unstandardized estimates and Std. is standardized estimates. Results involving item intercepts and errors were skipped for simplicity.

Additionally, regarding the autoregressive relationships in the growth process of job satisfaction, I found that job satisfaction at Year 5 (unstandardized γ = -.21, standardized γ = -.26, p < .01) and growth of job satisfaction in the first time period (unstandardized β= -.26, standardized β = -.23, p < .01) had negative effects on growth of job satisfaction in the second time period. Growth of job satisfaction in the second time period had a positive effect on latent difference scores of job satisfaction (unstandardized γ = .65, standardized γ = .63, p < .01).

In summary, results of the LDS-PLGC model showed that (1) individuals with higher CSE tend to have greater within-person changes in job satisfaction over time, (2) individuals with greater growth of job satisfaction tend to have higher subsequent CSE, (3) individuals with higher job satisfaction tend to have greater within-person changes in CSE over time, and (4) individuals with greater within-person changes in job satisfaction also have greater within-person changes in CSE

5. 5 Analysis involving between-person change

In this section, the longitudinal reciprocal relationships between CSE and job satisfaction were examined in terms of between-person change, that is, the rank order changes among people in the same population over time. Because results of measurement models of CSE and job satisfaction have shown that individuals changed their rank orders on the level of CSE and job satisfaction over time and supported H11 and H12. I directly tested H13 and H14 in this section.

Three analysis approaches were conducted. The first one used two-time point data with a cross-lagged (CL) model. That is, only CSE and job satisfaction data at Year 5 and Year 10 were used. The second one used all available CSE and job satisfaction data with a CL model combined with a LST model for job satisfaction, which is noted as the CL-LST model. Finally, the third approach used all available data

with a CL model combined with a PLGC model for job satisfaction, which is noted as the CL-PLGC model.

Cross lagged (CL) model. CSE and job satisfaction data at Year 5 and Year 10 were used to build a CL model presented in Figure 5-8. In the CL model, the same strong invariance model of CSE was specified, which contained two CSE factors and two method factors. For the measurement model of job satisfaction, the same strong invariance model of job satisfaction with two factors was specified. Regarding the structural part of the model, because CSE and job satisfaction were measured in the same year, CSE was allowed to be related to job satisfaction in the same year. In addition, CSE and job satisfaction at Year 10 was predicted both by CSE and job satisfaction at Year 5. The two method factors for CSE were allowed to be related, but they were not related to other latent variables.

Overall fit indices showed that this model was acceptable (MLR-χ^2 = 1787.72, *df* = 252; CFI = .96; TLI = .95; RMSEA = .032; SRMR = .032). Figure 5-8 and Table 5-11 present results of this model. First, CSE and job satisfaction were positively related both at Year 5 (unstandardized φ = .03, standardizedφ = .35, p < .01) and Year 10 (unstandardized ψ = .02, standardizedψ = .32, p < .01). Because CSE and job satisfaction at Year 5 have been controlled, the positive relationship between CSE and job satisfaction at Year 10 shows that between-person changes in CSE is positively related to between-person changes in job satisfaction.

Regarding the autoregreressive paths, CSE at Year 10 was positively predicted by latent CSE at Year 5 (unstandardized β = .65, standardized β = .64, p < .01), and job satisfaction at Year 10 was positively predicted by job satisfaction at Year 5 (unstandardized β = .29, standardized β = .30, p < .01). Regarding the cross-lagged paths, job satisfaction at Year 10 was positively predicted by CSE at Year 5 (unstandardized γ = .62, standardized γ = .11, p < .01), supporting H13. However,

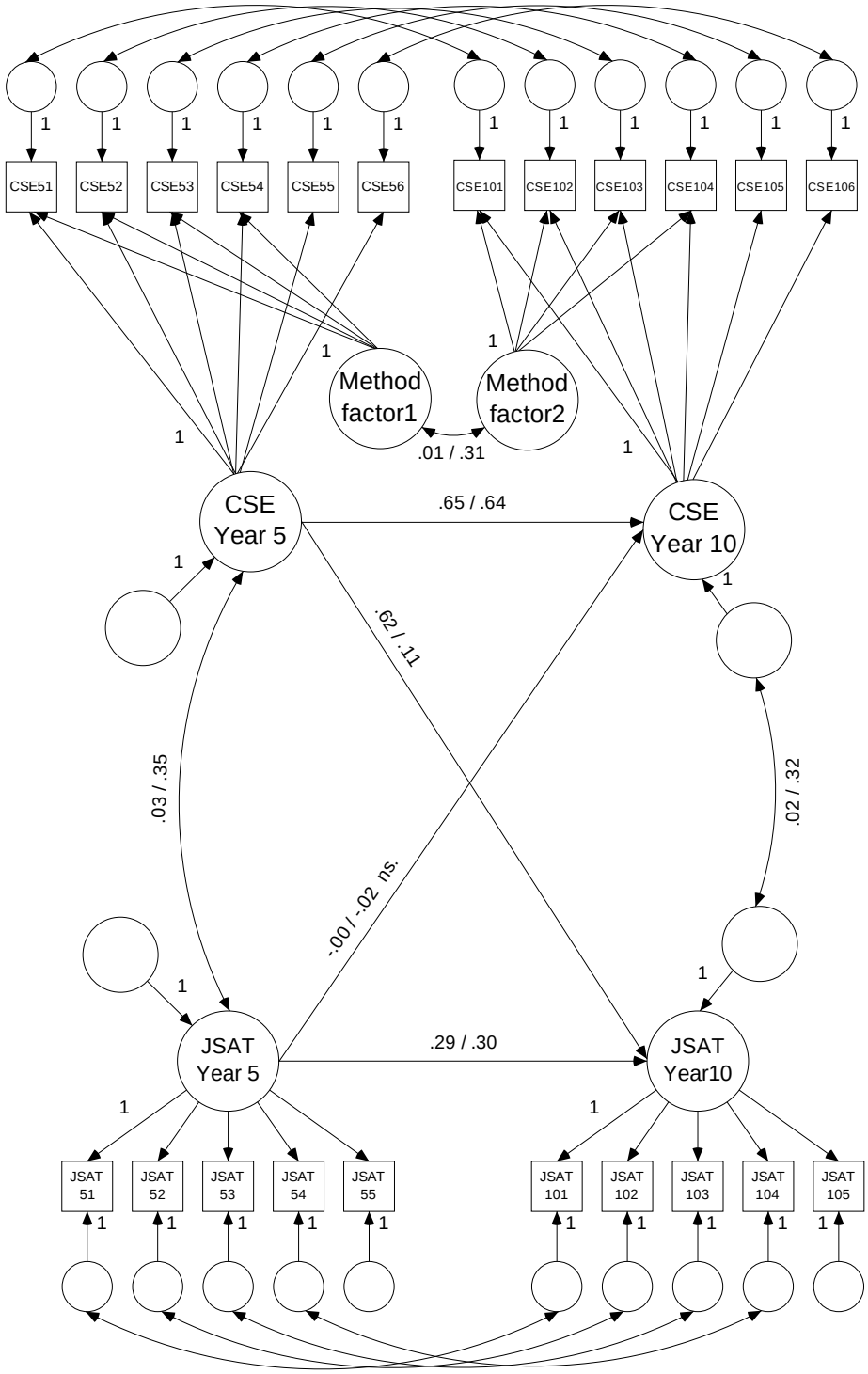

Figure 5-8. Cross-lagged structural equation modelling between CSE and job satisfaction (JSAT). Effects of sex, age and income were skipped for simplicity. In the structural part, values before a slash line were unstandardized estimates, whereas values after a slash line were standardized estimates. All displayed estimated were significant at $p < .05$, except for the path noted with ns., which indicated a non-significant effect. CSE51 means the first item at the fifth year of CSE. CSE101 means the first item at the tenth year of CSE. Other items are in the same notation rule. JSAT1 means the job satisfaction at the fifth year. JSAT101 means the job satisfaction at the tenth year. Other items are in the same notation rule.

Table 5-11 Estimates of the Cross-Lagged Model

Items/Factors	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Job satisfaction at Year 5		Job satisfaction at Year 10	
Items	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
Have you recently been able to face up to problems?	1.00	0.27	1.00	0.27	1.00	0.40	1.00	0.47	--	--	--	--
Have you recently been feeling unhappy or depressed? (r)	3.16	0.50	3.16	0.52	1.98	0.46	1.86	0.52	--	--	--	--
Have you recently been losing confidence in yourself? (r)	3.16	0.55	3.16	0.55	2.50	0.65	2.26	0.67	--	--	--	--
Have you recently been thinking of yourself as a worthless person? (r)	2.67	0.53	2.67	0.53	1.88	0.55	1.74	0.59	--	--	--	--
I feel that what happens to me is out of my control. (r)	3.79	0.60	3.79	0.62	--	--	--	--	--	--	--	--
I feel left out of things. (r)	4.37	0.69	4.37	0.71	--	--	--	--	--	--	--	--
Satisfaction with total pay	--	--	--	--	--	--	--	--	1.00	0.52	1.00	0.52
Satisfaction with security	--	--	--	--	--	--	--	--	0.89	0.47	0.89	0.47
Satisfaction with work itself	--	--	--	--	--	--	--	--	1.28	0.74	1.28	0.75
Satisfaction with work hours	--	--	--	--	--	--	--	--	1.08	0.58	1.08	0.59
Overall job satisfaction	--	--	--	--	--	--	--	--	1.52	0.93	1.52	0.91

Factor relationships

Factors	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Job satisfaction at Year 5		Job satisfaction at Year 10	
	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
CSE factor at Year 5	--	--	--	--	--	--	--	--	0.03	0.35	--	--
CSE factor at Year 10	0.65	0.64	--	--	--	--	--	--	0.00 [a]	-0.02	0.02	0.32
Method factor at Year 5	--	--	--	--	--	--	0.01	0.30	--	--	--	--
Method factor at Year 10	--	--	--	--	0.01	0.30	--	--	--	--	--	--
Job satisfaction at Year 5	0.03	0.35	--	--	--	--	--	--	--	--	--	--
Job satisfaction at Year 10	0.62	0.11	0.02	0.32	--	--	--	--	0.29	0.30	--	--

Except that the value denoting a is not significant, all other estimates were significant at $p < .01$. Unstd. is unstandardized estimates and Std. is standardized estimates. Results involving intercepts and errors were skipped for simplicity

CSE at Year 10 was not predicted by job satisfaction at Year 5 (unstandardized γ = .00, standardized γ = -.02, p > .05), failing to support H14.

In summary, based on the results of the CL model, I found that (1) individuals with higher CSE tend to have higher job satisfaction subsequently, (2) individuals with higher job satisfaction do not have higher CSE subsequently, and (3) individuals with higher rank-order changes in CSE also have higher rank-order changes in job satisfaction.

Cross lagged - Latent State-Trait (CL-LST) model. In the previous CL model, the contextual cross-lagged effect of job satisfaction on CSE was not found. This non-significant finding may suggest that job satisfaction at a specific time point might not have an impact on one's trait-like self-evaluation, especially after five years. Thus, again, based on the state-trait model (Steyer, Schmitt, & Eid, 1999), a LST model was built for job satisfaction to create two job satisfaction factors for five years from Year 1 to Year 5 and from Year 6 to Year 10. These two five-year job satisfaction factors were then used in the CL model to test the longitudinal reciprocal relationships between CSE and job satisfaction in terms of between-person changes. Previous results on the LST model for job satisfaction has indicated that the correlation between the two five-year job satisfaction factors was .75, revealing that individuals changed their rank orders on the level of five-year job satisfaction over time. Thus, the longitudinal reciprocal relationship between CSE and job satisfaction can be examined with the five-year job satisfaction measure.

The CL-LST model was presented in Figure 5-9. Regarding CSE, the same strong invariance model of CSE presented previously was specified. Regarding job satisfaction, again, based on the strong invariance model of job satisfaction over ten years, I extracted two five-year job satisfaction factor from job satisfaction data over first and last five years. Regarding the structural part, because CSE was

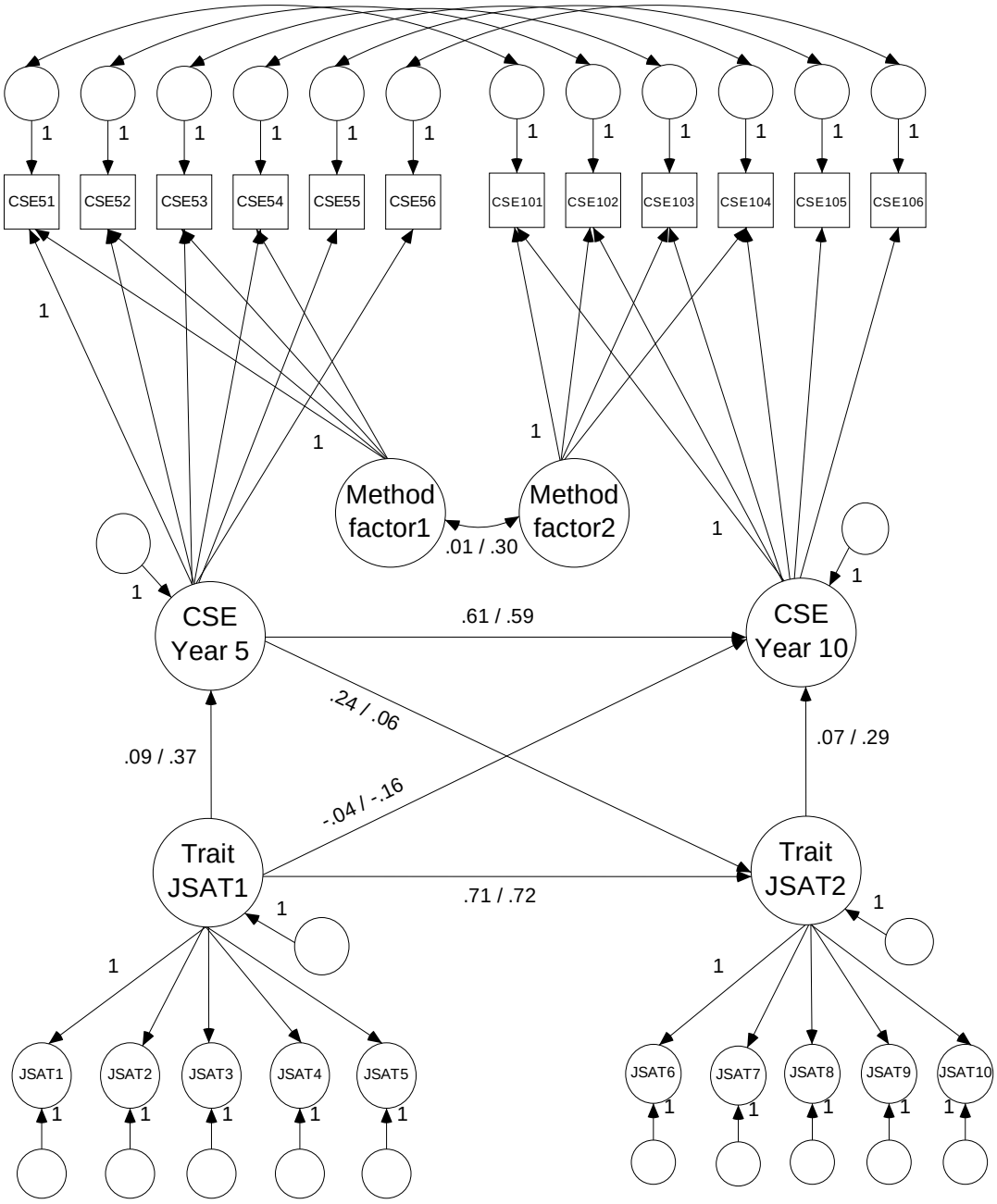

Figure 5-9. Cross-lagged structural equation modelling between CSE and five-year job satisfaction (JSAT). The measurement part of job satisfaction at item level and effects of sex, age and income were skipped for simplicity. In the structural part, values before a slash line were unstandardized estimates, whereas values after a slash line were standardized estimates. All displayed estimated were significant at $p < .01$. CSE51 means the first item at the fifth year of CSE. CSE101 means the first item at the tenth year of CSE. Other items are in the same notation rule. JSAT1 means the job satisfaction at the first year. Other first-order job satisfaction factors are in the same notation rule. The 1st five-year job satisfaction is the common job satisfaction factor in the first time period. The 2ed five-year job satisfaction is the common job satisfaction factor in the second time period.

measured in the last year of each time period, CSE at Year 5 was predicted by the first five-year job satisfaction, and CSE at Year 10 was predicted by the second five-year job satisfaction. In addition, CSE at Year 10 and the second five-year job satisfaction were predicted both by CSE at Year 5 and the first five-year job satisfaction. The two method factors for CSE were allowed to be related, but they were not related to other latent variables.

Overall fit indices showed that the CL-LST model was acceptable (MLR-χ^2 = 6630.47, *df* = 1878; CFI = .96; TLI = .96; RMSEA = .021; SRMR = .041). Figure 5-9 and Table 5-12 present results of this model. Regarding the autoregreressive paths, CSE at Year 10 was positively predicted by CSE at Year 5 (unstandardized γ = .61, standardized γ = .59, p < .01), whereas the second five-year job satisfaction was positively predicted by the first five-year job satisfaction (unstandardized γ = .71, standardized γ = .72, p < .01). Regarding the cross-lagged paths, the second five-year job satisfaction was positively predicted by CSE at Year 5 (unstandardized γ = .24, standardized γ = .06, p < .01), supporting H13. Although CSE at Year 10 was negatively predicted by the first five-year job satisfaction (unstandardized γ = -.04, standardized γ = -.16, p < .01), CSE at Year 5 was positively predicted by the first five-year job satisfaction (unstandardized γ = .09, standardized γ = .37, p < .01), and latent CSE at Year 10 was positively predicted by the second five-year job satisfaction (unstandardized γ = .07, standardized γ = .29, p < .01). All together, H14 was generally supported.

Additionally, the negative effect of first five-year job satisfaction on CSE at Year 10 actually reflect the phenomena that between-person changes in five-year job satisfaction is related to between-person changes in CSE. This is because I predicted the CSE at Year 10 by CSE at Year 5, the first and second five-year job satisfaction, if the change of five-year job satisfaction is associated with the change

Table 5-12 Estimates of the Cross-lagged -Latent State-Trait Model

Items/Factors	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Job satisfaction over the first five years		Job satisfaction over the last five years	
Items	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
Have you recently been able to face up to problems?	1.00	0.26	1.00	0.26	1.00	0.41	1.00	0.48	--	--	--	--
Have you recently been feeling unhappy or depressed? (r)	3.23	0.48	3.23	0.50	1.99	0.48	1.88	0.54	--	--	--	--
Have you recently been losing confidence in yourself? (r)	3.27	0.54	3.27	0.54	2.46	0.65	2.25	0.68	--	--	--	--
Have you recently been thinking of yourself as a worthless person? (r)	2.76	0.52	2.76	0.52	1.86	0.56	1.74	0.60	--	--	--	--
I feel that what happens to me is out of my control. (r)	4.02	0.60	4.02	0.62	--	--	--	--	--	--	--	--
I feel left out of things. (r)	4.74	0.71	4.74	0.72	--	--	--	--	--	--	--	--
JSAT1	--	--	--	--	--	--	--	--	1.00	0.64	--	--
JSAT2	--	--	--	--	--	--	--	--	0.99	0.68	--	--
JSAT3	--	--	--	--	--	--	--	--	0.95	0.65	--	--
JSAT4	--	--	--	--	--	--	--	--	1.00	0.73	--	--
JSAT5	--	--	--	--	--	--	--	--	1.01	0.71	--	--
JSAT6	--	--	--	--	--	--	--	--	--	--	1.00	0.69
JSAT7	--	--	--	--	--	--	--	--	--	--	0.98	0.67
JSAT8	--	--	--	--	--	--	--	--	--	--	1.03	0.71
JSAT9	--	--	--	--	--	--	--	--	--	--	0.98	0.68
JSAT10	--	--	--	--	--	--	--	--	--	--	0.95	0.66

Factor relationships

Factors	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Job satisfaction over the first five years		Job satisfaction over the last five years	
	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
CSE factor at Year 5	--	--	--	--	--	--	--	--	0.09	0.37	--	--
CSE factor at Year 10	0.61	0.59	--	--	--	--	--	--	-0.04	-0.16	0.07	0.29
Method factor at Year 5	--	--	--	--	--	--	0.01	0.30	--	--	--	--
Method factor at Year 10	--	--	--	--	0.01	0.30	--	--	--	--	--	--
Job satisfaction over the first five years	--	--	--	--	--	--	--	--	--	--	--	--
Job satisfaction over the last five years	0.24	0.06	--	--	--	--	--	--	0.71	0.72	--	--

All estimates were significant at $p < .01$.Unstd. is unstandardized estimates and Std. is standardized estimates. Results involving first-order factor structure for job satisfaction, item intercepts, and errors were skipped for simplicity.

of CSE, then one would expect a negative effect of the first five-year job satisfaction on CSE at Year 10. It is because that once second five-year job satisfaction predicts CSE at Year 10, lower scores on the first five-year job satisfaction are indicative of greater change in five-year job satisfaction.

Overall, results of the CL-LST model showed that (1) individuals with higher CSE tend to have higher subsequent five-year job satisfaction, (2) individuals with higher five-year job satisfaction tend to have higher subsequent CSE, and (3) individual with greater changes in CSE in their rank orders, tend to have greater changes in five-year job satisfaction in rank orders over time.

Cross lagged – piecewise latent growth curve (CL-PLGC) model. Finally, the growth process of job satisfaction was introduced in the cross-lagged model to examine the longitudinal reciprocal relationships between CSE and job satisfaction. Similarly, CSE data at Year 5 and Year 10 and job satisfaction data in all years were used to build a CL-PLGC model presented in Figure 5-10.

In the CL-PLGC model, the same strong invariance model of CSE presented previously was specified. The same PLGC model was also built for job satisfaction in the two time periods by setting job satisfaction scores at Year 5 and Year 10 as two intercepts and extracting two growth factors over first and last five years. Regarding the structural part, both CSE and job satisfaction at Year 10 were predicted by CSE and job satisfaction at Year 5 and growth of job satisfaction in the second time period. CSE and job satisfaction at Year 5 were predicted by the growth of job satisfaction in the first five years. Growth of job satisfaction in the second time period was also predicted by CSE and job satisfaction at Year 5 and growth of job satisfaction in the first time period.

Overall fit indices showed that this CL-PLGC model was acceptable (MLR-χ^2 = 1450.80, *df* = 247; CFI = .97; TLI = .96; RMSEA = .029; SRMR = .054). Figure 5-10

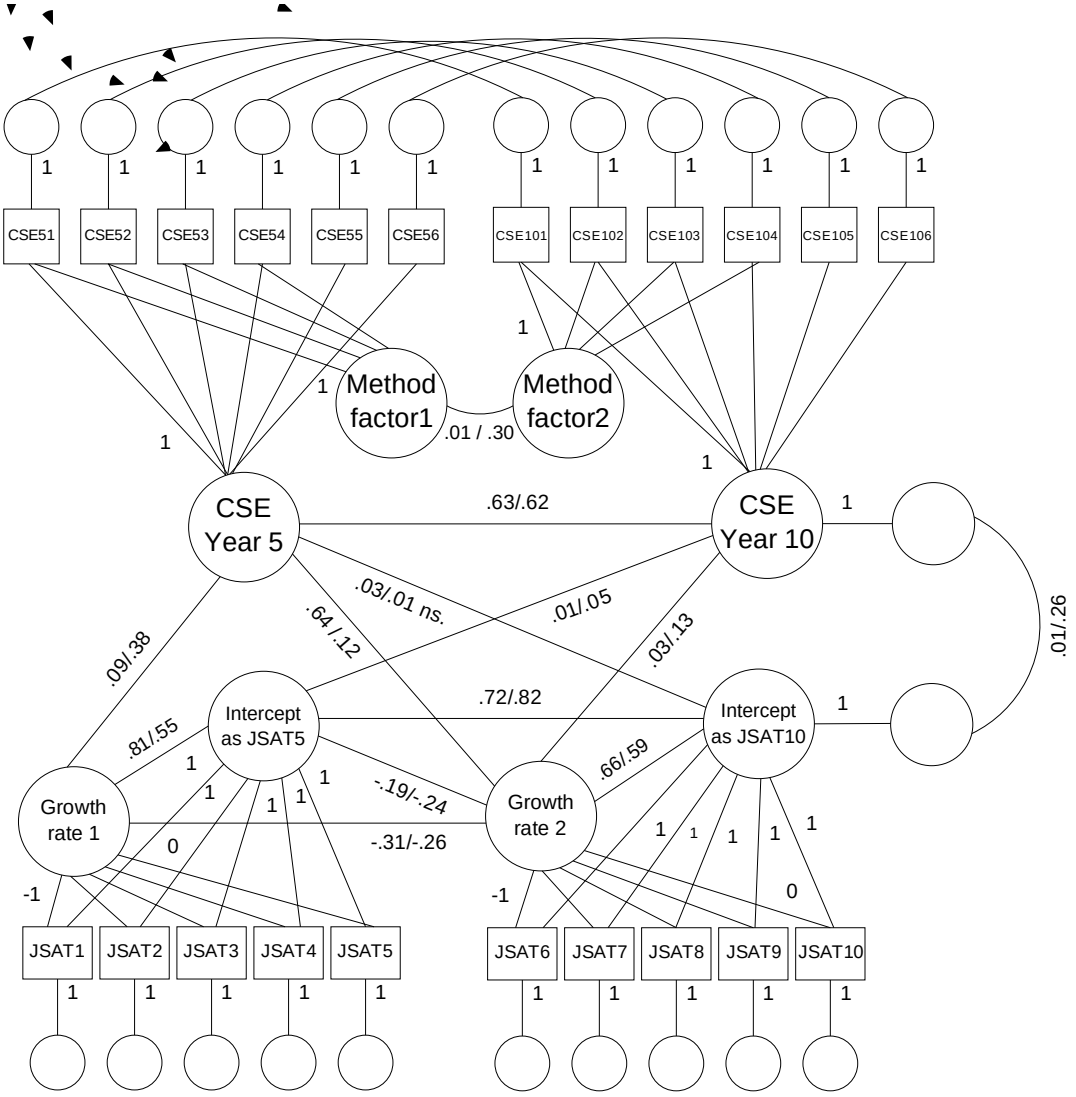

Figure 5-10. Cross-lagged structural equation modelling between CSE and job satisfaction (JSAT) with a piecewise latent growth curve model. Effects of sex, age and income were skipped for simplicity. In the structural part, values before a slash line were unstandardized estimates, whereas values after a slash line were standardized estimates. All displayed estimated were significant at $p < .05$, except for the path noted with ns., which indicated a non-significant effect. CSE51 means the first item at the fifth year of CSE. CSE101 means the first item at the tenth year of CSE. Other items are in the same notation rule. JSAT1 means the composite score of job satisfaction at the first year. Other composite scores of job satisfaction are in the same notation rule.

Table 5-13 Estimates of the Cross-Lagged - Piecewise Latent Growth Curve Model

Items/Factors	CSE factor		CSE factor		Method factor		Method factor		Intercept as		Intercept as		Growth rate 1		Growth rate 2	
Items	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
Have you recently been able to face up to problems?	1.00	0.26	1.00	0.26	1.00	0.41	1.00	0.47	--	--	--	--	--	--	--	--
Have you recently been feeling unhappy or depressed? (r)	3.19	0.49	3.19	0.50	2.00	0.48	1.89	0.54	--	--	--	--	--	--	--	--
Have you recently been losing confidence in yourself? (r)	3.21	0.54	3.21	0.54	2.49	0.66	2.26	0.68	--	--	--	--	--	--	--	--
Have you recently been thinking of yourself as a worthless person? (r)	2.73	0.52	2.73	0.52	1.88	0.56	1.74	0.60	--	--	--	--	--	--	--	--
I feel that what happens to me is out of my control. (r)	3.94	0.60	3.94	0.62	--	--	--	--	--	--	--	--	--	--	--	--
I feel left out of things. (r)	4.62	0.71	4.62	0.72	--	--	--	--	--	--	--	--	--	--	--	--
JSAT1	--	--	--	--	--	--	--	--	1.00	0.80	--	--	-1.00	-0.54	--	--
JSAT2	--	--	--	--	--	--	--	--	1.00	0.85	--	--	-0.98	-0.56	--	--
JSAT3	--	--	--	--	--	--	--	--	1.00	0.78	--	--	-0.79	-0.42	--	--
JSAT4	--	--	--	--	--	--	--	--	1.00	0.83	--	--	-0.42	-0.24	--	--
JSAT5	--	--	--	--	--	--	--	--	1.00	0.80	--	--	0.00	0.00	--	--
JSAT6	--	--	--	--	--	--	--	--	--	--	1.00	0.72	--	--	-1.00	-0.65
JSAT7	--	--	--	--	--	--	--	--	--	--	1.00	0.72	--	--	-0.59	-0.38
JSAT8	--	--	--	--	--	--	--	--	--	--	1.00	0.73	--	--	-0.29	-0.19
JSAT9	--	--	--	--	--	--	--	--	--	--	1.00	0.73	--	--	0.02	0.02
JSAT10	--	--	--	--	--	--	--	--	--	--	1.00	0.74	--	--	0.00	0.00

Factor relationships

Factors	CSE factor at Year 5		CSE factor at Year 10		Method factor at Year 5		Method factor at Year 10		Intercept as JSAT5		Intercept as JSAT10		Growth rate 1		Growth rate 2	
	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
CSE factor at Year 5	--	--	--	--	--	--	0.01	0.30	--	--	--	--	0.09 [b]	0.38	--	--
CSE factor at Year 10	0.63	0.62	--	--	--	--	--	--	0.01	0.05	0.01	0.26	--	--	0.03	0.13
Method factor at Year 5	--	--	--	--	0.01	0.30	--	--	--	--	--	--	--	--	--	--
Method factor at Year 10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Intercept as JSAT5	--	--	--	--	--	--	--	--	--	--	--	--	0.81	0.55	--	--
Intercept as JSAT10	0.03 [a]	0.01	0.01	0.26	--	--	--	--	0.72	0.82	--	--	--	--	0.66	0.59
Growth rate 1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Growth rate 2	0.64	0.12	--	--	--	--	--	--	-0.19	-0.24	--	--	-0.31	-0.26	--	--

Except that the value denoting a is not significant, and b is significant at $p < .05$, all other estimates were significant at $p < .01$.Unstd. is unstandardized estimates and Std. is standardized estimates. Results involving item intercepts and errors were skipped for simplicity.

and Table 5-13 present results of this model. Regarding the autoregreressive paths, CSE at Year 10 was positively predicted by CSE at Year 5 (unstandardized γ = .63, standardized γ = .62, p < .01), whereas job satisfaction at Year 10 was positively predicted by job satisfaction at Year 5 (unstandardized γ = .72, standardized γ = .82, p < .01). Regarding the cross-lagged paths, job satisfaction at Year 10 was not predicted by CSE at Year 5 (unstandardized γ = .03, standardized γ = .01, p > .05), failing to support H13. CSE at Year 10 was positively predicted by job satisfaction at Year 5 (unstandardized γ = .01, standardized γ = .05, p < .01), supporting H14. Additionally, CSE and job satisfaction were positively related at Year 10 (unstandardized ψ = .01, standardized ψ = .26, p < .01). Because CSE and job satisfaction at Year 5 have been controlled, the positive relationship between CSE and job satisfaction at Year 10 further revealed that between-person changes in CSE were positively related to between-person changes in job satisfaction.

Regarding the effect of growth of job satisfaction, in each time period, CSE and job satisfaction were positively predicted by growth of job satisfaction (for the first time period, unstandardized β = .09, standardized β = .38, p < .01; unstandardized β= .81, standardized β = .55, p < .01; for the second time period, unstandardized γ = .03, standardized γ= .13, p < .01; unstandardized γ = .66, standardized γ = .59, p < .01). In addition, growth of job satisfaction in the second time period was positively predicted by CSE at Year 5 (unstandardized γ = .64, standardized γ = .12, p < .05) and negatively predicted by job satisfaction at Year 5 (unstandardized γ = -.19, standardized γ = -.24, p < .01) and growth of job satisfaction in the first time period (unstandardized β = -.31, standardized β = -.26, p < .01).

Given the whole results, the non-significant effect of CSE at Year 5 on job satisfaction at Year 10 may show a full mediation effect of growth of job satisfaction in the second time period between CSE at Year 5 and job satisfaction at Year 10. Indeed,

this mediation effect was significant (unstandardized effect=.42, standardized effect = .07, $p < .05$) in the indirect effect test, revealing that CSE contributed to greater growth of job satisfaction over time, which then lead to a higher level of job satisfaction in the end.

Overall, results of the CL-PLGC model showed that (1) individuals with higher CSE tend to have higher subsequent job satisfaction through the effect of growth of job satisfaction, (2) individuals with higher job satisfaction tend to have higher subsequent CSE, and (3) individuals with higher rank-order changes in CSE also have higher rank-order changes in job satisfaction.

In order to provide a clear understanding of the findings for hypothesis testing, Table 5-14 provides summary of hypotheses and corresponding results.

Table 5-14 Summary of Hypotheses and Corresponding Results

Hypothesis	Corresponding results
Hypothesis 1: After controlling for measurement error, factor loadings and item intercepts, the items assessing CSE will show longitudinal invariance over time.	This hypothesis has been supported by the measurement model of CSE with equality of factor loadings on latent CSE factors and item intercepts (see Table 5-2).
Hypothesis 2: After controlling measurement for error, factor loadings and item intercepts, the items assessing job satisfaction will show longitudinal invariance over time.	This hypothesis has been supported by the measurement model of job satisfaction with equality of factor loadings and item intercepts (see Table 5-4).
Hypothesis 3: An individual's level of CSE will change over time.	This hypothesis has been supported by the significant variance in the latent change scores of CSE in the LDS model.
Hypothesis 4: An individual's level of job satisfaction will change over time.	This hypothesis has been supported by the significant variance of latent change scores of job satisfaction in the LDS model.
Hypothesis 5: Individuals will display different amounts of change in CSE over time.	This hypothesis has been supported by the significant variance of latent change scores of CSE in the LDS model.
Hypothesis 6: Individuals will display different amounts of change in job satisfaction over time.	This hypothesis has been supported by the significant variance of latent change scores of job satisfaction in the LDS model.
Hypothesis 7: People with higher CSE will subsequently show a larger within-person change in job satisfaction over time.	This hypothesis has been supported by the significant effect of CSE on the latent difference scores of job satisfaction in the LDS, LDS-LST and LDS-PLGC models.
Hypothesis 8: People with larger within-person changes in job satisfaction over time will subsequently show a higher level of CSE.	This hypothesis has been supported by the significant effect of growth in job satisfaction on later CSE in the LDS-PLGC model.
Hypothesis 9: People with higher job satisfaction will subsequently show a larger within-person change in CSE over time.	This hypothesis has been supported by the significant effect of job satisfaction on the latent difference score of CSE in the LDS-LST and LDS-PLGC models, but not in the LDS model.
Hypothesis 10: The within-person change of CSE over time is positively related to the within-person change of job satisfaction in the same time period.	This hypothesis has been supported by the significant relationship between latent differences in the scores of job satisfaction and CSE in the LDS, LDS-LST and LDS-PLGC models.
Hypothesis 11: Individual rank order on the level of CSE will change over time.	This hypothesis has been supported by the test-retest correlation in the measurement model of CSE (see Table 5-3).
Hypothesis 12: Individual rank order on the level of job satisfaction will change over time.	This hypothesis has been supported by the test-retest correlation in the measurement model of job satisfaction (see Table 5-5).
Hypothesis 13: People with higher CSE tend to have higher job satisfaction subsequently.	This hypothesis has been supported by the significant effect of CSE on later job satisfaction in the CL and CL-LST models, but not in the CL-PLGC model.
Hypothesis 14: People with higher job satisfaction tend to have higher CSE subsequently.	This hypothesis has been supported by the significant effect of job satisfaction on later CSE in the CL-LST and CL-PLGC models, but not in the CL model.

Chapter 6. Discussion

Reciprocal relationships between psychological constructs of self and life experiences are important because they reflect the dynamic process through which individuals shape and are shaped by their environments. In this thesis, I capture this process by showing that CSE and job satisfaction mutually influence each other over time through both intra- and inter-individual change process.

In brief, this thesis contributes to better understanding of the malleability of CSE and the link between CSE and work experiences. It also demonstrates how to apply different SEM models to address different issues in longitudinal analysis. First, CSE has typically been treated as a static personality trait that can influence individuals' life experiences (Judge et al., 1997), but few previous studies have discussed the possibility of changes in CSE. Thus, this thesis directly contributes to this gap in CSE research by focusing on both intra and inter-individual changes in CSE. Second, previous studies have paid less attention to the dynamics of CSE and work experiences. Although this relationship has been theorized in previous research (e.g., Judge, 2009; Judge & Kammeyer-Mueller, 2004), few studies have addressed the implications of this reciprocal relationship for longitudinal research. Thus, this thesis directly contributes to this gap in CSE research by unpacking the potential reciprocal relationship between CSE and work experiences (i.e., job satisfaction). Finally, this study also contributes to longitudinal analysis by demonstrating how to use different SEM models to address different issues in this form of analysis.

In the following sections, results of this thesis were first summarized. Then, the contributions and implications of this thesis were then elaborated based on the findings. Limitations and future research were next provided. Finally, a general conclusion of this thesis was made in the end.

6. 1 Summary of results

In this thesis, three approaches have been used to examine the longitudinal reciprocal relationships between CSE and job satisfaction. I first used two time-point data to understand their longitudinal reciprocal relationships with a LDS model and a CL model for within-person and between-person change analysis respectively. When the two time-point data were analyzed, only the dispositional effect of CSE on job satisfaction was found in both analysis, supporting the dispositional perspective of CSE, but not the contextual perspective. However, because CSE is a basic, fundamental and encompassing evaluation toward self, it is possible that only salience life experiences would have impacts on CSE and result in the change of CSE. Therefore, using the measure of job satisfaction at one time is not desirable to detect the expected impact of success experiences embedded in job satisfaction on CSE.

Thus, in the second approach, I used five-year job satisfaction as the indicator to strengthen the meaning of success embedded in job satisfaction. This five-year job satisfaction represents an individual's overall evaluation on his/her job experiences over five years, which constitutes an enduring meaning of work success in a long time period. I further examined the longitudinal reciprocal relationships between CSE and job satisfaction with a LDS-LST model and a CL-LST model for within-person and between-person change analysis respectively. Results of this approach revealed that CSE and job satisfaction have mutual influences over time both with within-person and between-person changes, supporting the notion that job satisfaction conveying an enduring experience in success (i.e., five-year job satisfaction) has stronger impact on self-evaluations and also both dispositional and contextual perspectives of CSE.

Finally, I introduced the growth process of job satisfaction into the dynamics of

CSE and job satisfaction with a LDS-PLGC model and a CL-PLGC model for within-person and between-person change analysis respectively. In brief, results of the these two models altogether revealed that people who increased job satisfaction in the first five years with higher rate tend to achieve higher levels of CSE and job satisfaction in the end of that time period. Then, the higher level of CSE positively contributes to the growth of job satisfaction in the next time period, which again results in higher levels of CSE and job satisfaction in the end of the next time period, whereas the higher level of job satisfaction positively contributes to both intra- and inter-person change of CSE in the next time period. All this findings support the longitudinal reciprocal relationships between CSE and job satisfaction both with within- and between-person change phenomena.

6. 2 Theoretical contributions

The current findings make contributions to better understanding of CSE with within- and between-person change phenomena. Psychological research usually relies on a strong uniformity-of-nature assumption by assuming that mechanisms that operate at intra-individual level are consistent with those that operate at inter-individual level (Borsboom et al., 2003). However, researchers working on multilevel modelling have noted that mechanisms at different levels can be different because of the different contexts embedded in each level (e.g., Klein & Kozlowski, 2000). With this multilevel perspective in mind, I outline the implications of the current results.

First, the current results reveal the within-person changeability of CSE. This within-person changeability suggests adaptive opportunities for individuals to increase or decrease their levels of CSE. For example, people can redress serious negative self-views or excessive positive self-views that may result in psychological problems, such as depression (e.g., Beck & Alford, 2009) or narcissism (e.g., Rhodewalt &

Sorrow, 2003). Moreover, CSE can be used as a feedback indicator to monitor current status and guide following behaviours for adaptation. For example, increased CSE resulting from positive experiences can make an individual have more confidence to take challenges and pursue advanced goals for further progress; whereas decreased CSE resulting from negative experiences can make an individual reflect his/her own disadvantage and rethink his/her strategies for self-examination. This notion was supported by Tolli and Schmidt (2008) and Seo and Ilies' (2009) findings on self-efficacy, one component of CSE. They found that feedback or past performance determines the level of self-efficacy, which in turn, influences the goal revision, revealing that self-evaluation mediates the relationship between feedbacks from experiences and following actions. Therefore, within-person changeability of CSE does not represent a random fluctuation due to life experiences, but implies an ecological function in monitoring an individual's status and guiding behaviours for better adaptation. Nevertheless, given that I did not provide direct examination on the psychological meter function of CSE, this function should be to further explored and examined in future studies.

Second, with the multilevel perspective, I found reciprocal positive relationships between CSE and job satisfaction at different levels. In literature, the relationship between CSE and job satisfaction was usually examined at between-person level. However, the current findings extend understandings of the relationship between CSE and job satisfaction to different scenarios. Specifically, I found a positive relationship between CSE and job satisfaction at the between-person level with the positive relationships between CSE and job satisfaction in the CL, CL-LST and CL-PLGC models, which is consistent with the past finding that people high in CSE, compared to people low in CSE, tend to have higher job satisfaction or vice versa. Additionally, I found a positive relationship between CSE and job satisfaction at the within-person

level with the positive correlation between within-person change in CSE and within-person change in job satisfaction in the LDS, LDS-LST and LDS-PLGC models. This finding reveals that for an individual, if his/her CSE becomes higher, he/she will also experience higher job satisfaction or vice versa. Moreover, I found positive cross-level relationships between CSE and job satisfaction with (1) the positive effect of CSE on the subsequent within-person change in job satisfaction (growth of job satisfaction), (2) the positive effect of job satisfaction on the subsequent within-person change in CSE and (3) the positive effect of growth of job satisfaction on the subsequent CSE in the LDS-PLGC and CL-PLGC models. These findings reveal that CSE and job satisfaction can lead to within-person changes in the other construct. And the within-person change of job satisfaction, in turn, contributes to the level of CSE. Therefore, all these analyses unpack the relationship between CSE and job satisfaction in different scenarios and support a reciprocal relationship between CSE and job satisfaction.

It might be argued that the reciprocal relationship between CSE and job satisfaction reflects a shared maturational effect. That is, changes of CSE and job satisfaction could be a function of personal growth as people become mature in their self-concept and have more work experiences. However, the current analysis provides evidence that refutes this possibility. First, I have controlled the effect of age in all models. Second, a maturational explanation would result in a negative relationship between age and the rate of within-person change in CSE and job satisfaction to reflect that there would be a period of time for maturation. Nevertheless, this proposition was not supported in the analysis involving latent difference scores.

Third, the findings highlight the dynamics between self and environment with the indicators of CSE and job satisfaction in the current study. That is, the self (indicated by CSE) not only influences, but can also be influenced by the experiences (indicated

by job satisfaction) in the environment. The specific results in the CL-PLGC models further support the mechanism highlighted by the corresponsive principle of personality development (Caspi et al., 2005). That is, life experiences (i.e., growth of job satisfaction) influence the personality traits (i.e., CSE) that lead people to find these experiences (i.e., growth of job satisfaction) in the first place. The psychological mechanisms behind the corresponsive principle for CSE can be understood by the self-verification process, that is, high CSE people tend to seek positive feedback to maintain their higher level of CSE. Past studies only supported that high CSE people tend to seek positive feedback (e.g., Judge, Locke et al., 1998; Judge et al., 2000; Judge & Hurst, 2008), but did not show that the positive feedback can foster CSE in turn. Here I provided complete evidence to show that previous CSE contributes to growth of job satisfaction in the next few years, which in turn, positively predicts later CSE, supporting the whole self-verification process.

Forth, the negative effects of CSE and job satisfaction on the subsequent within-person changes of CSE and job satisfaction in the LDS, the LDS-LST and the LDS-PLGC models might have substantive implications. This negative relationship is reasonable because I constructed the latent change scores as the differences between two occasional scores for CSE or job satisfaction. It is reasonable to find the negative relationship between initial scores and difference scores in which the level of initial scores was subtracted. However, these are still some reasons that can explain this finding.

One possible explanation of this finding would be the ceiling effect. That is, it's hard to detect following change among people who already have higher initial score because of the restriction of the range of scale. However, when I checked distributions of item scores across years, I did not find that the proportion of using the highest numbers in the scale (i.e., point 4 for CSE items and point 7 for job satisfaction items)

becomes more over time. Even I divided the sample into two groups with high and low initial job satisfaction score at Year 1, I also did not find that the proportion of using the highest numbers in the scale becomes more from Year 2 to Year 5 in the high group than the low group. A similar finding was obtained when the same procedure was applied using job satisfaction score at Year 6. Hence, it means that the negative relationship between initial status and following change may not be due to a ceiling effect.

Drawing on Bandura's (1989) social cognitive theory, one alternative explanation might be that people who already have higher CSE or job satisfaction may need a strong impact, such as a large career progression or success in a highly demanding task, to enhance their levels. This is because people tend to set goals at a level higher than previous performance or standard to produce discrepancy that motive themselves to enhance their performance or status. Also, it could be that people high in CSE or job satisfaction tend to choose more challenging goals that need more efforts and time to attain, which may explain why people who have higher initial scores of CSE or job satisfaction have small changes in CSE or job satisfaction in following years. Nevertheless, this post-hoc explanation needs further examination.

Fifth, it is interesting to note that job satisfaction at Year 5 in the LDS-PLGC and CL-PLGC models can predict the latent difference score of CSE and the level of CSE at Year 10 respectively, but it is not the case in the LDS and CL models when two time-points data were analyzed. These different results may highlight the meaning of growth of job satisfaction in interpreting the level of job satisfaction. Specifically, in the LDS-PLGC and CL-PLGC models, job satisfaction at Year 5 was predicted by the growth of job satisfaction in the first five years, which means that the personal meanings embedded in the growth of job satisfaction in the first five years was controlled for the level of job satisfaction at Year 5. Drawing on prospect

theory (Kahneman, & Tversky, 1984), Chen et al. (in press) has indicated that the prior satisfaction level provides a referent point in interpreting the meaning of later satisfaction level, thus, the growth of job satisfaction itself reflects a psychological meaning in interpreting the meaning of the level of job satisfaction in the end of a time period. If this personal meaning in growth of job satisfaction was not controlled for the level of job satisfaction at one time, it's hard to infer that people with higher job satisfaction would perceive more success at work, because people may achieve the same levels of job satisfaction in the end of a time period from different starting points, and the different starting points lead to different interpretations of the same levels of job satisfaction across people. As the example mentioned previously, a person who achieves his/her satisfaction level at point 5 on a five-point scale from point 1 would perceive great success him/herself and have a strong psychological impact, comparing to a person who achieves his/her satisfaction level at point 5 from point 4 at the same scale. Thus, the point 5 score on job satisfaction scale will have different meanings for these two persons. This speculation may explain why job satisfaction at Year 5 can predict the latent difference score of CSE and the level of CSE at Year 10 respectively in the LDS-PLGC and CL-PLGC models, in which the effect of growth of job satisfaction was controlled, but cannot predict them in the LDS and CL models. It is because in the latter case, the meaning of success embedded in the level of job satisfaction would depend on individual's growth trajectories of job satisfaction in the previous years. Nevertheless, this explanation should be further examined.

Finally, the current findings also enrich the meaning of job satisfaction. In literature, job satisfaction was usually treated as an outcome variable that influenced by job characteristics, personality and their interactions or as an antecedent variable that influenced life satisfaction, job performance and other work behaviour (see Judge,

Parker, Colbert, Heller, & Ilies, 2001, for a review). However, in this study, not only treating job satisfaction and its growth as work success outcomes influenced by personality (see Erdogan & Bauer, 2005; Judge & Hurst, 2008), but I also treated job satisfaction and its growth as feedback of work success that convey information to help an individual to make self-evaluations. That is, job satisfaction and its growth, as work success indicators, not only indicate the level of success, but also provide a reflective meaning for an individual to make self-evaluations.

6. 3 Limitations and future research

Beyond the above contributions, limitations of this study should also be noted. CSE was measured on two occasions, which leads to two limitations. First, I could not introduce the growth process of CSE in the analysis as I did for job satisfaction. Second, I aimed to focus on the trait-like change in CSE in this study, but according to latent state-trait theory (Steyer et al., 1999), a latent factor of CSE in each year is a latent state variable influenced by a latent trait variable and a state residual. With only two occasional data points, it's hard to clearly differentiate the variances of state residual and latent trait variance. Moreover, four items selected for measuring CSE from the GHQ-12 only focused on short-term experiences, which involves more state-like variance. To address this challenge, I used the CT-C(M-1) model (Eid et al., 2003) for the CSE data in the analysis to control the short time frame effect and maximize the latent CSE trait variance. Although I cannot verify that the latent CSE factors only represents latent trait variance, I can ensure that the latent CSE factors have higher proportion of trait variance with CT-C(M-1) modelling. Supporting this approach, I found that test-retest correlation (r = .63) of the latent CSE factors over five years was higher than the correlation (r = .46) of the composite score of CSE over

five years, supporting the use of CT-C(M-1) modelling.

All items are assessed by self-report method. It could be argued that the association between variables are influenced by the common method effect. However, the common method effect is not serious here because variables are assessed at different years, which alleviates the problem of common method effect due to self-report responses at the same time.

I also acknowledge that job satisfaction is not a direct indicator of successful work experiences. Alternative indicator might include measures of career performance or satisfaction, or objective indicators such as promotions and job change. In addition, job satisfaction, as a single indicator of life experiences, might not be sufficient to assess the complex process between CSE and life experiences. Life experiences can be captured at different levels of specificity, such as actual life events (e.g., job change), perceived or interpreted experiences (e.g., perceived organizational justice), and an overall evaluative judgment (e.g., job satisfaction). Moreover, different life experiences can influence each other when they influence CSE. For example, Schinkel et al. (2004) suggested that perceived procedural fairness will lead to different interpretations on the selection rejection, which then influence the level of CSE. Specifically, among people received a rejection notice without performance feedback, people perceived lower procedural fairness can attribute the rejection to external causes, which provides an opportunity to protect self by increasing the CSE, whereas people perceived higher procedural fairness tend to attribute to the rejection to internal causes, which tends to lead to self blames by decreasing the CSE. Their finding reveals that the relationship between CSE and life experiences is more complex than I outlined here. Thus, in future studies, indicators of life experiences should be expanded.

It should be also noted that the mutual dynamic between CSE and experiences of

job satisfaction would not be as simple as the research model. Factors which may mediate or moderate paths in the reciprocal relationship between CSE and experiences of job satisfaction were not examined in this study. For example, based on the social selection process embedded in corresponsive principle of personality development (Caspi et al., 2005), the crucial mediator that makes CSE contribute to a higher job satisfaction might be the positive perception of situational features or feedbacks, because it was theorised that CSE will guide an individual's attention to seek positive features in external environment, and then, result in higher job satisfaction. Similarly, the mediation process for the effect of job satisfaction on CSE is also worth examining in more detail to unpack the social influence process embedded in corresponsive principle of personality development (Caspi et al., 2005). In this study, I proposed that job satisfaction can contribute to higher CSE because it allows an individual to infer he/she is or becomes close to the self-standard in his/her career and then make a better evaluation toward self. However, I did not empirically test this hypothesis. Hence, these hypothesized mediation process are needed to be tested in the future.

In addition to mediation process, possible moderators involving in the mutual dynamic between CSE and job satisfaction can also be tested in the future. For example, Judge and Kammeyer-Mueller (2004) and Tolli and Schmidt (2008) indicated that internal attribution, a tendency to attribute causality of events to oneself, can moderate the effect of success or failure in increasing or decreasing the core self-evaluations or self-efficacy. Also, based on the contingencies of self-worth model (Crocker & Wolfe, 2001) that self-evaluations are made according to what people believe they need to be or do to have worth as a person, only when job experience is crucial for an individual, it then will be used as a basis to make self-evaluation. Thus, concepts such as the importance of job performance, involvement in a job, or personal identity with job,

may exaggerate the effect between CSE and job satisfaction. In other words, the mutual dynamic between CSE and experiences of job satisfaction would not be as simple as the current research model. Factors which may mediate or moderate paths in the mutual dynamic between CSE and experiences of job satisfaction are worth examining in the future.

6. 4 Managerial implications

Although the current study does not directly link to practical issues, the findings of this study do provide managerial implications. The current study has highlighted the role of CSE in enhancing job satisfaction and the role of job satisfaction in increasing CSE. Based on these two directional effects, first, it is easy to draw an implication that if we can select employees with higher CSE, then, we probably can ensure that these employees will enjoy their work and have higher job performance because they tend to perceive intrinsic job characteristics (Judge, Locke et al., 1998; Judge et al., 2000) and less organizational constrains (Best et al., 2005), and set and pursue goals (Erez & Judge, 2001; Judge et al., 2005), all of which are helpful to drive better job performance. However, this suggestion might not be really helpful practically, because the current study also outlined that the level of CSE can be changed as a function of life experiences. Even though employees with higher CSE were selected in the first stage, it's hard to ensure that these employees will maintain their higher CSE against experiences from various life domains.

Thus, the most important implication of this study might rely on the role of job satisfaction in increasing CSE. In other words, if we can provide a positive work environment to ensure that employees can have higher satisfaction at work, it not only can contribute to increasing CSE as shown in this study, but also can contribute

to better job performance (Judge, Thoresen, Bono, & Patton, 2001) and preventing negative outcomes at work, such as burnout (Best et al., 2005). Therefore, the current study would then re-emphasize the importance of a positive work environment for practitioners to create an environment that not only can enhance employees' happiness at work, but, most importantly, also can contribute employees to building up a positive self-concept at work. When employees have stronger positive self-evaluations from their work experiences, then, they will have higher motivation to achieve their goals and change their perceptions of the environment, both of which may not only lead to higher in-role job performance, but also trigger personal initiatives to contribute more at work. Thus, consistent with the main contribution of this study on the changeability of CSE, we should focus on the contextual effect on the development of CSE.

6. 5 Conclusion

In summary, this study has three main contributions. First, I theorized and demonstrated the within- and between-person changeability of CSE to extend the understanding of CSE. Second, I unpacked the longitudinal reciprocal relationships between CSE and job satisfaction based on changes both at within- and between-person level. Third, I have demonstrated how to use different SEM models to test different hypothesis accordingly. Generally, this thesis has broader theoretical and methodological implications for understanding reciprocal relationships between constructs over time in the within- and between-person change phenomena.

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