Delineating the Relationship between Self-Trust and Generalized Self-Efficacy: Implications for Mental Health

by

Michael Mazo

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Department of Psychiatry
University of Alberta

Abstract

Generalized self-efficacy (GSE) is understood as a stable and trait-like belief that one can manage challenging situations or tasks one is faced with. Based on Bandura's social cognitive theory, GSE is thought to arise from repeated experiences of mastery and performance success over a broad range of situations and challenges. Low levels of GSE are thought to exert negative influences on psychological well-being, including in mental health settings. A seemingly related trait, self-trust, is much less studied. In contrast to GSE, self-trust focuses less on performance outcomes or successes, but instead emphasizes the self-validating acceptance of one's experiences, feelings, and thoughts. However, the two constructs have never been examined in conjunction. Thus, the primary aims of this study were to explore whether GSE and self-trust are distinguishable psychological constructs, and to assess whether the two constructs predict risk factors of mental illness (trait-anxiety here) in a similar manner. A large sample of undergraduate students (N=1859) responded to three questionnaires pertaining to GSE, self-trust and trait-anxiety. Participants also provided information pertaining to basic background and demographic information. A moderate positive relationship between self-trust (STQ) and generalized self-efficacy (GSE-S) suggested that the two constructs are related but not identical. Self-trust emerged as a better predictor of trait-anxiety than GSE. However, self-trust and GSE together explained more of the variance in trait-anxiety scores, compared to GSE and self-trust separately. These findings did not change substantially as a function of gender, ethnicity, year in university, or age. Findings imply that the psychometric assessment of self-trust, in conjunction with GSE is indeed relevant in the context of mental health, such that addressing self-trust may well contribute to supporting those who struggle with persistent anxiety symptomology.

Preface

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List of Abbreviations

AAP	Adult Attachment Projective Picture System
ANOVA	Analysis of Variance
BAI	Beck Anxiety Inventory
CI	Confidence Interval
DF	Degrees of Freedom
EI	Emotional Intelligence
EMT	Emotional Trust
EV	External Validation
EXP	Experiential Trust
FSQ	The Fear of Self Questionnaire
GSE-S	Generalized Self-Efficacy Scale
GST	Generalized Self-Trust
JSDS	Judgmental Self-Doubt Scale
MTS	Multidimensional Trust Scale
NGSE	New Generalized Self-Efficacy Scale
OC	Oral Contraceptive
OCD	Obsessive-Compulsive Disorders
OT	Oxytocin
SD	Standard Deviation
SE	Self-Efficacy
SGSE	General Self-Efficacy Scale
STAI-T	State Trait Anxiety Inventory (Trait Version) / Trait Anxiety Inventory
STAI-S	State Trait Anxiety Inventory (State Version) / State Anxiety Inventory
STQ	Self-Trust Questionnaire
TABS	Trauma and Attachment Belief Scale
VIF	Variance Inflation Factor

I. Introduction

Self-efficacy is defined in Bandura's (1977) social-cognitive theory as the belief that one possesses the capabilities to produce desired effects by one's own actions. Originally thought to be a situation-specific belief, evidence that increased self-efficacy in one situation can lead to increased self-efficacy in other situations or across broader domains (Bandura, 1997) fuelled the interest in a more global, situation-nonspecific form of self-efficacy, known as **generalized self-efficacy (GSE)**. Both forms of self-efficacy have been shown to be associated with several types of desired outcomes, e.g., in quality of life, in academic settings or in the health domain (Lavasani, 2011; MacPhee, Farro & Canetto, 2013; Power, Harber & WHOQoL-group 1998; Schwarzer et al, 2005). The simple *belief* that one can succeed in tackling tasks (or a range of tasks) can increase the likelihood of success and, within limits, can outweigh lack of support, resources or actual ability. Applied to health outcomes, several lines of research have shown that high GSE is linked to psychological well-being (Power, Harber & WHOQoL-group 1998; Schwarzer & Jerusalem, 1995). In turn, a variety of psychiatric disorders (e.g., mood and anxiety disorders) have been shown to be associated with low levels of GSE (Muris 2002; 2012; Mystakidou, 2013). The reason why GSE is linked to psychological well-being could be a self-perpetuating cycle of mastery expectations, evidence of (performance) success, and subsequent feedback to maintain or increase GSE. However, not all situations directly provide evidence for success or lend themselves to mastery experiences. I argue here that **self-trust** might serve a similar function to bolster psychological well-being as GSE, but for different reasons. As a psychological construct, self-trust has been considerably less systematically studied than self-efficacy, partly due to a wide range of definitions of self-trust. Self-trust is defined here as

acceptance of one's experiences, feelings and thoughts as valid indicators of subjective experiences (Pasveer, 1998). Thus, self-trust defined this way does not necessitate evidence from performance outcomes or success. Grounded in attachment theory (Bowlby, 1979), people with high self-trust were shown to have secure adult attachment styles (Pasveer, 1998). In addition, self-trust has been studied in the context of psychological trauma and post-trauma recovery (Berger, 1998; Brothers, 1995; Janoff-Bulman, 1992; McLeod, 2002). Evidence from both literatures implies that self-trust might also be associated with psychological well-being, similar to GSE (Carrington, 2007). However, GSE and self-trust have not been formally delineated from each other. The primary purpose of my thesis is to determine whether GSE and self-trust are distinguishable psychological constructs by examining their interrelationships and factors that may influence either or both, using a large sample of undergraduate students. I also examine which one of the two constructs shows closer links to psychological well-being, using trait-anxiety as a component of well-being. If self-trust is distinguishable from GSE, and adds to the prediction of trait anxiety, my findings could help clarify whether and in whom self-trust should be considered as part of psychological interventions. Thus, my findings could inform the development of targeted interventions to increase self-trust, for example, in the treatment of anxiety disorders.

II. Background

The following background section gives an overview on self-efficacy, first focusing on GSE, and its measurement. My discussion of known determinants and correlates of GSE spans demographic variables, related psychological constructs (e.g., locus of control, self-esteem) as well as indicators of psychological well-being, concentrating on trait-anxiety. I then review research on self-trust, starting with definitions of self-trust. A detailed overview on the assessment tool for self-trust used in my thesis, the Self-Trust Questionnaire (STQ) is provided, including a discussion of known factors influencing self-trust in the STQ. Finally, I provide a review of possible linkages between self-trust and psychological well-being, again concentrating on anxiety. I fully acknowledge that these and similar psychological constructs are influenced by social determinants of health, such as gender, ethnicity and socioeconomic status. Delineated definitions of sex and gender have pervaded the human literature, with sex being defined as characteristics related to genomic differences between men and women and gender relating to the psychosociopolitical environments in which men and women live, as well as being related to sexual orientation. However, the expanding field of epigenetics has blurred these distinctions between the definitions of sex and gender. Thus, we will use the term gender in this thesis, acknowledging our only source of data is the demographic information sheet that asked participants to indicate whether they were male or female. I limit my review and discussion regarding gender to articles that specifically looked at gender differences in the instruments I used here, the GSE-S and the STQ. No socioeconomic data were included in the data collection, and thus this influence will not be addressed further; however, ethnic background information was included and will be explored for its impact on GSE-S and STQ scores.

1. Self-efficacy

Self-efficacy is the central component in Bandura's (1977) social cognitive theory and refers to the belief that one possesses the abilities to produce desired outcomes. Within his framework, self-efficacy is thought to develop from ongoing reciprocal interactions between person factors (i.e., cognitive, affective and biological processes), behaviour (i.e., performance in a given situation) and environmental factors (i.e., observing others, receiving feedback). Self-efficacy beliefs critically mediate people's emotions and behaviours such that these subjective beliefs can become more predictive of actual behaviour than objective skills or situational factors (Bandura, 1977). Social cognitive theory is one of the most influential psychological theories of complex human behaviour. Self-efficacy in particular has been studied in diverse contexts, ranging from improving nutritional interventions through increasing self-efficacy in healthy food-habits (Campbell et al, 1994), to the role of work-place enrichment strategies to increase self-efficacy across work tasks in employees (Parker, 1998), and to mediating successful military training in soldiers (Tannenbaum et al, 1991). Self-efficacy was first studied in the context of mental health and to this day is an integral part of many psychological mental health treatments (Kelly & Greene, 2013; Bayne, 2013; Sullivan et al., 2013).

1.1. Early observations

Bandura's first experimental studies of self-efficacy involved individuals with specific phobias. Bandura (1977) had snake phobics complete a series of increasingly difficult snake-handling tasks, culminating in direct contact with snakes. Participants who had mastered the progression of tasks reported a more substantial increase in perceived self-efficacy from pre- to post-treatment than participants who had to stop the progression of tasks. Thus, the personal

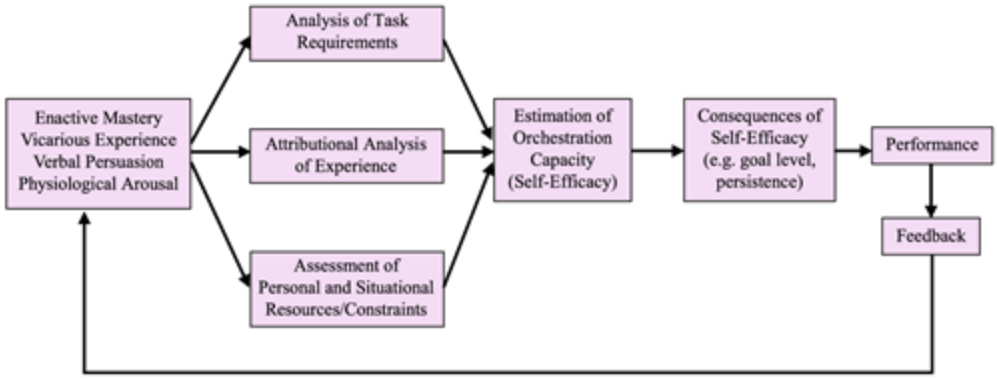
experience of mastering difficult situations increased beliefs in self-efficacy (Bandura, 1977). Bandura (1985; 1988) also showed that self-efficacy beliefs can mediate physiological arousal. For example, Bandura (1988) measured elevation in blood pressure and cardiac accelerations in phobic individuals while they anticipated or performed phobia-related tasks. Participants showed virtually no change from baseline physiological arousal levels when faced with tasks they regarded with high self-efficacy. As the difficulty of the tasks increased and subsequent self-efficacy decreased, participants' heart rate accelerated and their blood pressure was elevated during anticipatory and performance stages of the tasks. These and similar results (Bandura, Reese & Adams; 1982; Harmell, 2011; Wiggins, 2002) demonstrate that anxiety related to stressful tasks is inversely related to individuals' perceived self-efficacy. In turn, experimentally manipulating self-efficacy can result in observable behavioural and physiological changes in stressful situations. Bandura, Reese and Adams (1982) conducted a series of experiments with phobic individuals. Participants mastered and observed others mastering a series of progressively more difficult snake/spider handling tasks until they had reached a pre-assigned level of self-efficacy. For example in experiment 1, snake phobics in an assigned low self-efficacy condition were pre-treated (through observation or direct mastery) with snake handling tasks only until they judged they could handle a snake proximally without touching it. Participants in a high self-efficacy condition were treated until they judged they could touch the snake. As soon as participants achieved their pre-assigned level of self-efficacy, they were asked to then attempt *all* snake handling activities, culminating in direct physical contact with the snake. Participants who had been trained to high levels of self-efficacy achieved higher levels of actual snake/spider handling and reported lower levels of distress when doing the tasks compared to participants in low self-efficacy condition. This difference was accompanied by substantially higher

anticipatory and performance-related increases in heart rate and blood pressure in participants in the low self-efficacy compared to the high self-efficacy condition.

These early findings illustrate the reciprocal relationships between anxiety, self-efficacy beliefs and performance achievements in stressful situations. Mastering a feared task can increase self-efficacy beliefs and subsequent mastery of similar tasks; instilling self-efficacy decreases perceived and physiological anxiety levels associated with stressful tasks, which in turn will raise performance levels.

1.2. Sources and determinants of self-efficacy

Behaviour is determined by a combination of situational demands and the person's assessment (i.e., their self-efficacy beliefs) about whether/if and how to respond to those demands. Thus, self-efficacy requires the development of a sense of personal agency (Bandura, 1982, 1992): One must learn that one possesses the ability to comprehend, predict, and alter the course of events, i.e., that one's own actions can cause desired results. Where and how does this learning occur? As illustrated in **Figure 1**, Bandura (1977, 1986, 1997) proposed four primary sources of self-efficacy: mastery experiences, vicarious experiences, verbal persuasion, and physiological arousal.



Retrieved from: https://wikispaces.psu.edu/display/PSYCH484/7.+Self-Efficacy+and+Social+Cognitive+Theories

Figure 1. Bandura's model of self-efficacy

Besides situational characteristics (see **Fig. 1**: task requirements, and the assessment of available resources to fulfill and/or constraints posed by these requirements), and in addition to the four sources of self-efficacy, attributional processes are thought to qualify self-efficacy. These are outlined in the following.

1.2.1. Sources of self-efficacy

Mastery experiences refer to a record of successful first-hand past performances in the same or similar settings. This source of self-efficacy is also referred to as 'enactive mastery' or 'performance attainment', and is considered the most influential predictor of self-efficacy (Bandura, 1977, 1997; Chowdhury et al., 2002; Dawes, Horan and Hackett, 2000). Mastery experiences are strongly linked to self-efficacy since they provide direct, first-person evidence of past accomplishments (Muretta, 2005), compared to other sources of self-efficacy (Bandura, 1977).

However, most human behavior is learned by observation (Bandura, 1986). V*icarious experiences* do not entail direct behavioural performance, but closely observing others perform a

task one has not or only unsuccessfully done before. 'Modeling' in this context refers to a combination of vicarious experiences (observing) and enactive mastery (doing). Seeing others perform a task can affect one's own self-efficacy through direct observational learning of the specific observed skills and task features or through comparison between one's own with the observed performer's behaviours and skills.

Verbal persuasion refers to expectations on the part of others, self-talk or evaluative feedback that influences self-efficacy by encouraging or discouraging the individual's performance. While verbal persuasion is considered to have a weaker impact on self-efficacy compared to mastery experiences, it is ubiquitous in real life settings that entail guidance and supervision. For example, in the context of athletic (Milner & Hoy 2003; Vargas-Tonsing, 2009; Weinberg & Jackson, 1990) and academic performance (Chin & Kameoka, 2002; Hagen et al, 1998), verbal persuasion by coaches and teachers can boost self-efficacy beliefs and subsequent performance in athletes and students, respectively.

Finally, *physiological arousal* is an important source of self-efficacy. According to Bandura (1986, 1997) individuals are more likely to report high self-efficacy when they do not experience aversive arousal (e.g., an increased heart rate in a stressful situation). Conversely, individuals can elicit aversive arousal in themselves by focusing on low self-efficacy, for example, failure and embarrassment-related thoughts (Bandura, 1988). Causal attributions play an important role in whether physiological reactions are experienced as aversive or not, as will be detailed in the following, after a brief outline of how self-efficacy might develop in the first place.

1.2.2 Development of self-efficacy

The sources of efficacy explain how self-efficacy fluctuates in response to changes in one's environment or internal state. However, how does self-efficacy as a perception of ability develop in the first place? Self-efficacy is inherently a developmental construct: Self-efficacy is obtained through cycles of observation, mastery and learning. In reaction to psychoanalytical theories, although early childhood experiences in promoting self-efficacy are also part of Bandura's theory, he places considerably more emphasis on peer and school experiences (Bandura 1961, 1977), all of which together are thought to promote a sense of personal agency underlying self-efficacy. Furthermore, according to Bandura (1993), some children perceive ability as an acquired skill that they can increase by gaining knowledge and competencies. Bandura states that children who adopt such a view actively seek challenges that provide opportunities for the increase of their knowledge. They view errors as a fundamental part of their learning process and therefore are not rattled by them. Conversely, some children view ability strictly as a fixed capacity, and for them performance is indicative of their overall capacities. Poor performance results in a high evaluative threat that they are not competent enough. Although Bandura did not directly speak to this, it is likely that the two types of ability perceptions exist along a continuum as a dimensional attribute. In addition, cognitive factors are considered to play a critical role in self-efficacy. Indeed, Bandura stated that a major function of cognition is to allow people to predict events and to develop strategies to control events that affect their lives. Hence, effective cognitive processes such as memory, planning, testing and revising action strategies, underlie a strong sense of self-efficacy. Thus, although much of the development of this construct focused on children, the importance of effective cognitive processes suggests that self-efficacy likely reflects development across the entire life span.

1.2.3. The role of causal attribution in self-efficacy

Bandura (1988) and others (Silver et al, 1995) suggested that causal attributions about situational outcomes can limit or augment self-efficacy. Following Weiner's attribution theory (1992), 'locus of control' refers to whether one attributes the cause of a given situation to internal factors (for example, ascribing failure in a test to one's lack of ability) or external factors (e.g., test difficulty). 'Stability' refers to whether one believes causes of the situation are changing (e.g., bad luck) or not (e.g., bad teacher). The role of attributions in Bandura's self-efficacy model is best understood in the context of self-efficacy sources. In mastery experiences, attributing success to internal causes such as one's ability and effort is predictive of subsequent high self-efficacy. Attributing success to external/unstable circumstances is not likely to increase self-efficacy (Bandura, 1977). Conversely, individuals who experience persistent low self-efficacy often attribute mistakes or failures to internal causes such as personal deficiencies (Gundlach, Martinko & Douglas, 2003; Silver et al, 1995). In the context of physiological arousal, reframing causal attributions about the experience of physiological arousal is one approach for reducing fearful behaviour and increasing subsequent self-efficacy. For example, Wang et al (2011) led anxious individuals in psychological treatment to believe that their physiological arousal was caused by a non-emotional source (fatigue). Participants subsequently no longer described their (objectively) high physiological arousal levels as anxiety (Wang et al, 2011). Thus, causal attributions qualify whether and how sources of self-efficacy such as mastery experiences and physiological arousal affect subsequent self-efficacy.

1.3. From situation-specific to generalized self-efficacy

As outlined above, Bandura's model of self-efficacy is at its very core situation-specific: Self-efficacy is an individual's belief in their capacity to perform a specific behaviour in a

specific situation. Therefore, Bandura recommends that the assessment of self-efficacy be tailored towards the specific behaviour one is interested in predicting (Bandura, 1977). Situation-specific factors of task difficulty influence the *magnitude* of self-efficacy in a given situation, and the degree of certainty of achieving desired outcomes influences the *strength* of self-efficacy (Bandura, 1977; 1997). If a person experiences unclear performance aims and/or performance ambiguity, their sense of self-efficacy cannot predict behavioural outcomes. Individuals will then not have a clear idea of how much effort they need to spend to achieve what they want, how long to sustain such effort, and how to correct mistakes. However, Bandura (1997) also suggested that self-efficacy beliefs might generalize from specific situations to broader levels of functioning within a person or even in collectives like families, communities and organizations. Thus, self-efficacy includes specific behaviours (i.e., medication adherence), but can also encompass domain-general self-efficacy (i.e., health self-efficacy) and even non-specific, GSE.

Task-specific self-efficacy measures the perceived ability to produce desired outcomes under a narrowly determined set of conditions. For example, 'mathematics self-efficacy' is one form of task-specific perceived self-efficacy (Pajares & Miller, 1995), in which specific mathematics-related self-efficacy questions will be used to predict performance in math tasks. In Nielsen and Moore (2003), individuals who reported higher mathematics self-efficacy were more successful in solving math problems and experienced lower levels of physiological arousal (i.e., increased heart rate) when solving mathematics problems, than those with lower mathematics self-efficacy. Other task-specific examples include self-efficacy beliefs in physical exercising (Ornes, 2010), breastfeeding (Oliver-Roig et al, 2012) and medication adherence (Erlen et al, 2010). Such forms of task-specific self-efficacy are most closely aligned with Bandura's model

of self-efficacy (1997), in that specific behavioural outcomes are best predicted by specific self-efficacy, as opposed to broader self-efficacy measures.

Domain-general self-efficacy refers to a class of similar tasks or situations among which self-efficacy beliefs might spread from one specific situation to another and therefore becomes predictive of performance in a larger range of situations. For example, academic self-efficacy is a well-studied form of domain-general self-efficacy. Academic self-efficacy does not measure any particular academic performance situation or task (e.g., self-efficacy in research, mathematics), but the broad belief that one can manage demanding academic tasks. High academic self-efficacy is predictive of better academic performance, adjustment in college and lower levels of anxiety and depressive symptoms in students, compared to low academic self-efficacy (Lavasani, 2011; MacPhee, Farro & Canetto, 2013; Putwain, Sander & Larkin, 2013). Other forms of domain-general self-efficacy include self-efficacy in health behaviours (Lee et al, 2008) and occupational behaviours (Rigotti, Schyns & Mohr, 2008).

Generalized self-efficacy (GSE) represents a broad belief in self-efficacy, irrespective of specific activities or domains. As stated above, Bandura's original focus on self-efficacy was strictly applied to specific situations (i.e., snake-handling self-efficacy). Nevertheless, experiencing success in domain-specific behaviours can have "ripple" effects that generalize to other domains (Bandura, 1997). Bandura (1997, 1988) reported that an increase in phobia management self-efficacy often resulted in better coping in situations that were not phobia-related. In other words, task-specific self-efficacy beliefs may generalise into a broad sense of self-efficacy, which then in turn may influence emotions and performance in a variety of situations.

1.4. Debates in generalised self-efficacy research

The idea that people may possess a generalizable, trait-like ability to feel competent has been particularly attractive to health researchers (Dahlbeck & Lightsey, 2008; Kuno, 2003); however, the precise nature and measurement of such GSE remains contentious (Elias, Barney & Bishop; 2013; Mischel & Shoda, 1995; Stajkovic & Luthans, 1998). Grounded in social-cognitive theory, Bandura (1997) and others (Cervone, 1997) assume that there is no higher-order trait-like GSE and therefore suggest that assessing such a trait with global rating scales must remain elusive. Instead, they propose an inductive reasoning process, compiling many self-efficacy assessments across specific performance situations, to attain a measure of the person's GSE. As such, Cervone (1997) found that patterns of self-efficacy appraisals across diverse, idiosyncratic sets of situations do not correspond well to high-level traits, in line with Bandura's idea of self-efficacy as a situation-specific construct.

Nevertheless, there have been many attempts to assess GSE as a stable personality trait measured by global self-efficacy scales. For example, Sherer et al (1982) developed and validated the General Self-Efficacy Scale (SGSE), and found that the scale predicted success across various domains such as vocational, educational and military areas. Tipton and Worthington (1984) developed another measure of GSE and examined whether it predicted performance in several unrelated tasks such as endurance of physical discomfort (e.g., holding a book with the non-dominant hand as long as possible) or habit changes (i.e., reducing smoking, losing weight). Higher scores were positively correlated with endurance effort as well as the degree of change in the target habit behaviours. According to the authors, the fact that the two tasks were unrelated supports the construct validity of GSE as a trait that generalizes across situations and therefore can also be assessed with a global trait-rating scale (see also Schwarzer

& Jerusalem 1995; Shelton 1990). Conversely, the utility of a trait-like GSE is questioned by findings of substantial overlap between GSE and related constructs such as self-esteem (Judge et al., 2002; Stanley & Murphy, 1997), even though the two are thought to be conceptually distinct (see section 1.8.; Brockner, 1988; Eden, 1988; Gardner & Pierce, 1998). GSE scales also often underperform in their prediction of behaviour, compared to scales assessing more specific self-efficacy (Elias, Barney & Bishop; 2013). According to Eden (2001), the latter might be an artefact due to errors in specificity matching. Briefly, according to his suggestion, scales assessing specific self-efficacy will be superior to more global scales in predicting performance in specific tasks, whereas GSE scales (by definition) will be better able to predict more global outcomes. As such, Eden and Aviram (1993) found that GSE predicted traits (i.e., trait-anxiety) best. On the other hand, Eden and Granat-Flomin (2000) found that specific self-efficacy predicted performance in specific domains (i.e., leadership self-efficacy) better than GSE. In other words, if one is trying to predict specific behaviour such as mathematic problem solving, a specific self-efficacy measure (i.e., assessing mathematics self-efficacy) would be the most appropriate choice. However, if one is interested in a broader set of behaviours such as academic or health behaviours, the use of a domain-specific self-efficacy measure would be more suitable.

The current research focuses on generalized, i.e., non-specific self-efficacy and its relationships with other traits (trait-anxiety, self-trust). Therefore, the following sections examine more closely research on the assessment and correlates of GSE.

1.5. Generalized self-efficacy scales

Sherer et al. (1982; see also Sherer & Adams, 1983) developed the general Self-Efficacy Scale (SGSE), a widely used measure of generalized self-efficacy. The 23-item scale comprises two factors measuring GSE (17 items) and social self-efficacy (6 items) but has been most

frequently used for its GSE sub-scale (Chen et al., 2001). GSE is defined here as a "general set of expectations that the individual carries into new situations" (Sherer et al., 1982, p. 664). The 17 GSE items are rated on a 5-point scale with the anchors '*agree strongly*' and '*disagree strongly*' (Sherer & Adams, 1983). An example item is "If I can't do a job the first time, I keep trying until I can." Higher scores indicate higher levels of GSE. Internal consistency (Cronbach's alpha) of the SGSE has been moderate to high (α = .76 to .89) (Cable & Judge, 1994; Earley & Lituchy, 1991; Gardner & Pierce, 1998; Riggs & Knight, 1994; Schaubroeck & Merritt, 1997; Smith & Foti, 1998). The factor structure of the SGSE is unclear: Sherer (1982) found the intended two-factor solution in the validation of the SGSE. However, later studies have reported a multifactorial structure of the scale (Bosscher & Smit 1998; Chen et al., 2001; Woodruff & Cashman, 1993; but see Scherbaum, Cohen & Kern, 2006 who found a one-factor solution).

Schwarzer and Jerusalem (1995) created the 10-item Generalized Self-Efficacy Scale (GSE-S). This scale is used in the current thesis. The scale has a four-point Likert scale response format, ranging from 1 *(not at all true)* to 4 *(exactly true)* and measures beliefs in one's capability to handle new and difficult tasks in a variety of different domains. An example item is "I can handle whatever comes my way". Higher scores on this measure indicate higher levels of GSE. Originally in German, the GSE-S has been translated into 28 languages, including English (see Methods for details and Appendix for the full scale). Its one-factor structure has been confirmed in large cross-national validation samples (for example, see Wu 2009). As reviewed in Scholz et al. (2002), previous studies have indicated that the GSE-S has satisfactory psychometric properties. Cronbach's alpha ranged from 0.75 to 0.91 across studies. Although still modest in size, test-retest reliabilities are higher than those of the SGSE. Scholz et al. (2002)

reported test-retest reliabilities 0.67 with a retest interval of half a year, 0.70 with a retest interval of a year and 0.63 with a retest interval of two years.

More recently, Chen et al. (2001) designed the New Generalized Self-Efficacy Scale (NGSE). The NGSE consists of eight items rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The NGSE measures GSE according to Eden's (2001) definition as "one's belief in one's overall competence to effect requisite performance across a wide variety of achievement situations" (p. 75). An example item is "I will be able to achieve most of the goals that I have set for myself." Higher scores on this measure indicate higher levels of GSE. Internal consistency of the NGSE is high, with Cronbach alpha levels ranging from 0.85 to 0.90 (Chen, 2001; Scherbaum, Cohen & Kern, 2006). The NGSE might offer advantages over the other two scales, for example, yielding similar or higher psychometric qualities despite its shorter length (Scherbaum, Cohen & Kern, 2006). Nevertheless, the GSE-S has been more widely used, spanning cross-national validation/norming studies (Scholz et al., 2002; Schwarzer & Born 1997; Schwarzer et al, 1997) and was therefore included here.

1.6. Correlates and determinants of generalized self-efficacy measured with the GSE-S

GSE has been shown to predict a broad variety of outcomes. Using the GSE-S, Schwarzer and Jerusalem (1995) reported positive correlations between GSE-S scores and dispositional optimism, and work satisfaction and negative associations between GSE-S scores, stress, burnout, and health complaints. Furthermore, individuals with low GSE-S scores were more likely to experience longer post-surgery recovery (Schwarzer et al, 2005). Scholz et al. (2002) reported in a large cross-national sample of 19,120 participants that the GSE-S shows positive associations with optimism, perceptions of challenge and self-regulation. Compared to people with low GSE, individuals high in GSE were more likely to interpret stressful events as

challenges rather than threats (Schwarzer & Jerusalem, 1995) and reported higher quality of life, better social relationships, and higher satisfaction with overall life circumstances, as well as with their physical environment (Luszczynska, Gutiérrez-Doña & Schwarzer 2005; Power, Harber & WHOQoL-group 1998). Thus, the GSE-S can be predictive of adaptive psychological functioning in many domains.

Apart from these psychological outcomes, several person- and demographic variables have been shown to be associated with scores in the GSE-S. Among the more frequently examined are nationality/ethnicity, gender and age. For example, cross-national studies with participants from 13 countries (Scholz et al., 2002; Schwarzer & Born 1997; Schwarzer et al, 1997) found that men have consistently higher GSE-S scores than women. Furthermore, East Asian participants (e.g., people from Japan, Hong Kong) scored lower than participants from Western countries (e.g., Americans, Germans) in the GSE-S. As demonstrated in the validation study of the GSE-S (Schwarzer & Jerusalem, 1995), age seemed to have no significant relationship with the scale. In this study, 3494 high school participants (aged 12-17) as well 1660 adult participants (aged 18 and above) showed similar mean GSE-S scores (means around 2.9 points). Age-independence of GSE-S scores was further confirmed in the large sample of Scholz et al.'s (2002). In their study, nationality and gender, but not age influenced GSE-S scores, with women scoring lower in GSE-S than men and East-Asian participants scoring lower than Western participants. However, it should be pointed out that Wu (2009), reanalyzing Scholz et al.'s database, could not confirm systematic cross-national variations in GSE-S. Instead of categorizing samples by country as in Scholz et al. (2002), he used a continuous measure to quantify the degree of collectivistic (e.g. Japanese as the most extreme) versus individualistic

cultural heritage (Americans as the most extreme) of each of the samples included, which might have resulted in the discrepancy between the results.

1.7. Generalized self-efficacy and anxiety

As discussed above, the development of Bandura's self-efficacy idea was tightly linked to observations in phobic individuals. Furthermore, manipulating specific self-efficacy can cause high/low state anxiety. For example, Marquez et al (2002) induced high self-efficacy in participants by bogus feedback about their "excellent" performance in a physically challenging task. Low self-efficacy was induced in another group of participants by giving task feedback on their performance being in the bottom 20th percentile of their peer group. Participants in the high self-efficacy condition later reported lower cognitive and somatic state-anxiety compared to those in the low self-efficacy group. In clinical settings, high stress coping self-efficacy has been linked to lower symptom severity in patients diagnosed with anxiety disorders such as phobia (Biran & Wilson, 1981) and post-traumatic stress disorder (Benight & Bandura, 2004). These and many other findings (Muris 2002; Isik, 2012; Mystakidou, 2013; Soysa, 2013) attest to an inverse relationship between both task-specific and domain- general self-efficacy and anxiety symptoms.

Similar relationships seem to apply to GSE, although these are less well studied. A cognitive stress challenge was found to lead to less state-anxiety in student participants with high GSE than in students with low GSE (Endler et al, 2001). In the healthy validation sample of the GSE-S (Schwarzer & Jerusalem, 1995) self-reported levels of trait-anxiety were moderately negatively correlated with GSE-S scores. Smith (1989) reported that cognitive–behavioral coping skills training significantly increased GSE-S and reduced both state and trait anxiety in a sample of college students who experienced test anxiety. Because no significant differences

between men and women were found on any of the measures, the author combined data for the two genders in all analyses. Furthermore, Cao (2008) administered the Chinese adaptations of the GSE-S (Zhang & Schwarzer, 1995) and the State-Trait Anxiety Inventory (Shek, 1988) to a sample of 144 patients with anxiety disorders as well as 144 controls. The study demonstrated that participants with anxiety disorders reported higher trait- and state-anxiety, as well as lower GSE-S compared to the control groups. Similarly, using the SGSE, Stanley et al. (2002) found lower levels of GSE in older adults with generalized anxiety disorder, compared to healthy individuals. Thus, GSE seems to show similar inverse relationships to both state- and trait-anxiety levels as do more situation-specific measures of self-efficacy.

1.8. Related constructs

There is considerable debate concerning theoretical and psychometric distinctions between GSE and similar, related psychological constructs. As such, Judge et al (2002) demonstrated in a meta-analysis strong cross-correlations ($r = 0.60$) among GSE, locus of control, neuroticism and self-esteem. Furthermore, using factor analysis, the authors compared a model in which GSE, self-esteem, neuroticism, locus of control were forced into an orthogonal structure, to a second-order factor model in which the measures were allowed to correlate. Results indicated that the second-order factor provided a better statistical fit. This led to the suggestion to summarize these four traits into a superordinate trait, so-called 'core self-evaluations' (Judge et al, 2002).

However, other evidence suggests that GSE and self-esteem are distinct psychological constructs. Self-esteem is supposed to assess global self-worth, whereas GSE refers to one's perceived capabilities. As outlined above, although the two constructs are moderately and positively correlated (Brockner, 1988; Judge et al, 2002; Sherer et al., 1982; Woodruff &

Cashman, 1993), several studies have demonstrated that the two might have different relationships with psychological outcomes. For example, Dieserud et al (2001) reported that low GSE but not self-esteem in a group of 50 suicide attempters predicted repeated suicide attempts 18 months later. Of note, the sample included more females (n = 73) than males (n = 51), but the authors did not separately analyze effects of gender on the outcome. The authors suggested that a low GSE, as opposed to low self-esteem, could be linked to the way a suicide attempter cognitively evaluates their future capacity to deal with concrete stressful situations, and may then render them vulnerable for future suicide attempts in an actual crisis. Furthermore, Avery (2003) reported that GSE but not self-esteem predicted the rate at which employees expressed their opinion in work settings. Lightsey et al (2006) predicted that GSE fuels self-esteem, but not vice versa. As such, they demonstrated in a longitudinal study that GSE at the first test time predicted self-esteem six weeks later, whereas initial self-esteem did not predict later GSE, suggesting that augmentation of GSE is likely to result in future improved self-esteem but not vice-versa. Thus, while GSE and self-esteem correlate positively (convergent validity), they might be associated with different psychological outcomes (discriminant validity).

Moreover, Bandura (1977) emphasized the importance of differentiating self-efficacy and locus of control, since the two can have different effects on behavior. For example, individuals who view their academic performance as determined by an internal locus of control (i.e., time spent studying) but nevertheless struggle with carrying out the necessary behavior to achieve academic success, would experience low self-efficacy. Thus, the consequences of internal locus of control and self-efficacy may not necessarily covary. Smith (1989) assessed the effects of cognitive–behavioral coping skills training on both specific self-efficacy and GSE, as well as locus of control in a sample of college students who experienced test anxiety. Those who

received the training exhibited increased scores on a measure of GSE, compared to participants on the training waiting list. However, locus of control did not change as a result of the training program, and changes in GSE were unrelated to changes in locus of control. Locus of control and GSE also appear to have different associations with gender. Archer and Waterman (1988) conducted a meta-analysis of 22 studies to explore gender differences in constructs related to psychological individualism, including locus of control. In 15 of the studies no gender differences were found, whereas 6 studies demonstrated that men have a higher internal locus of control (see also Schultz and Schultz, 2005 who found little evidence for broad, systematic gender differences in locus of control). One study suggested that women have higher internal locus of control. An interaction between gender and age may best describe the relationship between gender and locus of control, such that gender differences in locus of control exist predominantly in younger populations, and only in specific domains of behaviour such as academics (Schultz and Schultz 2005). As discussed in section 1.6, gender effects in GSE seem to be observable in large samples (Schwarzer & Born 1997; Schwarzer et al, 1997), suggesting that locus of control and GSE seem to be expressed differently across genders. These findings support that the two constructs may be distinguishable.

1.9. Summary

There is extensive literature about determinants of situation-specific self-efficacy and its outcomes. Irrespective of ongoing debates surrounding its assessment, GSE is usually understood as an accumulation of self-efficacy-promoting experiences over one's lifetime (e.g., many mastery experiences in a range of situations). Broad-range outcomes, including those pertaining to mental health, seem to covary with GSE and they do so in the same direction as specific behaviours covary with specific self-efficacy: High GSE is generally predictive of

psychological well-being. While the determinants and consequences of high or low GSE have been studied in various domains, including research on related psychological constructs like self-esteem or locus of control, **self-trust** has not been formally delineated from GSE. This is a core aim of my thesis.

2. Trust

In the clinical psychological literature, 'trust' is often identified as an important variable contributing to psychological well-being (Garske, 1975; Rotter, 1980; Zak et al, 1998). In turn, lack of trust has been associated with psychological distress (Andrews, Guadalupe & Bolden, 2003; Barefoot et al, 1998; Berry et al, 2002; Wissman & Tankel, 2001). Trust is usually defined and treated as an *inter*-personal construct. Before turning to an *intra*-personal form of trust, i.e., self-trust, I give a brief overview on definitions of interpersonal trust.

2.1. From relational trust to self-trust

Interpersonal forms of trust have been extensively studied over many decades (Couch, Adams & Jones 1996; Jones et al, 1994; Lazerele & Huston, 1980; Rempel, Holmes & Zana, 1985; Rotter 1967, 1971, 1980; for reviews, see Campbell, 2010; Hosmer, 1995; Kramer, 1999; Mayer, & Davis, 2007; Ostrom & Walker, 2003; Rousseau et al, 1998; Schoorman; Yamagishi, 2011). Although differing in details and scope, common to all definitions of interpersonal trust is the presence of at least two parties (which can be people, groups, organizations, etc.): The trustor and the trustee. For example, prominent definitions of interpersonal trust include that of social psychologist Rotter (1967), who defined trust as "an expectancy held by an individual or a group that the word, promise, verbal or written statement of another individual or group could be relied

upon" (p. 651). Philosopher Baier (1985) described trust as the reliance on other's competence and willingness to look after, rather than harm what one cares about or what is entrusted to one's care. Sociologist Coleman (1990) defined trust as committing to an exchange before knowing how the other person (or entity) will reciprocate, with the function to reduce transaction costs in risky social interactions. Philosopher Govier (1993) suggested that trust involves four primary features; 1) expectations of benign, not harmful, behaviour based on beliefs about the trusted person's motivation and competence; 2) an attribution or assumption of general integrity on the part of the other, a sense that this is a good person; 3) a willingness to rely on this person, an acceptance of risk and vulnerability; 4) a general disposition to interpret this person's actions favorably. Such definitions of trust address a common theme concerning assumptions made by the trustor: Trust is founded on a set of assumptions concerning the character (i.e., intentions, integrity) of the trustee. Expectations about the trustee's actions are formed on the basis of these assumptions; these expectations in turn can be informed by experience with and evidence about prior actions of the trustee (Lazelere & Huston, 1980). While relational trust (or lack thereof) can be directed at a specific person or entity (Rempel & Holmes, 1986), many psychological definitions of relational trust refer to a trust as having trait-like qualities (Rotter, 1967; Webb & Worchel, 1986): A general and situation-nonspecific propensity to entrust others (or the world).

What if the trustee is no other person or entity but oneself? As in relational trust, one can have positive beliefs about one's own motivation, integrity and overall worth. Furthermore, one can be willing to depend on oneself and accept potential risks of one's own decisions. Govier (1993) suggests that when these attitudes exist in a person, they are said to 'trust' themselves:

> If a person sees herself as basically well-intentioned and competent, able to make reasonable judgments and decisions … and if she is disposed, on the whole, to view

> herself in this light even in the face of superficial evidence or criticism indicating the contrary, she shows trust in herself (p. 106).

In addition, McLeod (2002) suggested that if self-trust as a distinct construct exists, then when that trust is broken, one would feel guilty and/or ashamed. According to McLeod, such emotional responses are similar to the expected emotional responses to violations of *inter*personal trust:

> What we expect from the trusted, that is, the one who broke the trust, is guilt or shame, since those emotions are appropriate for someone who has betrayed another. When we trust ourselves, we are the one trusted and therefore the one responsible for honouring the trust. When we fail to meet that responsibility through some fault of our own, we feel guilty or ashamed because we have betrayed ourselves (p. 76).

Similar to Govier and McLeod, Pasveer (1998) suggested that self-trust is a function of basic assumptions concerning the self:

> It is trust in general that allows one to make the assumption of a benevolent world and a worthy self. Trust in others underpins the assumption that the world provides a just and fair environment that is ultimately controllable. Trust in self underpins the assumption of the self as worthy and controllable (p. 5).

Thus, while trust is more commonly treated as a relational construct, several authors have proposed that trust may include the self as a target. The basic ideas that underlie relational trust may then apply also to self-directed forms of trust. Formal definitions of self-trust are examined more closely in section 2.6. I first outline how trust may develop.

2.2. Development of trust

Psychoanalyst Erik Erikson (1950; 1968) viewed trust as an integral part of ego development. In his theory of psychosocial development, attaining trust is the very first developmental task (trust vs. mistrust) the infant faces. During this phase, the infant develops a basic understanding of the world, particularly, how reliable and dependable others are. According to this theory, trust in others develops if the infant's needs are regularly met, whereas mistrust develops if the infant experiences irregularity in care or neglect. Similar to Erikson, James Bowlby (1979) suggested that the early infant-caregiver relationship is critical to the development of trust throughout both childhood and adulthood. Bowlby's attachment theory suggests that infants form internal models of relationships with others based on their early interactions with a primary caregiver. These working models can shape future relationship experiences. Bowlby viewed trust as a primary component of attachment, such that the infant's trust in the caregiver underlies the formation of future attachment bonds. A prominent extension of attachment theory to adult attachment styles in romantic relationships was proposed by Hazan and Shaver (1987). They suggested four basic categories of adult attachment styles, including secure adult attachment and three types of insecure attachment, corresponding to similar categorizations in childhood (Ainsworth & Bell 1970, 1978; cf. Bowlby 1969). These and similar theories (Webb & Worchel, 1986) suggest that early childhood experiences play a significant role in the formation of a generalized sense of trust in others and the world. As mentioned above, trust is treated by several of these accounts (Bowlby, 1969; Erikson, 1950; 1968; Rotter, 1969) as a personality trait that develops early in life and remains relatively stable through adulthood.

While Erikson and Bowlby primarily focused on trust as a relational construct, it is important to note that they also explicitly referred to trust as encompassing a self-directed,

intrapersonal dimension. Specifically, Erikson described the sense of trust as "an essential trustfulness of others as well as a fundamental sense of one's own trustworthiness" (p. 96). Erikson further argued that a general sense of trust (as opposed to distrust) includes a self-trust component, such that "one may trust oneself and the capacity of one's own organs to cope with the urges; that one is able to consider oneself trustworthy enough so that the providers will not need to be on guard or to leave" (p. 61). Bowlby (1969) proposed that securely attached individuals seek less external validation, report higher self-esteem and are less likely to doubt their decisions, implying high levels of one's trust in the self. Building on the importance of early childhood experiences in trust development, Pasveer (1998) suggested that caregiving which communicated a sense of trust in the child's capacity to express their thoughts, emotions and needs may more likely result in high self-trust. Conversely, a child's self-trust may diminish when the caregiver either showed neglect or inconsistent attachment. Brothers (1995) suggested that adults being approached by a child for help, but refusing to validate, acknowledge or believe the child's story and negative feelings, may trigger an erosion of self-trust in the child. Thus, without initial external validation through reliable adults, a child may become more doubtful of their feelings, judgments and actions (O'Brien, 1987; Timmons-Mitchell & Gardner, 1991).

2.3. Violations of trust in trauma

A high propensity to trust (Rotter, 1969) is one of the strongest predictors of subjective well-being (DeNeve & Cooper, 1998). In turn, experiences of psychological trauma, especially when repeated, prolonged, or occurring in early developmental stages, can have pervasive effects on the individual's well-being, including damage to the propensity to trust others and oneself (Herman, 1992; McCann & Pearlman, 1990; Weaver & Clum, 1995). Trust has been studied widely in the context of trauma and trauma recovery (Brothers, 1995; Berger, 1998; Cole &

Putnam, 1992; Janoff-Bulman, 1992; Finkelhor & Browne, 1985; McLeod, 2002). As stated above, at the core of several trust definitions is the assumption that the trustee is generally good-intentioned and the expectation that they will behave in a caring manner. In the context of psychological trauma, often including situations of abuse or violence, such interpersonal assumptions and expectations are violated. For example, according to Janoff-Bulman (1992) traumatic experiences may influence post-trauma adjustment via challenging one's core assumptions about the world and the self. The author suggested that trauma alters one's global belief that the world is benevolent and that the self is worthy. Hence, assumptions and expectations do not necessarily pertain to a specific individual, but may underlie a generalized view of the world and people as a whole (e.g., 'people are fair'). Trauma-induced changes in these basic assumptions may then be related to experiences of post-traumatic adjustment challenges, distress and psychopathology. Finkelhor & Browne (1985) define betrayal as the dynamic by which one discovers that someone whom they trusted has caused them harm. Thus, the link between trauma and relational trust is rather intuitive since psychological trauma often arises from situations that include violations of assumptions and expectations involving a trustee other than oneself.

However, trauma may also have effects on trusting oneself. In the context of her dissertation, Brothers (1982) developed a trust scale, including self- and relational trust domains, and measured trust-related difficulties among 20 young (18-19 years old) women who had been victims of sexual abuse. She found that the most pronounced problems after trauma were in the area of self-trust (compared to relational trust). Problems in self-trust were expressed such that participants tended to self-blame, de-value themselves and showed reduced appreciation for their own judgments. Brothers attributed these outcomes to the

participants' need to preserve a sense of *relational* trust, i.e., perceiving the world and others as generally fair and safe, something that her participants would achieve by self-denial, -devaluation and -negation. Berger (1998) conducted a thematic analysis of the reported experiences of traumatized women (n = 46). Self-trust was assessed as one of various themes (e.g., fear, loss, self-blame). Participants were asked a series of questions aimed at assessing self-trust:

"Have you ever doubted your own perceptions and judgments?"

"What types of situations make you feel that way?"

"Where are you with that now?"

A total of 89.1% of the participants reported that they had experienced difficulties related to low self-trust 'at some point in time' and 45.6% of the sample reported current pervasive and frequent difficulty trusting their own perceptions and judgments. Notably, nearly half of the participants reported difficulties concerning self-trust even after leaving an abusive relationship, implying potentially long-lasting and pervasive damage to self-trust after traumatization, i.e., extreme violations of *inter*personal trust.

A prominent psychometric tool to assess changes in trust after trauma is the 84-item Trauma and Attachment Belief Scale (TABS; Pearlman, 1990). The scale assesses trust among four other beliefs that are commonly affected by traumatic experiences: safety, esteem, intimacy, and control. Each of these domains is tested with self-directed and other-directed questions. Self-trust in the TABS is defined by Pearlman as the belief that that one can depend on oneself and have faith in one's own judgment, perception and instincts. This scale has been most extensively studied in the context of secondary traumatization (often labeled 'vicarious' traumatization in

line with Bandura's terminology) in psychotherapists dealing with trauma survivors (Pearlman & MacIan, 1993).

2.4. Self-trust

Although not explicitly termed as 'self-trust', as early as 1955, Carl Rogers suggested that self-acceptance may be a pre- requisite to open and trusting social relationships. Positive relationships between trust in others and trust in oneself were indeed also confirmed early on (Lindskold and Tedeschi, 1971). Nevertheless, there has been little systematic research on self-trust as a psychological construct, especially outside the literature on psychological trauma, possibly related to ambiguities across formal definitions of self-trust. The elusive nature of the term becomes apparent when inspecting definitions of self-trust. While some appear very closely related to social-cognitive theory, describing self-trust almost identically as self-efficacy (Carrington, 2007; Earls, 1987; Homburg, 2010), others have a more psychodynamic orientation, emphasizing processes of attachment, self-awareness and acceptance (Pasveer, 1998; Rietdorf, 1998). A core question explored in this thesis is to identify distinguishing or shared determinants and correlates of self-trust and GSE. Specifically, I am interested how a psychodynamically oriented definition of self-trust, assessed with the Self-Trust Questionnaire (STQ; Pasveer, 1998), covaries with GSE and whether such defined self-trust predicts psychological well-being (here: trait-anxiety), similar to or better than GSE.

2.4.1. Definitions of self-trust

According to some definitions, self-trust seems to overlap substantially with (generalized) self-efficacy. For example, Earls (1987) defined self-trust as "…the faith (belief plus action) in one's ability to fulfill a perceived task" (p. 421). Earl's definition of self-trust is essentially identical with that of GSE. Homburg (2010), using a qualitative inquiry approach to explore

what self-trust means for women in mid-life, describes self-trust as "coming to understand how great she was, where she wanted that greatness to manifest, and how to use that greatness when she encountered the significant and insignificant difficulties of life" (p. 29). Thus, Homburg (2010) also includes an element hinging on self-efficacy ("…when she encountered the significant and insignificant difficulties of life"), i.e., the ability to apply one's self-trust in demanding situations. Carrington's (2007) model of trust includes trust in oneself, others, and the environment, and was explicitly developed on the basis of Bandura's social-cognitive theory. It therefore intentionally included elements of performance expectations closely resembling the definition of self-efficacy. Her exact definition states:

> Trust is a person's assessment of the probability that they, other people, or environmental factors, will perform in an expected manner, consistent with their best interests, independent of their ability to always monitor these actions (p. 26).

Interestingly, the psychoanalytically-oriented definition of self-trust by Brothers (1995) suggests that self-trust is "…the hope or wishful expectation of obtaining and providing the self/object experiences necessary for the development, maintenance, and restoration of cohesive selfhood (p. 33)". Furthermore, she states that self-trust entails the trust that one's own actions "…will elicit a desired response from another person (p. 52)". Self-trust according to Brothers' definition is therefore intricately intertwined with trust in others and at the same time refers to self-efficacy ('if I trust myself, I can rely on my ability to get what I want from others').

Conversely, other definitions of self-trust do not encompass explicit performance outcomes, expectations or reference to others (i.e., causing effects in others or the environment, completing tasks and evidence for performance success). Rietdorf (1998) defined self-trust as "the experience of intimate connectedness with oneself – listening to and hearing one's own

voice and distinguishing that voice from all others" (p. ii). Pasveer (1998) offered a definition of self-trust that specifically focuses on the intrapersonal components underlying self-trust, defining self-trust as:

> An unconditional and unquestioning acceptance of all aspects of the self, including but not limited to self-concept, behaviour, judgment, emotions and feelings, abilities, self-knowledge, intuitions and experience. Self-trust includes an unquestioned acceptance of one's thoughts, feelings, and emotions as valid indicators of the individual's subjective experience (p.10)

My thesis pursues Pasveer's definition of self-trust as assessed with her STQ and tries to delineate it against GSE. I should note that research with the STQ is limited to Pasveer's original thesis (1998). Therefore, her work is outlined in more detail here. My own hypotheses regarding the STQ's links to demographic or psychological variables are mainly derived from Pasveer's original findings as well as literature with possible links to self-trust, as detailed in the following.

2.5. Self-trust according to Pasveer (1998; Pasveer & Ellard 1998)

Pasveer's definition of self-trust emphasizes two fundamental ideas: (1.) Self-trust encompasses emotional, cognitive and behavioural components and (2.) Self-trust requires the acceptance of one's experiences as unconditionally meaningful, worthy and relevant. Self-trust according to Pasveer entails knowledge of the self, such that one's feelings, emotions, thoughts, beliefs, and values are unconditionally accepted. Under these circumstances, self-questioning or self-doubt become unnecessary and self-trust becomes independent of expectations to cause desired effects in others, performance outcomes and/or other evidence of 'success'. This **self-validating** feature of self-trust, i.e., accepting ones' subjective experiences (or traits) as valid

components of the self, which then do not have to be doubted or questioned, critically defines Pasveer's concept of self-trust and differentiates it from other (self-) trust definitions as well as related constructs.

In particular, Pasveer delineated self-trust against self-esteem (Rosenberg, 1965). She proposed that self-esteem has a self-*evaluative* quality in contrast to the self-*validating* quality of self-trust and suggested a hierarchy in which self-trust supersedes other self-concepts. She proposed that if self-esteem has a more evaluative character, self-esteem should be more closely tied to the cultural and social setting of the person. Self-trust would entail that the self, as judged, is valid and acceptable no matter what the social environment dictates. Pasveer further suggested that there should be interactions between self-esteem and self-trust. Briefly, her definition of self-trust includes that a person with high self-trust would view the self as worthy, which may overlap with high self-esteem. Pasveer suggested that individuals high in self-trust may automatically and consistently validate a positive view of the self. Individuals with high self-esteem but low self-trust, on the other hand, may engage in more conscious evaluative processes and may be susceptible to external influences. These individuals may have more *unstable* self-esteem than people higher in self-trust. Therefore, Pasveer (1998) assumed a positive correlation between self-trust and self-esteem, but only in people with high and stable self-esteem. As mentioned previously, self-esteem measures show moderate to high correlations with several GSE scales (see section 1.8), but to my knowledge *stability* of self-esteem has not been assessed in the context of GSE. Nevertheless, it appears likely that if both self-trust and GSE covary with self-esteem as a third variable, they may also correlate with each other.

How does self-trust develop, according to Pasveer? Based on the attachment literature (see section 2.3), Pasveer suggested that early interactions with caregivers underlie the ability to trust the self. She proposed that self-trust is the product of a process through which an individual learns to validate the self with the end result that self-validation becomes internalized and automatic. In brief, she proposed that one of her most important components of self-trust, unconditional and unquestioned self-acceptance, may be related to the ability of the person's primary caregiver(s) to accept and trust the person in childhood: Secure attachment during childhood was proposed to lead to higher self-trust. Conversely, all types of insecure attachment were proposed to reduce self-trust with variations between types of insecure attachment styles. For example, a caregiver showing avoidant attachment (Colin, 1996) may validate a child's autonomy, yet stunt their emotional self-validation with resulting high self-trust in areas of autonomy, but low self-trust in domains of emotions and feelings. Children experiencing ambivalent attachment from caregivers would be exposed to inconsistencies in self-validation. Pasveer suggested that these individuals may later develop an overreliance on external validation as opposed to self-validation, in continued expectation of feedback from the caregivers.

Pasveer formally developed the Self-Trust Questionnaire (STQ) in the context of a PhD thesis to test her assumptions about self-trust. These are summarized in the next sections.

2.5.1. Expressions of self-trust according to Pasveer (1998)

Pasveer (1998; Pasveer and Ellard, 1998) initially proposed seven domains in which self-trust might manifest and these domains were included in the development of the STQ. The

following is a short summary of Pasveer's original assumptions about how self-trust might materialise.

a) **Judgment**: Pasveer understands 'judgment' to entail trust in one's own opinions and decisions. She proposed that self-trusting individuals may be firm in their own opinions and decisions, yet open to negotiating both if needed. Conversely, people with low self-trust may either defensively cling to their opinions and decisions despite better evidence or rely excessively on external validation for either.

b) **Feelings:** According to Pasveer's ideas, a person with high self-trust is accepting of their own feelings and therefore should be well able to identify and express them. In turn, individuals low in self-trust may have difficulties feeling and expressing emotion or may feel and express emotion with exaggerated intensity. The latter individuals may be likely ambivalent about the expression of emotion because they may fear embarrassment or be unable to identify their true emotions.

c) **Experience**: This domain includes, according to Pasveer, both past and current experiences and perceptions, as well as their integration. The precise relationship between the two remained somewhat elusive in her work, but Pasveer proposed that high self-trust in this domain should manifest as an unconditional acceptance of past experiences (good ones and bad ones). A concrete example she provided for possible problems with self-trust in the experience domain was one where a victim of incest has had a personal experience that may have differed starkly from what their perpetrator (or bystanders) had told them to believe about that experience. Acceptance of such (and other, less extreme) past experiences, e.g., in therapy, can involve a process of expanding one's self-concept (Rogers, 1955). Pasveer suggested that *within* this process of self-growth, it

may be necessary to attend to a wide variety of stimuli. Once acceptance and integration of past experiences into the current self-concept are accomplished, taking in of all types of new experiences may not be necessary anymore. Therefore, Pasveer predicted that people with high self-trust may not require excessive external sources to validate their current experiences, while people with low self-trust should require more such external validation.

d) **Intuition:** Pasveer defined intuition as relatively unconscious thoughts, feelings, hunches, or instinctual reactions. Although ill-defined, Pasveer proposed that trusting one's intuitions may be a manifestation of self-trust, reiterating that self-trust in her view does not necessitate evidence (i.e., in this case conscious thoughts or behaviours). A person low in self-trust, on the other hand, might discredit their intuitions more readily.

e) **Self-Knowledge:** According to Pasveer, self-trust requires profound self-knowledge. In order to accept oneself, one must recognise and acknowledge one's strengths and weaknesses. Conversely, people with low self-trust might have a need for conformism and construct a self-concept that is aligned with an identity that others (rather than themselves) constructed for them. As a result, people with low self-trust might have an overly negative or overly positive self-view.

f) **Behavior:** Pasveer further suggested that self-trust may manifest in people's beliefs that they will behave in a manner that is appropriate in a given situation without requiring extensive outside guidance or prompts. As such, people with high self-trust may not need explicit societal rules or moral codes to trust that they will direct their behaviours in an acceptable way, compared to people with low self-trust. Pasveer suggested further that minor violations of normative behaviours may be easier for people with high self-trust to

integrate and accept into their self-concept than for people with low self-trust. Thus, similar to (e), people with high self-trust may feel less need to conform to social norms, in this case, norms that would govern their behavior.

g) **Abilities:** This domains was described by Pasveer (1998) as an absence of doubt about one's own abilities to do something, especially if they have had experience with a similar activity or task in the past. Of note, although not declared as such by Pasveer, this is similar to GSE. Her verbatim description of a person with high self-trust in this domain is: "These individuals should know what their abilities and talents are and trust that they will be able to accomplish whatever it is that they set out to do. At the same time, they should recognize areas in which they lack ability and be comfortable with their decision not to engage in those activities. (p. 54)", a description resembling definitions of GSE (cf. section 1.3).

In summary, the manifestations of (high) self-trust across these seven domains refer to shared common features including an ability to identify, acknowledge and accept one's own emotions, thoughts, decision, and actions. At the core of these proposed manifestations lies the idea that self-trust is a personality trait that develops through attachments in childhood and has self-validating features.

2.5.2. The Self-Trust Questionnaire (STQ)

Based on their model of self-trust and the seven proposed domains of self-trust manifestations, Pasveer (1998; see also Pasveer and Ellard, 1998) developed the Self-Trust Questionnaire (STQ) which is used in the current research. Undergraduate students at the University of Calgary (n = 760; 593 females; mean age = 21.91 years, SD = 6.53) and participants from the internet (n = 429; 265 females; mean age = 27.46 years, SD = 9.70)

responded to an initial 72-item version in which each of the seven outlined domains were represented by some items. Further demographics of the scale development samples were marital status (with participants being predominantly single) and ethnic background (participants were predominantly Canadian).

Univariate tests and factor analyses led to the reduction of the STQ to a final version containing 20 items. Of note, within this process a pronounced difference between genders, qualified by age, was observed leading to several iterations of scale reductions. In brief, females in the younger age ranges (ages 20 years and below) appeared to show lower overall STQ scores than same-aged males, but this gender gap closed with increasing age. Furthermore, analyses of the STQ separated by genders yielded two different 23-item versions (one in males and one in females). Of these two versions, 20 items matched between males and females. These items were included in the final 20-item version of the STQ. The final 20-item STQ version contained four factors, obtained through an oblique rotation method due to the fact that all seven domains were thought to share features of self-trust, as outlined above. The final version had an internal consistency of Cronbach's alpha = 0.85. The four intercorrelated factors (correlations between r = 0.23 and r = 0.44) were labeled:

- *External Validation* (15% variance explained): The need to be validated by someone other than the self. This factor included items related to 'self-knowledge'.
- *Generalized Self-Trust* (15% variance explained)*:* The ability to validate one's judgement, experience and feelings. This was the broadest factor and contained items that covered a total of five different domains, 'experience', 'self-knowledge', 'intuition', 'judgment', and 'feelings'.

- *Emotional Self-Trust* (14% variance explained): The ability to trust in one's emotions. This factor contained three items from the 'feelings' domain and one item from the 'self-knowledge' domain.
- *Experiential Self-Trust* (12% variance explained): Trust in one's perceptions. This factor encompassed items from the 'experience' domain.

As apparent, the seven hypothesized domains in which self-trust could manifest were not confirmed as separate factors in the STQ; rather intriguingly, the Generalized Self-Trust factor, included items that were concerned with the ability to validate the self across many different domains. Pasveer therefore suggested that this factor might be the most crucial to her definition of self-trust as a self-validating trait. Items covering the additional domains 'behaviour' and 'abilities' were not represented in any of the factors such that the final STQ indeed does not refer specifically to trust in one's behaviours or abilities to perform tasks.

To validate the STQ, undergraduate students at the University of Calgary (n = 148; 94 females; age = 25.97, SD = 7.23) responded to the 20-item STQ on two occasions. Based on a two to three week interval, a test-retest reliability of r = 0.81 was established. The same sample also completed several other tasks and questionnaires to test psychological constructs thought to be related to self-trust. The following is an overview of her core results.

The two dominating results of Pasveer's validation study were positive correlations between STQ and self-esteem ($r = 0.69$, $p < 0.01$; assessed with the Self-Esteem Scale; Rosenberg, 1965) as well as between the STQ and social desirability ($r = 0.33$, $p < 0.01$; assessed with the Marlow Crowne Social Desirability Scale MCSD-S; Crowne, 1960). Pasveer's more detailed predictions about covariation between self-trust and self-esteem *stability* (rather than levels of self-esteem) were not supported, likely due to low power (only 13%

of individuals showed a combination of high self-esteem and low self-trust, a combination Pasveer had predicted to be associated with unstable self-esteem). Thus, a positive correlation between self-trust and self-esteem was predicted and confirmed by her results, but further qualifications by self-esteem stability were not. Pasveer also predicted that people with high self-trust would judge themselves as *less* rather than *more* compliant with social norms in a measure like the MCSD-S. Her prediction was specifically based on the assumption that people with high self-trust would have to rely less on external validation, which she had intended to measure with the MCSD-S. However, she failed to confirm this prediction.

Controlling for these two major influences on the STQ, as well as a significant positive relationships between age and STQ ($r = 0.19$, $p < 0.02$), the main further outcomes were that the STQ total score was positively correlated with secure adult attachment style (assessed with the Relationship Styles Questionnaire; Bartholomew, 1989) and negatively correlated with fearful adult attachment style, as predicted. These relationships were more pronounced when only assessing the generalized self-trust factor instead of the total STQ. In addition, people with high self-trust were assumed to show higher self-certainty. Pasveer had further hypothesized that if an individual is confident that a particular trait describes him or her, then the individual has also actively accepted that trait as being descriptive of them. Since self-acceptance is integral to the concept of self-trust in the STQ, faster reaction times when judging oneself may be measuring self-trust as well as self-certainty. This hypothesis was assessed with a self-referential judgement task of trait adjectives with response latency as a dependent measure. STQ was negatively correlated with response latencies in this task confirming the prediction that people with higher self-trust would also be more self-certain, i.e., less hesitant or doubtful when judging their own character traits. With regard to emotional intensity (assessed with the Affect Intensity

Measure; Larsen & Diener, 1987), those high in self-trust were expected to be capable of expressing their emotions in an appropriate manner. Individuals low in self-trust were expected to be overly controlled and uncomfortable with the expression of emotion or overly reactive and display intense emotion. The hypothesis that individuals low in self-trust would score either very high or very low on the Affect Intensity Measure was not supported. However, in accordance with her prediction, Pasveer found a significant negative relationship between the STQ and emotional ambivalence (assessed with the Ambivalence over Emotional Expressiveness Questionnaire by King & Emmons, 1990). Thus, she could confirm that individuals high in self-trust are less ambivalent about the way they feel compared to people with low self-trust.

In summary, a few interesting observations for the current thesis emerge from the analysis of Pasveer's work on the STQ. First, the STQ was developed specifically to offer an assessment of a self-directed form of trust, not confined to trauma-situations or post-traumatic adjustment. The concept of self-trust was informed by a broad range of literature with most explicit reference to attachment theories, a link Pasveer was able to confirm by finding a positive association between self-trust in the STQ and secure adult attachment styles. Although overt behaviours indicating high self-trust and trust in one's abilities to perform well were originally entertained in the STQ development, these elements were not included in the final version of the scale. Moderate to strong links between the STQ and self-esteem were found. Surprisingly, despite a large number of potentially related psychological constructs that Pasveer tested against the STQ, whether self-trust may directly (or indirectly, e.g., via self-esteem) relate to well-being, adjustment or other indicators of (mental) health, was not assessed. The possibility that self-trust is important for psychological well-being may seem intuitive. However, this possibility has not

been studied extensively in a formal way outside trauma research, likely because of the outlined ambiguities surrounding definitions of self-trust and resulting scarcity of assessment tools. Of note, no other studies I am aware of have used the STQ, hence its associations to constructs other than those tested by Pasveer herself are unknown. The following section proposes that (self-)trust may be predictive of trait-anxiety, a prediction I will test in my thesis.

2.6. Self-trust and anxiety

There is no previous literature on the STQ and links to anxiety. However, several of Pasveer's findings and/or theoretical considerations about self-trust can be understood to suggest such a link. First, Pasveer found that high STQ scores were related to less emotional ambivalence. Ambivalence over one's own emotions has been linked to several indicators of lowered psychological well-being, including trait- and state-anxiety (King & Emmons, 1990, 1991; Krause & Lynch, 2003; Mongrain & Zuroff, 1994). Pasveer further suggested that low self-trust could be expressed as an inability to recognize one's feelings. Alexithymia (Sifneos, 1972) refers to difficulties in identifying and expressing one's emotions and is widely explored in clinical psychology. Emotional ambivalence correlates with various measures of mental and physical health (Deighton & Traue, 2006) and shows moderate to strong correlations with alexithymia (Berenbaum, 1994; Helmers & Mente, 1999; Quinton & Wagner, 2005). The overlap between alexithymia and emotional ambivalence, at least when assessed with self-report, has even been suggested to make the two constructs indistinguishable (Müller et al, 2008). Alexithymia is correlated with a multitude of psychopathological and psychosomatic symptoms, including mood and anxiety disorders (De Berardis et al, 2008; Frewen et al, 2012; Honkalampi et al, 2001; Taylor, Bagby & Parker, 1999). These findings imply the possibility that self-trust might also be related to indicators of psychological well-being and mental health (as well as

alexithymia), although not specifically anxiety. Additional support for this prediction comes from Pasveer's findings that fearful adult attachment was related to low STQ scores. Fearful or avoidant attachment has also been linked to symptoms of depressed mood and elevated anxiety (Magai et al, 2000; Picardi et al, 2005).

According to Pasveer, self-trust may also entail the ability to trust that one's own decisions and opinions are valid, although she did not directly assess this prediction. Work by Mirels, Greblo and Dean (2002) should be mentioned in this context. They developed the Judgmental Self-Doubt Scale (JSDS) measuring generalized mistrust of one's own judgments. The authors suggest that self-doubters' approach to important decisions is heavily influenced by their underlying uncertainty concerning what they believe as well as what they think they should believe (Mirels, Greblo and Dean, 2002). Thus, the JSDS measures a counter-construct to the self-trust in the judgment dimension of the STQ. Individuals high in judgment self-doubt were found to have higher state-anxiety before as well as following decisions they had made. In addition, considering decision-making is a frequent task in day-to-day life, people with high judgmental self-doubt in the JSDS were also expected to report high trait-anxiety. Indeed, the authors reported a strong positive correlation between judgmental self-doubt and trait-anxiety.

Furthermore, Aardema et al (2013) developed and validated the Fear of Self Questionnaire which appears to conceptually overlap with (low) self-trust. The Fear of Self Questionnaire (FSQ) was developed in the context of Obsessive-Compulsive Disorders (OCD) with the goal to capture obsession-related self-evaluative processes reflecting a fear about who one might be or become. The instrument includes items referring to questioning and fear of one's own true character, desires, morality and intentions. Although this scale is not directly comparable to the STQ, based on its goal to sample obsession-specific fear of oneself in OCD

patients, some of its items resemble those of the STQ (e.g., STQ: “It doesn’t take much to get me to question myself”; “I seldom talk about my feelings because I’m afraid that they are wrong or stupid”; FSQ: “I often question my own character”; “I often worry about what my inner thoughts might reveal about my character”). Self-fearing individuals could be seen as people who are not willing or able to explore deeper self-knowledge and accept undesirable aspects of oneself. Not surprisingly, in a sample of 258 undergraduate students, the FSQ was shown to correlate positively with both anxiety and depression scores as measured by the Beck Anxiety Inventory (BAI; Beck et al, 1988) and the Beck Depression Inventory (BDI; Beck, et al., 1961). If fear of self represents another counter-construct to self-trust, at least in some aspects, one may expect similar (inverse) relationships between self-trust and low mood/ high anxiety.

Finally, Carrington (2007) devised the Multidimensional Trust Scale (MTS) in the context of a PhD thesis in counseling psychology. As mentioned in section 2.6, Carrington’s definition of self-trust (purposefully) overlaps with that of GSE. Research on interpersonal trust and its relationships with mental health/adaptive psychological functioning were the main motivation factors in the creation of the MTS. Carrington (2007) tested in 224 people (165 females, *Mean* 23.2 and *SD* = 8.0) whether self-trust and relational forms of trust would negatively correlate with trait-anxiety. Findings showed that the self-trust subscale of the MTS displayed the strongest correlation with trait anxiety (r = -0.61), compared to negative correlations between trait anxiety and trust in others (r = -0.41) and the items measuring personal safety / ‘trust in the environment’ (r = -0.34). Thus, at least when self-trust is assessed by an instrument in which self-efficacy elements are explicitly included in the self-trust definition, a strong negative correlation to trait-anxiety has been reported.

Taken together, there is no direct evidence for the STQ to relate to measures of psychological well-being or indicators of mental health, but several lines of research suggest that there might be. I focus here on trait-anxiety not because I assume an exclusive link between self-trust and anxiety, but in treating (low levels of) trait-anxiety as one of many possible indicators of psychological well-being. In addition, since my goal is primarily to delineate self-trust from GSE, and GSE has in turn been extensively linked with anxiety, assessing trait-anxiety in conjunction with both measures seems like a reasonable starting point. Before I turn to my specific predictions, I briefly outline possible additional correlates or moderators of self-trust.

2.7. Possible moderators of self-trust

The next sections give a rationale of other possible moderators of self-trust. Pasveer (1998) reported two primary demographic variables influencing self-trust: gender and age. Briefly, Pasveer found that men scored higher on the STQ compared to women, STQ increased with age, but gender differences in the STQ diminished with increasing age. Pasveer did not explore the influence of any other demographic variables on self-trust (e.g., nationality or ethnicity). Due to the scarcity of research with the STQ, the following section contains evidence about possible factors influencing self-trust assessed with tools other than the STQ.

2.7.1. Life-transitions

Duchscher (2009) and Goering (2009) proposed that self-trust undergoes changes in circumstances unrelated to trauma, i.e., professional role transitioning and parenting. Similarly, Kaleita (1998) explored the manner in which self-trust is gained or lost throughout adulthood in contexts unrelated to trauma. Kaleita (1998) conducted a qualitative study encompassing semi-structured interviews with 10 participants and found two primary themes concerning self-trust. Firstly, that high self-trust is strongly related to the ability to make decisions without second

guessing oneself. Secondly, that high self-trust can be developed and maintained via situations that require one to make numerous decisions and ultimately learn what works and what does not work in decision making. According to Kaleita, self-trust tended to increase as a function of experience in decision-making, particularly in novel situations that one had little experience in. Duchscher (2009) demonstrated that transition shock is often experienced in response to moving from the familiar role as a student in an academic environment to the role of a professionally practicing nurse in hospital settings. The study was a culmination of three studies conducted over the span of ten years, examining graduates as they integrated into a professional nursing environment immediately after graduating from a Canadian undergraduate BScN nursing programme (Duchscher, 2001, 2003b, 2007). Synthesizing results from all four studies, the author highlighted the conditions in which professional self-doubt develops. As the newly graduated nurses lost their access to previous educators and peers, levels of emotional support declined in some nurses, leading to feelings of isolation and self-doubt in the context of their work (Duchscher, 2009). Subsequently, during the initial phase of adjustment at the professional job, new nurses seemed to seek more validation for their decision-making and clinical judgment. Duchscher (2009) describes that during the first months of adjustment, the primary sociocultural and developmental task nurses were faced with was "finding and trusting their professional selves" (p. 1104).

Apart from work-related experiences, novel experiences such as parenting may also influence self-trust levels. Goering (2009) explored the relationship between postnatal sense of autonomy and self-trust in new parents. According to Goering, self-trust in the context of care for a newborn is gradually acquired and often fragile. New parents are faced with issues that demand prolonged and careful attention, yet these challenges are presented in a context that may

not allow opportunities for stable, clear-headed critical reflection (i.e., due to lack of experiences, sleeplessness, and anxiety). Such conditions, coupled with the presumption that good parents are instinctively competent, may lead to temporary erosion of self-trust. Goering states that the "Radical alteration to one's lifestyle […] catapult the new parent into reassessment of her self-understanding, and make her question her self-trust" (p. 15).

These few examples on role-transitioning and parenting illustrate that self-trust may decline also in non-traumatic situations if these entail facing novel circumstances and social roles as well as loss of support related to these changes. In the current thesis, role-transitioning is operationalized by assessment of student participants' year in their university degree, assuming that first-year students experience more substantial pressure in their new role as a university student than students in later university years.

2.7.2 Oxytocin

Of particular interest in mental health research are possible biological aspects of (relational) trust. As such, the neuropeptide oxytocin (OT) has been associated with social affiliative behaviors, both in animals (Insel, 1992; Young and Wang, 2004) and in humans (Kosfeld et al., 2005). A recent meta-analysis (Van Ijzendoorn & Bakermans-Kranenburg, 2012) confirmed that intra-nasal OT administration in humans can increase social perceptive and reactive behaviours, including interpersonal trust, albeit with rather large variations (e.g., in 8 OT studies measuring increases in interpersonal trust, the combined effect size was Cohen's $d = 0.48$ ranging between $d = 0.12$ in within-subject designs and $d = 0.63$ in between-subject designs). Although clarification is needed to understand basic parameters of OT physiology in humans (e.g., the role of gender, menstrual cycle, interactions with other hormones, etc.; Baskerville & Douglas, 2010; Stock et al, 1991; Yamamoto et al, 2004), intranasal administration of OT is

currently under extensive investigation, including dozens of clinical trials testing intranasal OT as a possible adjunctive treatment of a variety of mental disorders such as autism, schizophrenia and post-traumatic stress disorder (www.clinicaltrials.gov).

Although never tested, self-trust may also be associated with OT levels. Evidence for a possible link comes from Buchheim et al. (2009), who showed participants the Adult Attachment Projective Picture System (AAP), i.e., pictures with relationship themes. Participants were then asked to select one of four descriptions for each picture with descriptions indicating either secure or insecure attachment styles. Participants in an intranasal OT condition showed more selections of phrases reflecting secure attachments, and therefore presumably higher levels of relational trust, compared to a placebo group. Such findings may also be relevant to self-trust in the STQ, which was found to covary with secure adult attachment style by Pasveer. Of note, Cardoso et al. (2010) showed that OT administration induced changes in usually relatively stable personality traits (i.e., the Big Five). Self-trust, treated as a trait, covaried with secure attachment and could therefore also covary with levels of OT.

Importantly, the above mentioned studies refer to effects of intranasal administration of OT, yet variations in OT can occur without the administration of OT. In this context, researchers measure participants' basal levels of OT to determine how those levels vary as a function of experimental intervention (e.g., a type of social interaction such as cooperation or violation of trust in simulated interactions; or even physical massage; Bello et al, 2008; Grizzard, 2014). In women, oral contraceptives (OC) are known to increase plasma OT levels by up to 50% (Stock, Silber & Uvnäs-Moberg, 1989). In addition, some research suggests that OT levels may vary as function of menstrual cycle phase in women (Stock, Bremme & Uvnäs-Moberg, 1991).

Koven & Max (2014) examined whether basal levels of oxytocin predict intra- and extra-personal (i.e., self- and other-focused) elements of emotional intelligence (EI). The authors reported a relationship between basal levels of oxytocin in healthy adults and a subset of EI abilities, specifically the extra-personal emotion recognition. These and other results (Feldman et al, 2010; Tabak et al, 2011) confirm that basal levels of oxytocin may be related to behaviour. However, there is no literature on the effect of OC-induced increased OT and its association with any psychological measures.

2.8. Summary

Similar to GSE, 'trust' is an important variable contributing to psychological well-being. Although usually understood as a relational construct, self-directed forms of trust, i.e., self-trust have been considered by various accounts and with varying definitions. Common to developmental theory of relational trust and self- trust (Rotter, 1969), Pasveer's psychodynamically oriented definition is linked to early childhood experiences and attachment. Self-trust according to Pasveer has self-validating features such that it becomes independent of external influences and evidence of performance success, unlike GSE. However, no research has directly examined relationships and potential overlap between GSE and self-trust. Furthermore, there is direct evidence linking GSE to (low) trait-anxiety and suggestive evidence that the same may be true for self-trust. Thus, a direct comparison of the GSE-S and the STQ's power to predict trait-anxiety may help clarify whether self-trust (measured by the STQ) may have potential benefits for psychological interventions, e.g., in treatment of anxiety.

III. Aims and Hypotheses

The following section outlines the aims and hypotheses of my thesis. I have three general aims/questions to be explored with this work:

- *What is the nature of the relationship between GSE and self-trust?*
- *What is the nature of the relationship between self-trust and trait-anxiety?*
- *Are variations in trait-anxiety better explained by GSE and self-trust, compared to GSE alone?*

The following concrete hypotheses will be tested:

Based on prior evidence (cf. sections 1.6; 2.9), I expect several demographic variables (age, gender, ethnicity) will covary with both GSE and self-trust. The following hypotheses directed at these demographic variables are tested:

Hypothesis 1: Males will report higher GSE-S and higher STQ scores than females.

Hypothesis 2: Age will correlate with STQ but not with GSE-S.

Hypothesis 3: Individuals with Asian ethnicity will show lower GSE-S and STQ scores. Although the STQ was found not to covary with nationality/ethnicity (cf. section 2.9), the study to assess this relationship was likely underpowered. I expect similar relationships between ethnicity and STQ as with GSE-S.

Hypothesis 4: Individuals at the start of university will show lower STQ scores than people in later years of their university degree. Based on research of life-transition impact on self-trust (section 2.9.1), I expect STQ to be lower in people who have had a recent major life change compared to people who did not. 'Life-transition' is defined here as the start of university in students.

Hypothesis 5. Individuals with higher OT levels (females using oral contraceptives) report higher self-trust than individuals with lower OT levels (females not using oral contraceptives).

In addition to testing main effects of these demographic variables on either GSE-S or STQ, the following exploratory aim will be pursued:

Exploratory aim 1: To test (simple 2-way) interactions between demographic variables predicting GSE-S and STQ.

Hypothesis 6: Self-trust (STQ) and generalized self-efficacy (GSE-S) are moderately positively correlated. Although no direct comparison exists, there are several variables that point to similar relationships with self-trust and GSE. As such, the two constructs both show moderate to strong positive correlations with self-esteem (see sections 1.8 and 2.7.2). Thus, they might correlate themselves with each other, resembling 'core self-evaluations' (Judge et al., 2002). Another important shared third variable is adult attachment style, with evidence for higher self-trust and GSE scores in people with secure adult attachment styles (section 2.7.2). Furthermore, Bandura (1977) argued that self-efficacy beliefs interact with individuals' causal attributions (Ginzburg et al, 2003; Ito, 1996; Thomas and Mathieu, 1994), which in turn influence emotional experience. If trust in one's emotions is reduced, it should also be difficult to identify which attributions will produce desirable outcomes, i.e., stunt development of (generalized) self-efficacy. Thirdly, people who question their perceptions and emotions may perform at suboptimal levels in complex situations that require an integration of cognitive and emotional information (e.g., decision making; Bechara, 1994). They may then have experienced fewer mastery experiences in such situations, ultimately encumbering their development of self-efficacy. Importantly, I expect the correlation to only be of moderate size as there are also crucial

differences between the two constructs (and their assessment scales). As outlined in detail in section 1.5 and 2.7.2, GSE includes reference to performance outcomes, desired effects in others or the environment, or other forms of performance success. However, self-trust, by Pasveer's definition, explicitly does not refer to such forms of evidence but refers to an *un*conditional acceptance of the self.

Based on the outcomes of hypotheses 1-5 and exploratory aim 1 (i.e., main and interactive effects of demographic variables on either GSE-S or STQ alone), I will also explore whether these effects will change the relationship between the two questionnaires.

Exploratory aim 2: To test how the *relationship* between the STQ and GSE-S is influenced by demographic variables and their interactions.

Hypothesis 7: Both STQ and GSE will be negatively associated with trait-anxiety. As outlined in section 1.6, several studies provide direct evidence of the negative relationship between GSE and psychological problems, maladjustments, incidence of mood and anxiety disorders, as well as levels of trait-anxiety. Although never assessed in the context of the STQ, several lines of related evidence, i.e., research in alexithymia, emotional ambivalence, and fear-of-self suggest a positive link between self-trust and psychological health, including low trait-anxiety (see section 2.8 for details).

Again, I will then follow up and explore whether demographic variables and their interactions will change the relationships between STQ/GSE-S and STAI-T.

Exploratory aim 3: To assess how the *relationship* between self-trust or GSE and trait-anxiety is influenced by any of the demographic variables (and their interactions) identified to influence either self-trust or GSE alone.

Finally, to test specific facets of self-trust (see section 2.7.2) in their relationships with GSE and trait anxiety, factor scores of the STQ derived through an exploratory factor analysis will be regressed on GSE-S and STAI-T scores.

Hypothesis 8: I predict that a generalized self-trust factor in the STQ rather than other aspects of self-trust (i.e., external validation, emotional trust, experiential trust) will explain most variance in both, GSE and trait-anxiety.

IV. Methods

1. Participants

The participants in this study were a total of 2032 undergraduate students enrolled in an introductory psychology course at the University of Alberta. All participants received a portion of the course credit for their participation. Participation exclusively took place online in the context of the Research Participation Pool in the Department of Psychology, University of Alberta. Details on the final sample are presented in the results section. Participants provided informed consent (Appendix A) and the study was approved by Research Ethics Board 2 of the University of Alberta, Pro00047781.

2. Materials

Testing included a number of questionnaires that were not part of the current study. The following three questionnaires contained within the testing were used in the current study: the Self-Trust Questionnaire (STQ; Pasveer, 1998), the Generalized Self-Efficacy Scale (GSE-S; Schwarzer & Jerusalem, 1995), and the trait-version of the State-Trait Anxiety Inventory (STAI; Spielberger et al, 1983). Participants also responded to questions pertaining to basic background and demographic information.

2.1. Background and demographic questions

Prior to answering the questionnaires, participants answered the following background and demographic questions: gender, age, year in university, ethnicity, and birth control status (applicable to female participants only). Gender included three options: male, female, other. Age included a two-digit free form answer field. Year in university included a menu with nine options with ‘first year’ to ‘ninth and above’. Ethnicity included a menu in which participants were given the following options: Aboriginal, African, East Asian, South Asian, European, Hispanic/Latin-

American, Middle Eastern, Euro-North American, Pacific Islander, Other. Oral contraceptive status was inquired with the questions: “Are you currently using any birth control method beside condoms?” Choice options were ‘yes’ or ‘no’. The following question was “If on birth control pill, are you on a typical (3 weeks on, 1 week off) birth control pill?” with the answer options: ‘yes’ or ‘no’.

2.2. Generalized Self-Efficacy Scale (GSE-S)

As stated in section 1.5, the GSE-S is a 10-item questionnaire which measures beliefs in one’s capability to handle new and difficult tasks in a variety of different domains. As reviewed in Scholz et al. (2002), previous studies have indicated that the GSE-S has satisfactory psychometric properties. Cronbach’s alpha ranged from 0.75 to 0.91 across studies, with a test-retest reliabilities of 0.67 (half a year interval), 0.70 and 0.55 (one year interval) and 0.47 and 0.63 (two year interval). All items are worded positively such that a high GSE-S score indicates high GSE. The scale is unidimensional such that all items load on one factor (see Schwarzer & Jerusalem, 1995; Wu, 2009). Answers are on a 4-point scale ranging from ‘not at all true’ to ‘exactly true’ and the complete questionnaire requires about 4 minutes to fill out.

The full GSE-S and instructions are provided in Appendix B.

2.3. Self-Trust Questionnaire (STQ)

As outlined in section 2.7.2, the STQ assesses the degree to which individuals unconditionally accept who they are and trust their own perceptions, behaviour, emotion and decisions. The scale includes 20 items set on a 5-point Likert-type scale ranging from 'strongly disagree' to 'strongly agree'. The scale has an internal consistency of Cronbach’s alpha = 0.85 and is composed of four factors (see section 2.7.2). Fourteen of the twenty questions are negatively worded and need to be reversed such that a high STQ score reflects high self-trust.

The questionnaire takes about 10 minutes to fill out. The full STQ and instructions are provided in Appendix B.

2.4. Trait-Version of the State-Trait Anxiety Inventory (STAI-T)

The STAI is a 40-item self-report measure that is designed to assess the level of the temporary condition of state anxiety (STAI-S: 20 items) and the more generalized quality of trait anxiety (STAI-T: 20 items) in both clinical and normal populations. I used only the STAI-T subscale assessing longer-lasting trait-level anxiety (e.g., "I feel nervous and restless"). Responses are on a 4-point Likert scale (1 = almost never, 4 = almost always). The STAI-T has good internal consistency of r = 0.90 and good construct validity. For example, STAI-T scores have been found to be stable over time and not influenced by fluctuations in stress levels (Spielberger et el, 1983). Seven of the twenty STAI-T items need to be reverse-coded such that high STAI-T scores indicate high trait anxiety. The STAI-T takes about 4-5 minutes to fill out. Five example items of the STAI-T and instructions are provided in Appendix D (restriction due to publisher copyright).

3. Procedures

The questions were presented online in the following fixed order: 1) Demographics (gender, age, year in university, ethnicity); 2) STQ; 3) GSE-S. As noted above, this study was incorporated into online testing of a larger set of questionnaires. Therefore, assessment of the STAI-T (4) was separated from assessment of STQ/GSE-S by other questionnaires not included in this study and not accessible to me. The total time required to participate in online testing was about 60 minutes (i.e., including my questionnaires plus the additional questionnaires that were not part of my study). Participation took place during the second week of the Fall term of the 2012-2013 academic year at the University of Alberta. Participants were instructed to fill out the

questions in a quiet and undisturbed location (see Appendix A for the full consent form). After the one-week participation period ended, I received an Excel sheet from the test administrator (Dept. of Psychology) containing the compiled answers from all participants.

4. Data preparation and participant selection

Participants with missing information on any of the demographic variables were excluded (N = 46). In addition, two participants reported to be 11 years old, which was regarded as a mistake; these two participants were excluded as well. Furthermore, to retain a maximum number of the remaining participants, missing variables in the questionnaires were treated as follows: According to Tabachnick & Fidell (2007), a percentage of 10% missing answers in questionnaire data can be replaced by the individual participant's mean answer in the remainder of the questionnaire. Following this procedure resulted in

- Replacement of 1 missing answer in the GSE-S in N = 67 participants. Participants who had more than 1 missing GSE-S answers were excluded (N = 36).
- Replacement of 1-2 missing answers in the STQ in N = 163 participants. Participants who had more than 2 missing STQ answers were excluded (N = 40).
- Replacement of 1-2 missing answers in the STAI-T in 120 participants. Participants who had more than 2 missing STAI-T answers were excluded (N = 17).

The final sample consisted of 1859 participants without missing data.

5. Statistical analyses

Statistical analyses were carried out with Statistical Package for Social Sciences SPSS (version 15, 2006). Normality of the data was formally tested with the Shapiro Wilks Test and informally by inspection of distribution histograms/QQ-plots. Descriptive statistics on

demographic variables and all questionnaire data are presented first. Categorizing continuous demographic data (i.e., age and years in university), the subsequent analyses compared mean levels of GSE-S, STQ and STAI-T between groups based on demographics (e.g., between genders), addressing hypotheses 1-5. For this purpose, I conducted t-tests or one-way analyses of variance (ANOVA). To address exploratory aim 1, a series of moderated regression analyses was conducted to test simple 2-way interactions between demographic variables in predicting either one of the questionnaires.

Hypothesis 6 (positive relationship between GSE-S and STQ) was tested with a Pearson correlation first and followed up by moderated regressions including the demographic variables. These follow up analyses address exploratory aim 2. Similarly, Hypothesis 7 (negative relationships between STAI-T and GSE-S/STQ) was tested with Pearson correlations first. To address exploratory aim 3, moderated regressions were conducted predicting STAI-T by demographic variables, their interactions, as well as GSE-S, STQ, and their interaction.

Hypothesis 8 (the generalized self-trust subfactor of the STQ is most closely related to GSE and to STAI-T). For this purpose, the STQ was subjected to an exploratory factor analysis to identify the STQ factor structure in the current sample. Participants' factor scores within each of the extracted sub-factors were then correlated with GSE-S and STAI-T.

Throughout, the Welch F ratio was used, adjusting error degrees of freedom, if variance inhomogeneity between groups was present. ANOVA omnibus effects were followed up by Tukey post-hoc tests or, if variance inhomogeneity was present, by Games-Howell post-hoc tests. Predictors in the regression models were examined for variance inflation factor (VIF), an index that measures how much the variance of an estimated regression coefficient is artificially increased because of multicollinearity. Although conventions vary, a VIF larger than 5 (Field,

2009) was here considered as a serious violation of the multicollinearity tenet, leading to exclusion of the respective predictors Follow-up analyses to test interaction effects in moderated regressions were conducted according to a procedure proposed by Robinson et al (2013). Briefly, instead of comparing simple slopes against zero, they were compared directly against each other by using a t-statistic on their difference based on their individual beta weights and the pooled standard error. Finally, formal comparisons of correlations against each other were carried out with a procedure proposed by Zou (2007), based on Fisher z-transformations.

V. Results

1. Participant characteristics

The final sample (N = 1859) is summarized in **Table 1**. As expected, this was a highly homogenous sample of predominantly first-year university students, with a narrow age range.

Table 1. Participant characteristics

	Count or mean (SD)	**Group**
Gender	Male = 701	
	Female = 1158	
Oral contraceptives	N= 365 of females on oral contraceptives	
Age	18.93 (2.15) years	
16-17 years	275	1
18 years	762	2
19 years	385	3
20 years	190	4
21 or more	247	5
Year in University	1.69 (1.07) years	
Year 1	1114	1
Year 2	425	2
Year 3	178	3
Year 4	94	3
Year 5	33	3
Year 6	7	3
Year 7	7	3
Year 8	1	3
Year 9+	0	
Ethnicity		
East Asian	471	Asian
South Asian	138	Asian
Euro-North American	618	Western
European	345	Western
Aboriginal	27	Other
African	46	Other
Hispanic/Latin-American	32	Other
Middle Eastern	52	Other
Pacific Islander	2	Other
Other	128	Other

SD=Standard Deviation

Included in **Table 1** is the way in which variables were grouped into categories. As such, instead of treating 'year in university' (skewness = 1.9) and 'age' (skewness = 3.40) as continuous variables, the age variable was treated as an ordinal variable consisting of 5 groups; 16-17, 18, 19, 20, and 21 or more years. Year in university included two primary clusters of first and second year students, hence those in their third year and above were grouped together. The frequency counts for reported ethnicity from **Table 1** showed the highest numbers of participants reporting East Asian, European and Euro-North American ethnicities. This variable was collapsed into three categories: 'Euro-North Americans' (containing Europeans and Euro-North-Americans), 'Asian' (containing South Asians and East Asians) and 'Other' (containing participants who reported any of the other ethnicity).

2. Questionnaires

Table 2 summarizes means, standard deviations and Cronbach alpha of the three questionnaires and gives a comparison to published norms.

Table 2. Questionnaire characteristics

	Sample Mean (SD) Cronbach alpha	**Norm Sample**	**Published Mean (SD) Cronbach alpha**
GSE-S	Mean = 29.96 (4.21) Alpha = 0.86	Mixed multinational sample (Scholz et al. 2002) N = 19120 (7243 males) Age = 25 (14.7)	Mean = 29.55 (5.32) Alpha = 0.86
STQ	Mean = 58.49 (10.2) Alpha = 0.84	Undergraduate and graduate students (University of Calgary) (Pasveer, 1998) N = 148 (52 males) Age = 25.54 (6.86)	Mean = 67.93 (11.96) Alpha = 0.86

	Sample Mean (SD) Cronbach alpha	Norm Sample	Published Mean (SD) Cronbach alpha
STAI-T	Mean = 45.25 (10.21) Alpha = 0.91 Mean for males = 43.66 (10.13) Mean for females = 46.22 (10)	Psychology college students (Florida, USA) (Spielberger et al., 1983) N = 855 (324 males)	 Mean for males = 38.3 (9.18) Alpha (male) = 0.9 Mean for females = 40.4 (10.15) Alpha (female) = 0.91

GSE-S= Generalized Self-Efficacy Scale; SD= Standard Deviation; STAI-T= Trait Anxiety Inventory; STQ= Self-Trust Questionnaire

All three questionnaires showed high Cronbach alphas, similar to the scale characteristics in published norm samples, indicating high internal consistency across the items within each scale. The mean GSE-S was slightly, but significantly higher than the published mean ($t[1958] = 4.23$, $p < 0.001$). The mean STQ score was substantially lower in my sample than Pasveer's sample ($t[1958] = -39.84$, $p < 0.001$). Trait-anxiety in the STAI, tabulated only by gender in the STAI manual, was substantially higher in my sample for both males ($t[1958] = 14.02$, $p < 0.001$) and females ($t[1958] = 19.79$, $p < 0.001$).

All three scales were then inspected for violations of normality. Skewness and kurtosis values are listed in **Table 3** and the scales score distributions are shown in **Figure 2.**

Table 3. Skewness and kurtosis of all three questionnaire scores

	Skewness	Kurtosis
GSE-S	-0.18	0.55
STQ	0.16	0.22
STAI-T	-0.16	0.31

GSE-S= Generalized Self-Efficacy Scale; STAI-T= Trait Anxiety Inventory; STQ= Self-Trust Questionnaire

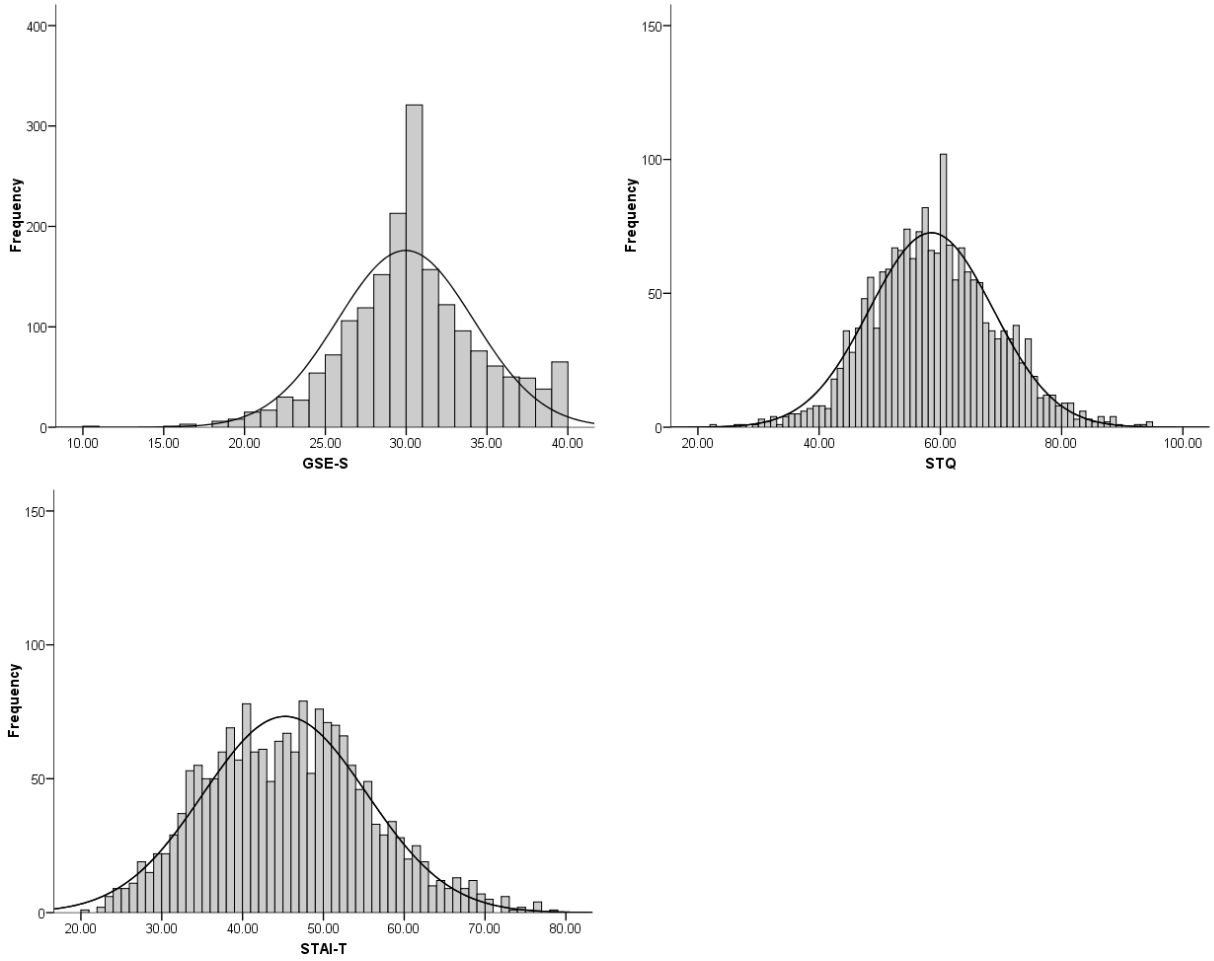


Figure 2. Questionnaire score distributions. GSE-S= Generalized Self-Efficacy Scale; STAI-T= Trait Anxiety Inventory; STQ= Self-Trust Questionnaire

Shapiro-Wilk normality tests revealed significant violation of the normality assumption in all three questionnaires (p's < 0.001). However, visual inspection of the Q-Q plots showed that apart from a few cases, no significant departures from the normal curve were present (Appendix E). Furthermore, skewness and kurtosis values were negligible (**Table 3**). With a sample size as large as here, even slight departures from the normal curve result in statistically significant but potentially meaningless violations of normality (Field, 2009). The negligible skew/kurtosis values, and the unremarkable Q-Q plots indicated no meaningful violations of normality and therefore, all three scales scores will be treated as normal in the following sections.

3. Hypotheses 1-5: Influences of demographic variables on GSE-S and STQ

The core outcomes of analyses testing the influences of demographic variables on the GSE-S and the STQ are summarized in **Table 4**.

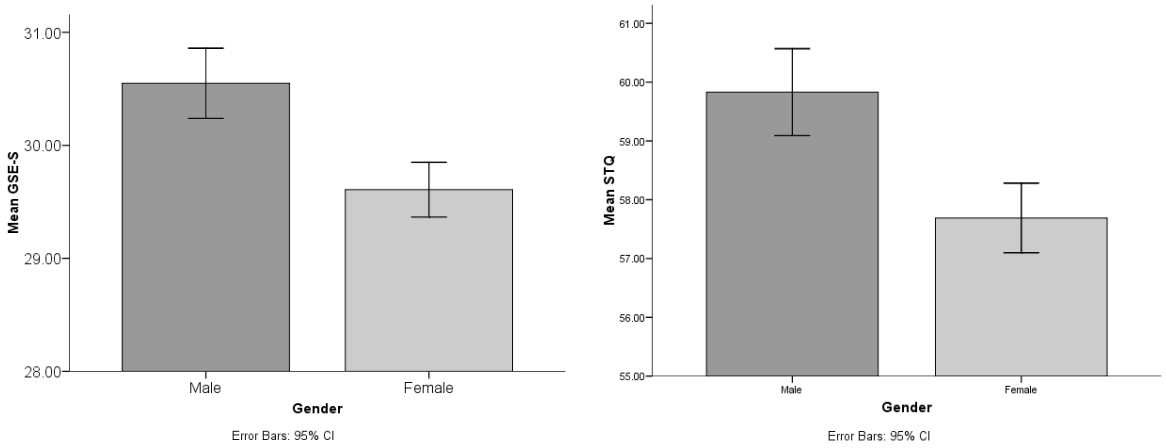
Table 4. Summary of demographic variables influencing GSE-S and STQ

	GSE-S		STQ	
	Test statistic Significance	**Post-hoc ($p < 0.05$)**	**Test statistic Significance**	**Post-hoc ($p < 0.05$)**
Gender	t[1857] = 4.70 $p < 0.001$	Male > Female	t[1857] = 4.40 $p < 0.001$	Male > Female
Age	F[4, 1854] = 0.87 $p > 0.1$	n.s.	F[4, 669.04][1] = 7.53 $p < 0.001$	Age 19+ > Age 16-17 Age 21+ > Age 18
Ethnicity[1]	F[2, 768.85] = 22.51 $p < 0.001$	Western = Other > Asian	F[2, 768.85] = 25.42 $p < 0.001$	Western = Other > Asian
Year in University[1]	F[2, 718.81] = 3.55 $p < 0.05$	Year 3+ > year 1	F[2, 746.99] = 6.14 $p < 0.01$	Year 3+ > year 1
OC Status[1]	F[2, 987.27] = 11.18 $p < 0.001$	Male > Female on OC = Female off OC	F[2, 968.34] = 10.07 $p < 0.001$	Male > Female on OC = Female off OC

[1]: Welch F ratio. GSE-S= Generalized Self-Efficacy Scale; n.s= non-significant; OC=Oral Contraceptive; STQ= Self-Trust Questionnaire

As seen in **Table 4**, with the exception of age, all assessed demographic variables influenced GSE-S and STQ scores in a similar manner.

Gender (Hypothesis 1, supported): Males scored significantly higher in both GSE-S (**Figure 3 A**) and STQ (**Figure 3 B**) (GSE-S: males: M = 30.55, SD = 4.20, females: M = 29.61, SD = 4.20; STQ: males: M = 58.80, SD = 9.10, females: M = 57.69, SD = 10.28).



A. **B.**

Figure 3. Gender difference in GSE-S (A) and STQ (B). CI= confidence interval; GSE-S= Generalized Self-Efficacy Scale; STQ= Self-Trust Questionnaire

Age (Hypothesis 2, supported): Age groups did not differ in the GSE-S. However, STQ scores significantly differed between age groups. The youngest group (16-17 years) scored lower (M = 56.38, SD = 10.30) than all groups of participants 19 years or older (19 years: M = 58.80, SD = 10.19; 20 years: M = 59.50, SD = 9.66; 21 years and above: M = 60.90, SD = 9.76). Furthermore, individuals who were 21 years or older also scored higher than the second youngest group, the 18 year olds (M = 58.09, SD = 10.30; all *p's* < 0.01). As illustrated in **Figure 4**, STQ scores seemed to linearly increase with age.

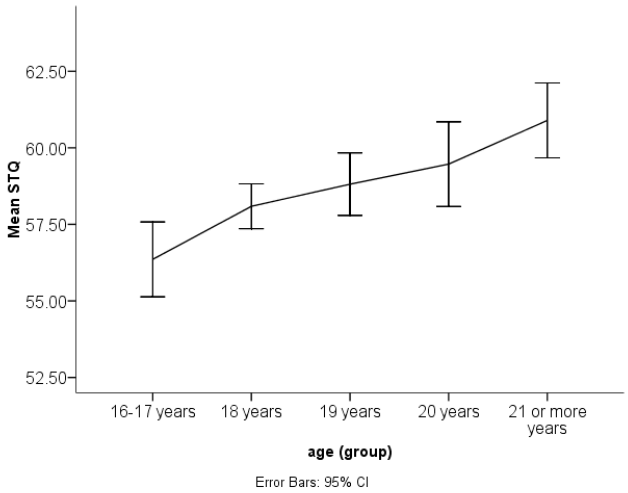
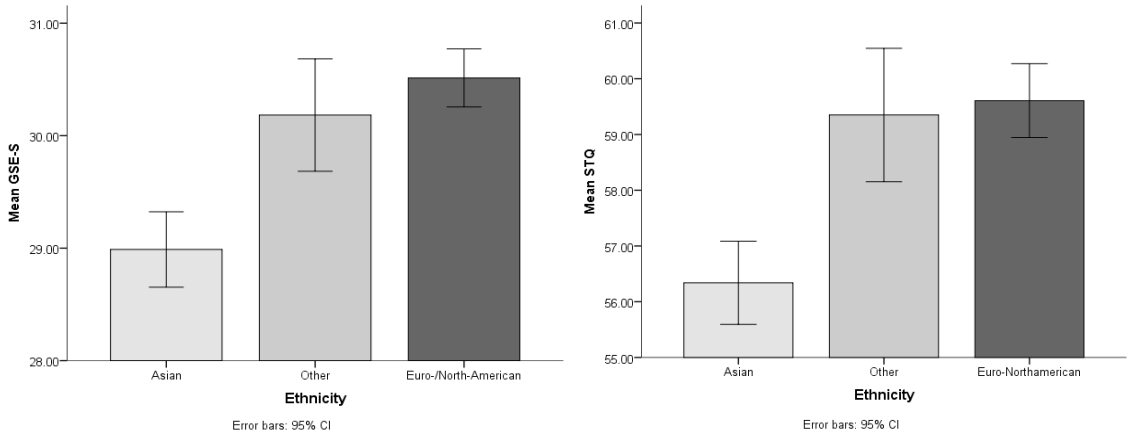


Figure 4. Mean STQ in each of the five age groups. CI= Confidence Interval; STQ= Self-Trust Questionnaire

Ethnicity (Hypothesis 3, supported): Both GSE-S (**Figure 5 A**) and STQ scores (**Figure 5 B**) were different across participants with different ethnicities. For both scales, Asians scored significantly lower than participants from the Euro-North-American and Other groups, while the latter two did not differ from another (**GSE-S:** Asians: M = 28.98, SD = 4.02; Euro-North Americans: M = 30.51, SD = 4.08; Other: M = 30.18, SD = 4.29; **STQ**: Asians: M = 56.33, SD = 9.38; Euro-North Americans: M = 59.60, SD = 10.48; Other: M = 59.34, SD = 10.3).

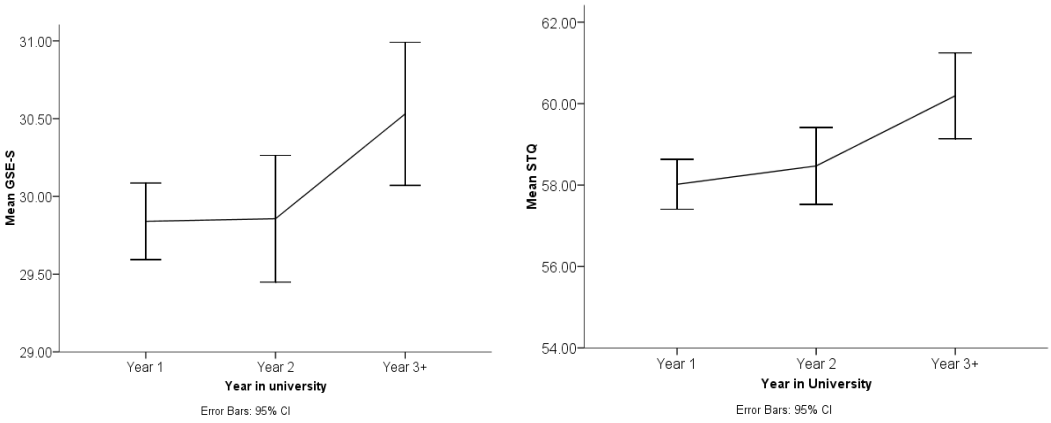


A. **B.**

Figure 5. Mean GSE-S and STQ in the ethnicity groups. CI= Confidence Interval; GSE-S= Generalized Self-Efficacy Scale; STQ= Self-Trust Questionnaire

Year in University (Hypothesis 4, supported): Groups of participants in different years in university differed in both GSE-S (**Figure 6 A**) and STQ (**Figure 6 B**). Post-hoc tests showed that for GSE-S scores, third-year students (M = 30.53, SD = 4.18) scored significantly higher than both first-year students (M = 29.83, SD = 4.18) and second-year students (M = 29.85, SD = 4.27), but the latter two did not differ. Post-hoc tests on the STQ showed a similar pattern, with third year students scoring significantly higher (M= 60.19, SD = 9.59) than first year students (*M*

= 58.02, SD = 10.45). Second year students (M = 58.47, SD = 9.90) were not different in the STQ than either first- or third-year students. These findings are illustrated in **Figure 6**.



A. **B.**

Figure 6. Mean GSE-S (A) and STQ (B) in the 'year in university' groups. CI= Confidence Interval; GSE-S= Generalized Self-Efficacy Scale; STQ= Self-Trust Questionnaire

OC Status (Hypothesis 5, rejected): Both GSE-S and STQ scores varied across OC status. Post-hoc comparisons revealed that GSE-S scores were higher in males (M = 30.54, SD = 4.19) than in females on birth control (M = 29.73, SD = 4.03) and in females off oral contraceptives (M = 29.55, SD = 4.25). GSE-S scores were not different between the two female groups (on/off oral contraceptives). Similarly, STQ scores were higher in males (*M* = 59.83, *SD* = 9.97) compared to both females on birth control (*M* = 57.99, *SD* = 10.28), and to females off birth control (*M* = 57.54, *SD* = 10.26). Again, the two female groups did not differ in their STQ scores. These results indicate a simple gender effect as shown initially and no influence of OC status on either GSE-S or STQ.

In summary, demographic variables affecting both GSE-S and STQ were gender, age, ethnicity, and year in university, but not OC status. Highest GSE-S scores were seen in participants with a male gender, non-Asian ethnicity, and those in year 3 or more of university.

Age or OC status did not influence GSE-S. The same pattern was seen in the STQ, with the exception that age played a role: Those older than 18 years of age scored higher in the STQ than younger participants. As OC status had no effect on either of the measures, this variable was excluded in the following analyses.

4. Exploratory Aim 1: Interactions between demographic variables predicting GSE-S and STQ.

Having ascertained which demographic variables independently explained variance in GSE-S and STQ scores, I explored two-way interactions between them in moderated regressions. To simplify these exploratory analyses, no higher-order interactions were pursued and all categorical predictors were dummy-coded into two levels. This procedure largely reflected how these variables influenced GSE-S or STQ by themselves. As such, age was collapsed from originally five into two groups: 16-18 years and 19+ years, with the younger group serving as the reference group (compare with **Table 4**, **Figure 4**). Ethnicity was reduced to two groups, such that the Asian participant group served as the reference group, whereas the Euro-North American participants and 'Other' ethnicities were grouped together (see **Figure 5**). 'Years in university' originally included three groups and was recoded such that first and second year students were combined and coded as the reference group, contrasting students in the third or higher years of university (see **Figure 6**)**.** All regressions were conducted in two steps with main effects tested first, followed by the interaction terms. The interaction between age and year in university was removed from any further analysis due to high variation inflation factor (VIF = 34.50).

For GSE-S, three predictors and their interactions were tested: Gender, ethnicity, and year in university. Since age did not influence GSE-S, it was not included as a main effect or in the interaction terms. **Table 5** shows the results of the two regression models predicting GSE-S.

Table 5. Model summary predicting GSE-S by demographic variables and their 2-way interactions

Model	R	R Square	F Change	df1	df2	Significant F-Change
1	0.21(a)	0.04	27.33	3	1855	***
2	0.22(b)	0.05	3.36	3	1852	*

(a) Predictors: Constant, Year in University, Ethnicity, Gender
(b) Predictors: Constant, Year in University, Ethnicity, Gender, Gender X Year in University, Gender X Ethnicity, Year in University X Ethnicity
df1: degrees of freedom; df2: error degrees of freedom
* = $p < 0.05$; *** = $p < 0.001$

As can be seen in **Table 5**, a significant increase in variance explained emerged in model 2, i.e., when including the interaction terms. A total of 5% of the variance in GSE-S was explained by including the interaction variables as predictors in addition to the main effects, compared to 4% when only including main effects in model 1.**Table 6** shows the models' overall significance and the strengths of the predictors.

Table 6. Summary of predictors for GSE-S regression models including demographic variables and their interactions

Model	df1	df2	F	Sig.	Predictors	B	beta	t	Sig.
1	3	1855	27.33	***					
					Gender	1.00	0.11	5.04	***
					Ethnicity	1.49	0.17	7.28	***
					Year	0.56	0.05	2.21	*
2	6	1852	15.40	***					
					Gender	1.14	0.13	3.26	***
					Ethnicity	1.28	0.14	4.65	***
					Year	0.47	0.04	0.91	p > 0.1
					Int.: Gender X Ethnicity	0.15	0.02	0.37	p > 0.1
					Int.: Gender X Year	-1.32	-0.08	-2.57	**
					Int.: Ethnicity X Year	0.91	0.07	1.63	p > 0.1

df1: degrees of freedom; df2: error degrees of freedom; Sig.: Significance; Int.: Interaction ; Year: Year in university;
* = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

As can be seen in **Table 6**, reflecting the results from the three separate ANOVA (see **Table 4**), gender, ethnicity, and year in university examined together in model 1, significantly predicted GSE-S. Model 2 found a significant interaction between gender and year in university, i.e., qualifying the main effect of gender on GSE-S scores. **Figure 7** shows this interaction.

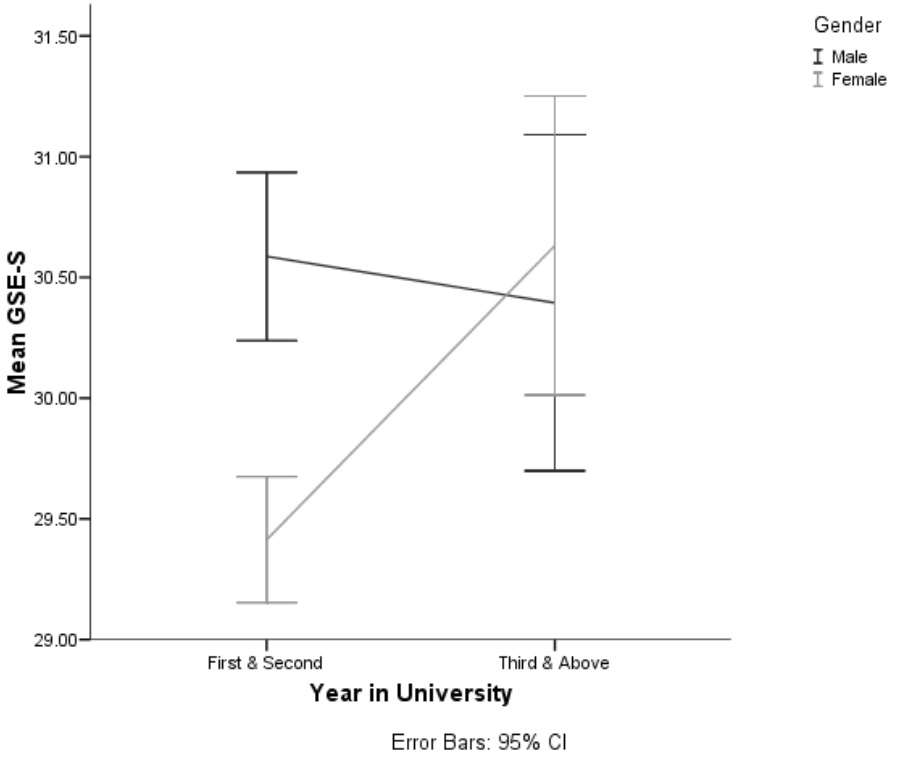


Figure 7. GSE-S: Interaction between gender and year in university. CI= Confidence Interval; GSE-S= Generalized Self-Efficacy Scale

While for females there appeared to be an increase in GSE-S with three or more years in university, for males there was no difference. The two slopes were found to be significantly different (difference of the simple slopes: $t_{diff}[1855] = 5.01$, $p < 0.001$; procedure by Robinson et al., 2013).

Two analogous regression models were conducted on STQ. Since age had predicted STQ scores in the simple ANOVA, age was included as a main effect and the interaction terms. The results of these analyses are shown in **Tables 7** and **8**.

Table 7. Model summary predicting STQ by demographic variables and their 2-way interactions

Model	R	R Square	F Change	df1	df2	Significant F-Change
1	0.21(a)	0.04	20.38	4	1854	***
2	0.22(b)	0.05	1.77	5	1849	p > 0.1

(a) Predictors: Constant, Gender, Age, Ethnicity, Year in University
(b) Predictors: Constant, Year in University, Ethnicity, Gender, Age, Age X Gender, Age X Ethnicity, Gender X Year in University, Gender X Ethnicity, Year in University X Ethnicity
df1: degrees of freedom; df2: error degrees of freedom
* = p < 0.05; ** = p < 0.01; *** = p < 0.001

Unlike in the GSE-S regression models, no significant increase in variance explanation emerged in model 2, i.e., when including the interaction terms. However, since the overall model 2 was significant, the results are reported here in **Table 8** nevertheless.

Table 8. Summary of predictors for STQ regression models including demographic variables and their interactions

Model	df1	df2	F	Sig.	Predictors	B	beta	t	Sig.
1	4	1854	20.38	***					
					Gender	2.21	0.11	4.61	***
					Age	1.50	0.07	2.80	**
					Ethnicity	3.28	0.15	6.61	***
					Year	0.79	0.03	1.12	p > 0.1
2	9	1849	10.06	***					
					Gender	2.14	0.10	2.32	*
					Age	2.32	0.11	2.27	*
					Ethnicity	3.24	0.15	4.24	***
					Year	0.76	0.03	0.54	p > 0.1
					Int.: Gender X Age	0.30	0.01	0.27	p > 0.1
					Int.: Gender X Ethnicity	0.82	0.03	0.80	p > 0.1
					Int.: Gender X Year	-3.32	-0.08	-2.23	*
					Int.: Age X Ethnicity	-1.42	-0.06	-1.25	p > 0.1
					Int.: Ethnicity X Year	2.00	0.06	1.30	p > 0.1

df1= degrees of freedom; df2= error degrees of freedom; Sig.: Significance; Int.: Interaction; Year: Year in university; * = p < 0.05; ** = p < 0.01; *** = p < 0.001

As can be seen in **Table 8**, mostly mirroring the ANOVA results (see **Table 4**), gender, age and ethnicity predicted STQ in model 1. In contrast to the ANOVA results, year in university did not predict STQ in model 1. That is, when accounting for gender, age, and ethnicity at the same time, year in university was no significant predictor of STQ. However, model 2 found a significant interaction between gender and year in university in predicting STQ scores. Thus, the simple gender difference in STQ scores was qualified by year in university. **Figure 8** illustrates this interaction, which appears similar to the moderation effects I found with the GSE-S: Female students in first or second year of university scored lower in the STQ than those in the third year or above, but there was no difference between male groups as a function of year in university (difference of the simple slopes: $t_{diff}[1855] = 4.64$, $p < 0.001$).

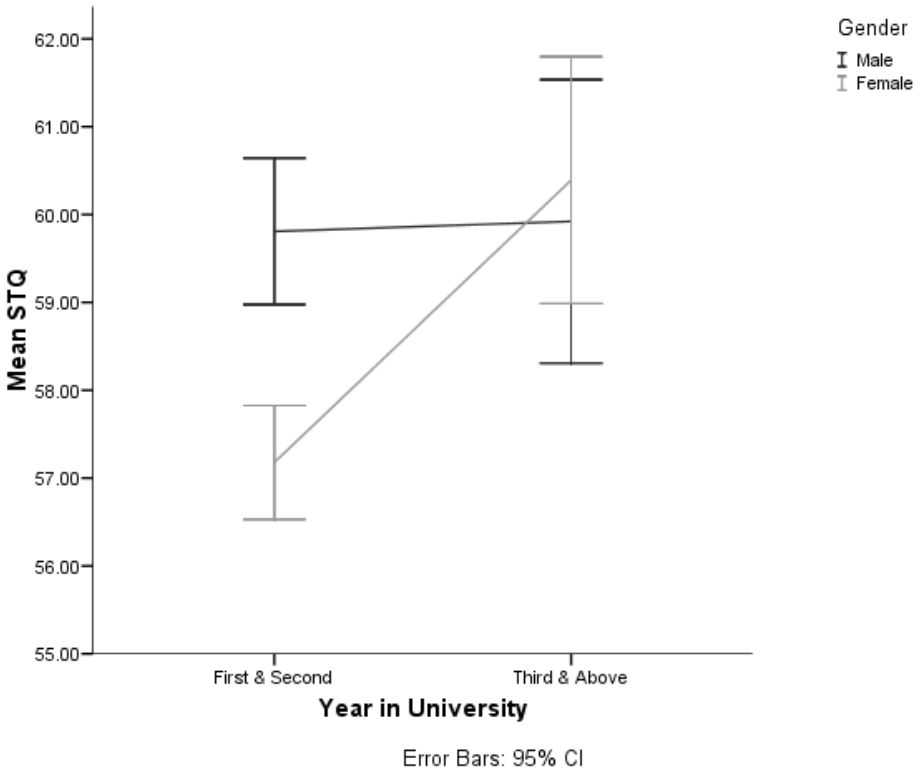


Figure 8. STQ: Interaction between gender and year in university. CI= Confidence Interval; STQ= Self-Trust Questionnaire

In summary, possible predictors of GSE-S/STQ were assessed simultaneously as opposed to the univariate analyses. The multivariate analyses largely confirmed the univariate analyses but uncovered one interesting moderation effect: Year in University showed a positive relationship with both questionnaires in females, but not in males.

5. **Hypothesis 6: Moderately positive correlation between GSE-S and STQ**

The first step in exploring the relationship between GSE-S and STQ was a simple correlation. This allowed me to understand what the relationship between the two constructs looked like prior to considering any additional variables. A Pearson correlation revealed a moderate positive correlation ($r[1882] = 0.38$, $p < 0.001$) between the questionnaires. This finding confirms the proposed hypothesis regarding the direction as well as the strength of the relationship between the two constructs. That is, the obtained correlation was in the 0.30 – 0.39 range which is generally considered a 'moderately' strong relationship (Field, 2009). **Figure 9**

illustrates the simple linear relationship between GSE-S and STQ[1].

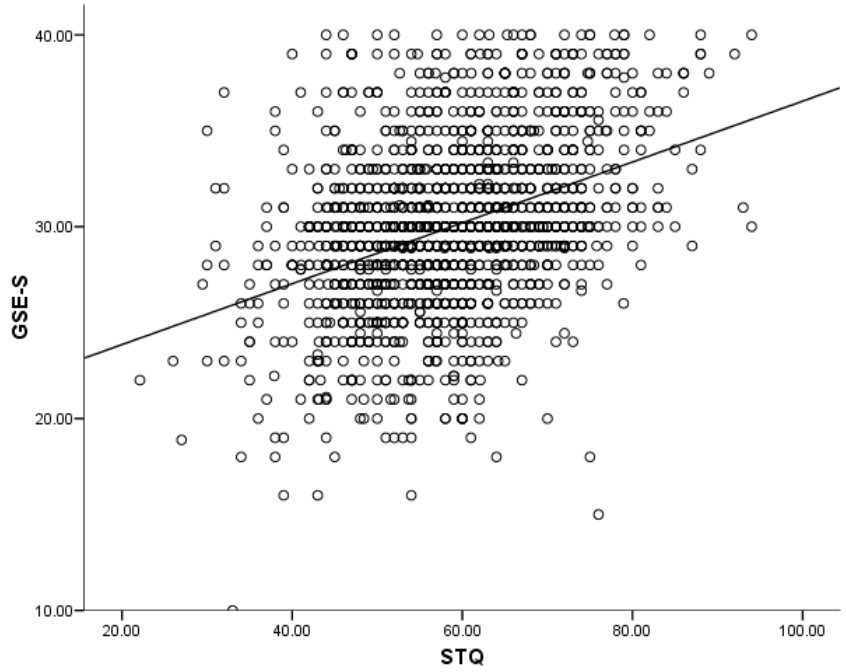


Figure 9. Correlation between GSE-S and STQ scores including a line of fit (r[1857] = 0.38, p < 0.001). GSE-S= Generalized Self-Efficacy Scale; STQ= Self-Trust Questionnaire

6. Exploratory Aim 2: Influences of demographic variables on the relationship between GSE-S and STQ.

Did any of the demographic variables change the relationship between GSE-S and STQ? This exploratory question was examined with moderated regressions. The dependent variable here was the GSE-S score. The first block of predictor variables included three main effects and one interaction term which were found to significantly predict GSE-S (see **section 3,4**): 1) Gender 2) Ethnicity 3) Year in university 4) Gender by Year in University interaction. The second block included the mean-centered STQ. Mean-centering shifts the scale but leaves the standard deviation/units intact. Thus, the slope between the predictor (STQ) and response

[1] Quadratic and cubic relationships were also examined, but none of these curve fits were statistically superior and are therefore not shown here.

variable (GSE-S) does not change, but the interpretation of the intercept does: A person who scores at the mean of STQ now has a value of zero. Hence, the intercept reflects the expected GSE-S score for someone who scores average on the STQ. Finally, the third block of predictors included two-way interactions between STQ and gender, STQ and age, STQ and ethnicity as well as STQ and year in university (i.e., interactions between those demographic variables that had been found in section 4 to influence the STQ independently). **Table 9** shows the results of three regression models.

Table 9. Model summary predicting GSE-S by demographic variables, STQ and STQ – demographic variable interactions

Model	R	R Square	F Change	df1	df2	Significant F-Change
1	0.21(a)	0.05	22.37	4	1854	***
2	0.41(b)	0.16	270.08	1	1853	***
3	0.42(c)	0.17	3.02	4	1849	*

(a) Predictors: Constant, Gender, Ethnicity, Year in University, Gender X Year in University
(b) Predictors: Constant, Gender, Ethnicity, Year in University, Gender X Year in University, STQ
(c) Predictors: Constant, Gender, Ethnicity, Year in University, Gender X Year in University, STQ, STQ X Gender, STQ X Age, STQ X Ethnicity, STQ X Year in University
df1= degrees of freedom; df2= error degrees of freedom; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

As can be seen in **Table 9**, all three models were significant and a significant increase in variance explained emerged in model 2 and 3. In detail, a total of 16% of the variance in GSE-S was explained by including the STQ scores in addition to the demographic variables and their interactions in model 1. The inclusion of interaction terms (model 3) slightly, but significantly increased the amount of variance explained to 17%. **Table 10** summarizes the three models and their predictors.

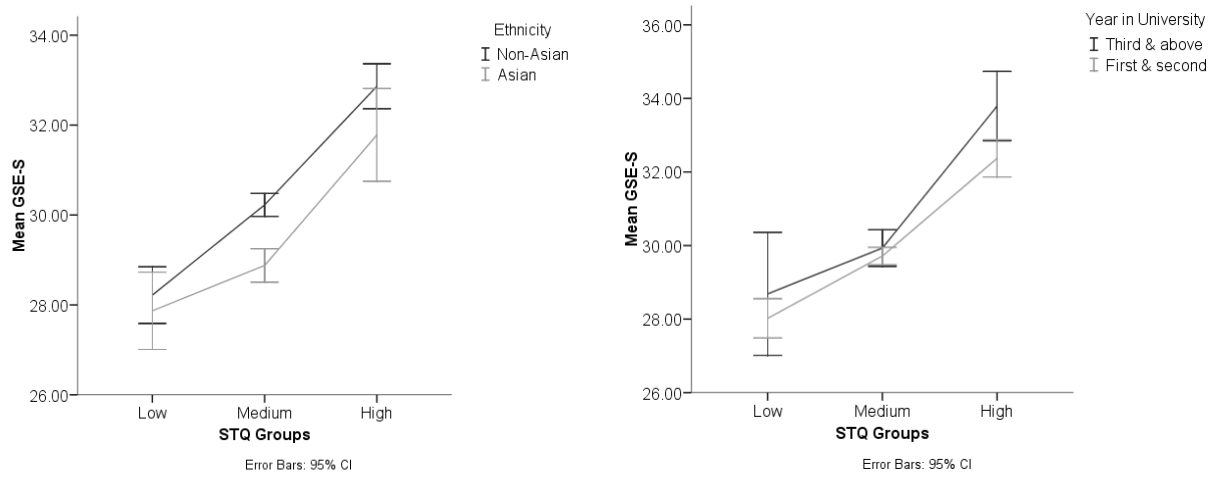
Table 10. Summary of predictors for GSE-S regression models including demographic variables, STQ and STQ – demographic variables interactions

Model	df1	df2	F	Sig.	Predictors	B	beta	t	Sig.
1	4	1854	22.37	***					
					Gender	1.25	0.14	5.71	***

Model	df1	df2	F	Sig.	Predictors	B	beta	t	Sig.
					Ethnicity	1.48	0.17	7.27	***
					Year	1.13	0.10	3.42	***
					Int.: Gender X Year	-1.38	-0.09	-2.68	**
2	5	1853	74.51	***					
					Gender	0.84	0.10	4.07	***
					Ethnicity	1.00	0.11	5.20	***
					Year	0.69	0.06	2.22	*
					Int.: Gender X Year	-0.93	-0.06	-1.94	p > 0.05
					STQ	0.15	0.36	16.43	***
3	9	1849	42.91	***					
					Gender	0.87	0.10	4.22	***
					Ethnicity	1.05	0.12	5.42	***
					Year	0.62	0.06	1.99	*
					Int.: Gender X Year	-0.99	-0.06	-2.05	*
					STQ	0.11	0.27	5.76	***
					Int.: STQ X Gender	0.00	0.00	0.03	p > 0.1
					Int.: STQ X Age	-0.03	-0.04	-1.37	p > 0.1
					Int.: STQ X Ethnicity	0.05	0.10	2.60	**
					Int.: STQ X Year	0.07	0.07	2.45	*

df1: degrees of freedom; df2: error degrees of freedom; Sig.: Significance; Int.: Interaction; Year: Year in university; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

As can be seen in **Table 10**, model 1 confirms the previous univariate analyses (see **sections 3-4**). In model 2, even when first controlling for gender, ethnicity, year in university and the interaction between gender and year in university, STQ positively predicted GSE-S scores. This validates the positive correlation between GSE-S and STQ while controlling demographic influences on the GSE-S. In model 3, STQ by ethnicity as well as STQ by university emerged as significant interactions. **Figure 10** illustrates these interactions.



A. **B.**

Figure 10. GSE-S – STQ relationship qualified by (A) ethnicity and (B) year in university. CI= Confidence Interval; GSE-S= Generalized Self-Efficacy Scale; STAI-T= Trait Anxiety Inventory; STQ= Self-Trust Questionnaire; Low= -1 SD from the median; Medium= within +-1 SD from the median; High=+1 SD from the median

Inspecting **Figure 10 A**, in the lower to medium STQ range the relationship between STQ and GSE-S was shallower in Asians than in Non-Asians (t_{diff} [1550] = 4, $p < 0.01$)[2]. However, in the medium to higher range of the STQ, the slopes between STQ and GSE-S did not differ between Asians and Non-Asians (t_{diff} [1554]= 1.82, $p > 0.5$). That is, even though the relationship between GSE-S and STQ was positive in all STQ ranges and ethnicity groups, in Asians with a low to medium STQ, there was relatively more decoupling between the STQ and the GSE-S.

Figure 10 B shows the simple slopes by year in university. In the lower to medium STQ range, the relationship between STQ and GSE-S was similarly steep in first-/second-year students compared to students in their third or higher year in university (t_{diff} [1554]= 1.36, $p > 0.5$). However, in the medium to higher STQ range, students in their third or higher year in university showed a stronger relationship between STQ and GSE-S (t_{diff} [1554]= 4.18, $p < 0.001$)

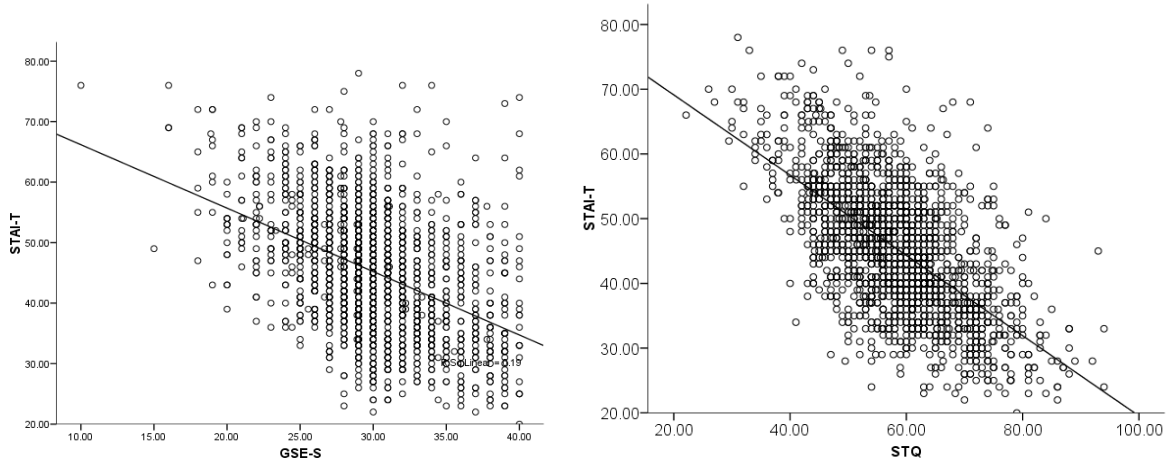
[2] Low, medium and high ranges in the continuous variables were defined as median +/- 1 SD of the scale. This is an arbitrary cut-off that is often used to illustrate slopes in follow up analyses of interactions in regression analyses (Preacher & Rucker, 2003).

than first-/second-year students. That is, even though the relationship between GSE-S in all ranges of the STQ was positive regardless of what year in university the students were in, those in their third or higher year in university who scored high in the STQ showed relatively stronger coupling between STQ and GSE-S.

It should be noted that these two interaction effects were rather small. Plotting the simple slopes (cf. **Figure 10**) then showed rather unremarkable changes in the relationship between GSE-S and STQ, due to demographic variables.

7. Hypothesis 7: Negative correlations between STQ/GSE-S and trait-anxiety.

As in **section 5,** the first step in exploring the relationship between STQ/GSE-S and trait-anxiety (STAI-T) entailed using simple correlations. These revealed a moderate (Field, 2009) negative correlation between GSE-S and STAI-T ($r[1857] = -0.44$, $p < 0.0001$) as well as a strong negative correlation between STQ and STAI-T ($r[1857] = -0.63$, $p < 0.0001$). These correlations are illustrated in **Figure 11**. These findings confirm hypothesis 7.



A. **B.**

Figure 11. Correlations between (**A**) GSE-S and STAI-T ($r[1857] = -0.44$, $p < 0.0001$) and (**B**) STQ and STAI-T ($r[1857] = -0.63$, $p < 0.0001$) including lines of fit. CI= Confidence Interval; GSE-S= Generalized Self-Efficacy Scale; STAI-T= Trait Anxiety Inventory; STQ= Self-Trust Questionnaire

The size of the correlations was then tested directly against each other. Briefly, following a procedure proposed by Zou (2007), the upper and lower bounds for 99% confidence intervals (CI) for each of the two correlations were calculated and their Fisher z-transforms were used to derive a confidence interval for their difference. The outcome of this calculation indicated a statistically significant size difference between the two correlations (CI low: $r_{diff} = 0.14$; CI high $r_{diff} = 0.28$). This means, the smallest difference in the size of the two correlations with an alpha level of $\alpha = 0.01$ was $r = 0.14$, i.e., unequal to zero and therefore sufficient to reject the null hypothesis assuming no difference between the two correlations. Thus, compared to GSE-S, the STQ was significantly more strongly (negatively) correlated with the STAI-T.

8. Exploratory aim 3: Influence of demographic variables on the relationships between trait-anxiety and GSE-S/STQ.

Did any of the demographic variables change how well GSE-S and STQ predicted the STAI-T? This exploratory question was examined using moderated regressions with the STAI-T as the dependent variable. In the first block, all four demographic variables and their interactions were tested. The second model included GSE-S and STQ scores and their interactions with demographic variables. The final model additionally included an interaction term between GSE-S and STQ. The rationale behind the addition of an interaction between GSE-S and STQ was based on two observations: First, GSE-S and STQ were only moderately correlated. In a sample of this size, a substantial proportion of participants should therefore show a relative decoupling of their scores in the two scales. Secondly, evidence also came from the moderation effects illustrated in **Figure 10**, showing that the relationship between STQ and GSE-S was not equally strong in all participants. Thus, I used an interaction term between STQ and GSE-S here to test

whether a potentially non-typical relationship between these two scales predicted STAI-T differently. **Table 11** shows the results of the three regression models.

Table 11. Model summary predicting STAI-T by demographics, STQ/GSE-S and interactions with demographics, and the GSE-S – STQ interaction

Model	R	R Square	F Change	df1	df2	Significant F-Change
1	0.20 (a)	0.04	8.32	9	1849	***
2	0.67 (b)	0.44	121.59	11	1838	***
3	0.67 (c)	0.45	5.02	1	1837	*

(a) Predictors: Constant, Gender, Age, Ethnicity, Year in University, Int.: Gender X Age, Int.: Gender X Ethnicity, Int.: Gender X Year in University, Int.: Gender X Ethnicity, Int.: Ethnicity X Year in University
(b) Predictors: Constant, GSE, STQ, Int.: STQ X Gender, Int.: STQ X Age, Int.: STQ X Ethnicity, Int.: STQ X Year, Int.: STQ X Gender X Year, Int.: GSE X Gender, Int.: GSE X Ethnicity, Int.: GSE X Year, Int.: GSE X Gender X Year
(c) Predictors: Constant, Int.: GSE X STQ
df1: degrees of freedom; df2: error degrees of freedom; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

As shown in **Table 11**, a substantial increase in variance explanation emerged in model 2. Compared to 4% of STAI-T score variance explanation by demographics in model 1, model 2 explained 44% of variance in STAI-T scores when GSE-S, STQ and their interactions with demographic variables were included as predictors. In model 3, the addition of the interaction term between GSE-S and STQ slightly, but significantly increased STAI-T score variance explained to 45%. **Table 12** shows only the final model 3 with all predictors.

Table 12. Summary of predictors for STAI-T regression models including demographics and their interactions, STQ/GSE-S by demographic interactions and GSE-S – STQ interaction

df1	df2	F	Sig.	Predictors	B	beta	t	Sig.
4	1854	22.37	***					
				Gender	-.42	-.02	-.59	p > 0.1
				Age	1.06	.05	1.34	p > 0.1
				Ethnicity	.15	.01	.25	p > 0.1
				Year	-.18	-.01	-.17	p > 0.1
				Int.: Gender X Age	-.03	.00	-.04	p > 0.1
				Int.: Gender X Ethnicity	-.60	-.03	-.75	p > 0.1
				Int.: Gender X Year	-.30	-.01	-.27	p > 0.1
				Int.: Age X Ethnicity	-.12	-.01	-.13	p > 0.1

	Int.: Ethnicity X Year	-1.00	-.03	-.82	p > 0.1
	GSE	-.58	-.24	-6.41	***
	STQ	-.57	-.58	-13.89	***
	Int.: STQ X Gender	-.04	-.03	-1.02	p > 0.1
	Int.: STQ X Age	.05	.03	1.12	p > 0.1
	Int.: STQ X Ethnicity	.06	.05	1.34	p > 0.1
	Int.: STQ X Year	-.10	-.04	-1.36	p > 0.1
	Int.: STQ X Gender X Year	.13	.03	1.13	p > 0.1
	Int.: GSE X Gender	.05	.01	.44	p > 0.1
	Int.: GSE X Ethnicity	-.01	.00	-.08	p > 0.1
	Int.: GSE X Year	.39	.07	2.39	*
	Int.: GSE X Gender X Year	-.38	-.04	-1.50	p > 0.1
	Int.: GSE X STQ	.01	.04	2.24	*

df1: degrees of freedom; df2: error degrees of freedom; Sig.: Significance; Int.: Interaction; Year: Year in university; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

As can be seen in **Table 12**, only four predictors emerged as significant; GSE-S, STQ, an interactions between GSE and year in university, as well as the interaction between GSE-S and STQ. Further examination of the moderation effect of year in university on the GSE-S and trait-anxiety relationship revealed that simple slopes (split by year in university) were not significantly different ($t[1855] = 1.72$, $p > 0.05$; not further illustrated). The significant interaction between GSE-S and STQ in predicting STAI-T, is shown in **Figure 12**.

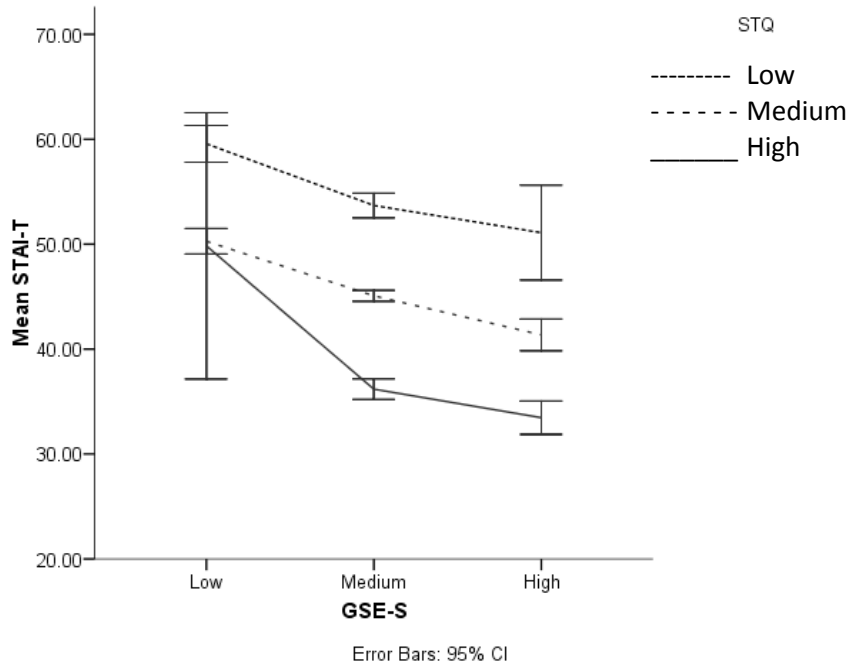


Figure 12. Predicting STAI-T by an interaction between GSE-S and STQ. CI= Confidence Interval; GSE-S= Generalized Self-Efficacy Scale; STAI-T= Trait Anxiety Inventory; STQ= Self-Trust Questionnaire; Low= -1 SD from the median; Medium= within +-1 SD from the median; High=+1 SD from the median

In the **low to medium GSE-S range**, the relationship between GSE-S and STAI-T was steeper in people with high STQ than in people with low STQ (t_{diff} [588] = 4.71, $p < 0.001$) or medium STQ (t_{diff} [1309] = 2.02, $p < 0.01$). In the **medium to high GSE range**, the relationship to STAI-T did not vary as a function of STQ levels (ps > 0.1). Thus, individuals with a high STQ and low to medium GSE-S seem to show a particularly step (negative) relationship to STAI-T. However, inspecting **Figure 12** shows that all slopes were negative; No matter how high or low a participant scored in the GSE-S or STQ, the core relationships between the two scales and the STAI-T were negative with only slight variations in the slopes.

In an attempt to simplify the interpretation of this interaction, I also examined participants who scored on the extreme ends of the GSE-S and the STQ, focusing on those with a potential decoupling between the two scales. For this purpose, quartile splits were performed on each scale, omitting participants in the middle ranges (remaining N = 570). I then separated four

groups of individuals:1) High GSE-S & high STQ (N= 193); 2) High GSE-S & low STQ (N = 64); 3) Low GSE-S & high STQ (N = 54); 4) Low GSE-S & low STQ (N = 259). These four groups' mean STAI-T scores were then examined by a one-way ANOVA. **Figure 13** shows mean STAI-T scores in each of the four groups.

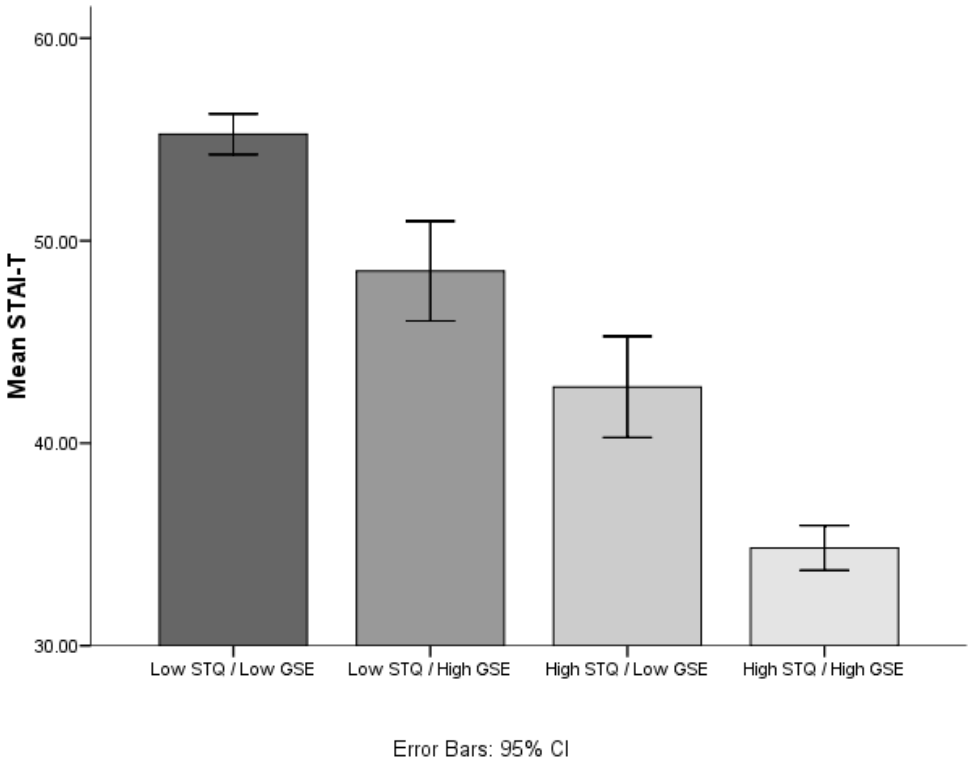


Figure 13. Mean STAI-T in groups based on quartile splits of GSE-S and STQ scores. CI= Confidence Interval; GSE-S= Generalized Self-Efficacy Scale; STAI-T= Trait Anxiety Inventory; STQ= Self-Trust Questionnaire. Low= participants in the lowest 25th quartile; High= participants in the highest 25th quartile.

The ANOVA showed a significant omnibus effect (Welch's $F[3, 153.15] = 244.25$, $p < 0.001$). Post hoc Games-Howell tests revealed significant differences between all four groups (all p's < 0.001). As seen in **Figure 13**, participants with low GSE-S and STQ reported the highest levels of trait-anxiety in the STAI-T (Mean = 55.26, SD = 8.18), whereas participants with high GSE-S and STQ reported the lowest STAI-T (Mean = 34.82, SD = 7.80). Participants high in

GSE-S but low in STQ had higher STAI-T scores (Mean = 48.50, SD = 9.86) compared to those low in GSE-S but high in STQ (Mean = 42.77, SD = 9.14).

9. **Hypothesis 8: Generalized self-trust is more closely linked to GSE-S and STAI-T than other facets of the STQ**

As stated in **section 2.7.2**, Pasveer (1998) had found a four-factor solution in the STQ (generalized self-trust [GST], emotional trust [EMT], external validation [EV], experiential trust [EXP]). I first examined whether her original factor solution was a good fit to the current sample. According to Pasveer, the subfactors of the STQ should correlate. For that reason an oblique rotation was the appropriate choice. To replicate Pasveer's original factor structure, I forced a four-factor solution with principal axis factoring extraction method, oblimin rotation, and set the item-to factor loading threshold to 0.3. **Table 13** shows the results of this factor analysis.

Table 13. Forced four-factor solution and item-to factor loadings for the STQ

	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**
18. Sometimes I have difficulty knowing what it is that I'm feeling.	.799			
12. Sometimes I become confused about what I am feeling.	.596			
11. I seldom talk about my feelings because I'm afraid that they are wrong or stupid.	.446			
6. I often find I can't trust my feelings.	.432			.319
15. I have a great deal of difficulty in knowing when something is right for me.	.389			
19. It doesn't take much to get me to question myself.	.377	.335		
8. Insight into myself comes easily to me.	.336			
Variance explained by factor 1	**26.27%**			
3. When I have to make a decision I often look to others for advice.		.662		
1. I often seek reassurance from others that my ideas are sound.		.623		
17. I often find myself second-guessing my own decisions.	.331	.414		
13. I count on other people to help me identify my strengths and weaknesses.		.371		
16. When I see myself differently from the way others	.323	.349		

	Factor 1	Factor 2	Factor 3	Factor 4
see me I tend to doubt myself.				
Variance explained by factor 2		**8.66%**		
20. I seldom need reassurance from others about my capabilities.			.574	
4. I don't need feedback very often to know that I'm doing a good job.			.402	
14. It doesn't bother me if I see myself differently from how others see me – it's my view that counts.			.399	
Variance explained by factor 3			**6.97%**	
5. Sometimes I wonder if what I've seen is really what it appears to be.				.697
9. I often find myself questioning my version of reality.				.586
2. Often after I talk to people, I question whether I have understood them correctly.		.326		.333
Variance explained by factor 4				**6.33%**
Total Variance Explained (48.24%)				

Cross-loadings: Items 6, 19, 17, 16, 2 load on more than one factor; **Weak loadings:** Items 7 and 10 did not reach the loading threshold of 0.3; **Structure:** Items 18,12, 8, 16, 17, 14 load on other than their original factors in Pasveer (1998)

The resulting solution was unsatisfactory for several reasons. In detail, I observed cross loadings: items 6, 19, 17, 16 and 2 loaded on more than one factor; weak loadings: items 7 and 10 did not reach the loading threshold. I also saw poor factor structure replication overall: items that Pasveer (1998) had determined to belong into GST clustered together with items that were originally deemed to belong to EMT, EV and EXP. Taken together, these results failed to replicate the original STQ structure. Therefore, I then conducted an exploratory factor analysis without forcing a four-factor solution. Factors were extracted based on eigenvalues > 1 [Kaiser criterion (Field, 2009)] with otherwise identical analysis parameters. This solution rendered five factors explaining 53% of the total variance in STQ responses. **Table 14** shows the five-factor solution.

Table 14. Five-factor solution and item-to factor loadings for the STQ

	GST	EV1	EMT	EXP	EV2
16. When I see myself differently from the way others see me I tend to doubt myself.	.642				
19. It doesn't take much to get me to question myself.	.633				
17. I often find myself second-guessing my own decisions.	.560				
15. I have a great deal of difficulty in knowing when something is right for me.	.452				
6. I often find I can't trust my feelings.	.394				
11. I seldom talk about my feelings because I'm afraid that they are wrong or stupid.	.382				
Variance explained by GST	**26.27%**				
3. When I have to make a decision I often look to others for advice.		.682			
1. I often seek reassurance from others that my ideas are sound.		.670			
13. I count on other people to help me identify my strengths and weaknesses.		.305			
Variance explained by EV1		**8.66%**			
18. Sometimes I have difficulty knowing what it is that I'm feeling.			.681		
12. Sometimes I become confused about what I am feeling.			.550		
8. Insight into myself comes easily to me.			.377		
10. I rarely have difficulty in identifying my own emotions.			.357		
Variance explained by EMT			**6.97%**		
5. Sometimes I wonder if what I've seen is really what it appears to be.				.743	
9. I often find myself questioning my version of reality.				.519	
2. Often after I talk to people, I question whether I have understood them correctly.				.320	
7. I seldom question whether I have seen something correctly.				.309	
Variance explained by EXP				**6.33%**	
20. I seldom need reassurance from others about my capabilities.					.520
14. It doesn't bother me if I see myself differently from how others see me – it's my view that counts.					.395
4. I don't need feedback very often to know that I'm doing a good job.					.352

	GST	EV1	EMT	EXP	EV2
Variance explained by EV2					**5.05%**
Total Variance Explained (53%)					

EMT: Emotional trust; EV1: External Validation Positively Worded; EV2: External Validation Negatively Worded; EXP: Experiential Trust; GST: Generalized Self-Trust

Three (**GST, EMT, EXP**) of the original four factors replicated Pasveer's previous results with identical items loading on the same factors here and in her work. The remaining factor, EV, was split into two separate factors, here labelled EV1 and EV2. Factor EV1 contained three positively keyed original EV items, whereas EV2 included three negatively worded original EV items. Of note, the factor GST emerged as a dominant factor, explaining 26% of the variance in the STQ, which decidedly contrasts Pasveer's (1998) original results in which the GST factor explained about the same amount of variance as the other factors.

More closely resembling Pasveer's original factor structure, I then extracted factor scores for each participant on each of the five factors (Anderson-Rubin method forcing orthogonal factors; Anderson & Rubin, 1956) to test my hypothesis whether the GST factor would be most predictive of both the GSE-S and the STAI-T compared to the other factors of the STQ. Thus, to examine which of the STQ factors explained the most variance in GSE-S or the STAI-T, two separate regressions were conducted. To predict GSE-S scores, all STQ factors were entered as predictors in one step. **Table 15** shows the result of this regression model.

Table 15. Model summary of GSE-S predicted by STQ factor scores

Model	R	R Square	F Change	df1	df2	Significant F-Change
1	0.43(a)	0.18	83.44	5	1853	***

Predictors: constant, EMT, EV1, EV2, EXP, GST
df1: degrees of freedom; df2: error degrees of freedom; *** = $p < 0.001$

As seen in **Table 15**, the model explained 18% of GSE-S scores. **Table 16** shows the model's predictors and effects.

Table 16. Summary of predictors for GSE-S including STQ factor scores

Model	df1	df2	F	Sig.	Predictors	B	Beta	t	Sig.
1	5	1853	83.44	***					
					GST	1.36	0.32	15.40	***
					EV1	0.30	0.07	3.43	***
					EMT	0.90	0.21	10.20	***
					EXP	0.02	0.01	0.28	$p > 0.1$
					EV2	0.71	0.17	8.01	***

df1: degrees of freedom; df2: error degrees of freedom; EMT: Emotional trust; EV1: External Validation Positively Worded; EV2: External Validation Negatively Worded; EXP: Experiential Trust; GST: Generalized Self-Trust; Sig.: Significance; *** = $p < 0.001$.

As can be seen in **Table 16**, all but one factor of the STQ (EXP) positively predicted GSE-S. Of note, the GST factor showed the strongest relationship with GSE-S scores, followed by the other factors. The size of the correlations was then tested directly against each other (Zou, 2007) revealing that the GST factor was more strongly correlated with the GSE-S than the other factors (p's < 0.001). The same procedure was used to predict STAI-T scores from STQ factor scores. **Table 17** shows the result of this regression model.

Table 17. Model summary of STAI-T predicted by STQ factor scores

Model	R	R Square	F Change	df1	df2	Significant F-Change
1	0.65(a)	0.43	275.17	5	1853	***

Predictors: constant, EMT, EV1, EV2, EXP, GST

df1: degrees of freedom; df2: error degrees of freedom; Sig.: Significance; *** = $p < 0.001$.

Table 17 shows a significant model which explains 43% of the variability in STAI-T scores. **Table 18** shows the model's predictors and effects.

Table 18. Summary of predictors for STAI-T including STQ factor scores

Model	df1	df2	F	Sig.	Predictors	B	beta	t	Sig.
1	5	1853	275.17	***					
					GST	-5.53	-0.55	-31.07	***
					EV1	-1.44	-0.14	-8.06	***
					EMT	-2.12	-0.21	-11.92	***
					EXP	-2.20	-0.22	-12.33	***
					EV2	-1.28	-0.13	-7.18	***

df1: degrees of freedom; df2: error degrees of freedom; EMT: Emotional trust; EV1: External Validation Positively Worded; EV2: External Validation Negatively Worded; EXP: Experiential Trust; GST: Generalized Self-Trust; Sig.: Significance; *** = $p < 0.001$

In this analysis, all STQ factors were significant negative predictors of STAI-T. Of note, again the GST factor had the strongest (negative) relationship with STAI-T scores, followed by the other factors. When testing the size of the correlations directly against each other (Zou, 2007) the GST factor scores more strongly predicted the STAI-T than the other factor scores of the STQ (p's < 0.001). Taken together, these results can be considered confirmation for hypothesis 8.

To examine the unique contribution of the self-trust factors over and above GSE-S in explaining variance in trait-anxiety, regression was analyses were conducted. The first model included only the GSE-S as a single predictor of STAI-T. The second model additionally included all STQ factor scores as predictors after having accounted for GSE-S. **Table 19** shows the result of these two regressions. **Table 20** shows the models' predictors.

Table 19. Model summary predicting trait-anxiety by GSE-S and STQ factors

Model	R	R Square	F Change	df1	df2	Significant F-Change
1	0.44(a)	0.19	436.71	1	1857	***
2	0.68(b)	0.47	191.91	5	1852	***

(a) Predictors : constant, GSE-S
(b) Predictors: constant, GSE-S, GST, EV1, EMT, EXP, EV2.
df1: degrees of freedom; df2: error degrees of freedom; Sig.: Significance; *** = p < 0.001.

Identical with the simple correlation, **Table 19**, illustrates that the GSE-S alone (Model 1) explained 19% of the STAI-T scores. The addition of STQ factors (Model 2), i.e., after accounting for the GSE-S, significantly increased variance explanation of STAI-T scores to 47%.

Table 20. Summary of predictors for trait-anxiety regression models including GSE-S and STQ factors

Model	df1	df2	F	Sig.	Predictors	B	beta	t	Sig.
1	1	1858	436.7	***					
					GSE-S	-1.05	-0.44	-20.90	***
2	6	1858	270.1	***					

Model	df1	df2	F	Sig.	Predictors	B	beta	t	Sig.
					GSE-S	-0.54	-0.22	-11.87	***
					GST	-4.80	-0.47	-26.34	***
					EV1	-1.27	-0.13	-7.39	***
					EMT	-1.64	-0.16	-9.29	***
					EXP	-2.18	-0.22	-12.71	***
					EV2	-0.90	-0.09	-5.15	***

df1: degrees of freedom; df2: error degrees of freedom; GSE-S: Generalized Self-efficacy; EMT: Emotional trust; EV1: External Validation Positively Worded; EV2: External Validation Negatively Worded; EXP: Experiential Trust; GST: Generalized Self-Trust; Sig.: Significance; *** = $p < 0.001$

Thus, the STQ factor scores were shown to explain a total of 28% unique variance in trait-anxiety, i.e., variance that was not explained by GSE-S. Lastly, it should be noted that The GST factor scores remained the best predictor of the STAI-T compared to other aspects of the STQ (p's < 0.001).

VI. Discussion

The purpose of this study was to delineate the relationship between generalized self-efficacy (GSE, assessed with the GSE-S) and self-trust (assessed with the STQ). To address this aim, I conducted the analysis in three consecutive steps: 1) I examined how the two constructs are influenced by demographic variables and their interactions; 2) I measured the correlation between the two constructs; 3) I tested the constructs' predictive power in the context of trait-anxiety (assessed with the STAI-T). In addition, I tested whether a generalized self-trust factor in the STQ rather than other aspects of self-trust (i.e., external validation, emotional trust, experiential trust) explains most variance in GSE and trait-anxiety.

I found that demographic variables influenced GSE and self-trust in a similar manner, with the exception of age. Highest GSE-S scores were seen in participants with a male gender, non-Asian ethnicity, and those in year 3 or more of university. Age or birth control status did not influence GSE-S. The same pattern was seen in the STQ, with the exception that STQ scores increased linearly with age. Exploring the interactions among demographics variables revealed that year in university was significantly related to GSE-S and to STQ only in females. Furthermore, I found a moderate positive correlation between the questionnaires. Although the relationship between GSE-S and STQ remained moderately positive irrespective of demographic variables, it was qualified by ethnicity and by year in university. A relatively smaller correlation, i.e., decoupling between the STQ and the GSE-S was observed within a low to medium STQ range, but only in Asian participants. Conversely, a relatively stronger coupling between STQ and GSE-S was observed within a high STQ range, but only in people in their third or higher year in university. Furthermore, both questionnaires showed negative correlations with trait-anxiety, but the correlation with the STQ superseded that with the GSE-S. Finally, generalized

self-trust as a subfactor of the STQ showed the strongest relationship with both GSE-S and STAI-T scores, compared to all other aspects of the STQ. Taken together, the two constructs responded to demographic variables in a similar manner and were significantly correlated, suggesting a similarity between the two. Nevertheless, the STQ emerged as the better predictor of trait-anxiety. In the following I will discuss these findings in more detail.

1. Influence of demographic variables on the GSE-S and STQ

In agreement with hypotheses 1 to 4, I found that participants' gender and ethnicity influenced their answers in the GSE-S and STQ, and that age influenced STQ but not GSE-S scores. These results replicate the direction in which the questionnaires are known to covary with demographic variables in the existing literature.

1.1 GSE-S/STAI-T, gender, ethnicity.

Ethnicity: Cross-national studies have reported GSE-S differences between Asian and Western participants as large as 12 points (Scholz et al., 2002; Schwarzer & Born 1997; Schwarzer et al, 1997). For example, Scholz et al. (2002) found the lowest means for Japanese (20.22) and Chinese (23.05) participants and substantially higher scores for Canadian (30.5) as well as the highest scoring French (32.04) participants. The GSE-S difference between participants who self-reported an Asian ethnicity of origin here, compared to those who reported a Euro-North American origin was much less pronounced and did not exceed 3 mean points, even when comparing the lower CI bound of the GSE-S mean in Asians to the higher CI bound in Euro-North American participants. Thus, even though my findings replicate the pattern and direction of GSE-S differences in Asians compared to Euro-North Americans, the actual point-difference was much smaller. A possible explanation for the size difference might be that all published studies are cross-national studies (i.e., Scholz et al. 2002). In these studies, participants

are recruited and categorized on the basis of their residency such that a sample of Japanese participants includes only people who actually live in Japan. My participants were university students who all resided in Alberta, Canada but self-identified as having an Asian ethnic background, without further specifying whether they were immigrants or second generation 'Asians'. Hence, Asian participants in this study had likely experienced varying degrees of acculturation and/or identification with Euro-North American culture, rendering them more similar to the rest of the sample and therefore leading to less pronounced differences across ethnicities, compared to the actual cross-national studies in the literature. Furthermore, mean STAI-T scores observed in my sample were significantly lower in both men and women, compared to published means (all p's <0.001). One explanation to the higher trait-anxiety scores observed in my sample may be the large number of Asian participants (n = 609). Participants of Asian background showed higher trait-anxiety scores compared to all other ethnicities. It is possible that the unique student demographics at the University of Alberta (i.e., large number of international students from Asian cultures) results in higher overall trait-anxiety in my sample. Of note, the norm samples were collected 31 years ago (1983), which may suggest these samples are no longer valid. For example, the trend for university education to become a societal standard, may have resulted in a more diverse, potentially less prepared and more anxious body of students. Larger class sizes and larger universities (as applicable to my sample) in general may also have become more anxiety-provoking than they were decades ago.

Gender: With respect to gender, Schwarzer & Born (1997) and Scholz et al. (2002) both reported higher GSE-S scores in males than in females. In Canadian participants the gap between male and female was 1.77 points (SD = 0.34). Again, although I also found males to score higher in the GSE-S than females, the mean difference here was 0.97 (SD = 0.44). Sample

characteristics can potentially explain the less pronounced gender differences in my sample. Both Schwarzer & Born (1997) and Scholz et al. (2002) included participants from the community whereas my sample was more homogeneous (i.e., university students with a strict age range).

1.2 STQ, gender, ethnicity.

Gender: As expected, males scored higher in the STQ than females. Of note, Pasveer (1998) found a gender difference of 1.73 STQ points (SD = 0.35), i.e., a somewhat larger difference than in my sample (mean difference = 1.1, SD = 0.21). Of note, in Pasveer's sample, males were also significantly older (M = 25.13, SD = 8.69) than female participants (M = 23.68, SD = 8.04; $t[1135] = 2.64$, $p < 0.01$), while they did not differ in my sample. Considering age was a significant predictor of STQ scores as well (see next section), it is likely that the older male population in Pasveer's sample inflated the difference to females' STQ scores. Thus, controlling for age here, the gender difference in the STQ was still observed, but less pronounced than in Pasveer (1998).

Ethnicity: I found that participants who reported their ethnicity to be of Asian origin, scored significantly lower than participants reporting non-Asian ethnicities. Even though all participants resided in Canada, this finding draws attention to the role that culture (in my case, culture of origin) may play in perceptions related to self-trust. At the core of self-trust is the ability to *self*-validate. In the context of Asian or otherwise more collectivistic cultures, such self-validation may not be as essential as in individualistic cultures (Kashima et al, 1995; Markus & Kitayama, 1991), which should be more systematically assessed in future studies. From my data, it was not possible to assess the impact of years or generations living in Canada to ethnic/cultural differences observed in the STQ (and GSE-S) scores. Hence, distinguishing

between first generation Canadians and international students in future similar studies may contribute to understanding the role culture plays in self-trust and GSE.

In summary, as far as comparable with published findings, my study replicated patterns of influences of gender and ethnicity on both of the questionnaires. The magnitude of the observed differences was less pronounced, likely due to the highly homogenous student sample here.

1.3 GSE-S, STQ and age

Meta-analysis of large-scale GSE-S studies has determined no changes of the GSE-S with age, irrespective of the population (Scholz et al., 2002). Although within a narrow age range, this age-independence in GSE-S scores was also seen in my sample. Importantly, I did observe significant increases in STQ with increasing age (see **Figure 4**) suggesting that the narrow age-range did not categorically preclude observing influences of age on all questionnaire scores. Furthermore, this finding implies potential differences in the developmental trajectory of GSE and self-trust: As individuals age (even within the small margins of my study), their performance-related (GSE) perceptions of their own abilities remain stable, whereas their self-trust increases. Self-trust is at its core an intrapsychological construct and can be conceived as a maturity to accept one's feelings, thoughts, and actions as valid parts of one's self. Considering that the age range in my sample included quite a substantial proportion of adolescents, even if only defined by a conventional cut-off of 18 years, one may argue that self-trust in my sample is still on a developmental trajectory, with possible further increases in older ages. This interpretation is also supported by the fact that the average STQ score was substantially lower in my (younger) sample than in Pasveer's. Conversely, GSE may be less related to such psychological maturation processes due to its more external orientation. For example, difficult circumstances are often managed with external support and direct feedback (i.e., help from

family members, close friends or professional help). Thus, the manner in which individuals manage difficult circumstances may be less dependent on intrapsychological processes like self-reflection and self-knowledge. In addition, it is possible that a generalized form of self-efficacy is too broad to reflect age-related changes. For example, age may still positively correlate with self-efficacy in one's occupation or relationships (domain-specific self-efficacy) as they develop, but my results cannot speak to this possibility.

1.4 OC status and STQ

Intranasal oxytocin (OT) has been studied extensively in the context of interpersonal trust and social affiliative behaviours. Knowledge about the relationship between basal levels of OT and any psychological construct in very scarce. Basal levels of OT are influenced by the use of oral contraceptives (OC) (Stock et al, 1989). Using OC status to approximate basal levels of OT, I found that OC status did not significantly predict STQ scores in this sample. Several reasons may explain this finding. First, as mentioned in the background section (**2.9.2**), although some literature exists on the potential link between OT and personality constructs such as attachment styles, the majority of OT research was done with intranasal, acute OT administration and concerned with interpersonal trust or similar relationship constructs. Hence, an OC-induced increase in OT may not influence intrapersonal constructs at all, including *intra*personal/self-trust. Furthermore, even *inter*personal trust remains to be examined in the context of OC-induced OT changes.

In addition, apart from OC status, many variables that influence basal OT levels were not controllable in this study. For example, menstrual phase, type of oral birth control as well as length of OC use may all influence OC-induced variations in OT (Baskerville & Douglas, 2010;

Stock et al, 1991; Yamamoto, 2004). Properly controlling for such variables is necessary to truly test the relationship between OT and self-trust in future, more targeted studies.

1.5 Year in university by gender interaction in predicting GSE-S and STQ

Gender main effects on GSE-S and on STQ were qualified by year in university, such that gender gaps in first and second year students were no longer present in students in their third or higher year in university. Of note, although year in university is confounded by age, these results were independent of age, since age was entered as an independent predictor in the first step of the moderated regression; I also did not observe age by gender interactions in predicting either questionnaire. Thus, females in year one or two of university scored lower than males in the GSE-S and the STQ, irrespective of age. What could explain the increase in GSE-S and STQ scores with increasing years in university in female participants only? One speculative explanation is related to the nature of the transition to university and its link to social support. Since many students arrive at the University of Alberta from surrounding cities and small towns, inherent in the transition to university may be a reduction of previously available social support. As such, new students may have to re-establish their support network, for example to adjust to the increased academic demands compared to high-school. Interestingly, literature suggests that outcomes related to social support are particularly relevant to the lives of women. Women show greater investment in relationships than men (Laireiter & Baumann 1992), implying that relationships and, more broadly, social support, may be more important for women than men. Furthermore, when facing significant life events and stress, women also rely more strongly on social support than men (Tamres, Janicki & Helgeson, 2002) and show more beneficial effects from social support (Schwarzer & Leppin, 1989). Thus, correlations between social support and mental health indicators like anxiety are usually stronger in women than men (Dalgard et al.,

2006). In the context of life transitions, women with lower social support, who are exposed to significant and stressful life events (i.e., transitioning to university here), may experience greater anxiety-related symptoms than men with similar reductions in social support. Thus, women experiencing a decrease in social support when transitioning to university might be more likely experiencing negative effects such as increased trait-anxiety. As I found negative relationships between GSE-S/STQ and trait-anxiety, one might argue that the stress of transitioning into university was particularly obvious for new female students, perhaps via loss of social support. Possibly then, by their third year in university female participants may have re-established their sense of community and social support which could then be reflected by increased GSE-S and STQ scores. Evidently, this speculative interpretation should be tested more directly in future studies, considering less simplistic interactions between gender, stress, social support, and personality traits (Hobfoll & London, 1986).

In summary, except for age, demographic variables influenced GSE-S and STQ in a similar manner. Although this may suggest an overlap between the constructs, the interpretation of these results remains elusive for a number of reasons. First, all demographic variables and their interactions explained only 5% of variance in GSE-S scores and 4% in STQ, leaving a large portion of unexplained variance. Furthermore, demographic variables such as gender and ethnicity influence a large number of psychological constructs in a similar manner, reflecting broader response styles and not necessarily implying any overlap between GSE-S and STQ. Thus, similarities between GSE-S and STQ were more directly assessed with correlations, and these results are discussed in the following sections.

2. The correlation between GSE-S and STQ

In accordance with hypothesis 6, GSE-S and STQ were moderately positively correlated. With a correlation of a moderate size, the constructs are shown to be substantially coupled, nevertheless considerable unexplained variance suggests that the two are tapping at least partly differentiable psychological constructs. Such correlational evidence suggests that self-trust may be part of the perception that one can manage difficult demands in life (i.e., unforeseen situations) and conversely, that self-efficacy can be derived in part from self-trust. Why and how are perceptions regarding one's ability to face external situations (self-efficacy) related to the more internal, emotional milieu captured in self-trust? Although a speculation, self-trust may be a basic tool that individuals continuously use in the process of managing difficult situations. The GSE-S scale draws on abilities such as problem solving, persistence, resourcefulness and creativity. Self-trust on the other hand is composed of items that evaluate judgment and self-knowledge. Hence, it is likely that a strong sense of self, coupled with confidence in one's judgment (high self-trust) would aid one in making decisions, coming up with and following through action plans. Conversely, low self-trust in the form of second-guessing one's decisions, emotions or behaviour may increase the likelihood that one will struggle with managing demanding situations. More concretely, self-trust may interact with self-efficacy at specific stages within social cognitive theory (see **Figure 1**). For example, the attributional processes in self-efficacy might be intimately tied to self-trust: Since self-trust entails awareness of one's own emotions, self-trusting individuals may be less prone to attributional mistakes in assigning the correct causes to current situations and their resulting emotions. Furthermore, since some of the STQ items refer to decision making, it is possible that a propensity to trust one's decisions would entail that one takes action, without having to consistently second-guessing one's decisions.

Conversely, low self-trusting individuals may not trust their decisions and ultimately avoid committing to a course of action. In other words, social cognitive learning cannot occur without performance and feedback from performance. An individual who avoids making decisions (i.e. one with low self-trust) would therefore have less chance of developing self-efficacy.

Evidently, the causality between self-trust and GSE should be further tested, for example, with longitudinal studies. Conceptual overlap between the two may extend to further, related constructs. As such, the question whether self-trust may belong to the list of core-self evaluations proposed by Judge, Locke & Durham (1997), along with GSE and self-esteem should be assessed in more detail, e.g., by examining GSE-S, STQ, and self-esteem together. Importantly, the positive relationship between GSE-S and STQ was observed irrespective of the demographic variables influencing either one of the two questionnaires separately. This could be potentially explained by the limited strength that these variables showed in predicting GSE-S and STQ scores in this sample. Thus, it remains possible that a higher age range, or true cross-cultural differences may influence the relationship between the constructs; again, which remains to be tested in more representative samples.

3. Correlation between GSE/STQ and trait-anxiety

Both the GSE-S and the STQ were found to moderately negatively correlate with STAI-T scores. However, of the two measures, the STQ was statistically the stronger predictor. The link between GSE-S and trait-anxiety has been better explored, yet the STQ, a relatively unexplored construct, emerges here as the better predictor of trait-anxiety. Importantly, even after controlling for GSE-S, a substantial portion of variance in trait-anxiety was explained by the STQ and its facets. On the level of the assessment tools, inspecting the STQ and STAI-T items, it becomes apparent that both scales encompass items that refer to statements regarding the internal state of

the participant (i.e., STQ: “I have a great deal of difficulty in knowing when something is right for me”; STAI-T: “I feel pleasant”), whereas the GSE-S includes items that are mostly external to the participant (“When I am confronted with a problem, I can usually find several solutions”). Hence, it is possible that the strength of the STQ – STAI-T relationship reflects an overlap in items that are simply more intrapersonal in nature than those captured in the GSE-S.

Apart from these psychometric considerations, it is possible that perceptions related to self-trust are indeed linked to well-being more so than perceptions related to ability. Finding unique aspects of trait-anxiety predicted by the STQ and not the GSE-S also speaks to this interpretation. From this perspective, the feeling that one can trust (and therefor rely on) their judgment, emotions and observations is more protective against trait-anxiety, than the perception that one has what it takes to manage difficult situations. While the GSE-S measures one’s perceptions in an external context (i.e., when facing problems), the STQ measures broader self-related perceptions that may be applicable to any context. In other words, low self-trusting individuals may struggle with all types of scenarios (e.g., related to occupational, relational or financial domains), whereas those low in GSE may function well when they are not faced with difficult circumstances. Finding that the extreme groups in whom self-trust and GSE-S were decoupled showed rather large differences in trait anxiety further illustrates the importance of self-trust compared to GSE in predicting trait-anxiety.

Considering self-trust and GSE are positively related in this sample, what may characterize individuals who show decoupling between the two constructs? It should be mentioned that none of the demographic variables assessed here were statistically able to differentiate between these two relatively small subsamples of extreme groups with decoupled GSE-S and STQ. However, one could speculate that individuals low in self-trust and high in

GSE may do well when external tasks, performance measures or other indicators of observable success are involved, yet may be less able to internalize these accomplishments as part of their own identity. Conversely, low GSE in individuals who report high self-trust may be explained by the presence of uncontrollable environmental factors. That is, although these individuals are capable of self-validation, they may nevertheless be exposed to an environment in which they cannot establish mastery experiences. For example, frontline soldiers may have high self-trust, and yet little control over their immediate environment and overall safety. I speculate that under such circumstances, the individual's intrapersonal perceptions are less affected than their perceptions related to managing their current life circumstances. Applied to my sample, such set of circumstances may apply to students with high self-trust who, for whatever reason, nevertheless feel particularly ineffective in an academic (and only in an academic) environment.

4. STQ facets

Pasveer's (1998) scale development suggested a particular factor structure in the STQ, and I examined whether that factor structure would emerge in my sample. I could not replicate her original 4-factor solution, even though my 5-factor solution largely replicated the original item-to-factor designation. Furthermore, apart from differences in the number of extracted factors, each of Pasveer's (1998) original factors had shown similar levels of total STQ score variance explanation, whereas in my sample, the generalized self-trust (GST) factor emerged as a dominant first factor, accounting for 25% of the total variance in STQ scores. What could explain the difference in factor structure between my results and Pasveer's? One reason could be differences in sample composition: Pasveer's sample included participants recruited online (n = 406), who were on average older (M = 21.96) than my sample (M = 18.93). However, it is unlikely that age alone can explain this discrepancy; when comparing only those who are 21 and

above to Pasveer's sample, significant changes in mean STQ scores are observed. In detail, Pasveer's participants (who were on average 21.9 years old) scored higher than participants aged 21 and above in my sample [$t(253) = 4.53$, $p < 0.01$]. Thus, other variables likely played in role in the discrepancy among the two samples. For example, her participants were recruited via a link on a website accessible to the general population (yahoo.com), such that her sample included individuals with more varied demographic (e.g., educational) backgrounds compared to my sample. Another possible reason could be that my sample answered the questionnaires along with a series of others (**section 3** in methods), with a relatively long total administration time (~60 minutes for all questionnaires). Thus, participants in my sample might have adopted a more homogenous response style across (all) questionnaires in their session, (artificially) leading to a dominant first factor. However, it should also be stated that my sample size was much larger than Pasveer's and that perhaps the increase in power may have revealed a different anatomy in the questionnaire. Assuming for a moment that the dominant factor emerging in the STQ here is true, this would imply a challenge to the STQ as it was developed. In that case, rather than measuring self-trust as a multifaceted construct with related but separable and equally important sub-aspects, it would appear that one generalised self-trust (GST) factor would be sufficient. Items in such GST factor are concerned with the ability to validate the self across different domains (feelings, self-knowledge, intuition, judgment, and experience), the core definition of self-trust according to Pasveer. Even though I cannot rule out methodological reasons for the factor analytical patterns I observed, it should be noted that among the correlations between GSE-S or STAI-T and any of the STQ factors, those with the GST factor were significantly stronger than any of the others. This result lends some credence to my interpretation that the GST factor in the STQ may be the most meaningful. Hence, based on my results, a version of the STQ containing only the

GST items seems advisable, focussing on the unique features of self-trust as having self-validating functions across many domains of human inner life.

5. Study limitations and outlook

Building on findings in this research, various questions require further investigation in potential future research. In detail, the validity of self-trust as a construct (i.e., its relationship with other core self-evaluations such as self-esteem and locus of control), the applicability of self-trust in populations other than undergraduate students, as well as methods which may increase self-trust, all require further investigation.

Self-trust and core self-evaluation. GSE is a component of core self-evaluations which encompass self-esteem, locus of control and neuroticism (Judge, Locke & Durham, 1997). An important question in this context is whether self-trust may be considered a component of core self-evaluation. Bono & Judge (2003) stated that core self-evaluation traits are closely related, such that each one predicts a small portion of various outcomes (e.g., job satisfaction). However, when used together their predictive power increases. This was observed in my study when STQ and GSE together explained trait-anxiety better than either alone. However, relationships between the STQ and other core evaluations are unexplored thus far.

Self-trust and GSE in the general population. A main problem in research on self-trust is the variability in how self-trust is defined. All quantitative work on self-trust has been conducted with undergraduate students, hence further work is required to test the broader community. In detail, information currently available on self-trust assessed in healthy participants with formal questionnaires comes from studies conducted by Pasveer (1998), Carrington (2007) and myself, all of which were conducted with undergraduate students. The

outcomes (e.g., linear increase with age, relationship with GSE/trait-anxiety) were therefore established in the context of a very narrow age range, and little demographic variability. These findings may change considerably once a sample from the community is considered. The benefit of extending this research to a community sample is the ability to understand how self-trust changes throughout the entire lifespan, to establish norms and to more fully understand its relationship with indicators of mental health and/or other core self-evaluation constructs. For example, with regard to age, it is possible that certain ages or more likely, life-stages, are particularly critical for self-trust, marked by a significant gain or loss (e.g., entry into the workforce, retirement). Furthermore, although self-trust was moderately related to GSE here, this relationship might be expressed differently across the life-span. Once norms are established with a non-student sample, further work can be done with more specific samples. For example, the relationship between GSE and self-trust can be examined in individuals experiencing life transitions (i.e., loss of employment), with the goal of learning how GSE/STQ differ in response to changes in one's life circumstances.

Psychometric considerations in the STQ. Although the STQ showed adequate reliability here, it is worth drawing attention to the wording of the questionnaire items. In particular, 14 of the 20 scale items are negatively worded (i.e., require reverse scoring), which potentially suggests the scale measures the inverse of self-trust (i.e., lack of self-trust), not self-trust itself. A more balanced inclusion of positively as well as negatively worded items would increase content and face validity.

Increasing self-trust. A significant negative relationship between self-trust and trait-anxiety suggests that increasing self-trust in individuals who experience chronic anxiety symptoms may be of therapeutic benefit. However, how to increase self-trust requires further

investigation. Although unexplored by Pasveer, mindfulness (a mental state achieved by focusing one's awareness on the present moment) appears to foster a state similar to self-trust. Thompson and Waltz (2008) demonstrated that mindfulness and unconditional self-acceptance allow individuals to accept their thoughts and feelings, leading to higher self-esteem. According to Brown and Ryan (2003) mindfulness is a component of self-awareness that involves pre-reflective reasoning. In practicing mindfulness meditation, individuals experience enhanced attention to and awareness of moment-to-moment experiences. According to the authors, such pre-reflective reasoning is a precursor to the direct self-reflection of one's emotions, thoughts and perceptions. These findings demonstrate a potential conceptual link between mindfulness and components of self-trust such as self-acceptance and self-knowledge, a link that remains to be tested.

Another way to increase self-trust may be through self-reflection. While mindfulness entails mere attentiveness to the present, self-reflection is the act of 'making sense' of what is present, cognitively and affectively. Self-reflection has been shown to promote self-awareness (Duval and Wicklund, 1972). Individuals who engage in self-reflection can compare their behaviour to their internal values and better understand the relationship between their actions and what they stand for. Self-reflection also allows individuals to evaluate the potential causes of emotion-eliciting events and their own subsequent reaction to those events (Leary, 2003). Self-reflection therefore should foster components of self-trust such as self-knowledge (knowing what one stands for), judgment (expressing self-knowledge in one's decision making) and emotions (identifying and expressing emotions), again which is untested.

A causal relationship between self-trust and GSE. Future research may attempt to address the potentially causal relationship between self-trust and GSE. Although I speculate that

self-trust is the underlying component which gives rise to the perception that one can effectively manage difficult situations, my results are strictly correlational, such that this question requires future research. Longitudinal studies and/or experimental manipulations would be necessary to test this prediction. For example, if self-trust is the cause for GSE perceptions, then STQ at time 1 would predict GSE-S scores in time 2, but not the other way around.

Data collection. Along with issues related to my sample, the manner in which the data were collected is also a potential limitation. In detail, participation took place on-line and ultimately involved no monitoring of how participants responded to the questionnaires, such that there is no way to confirm who filled out the questionnaires and whether responses were indeed genuine. Furthermore, as stated above, since participants answered the questionnaires along with a series of others, a long total administration time may have impacted the manner in which participants responded to the questionnaires in this study.

6. Conclusion and application

The main aim of this study was to delineate the relationship between self-trust and GSE. This is the first study to measure these two constructs together. A moderate positive relationship between self-trust (STQ) and generalized self-efficacy (GSE-S) suggests that the two constructs are related but not identical. Self-trust and GSE focus on different aspects of psychological functioning. While the GSE-S is concerned with perceptions regarding issues that are mostly external to the self, the STQ measures perceptions that are more internally directed. Although this can be determined simply by reading the items in each scale, a novel finding here is that together the two constructs explain nearly half of the variability in trait-anxiety scores, and more than either of them alone. Furthermore, a critical finding in my study was that self-trust superseded GSE in explaining variance in trait-anxiety. My findings imply that the psychometric

assessment of self-trust with a questionnaire like the STQ (or a shortened version of it) might have a place in mental health, counseling, or related settings, and that self-trust is at least as if not more important as self-efficacy for psychological well-being. Thus, my results suggest that a measure of and a dialogue about self-trust may well contribute to supporting those who struggle with persistent anxiety symptomology. Such a dialogue may serve as an addition to counselling or psychotherapy centered on symptom management and behavioral outcomes.

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Appendix A
Consent Form

PLEASE READ THE FOLLOWING BEFORE CONTINUING WITH THE MASS TESTING SURVEY

You have 7 days to complete the mass testing survey once the survey has been made available to your particular class section. Specific details regarding mass testing opening and closing dates and times for each class section will be listed on the Research Participation Credit Sign-up and Info area page when those dates and times are known.

The Purpose of Mass Testing:

The Mass Testing Survey is conducted in Psychology 104/105, and serves a number of purposes.

1. Researchers are able to track changes in student characteristics over time, and relate such changes to other psychological and social variables.
2. Researchers are able to pre-test materials for future research.
3. By participating, you can earn 1 credit (2%) toward the research participation component of your PSYCO 104 or 105 class.
4. Most importantly, mass testing allows researchers to identify students with certain psychological characteristics and then make those students eligible to participate in research projects that are concerned with those characteristics.

Your Participation:

Your participation involves answering a number of questions concerning your background, attitudes, feelings, and experiences. The entire survey should not take longer than 60 minutes to complete, depending on how quickly you proceed.

Data Storage and Disposal:

Once your responses to the survey questions have been collected, they will be disseminated to the particular investigators who devised them. Responses will be linked to your student ID number so that they can be used in other research projects by the investigators who constructed the questionnaires and their colleagues in the Department of Psychology, but will not be associated with your name or other identifying information. Each investigator will treat your responses as strictly confidential.

In addition to these uses, all responses collected in the mass-testing survey will be added to a historical repository containing all Mass Testing data collected over time. In this case, responses will not contain ID numbers or any other identifying information and so will be completely anonymous.

In accordance with university policy, your responses to survey questions will be stored on a secure, password protected computer database in the department of Psychology, and can only seen by investigators who have been given permission to do so by both the University of Alberta Research Ethics Board and the Department of Psychology. Individual investigators will retain mass-testing data for a minimum of 5 years, while the anonymous historical data set will be retained indefinitely

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Your Rights:

Your decision to participate in mass testing is entirely voluntary, and you may decide to withdraw from the survey at any time. You may also choose to not take part in the mass testing survey, but in this case you will not receive a mass testing credit. If any particular questionnaire, or individual question, is disturbing, or makes you feel uncomfortable, you may feel free just to pass it by. You will still receive credit for participating even if you choose not to answer a particular set of questions or if you decide to withdraw part way through the mass testing survey. However, once the entire survey is complete, it will no longer be possible to withdraw from survey or change your response to an item(s).

Benefits and Risks:

In choosing to participate in mass testing, you may be made eligible to participate in more research studies throughout the term, which would give you more flexibility in fulfilling the research participation requirements for your PSYCO 104 or 105 course. There are no foreseeable risks in participating.

Technical Information:

The Mass Testing Survey is comprised of several sections. Each section will be saved upon proceeding to the next section and you will not be able to return to a section once you have moved on. Should your computer lock up or crash before you have finished the survey, upon re-entering you will be need to answer the first set of questions again (Demographic and Background Information) and then forwarded to the part that you were completing when you encountered the problem. Your mass testing credit will appear in your "Credit Status" within the Research Participation system early next month.

Your Consent to Participate:

Please check the boxes below to indicate that you have read and understood the nature and purpose of the Mass Testing survey, and that you are willing to participate.

Dr. Jeff Schimel, Mass-Testing Coordinator, jschimel@ualberta.ca, 780-492-5280.

[Checkbox] Yes, I understand the nature and purpose of the survey, and would like to participate.

Before proceeding, please ensure that you are in a quiet and private location where you can complete the survey without undue distractions and without interruption from start to finish. Be sure to use a laptop or pc and not a mobile phone/device.

[Checkbox] Yes, I am in a quiet and private location

If you have concerns about this study, you may contact the Research Ethics Office at 492-2615. This office has no direct involvement with this project.

Appendix B

Generalized Self-Efficacy Scale

Instruction: *Listed below are a number of general statements concerning different levels of confidence that people can have in themselves. Please read each statement carefully. Then respond to each of the following items by indicating the degree to which you think the statement is true.*

		Not at all true	**Hardly true**	**Moderately true**	**Exactly true**
1.	I can always manage to solve difficult problems if I try hard enough.	1	2	3	4
2.	If someone opposes me, I can find the means and ways to get what I want.	1	2	3	4
3.	It is easy for me to stick to my aims and accomplish my goals.	1	2	3	4
4.	I am confident that I could deal efficiently with unexpected events.	1	2	3	4
5.	Thanks to my resourcefulness, I know how to handle unforeseen situations.	1	2	3	4
6.	I can solve most problems if I invest the necessary effort.	1	2	3	4
7.	I can remain calm when facing difficulties because I can rely on my coping abilities	1	2	3	4
8.	When I am confronted with a problem, I can usually find several solutions.	1	2	3	4
9.	If I am in trouble, I can usually think of a solution.	1	2	3	4
10.	I can usually handle whatever comes my way.	1	2	3	4

Appendix C

Self-Trust Questionnaire

Instruction: *Listed below are a number of general statements concerning different levels of trust that people can have in themselves. Please read each statement carefully. Then respond to each of the following items by indicating the degree to which you agree with the statement.*

			Strongly Disagree	Dis-agree	Neither Agree nor Disagree	Agree	Strongly Agree
R	1.	I often seek reassurance from others that my ideas are sound.	1	2	3	4	5
R	2.	Often after I talk to people, I question whether I have understood them correctly.	1	2	3	4	5
R	3.	When I have to make a decision I often look to others for advice.	1	2	3	4	5
	4.	I don't need feedback very often to know that I'm doing a good job.	1	2	3	4	5
R	5.	Sometimes I wonder if what I've seen is really what it appears to be.	1	2	3	4	5
R	6.	I often find I can't trust my feelings.	1	2	3	4	5
	7.	I seldom question whether I have seen something correctly.	1	2	3	4	5
	8.	Insight into myself comes easily to me.	1	2	3	4	5
R	9.	I often find myself questioning my version of reality.	1	2	3	4	5
	10.	I rarely have difficulty in identifying my own emotions.	1	2	3	4	5
R	11.	I seldom talk about my feelings because I'm afraid that they are wrong or stupid.	1	2	3	4	5
R	12.	Sometimes I become confused about what I am feeling.	1	2	3	4	5
R	13.	I count on other people to help me identify my strengths and weaknesses.	1	2	3	4	5
	14.	It doesn't bother me if I see myself differently from how others see me – it's my view that counts.	1	2	3	4	5
R	15.	I have a great deal of difficulty in knowing when something is right for me.	1	2	3	4	5
R	16.	When I see myself differently from the way others see me I tend to doubt myself.	1	2	3	4	5

R	17. I often find myself second-guessing my own decisions.	1	2	3	4	5
R	18. Sometimes I have difficulty knowing what it is that I'm feeling.	1	2	3	4	5
R	19. It doesn't take much to get me to question myself.	1	2	3	4	5
	20. I seldom need reassurance from others about my capabilities.	1	2	3	4	5

R = Reverse-scored

Appendix D

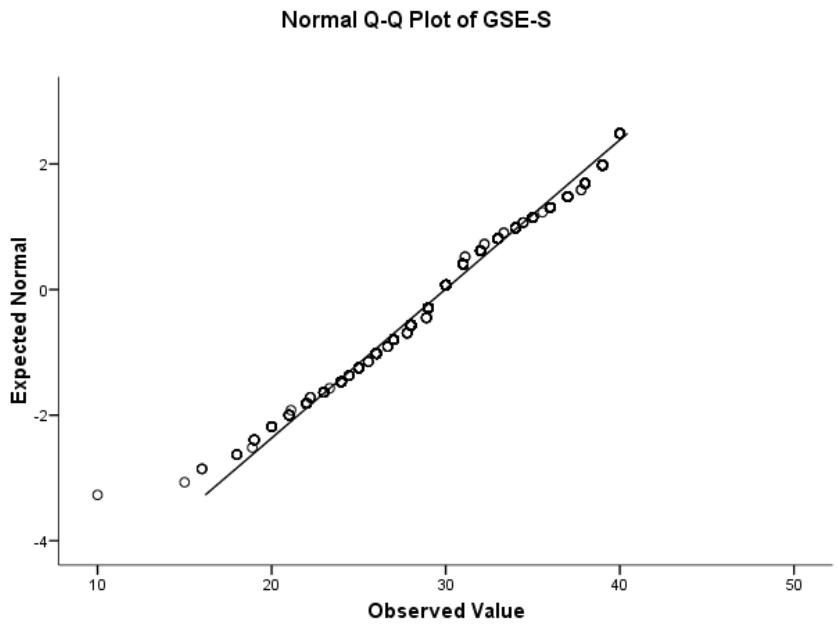
STAI-T questionnaire (five example items)

Instruction: *A number of statements which people have used to describe themselves are given below. Read each statement and then blacken the appropriate circle to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best. Please use the following scale:*

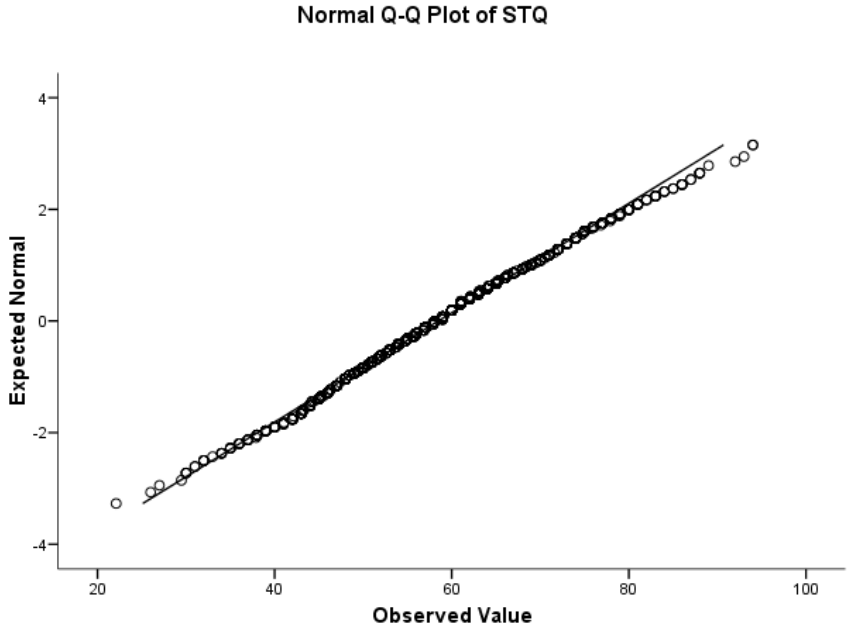
		Almost Never	**Sometimes**	**Often**	**Almost Always**
	I worry too much over something that really doesn't matter	1	2	3	4
	I feel nervous and restless	1	2	3	4
R	I am content	1	2	3	4
	I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
R	I am a steady person	1	2	3	4

R = Reverse-scored

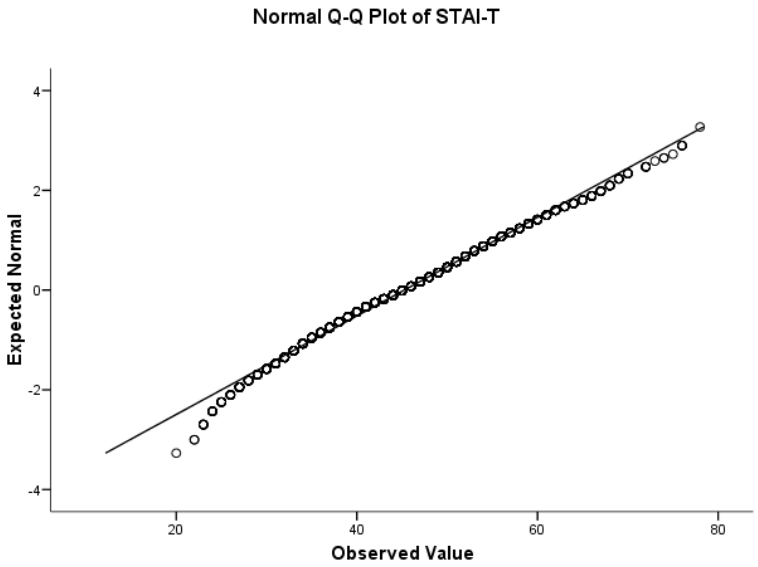
Appendix E
Q-Q plots



GSE-S= Generalized Self-Efficacy Scale



STQ= Self-Trust Questionnaire



STAI-T= State-Trait Anxiety Inventory