

Free University Berlin  
Department of Educational Science and Psychology

Dissertation in Psychology

Dissertation to obtain the academic degree of the Doctor of Philosophy (Dr. phil.)

**Exploring the landscape of socio-motivational relationships and  
achievement emotions in secondary school students**

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### Statement of Authentication

I hereby declare that I have written the present thesis independently, without assistance from external parties and without use of other resources than those indicated. The ideas taken directly or indirectly from external sources are duly acknowledged in the text. The material, either in full or in part, has not been previously submitted as a PhD thesis at this or any other academic institution.

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Berlin, April 15th, 2015

This dissertation was submitted as a cumulative work, which is based on the following publications:

Hoferichter, F., Raufelder, D., & Eid, M. (2014). The mediating role of socio-motivational relationships in the interplay of perceived stress, neuroticism, and test anxiety among adolescent students. *Psychology in the Schools, 51*, 736–752. doi: 10.1002/pits.21778

Hoferichter, F., Raufelder, D., & Eid, M. (2015). Socio-motivational moderators – Two sides of the same coin? Testing the potential buffering role of socio-motivational relationships on achievement drive and test anxiety among German and Canadian secondary school students. *Frontiers in Psychology, 6*. doi: 10.3389/fpsyg.2015.01675

Hoferichter, F., Raufelder, D., Eid, M., & Bukowski, W. M. (2014). Knowledge transfer or social competence? A comparison of German and Canadian adolescent students on their socio-motivational relationships in school. *School Psychology International, 35*, 627–648. doi: 10.1177/0143034314552345

## Abstract

The need to belong, to affiliate with others, and to feel socially accepted constitutes the basic psychological need of humans (Baumeister & Leary, 1995; Osterman, 2001) and motivates individuals to form and maintain social relationships as well as to pursue social activities (Baumeister, 2012). Within the school context, social relationships with peers and teachers function as powerful domains, as social interactions affect different academic and personal factors including students' motivation (Wentzel, Battle, Russel, & Looney, 2010), well-being, self-esteem, social and emotional adjustment, and competence behavior (Arnett, 2007; Flanagan, Erath, & Bierman, 2008; Leary & Baumeister, 2000; Murray & Greenberg 2001; Pianta & Nimetz, 1991; Roorda, Koomen, Spilt, & Oort, 2011; Wentzel, 2009). According to Lerner's Developmental Contextualism (1985, 1998, 2001) the reciprocal interaction of person and context shapes the quality of human behavior and psychological functioning and therefore configures attitudes, values, and beliefs, which in turn may vary across educational systems of different countries (cf. Bronfenbrenner, 1979, Jovanovic & Lerner, 1999; Lerner, 2001; Pekrun, 2006).

Considering the aforementioned findings and the need for cross-national investigations (Kinga & McInerney, 2014; Pajares, 2007), the central research objective of the present cumulative dissertation was to investigate how socio-motivational relationships (student-student relationships, teacher-student relationships, peers as positive motivators, teachers as positive motivators) relate to personal and academic aspects of students from Germany (Brandenburg) and Canada (Québec). A total of 1,088 secondary school students from the state of Brandenburg, Germany (54% girls, 46% boys) ( $M_{age} = 13.71$ ,  $SD = .53$ , age span 12–15 years) and 389 secondary school students from the state of Québec, Canada (56% girls, 44% boys) ( $M_{age} = 13.43$ ,  $SD = .82$ , age span 12–16 years) participated in the study during the school years 2011/2012 (Germany) and 2012/13 (Canada).

This PhD thesis consists of three studies that are interrelated by the research focus. Study 1 investigates the mediating role of socio-motivational relationships for the association of neuroticism and test anxiety as well as perceived stress and test anxiety among German secondary school students. By applying structural equation modeling (SEM), it was found that high quality student-student relationships mitigate feelings of test anxiety in neurotic and non-neurotic students, while the perception of peers and teachers as a source of motivation intensified feelings of test anxiety in students, particularly in neurotic and stressed students. As the findings of Study 1 indicate, the perception of supportive, high quality peer relationships is related to low levels of test anxiety among German secondary school students,

while students who depend on peers and teachers for their own motivation reported increased levels of test anxiety.

Building on these findings and on the buffering hypothesis (Cohen & Wills, 1985), according to which supportive and caring social relationships buffer feelings of stress, Study 2 was motivated by the question whether socio-motivational relationships would moderate the association of achievement drive and test anxiety among German and Canadian secondary school students. Research indicates that achievement drive is related to behavior of avoidance, anxiety, disruptive behavior, low retention of knowledge, and the use of superficial learning strategies (Covington, 1992; Selkirk, Bouchey, & Eccles, 2011), which are elements of test anxiety (Cortina, 2008; Frydenberg, 2002; Zeidner, 1998). By applying Multi-Group Latent Moderated Structural Equations (MGLMS), it was found that among Canadian students, high quality student-student relationships buffered feelings of test anxiety independent of students' level of achievement drive. Additionally, teachers who were perceived as motivators also dampened feelings of test anxiety with increasing levels of achievement drive among Canadian students. In contrast, among German students no such buffering effects could be found. However, the results indicate that among German students teacher-student relationships, independent of quality, do not mitigate feelings of test anxiety with increasing levels of achievement drive but rather intensify test anxiety. Hence, the results of Study 2 indicate that perceptions of teachers and peers within the German and Canadian educational setting differ and consequently have different impact on students' development.

As social settings create environments, shaping perceptions, attitudes, values, emotions, beliefs, and motivation (cf. Pekrun, 2006), it is important to detect relevant properties of social environments and compare them quantitatively across countries. Concerning the school context, the motivation typology postulated by Raufelder, Jagenow, Drury, and Hoferichter (2013) is an approach to put into relation students' perception of teachers and peers as motivators at different degrees. The motivation typology was found among German secondary school students and consists of four motivation types (MT), which are based on socio-motivational relationships: (1) peer-dependent MT, (2) teacher-dependent MT, (3) peer-and-teacher-dependent MT, (4) peer-and-teacher-independent MT. The question at hand is whether a universal, underlying motivational typology exists in school, i.e., whether teachers and peers are perceived as motivational sources in the same manner among German and Canadian students. To investigate the research question of Study 3, a multigroup confirmatory latent class analysis (MLCA) was conducted. The results indicate that the motivation typology may be valid internationally, as the four motivation types were identified

not only among German students but also among Canadian students. However, cross-national differences have been found as the class sizes of each motivation type varied considerably. These findings reflect the strong contextual impact on the role assigned to peers and teachers varying among German and Canadian students. The Canadian educational system is mainly oriented toward moral and civil development, focusing on social skills, community values as well as individual development and leadership (Cheah & Chirkov, 2008; Wilson & Lam, 2004). This orientation is reflected in the results of Study 3, as for example the teacher-and-peer-dependent MT constitutes the largest group (almost 60%) followed by the teacher-and-peer-independent MT (20%) among Canadian students. In contrast, German school settings have been characterized as competitive which corresponds to the need of the peer-dependent MT as found in a qualitative study (Hoferichter & Raufelder, 2014). Students of the peer-dependent MT represent the largest group among German students (34%), followed by the teacher-and-peer-independent MT (29%). Students of the peer-dependent MT emphasize that the competition with their peers in class motivates them to learn, while at the same time, they long for recognition and approval from their peers (cf. Fritzsche, 2000; Hoferichter & Raufelder, 2014). The results suggest that cross-national differences based on the orientation of educational settings may be underlying factors in motivational processes as motivation emerges from a dynamic and reciprocal person-context interaction of individuals (cf. Lerner, 1986, 1991; Lewin, 1951).

All studies presented in this PhD thesis indicate the strong and diverse impact of learning contexts on personality aspects, stress, achievement emotions, and motivation by outlining the divergent role of socio-motivational relationships. Theoretical and practical implications, future directions as well as general conclusions are discussed.

*Keywords:* socio-motivational relationships, school context, neuroticism, stress, test anxiety, buffering hypothesis, achievement drive, motivation typology, German and Canadian secondary school students

## Abstrakt

Das Bedürfnis sich einer Gruppe zugehörig zu fühlen, mit anderen Menschen verbunden zu sein und Anerkennung zu empfangen, ist ein psychologisches Grundbedürfnis eines jeden Menschen (Baumeister & Leary, 1995; Osterman, 2001). Dieses Grundbedürfnis (the need to belong) motiviert Individuen, soziale Beziehungen einzugehen und sozialen Aktivitäten nachzugehen (Baumeister, 2012). Im Schulkontext sind soziale Beziehungen mit Gleichaltrigen (Peers) und Lehrern/-innen wichtige Einflussfaktoren, da soziale Interaktionen verschiedene akademische und persönliche Faktoren beeinflussen, wie zum Beispiel Motivation (Wentzel, Battle, Russel, & Looney, 2010), Wohlbefinden, Selbstwertgefühl, soziale und emotionale Einstellungen und Kompetenzverhalten (Arnett, 2007; Flanagan, Erath, & Bierman, 2008; Leary & Baumeister, 2000; Murray & Greenberg 2001; Pianta & Nimetz, 1991; Roorda, Koomen, Spilt, & Oort, 2011; Wentzel, 2009). Ausgehend von Lernalterns Developmental Contextualism (1985, 1998, 2001) wird das menschliche Verhalten und die psychologische Funktionalität durch die gegenseitige Wechselwirkung von Person und Kontext geformt, was wiederum das Werteverständnis, Einstellungen und Glaubenssätze beeinflusst, die je nach Ausrichtung der Bildungssysteme in verschiedenen Ländern variieren können (vgl. Bronfenbrenner, 1979, Jovanovic & Lerner, 1999; Lerner, 2001; Pekrun, 2006).

Im Hinblick auf die zuvor angeführten Ergebnisse und der beispielsweise von Kinga, McInerney (2014) und Pajares (2007) geforderten Notwendigkeit für länderübergreifende Untersuchungen in bildungsrelevanten und psychologischen Studien, wurde folgende zentrale Forschungsfrage in der vorliegenden kumulativen Dissertation verfolgt: Wie hängen sozio-motivationale Beziehungen (Schüler-Schüler Beziehungen, Lehrer-Schüler Beziehungen, Peers als positive Motivatoren, Lehrer als positive Motivatoren) mit persönlichen und akademischen Aspekten von Schülern/-innen aus Deutschland (Brandenburg) und Kanada (Québec) zusammen? An der Fragebogenstudie nahmen im Schuljahr 2011/2012 insgesamt 1088 Sekundarschüler/-innen aus Brandenburg, Deutschland teil (54% Mädchen, 46% Jungen) ( $M_{Alter} = 13,71$ ,  $SD = ,53$ ; 12–15 Jahre) als auch 389 Sekundarschüler/-innen aus Québec, Kanada (56% Mädchen, 44% Jungen) ( $M_{Alter} = 13,43$ ,  $SD = ,82$ ; 12–16 Jahre) im Schuljahr 2012/2013.

Die vorliegende Dissertation besteht aus drei Studien, die durch die zentrale Forschungsfrage miteinander verbunden sind. Studie 1 untersucht den Einfluss sozio-motivationaler Beziehungen auf den Zusammenhang von Neurotizismus und Prüfungsangst als auch auf Stress und Prüfungsangst bei deutschen Sekundarschülern/-innen. Basierend auf Strukturgleichungsmodellen (SEM) zeigen die Ergebnisse, dass eine hohe Qualität von

Schüler-Schüler Beziehungen bei neurotischen und nicht-neurotischen Schülern/-innen die Prüfungsangst mediiert. Jedoch steht die Wahrnehmung von Peers und Lehrern/-innen als Motivationsquelle in Verbindung mit höherer Prüfungsangst, insbesondere für neurotische und gestresste Schüler/-innen. Wie die Ergebnisse der ersten Studie zeigen, steht die Wahrnehmung von unterstützenden, qualitativ hochwertigen Beziehungen von Schülern/-innen zu ihren Mitschülern/-innen in Verbindung mit geringer Prüfungsangst für deutsche Sekundarschüler/-innen, während Schüler/-innen, die ihre eigene Motivation von ihren Peers und Lehrern abhängig machen eher dazu neigen, höhere Prüfungsangst zu empfinden.

Aufbauend auf diesen Ergebnissen und der Buffering Hypothesis (Cohen & Wills, 1985), nach der unterstützende soziale Beziehungen Gefühle von Stress mildern, untersucht Studie 2, ob sozio-motivationale Beziehungen den Zusammenhang von Leistungsstreben und Prüfungsangst unter deutschen und kanadischen Sekundarschülern/-innen moderieren. Studien zeigen, dass Leistungsstreben in Verbindung mit Vermeidungsverhalten, Angst, unangepasstem Verhalten, geringer Speicherung von Wissen und oberflächlichen Lernstrategien steht (Covington, 1992; Selkirk, Bouchey, & Eccles, 2011), was wiederum Charakteristika von Schülern mit Prüfungsangst sind (Cortina, 2008; Frydenberg, 2002; Zeidner, 1998). Durch die Anwendung von Multigruppen latent moderierten Strukturgleichungsmodellen (MGLMS) wurde festgestellt, dass unter kanadischen Schülern eine hohe Qualität von Schüler-Schüler-Beziehungen Gefühle der Prüfungsangst abschwächt, unabhängig vom Grad des Leistungsstrebens der Schüler/-innen. Weiterhin zeigte sich, dass kanadische Schüler/-innen, die ihre Lehrer als Motivatoren wahrnehmen, weniger Prüfungsangst mit steigendem Leistungsstreben empfinden. Im Vergleich dazu, wurden unter deutschen Schülern/-innen keine Abschwächungseffekte gefunden. Hingegen zeigen die Ergebnisse, dass Lehrer-Schüler Beziehungen, unabhängig von deren Qualität, zwar als Moderator fungieren, jedoch Prüfungsängste mit steigendem Leistungsstreben bei deutschen Schülern/-innen nicht abschwächen, sondern eher intensivieren. Somit zeigen die Ergebnisse der zweiten Studie, dass Lehrer/-innen und Mitschüler/-innen innerhalb des deutschen und kanadischen Bildungssystems differenziert wahrgenommen werden und folglich unterschiedlichen Einfluss auf die Entwicklung der Schüler/-innen haben.

Da der soziale Rahmen die Wahrnehmung, Einstellung, Werte, Emotionen, Überzeugungen und Motivation mit formt (vgl. Pekrun, 2006), ist es wichtig, relevante Eigenschaften der sozialen Umgebung zu erfassen und quantitativ länderübergreifend vergleichen zu können. Für den schulischen Kontext ist die von Raufelder, Jagenow, Drury und Hoferichter (2013) aufgestellte Motivationstypologie ein Ansatz, Lehrer/-innen und Peers



hinsichtlich des sozialen Motivationsgrades zueinander in Beziehung zu setzen. Die Motivationstypologie besteht aus vier Motivationstypen, welche sich auf der Basis von sozio-motivationalen Beziehungen formieren und bei deutschen Sekundarschülern/-innen gefunden wurden. Basierend auf diesen Ergebnissen, verfolgt Studie 3 die Frage, ob Lehrer/-innen und Mitschüler/-innen bei deutschen und kanadischen Schülern/-innen gleichermaßen als Motivationsquelle wahrgenommen werden. Um diese Forschungsfrage zu untersuchen, wurde eine multigruppen konfirmatorische latente Klassenanalyse (MLCA) durchgeführt. Die Ergebnisse zeigen, dass die Motivationstypologie länderübergreifend gültig sein könnte, da die vier Motivationstypen nicht nur bei deutschen, sondern auch bei kanadischen Sekundarschülern/-innen gefunden wurden. Es konnten länderübergreifende Unterschiede in Bezug auf die Verteilung der einzelnen Motivationstypen gefunden werden. Die Ergebnisse zeigen einen starken kontextuellen Einfluss auf die Rolle, die Mitschülern/-innen und Lehrern/-innen bei sozial induzierten Motivationsprozessen zugeschrieben wird und weisen einen Unterschied zwischen Deutschland und Kanada auf. Das kanadische Bildungssystem setzt seinen Fokus auf die moralische und zivile Entwicklung und somit auf die Ausbildung von sozialen Kompetenzen und Werten (community values) sowie die individuelle Entwicklung (Cheah & Chirkov, 2008; Wilson & Lam, 2004). Diese Orientierung findet sich in den Ergebnissen der dritten Studie wieder, da zum Beispiel unter kanadischen Schülern/-innen der Lehrer-und-Peer-abhängige Motivationstyp (MT) die größte Gruppe der Motivationstypologie darstellt (fast 60%), gefolgt vom Lehrer-und-Peer-unabhängigen MT (20%). Im Gegensatz zur Ausrichtung des kanadischen Bildungssystems, wird die deutsche Schulumgebung, insbesondere an weiterführenden Schulen, als wettbewerbsorientiert charakterisiert, was wiederum mit dem Bedürfnis des Peer-abhängigen MT einhergeht, wie eine qualitative Studie zeigte (Hoferichter & Raufelder, 2014). Die Gruppe des Peer-abhängigen MT stellt in Deutschland die größte dar (34%), gefolgt vom Lehrer-und-Peer-unabhängigen MT (29%). Schüler des Peer-abhängigen MT, betonen, dass der Wettbewerb mit ihren Mitschülern/-innen sie motiviert zu lernen, wobei sie gleichzeitig nach Anerkennung und Wertschätzung von ihren Peers streben (vgl. Fritzsche, 2000; Hoferichter & Raufelder, 2014). Die Ergebnisse legen nahe, dass die spezifische Ausrichtung von Bildungssystemen die dem Motivationsprozess zugrundeliegenden Faktoren beeinflusst, da Motivation aus der dynamischen, wechselseitigen Person-Kontext Beziehung entsteht (vgl. Lerner, 1986, 1991; Lewin, 1951).

Alle Studien, die in der vorliegenden Doktorarbeit dargestellt werden, zeigen durch die Herausarbeitung der divergierenden Rolle von sozio-motivationalen Beziehungen die starke

und vielfältige Auswirkung von Lernkontexten auf Persönlichkeitsaspekte, Stress, Leistungsemotionen und Motivation. Theoretische und praktische Implikationen und ein Ausblick auf zukünftige Studien bzw. generelle Schlussfolgerungen werden diskutiert.

*Schlüsselwörter:* sozio-motivationale Beziehungen, Schulkontext, Neurotizismus, Stress, Prüfungsangst, buffering hypothesis, Leistungsstreben, Motivationstypologie, deutsche und kanadische Sekundarschüler

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## Chapter I

### General Introduction

#### 1.1 Social relationships and the need to belong in school

Social relationships accompany learning processes in school and play an important role for the personal development of students as they are essential socialization factors (Barber & Olsen, 1997; Bester, 2007; Wentzel, Battle, Russell, & Looney, 2010). Various studies have shown that high quality social relationships are associated with increased well-being, self-esteem, and stabilize the development of a healthy personality (Arnett, 2007; Flanagan, Erath, & Bierman, 2008; Leary & Baumeister, 2000; Roorda, Koomen, Spilt, & Oort, 2011). In particular, high quality teacher-student relationships are related to social and emotional adjustment (Murray & Greenberg 2001), competence behavior (Pianta & Nimetz, 1991), and compensate for risk factors such as adverse demographic characteristics and multiple functional (behavioral, attention, academic, social) problems (Baker, Grant, & Morlock, 2008; Roeser, Eccles, & Sameroff, 2000; Roorda, Koomen, Spilt, & Oort, 2011). A meta-analysis on the association of affective teacher-student relationships on school engagement and achievement found medium to large links between the variables (Roorda et al., 2011), emphasizing the importance of high quality teacher-student relationships for the scholastic development of students.

Besides teacher-student relationships, the relationship between students within the classroom has an important impact on behavioral, emotional, and cognitive components of students (Ladd, Herald-Brown, & Kochel, 2009; Ladd, Kochenderfer, & Coleman, 1996; Wentzel, 2009). Peers serve as companions and friends and as such fulfill social needs of the developing individual (Harter, 1996; Bukowski, Laursen, & Rubin, 2009; Rubin, Bukowski, & Parker, 2006). In fact, self-worth is determined by group membership and relationships in general (Leary, 2004; Sherman & Cohen, 2006). In a sample of European American undergraduates, Walton and colleagues (2011) found that even minimal cues of social connectedness to another person or group in a performance domain affected aspects of self-efficacy and motivation in math positively.

The need to belong related to experiencing integration, membership, mutual trust, and safety (Furman, 1998) is defined as a basic psychological need (Baumeister & Leary, 1995; Osterman, 2001). In his early work, Maslow (1943) structures human needs in a hierarchical schema according to which the need for food, water, and sleep represent the basic physiological needs followed by the need for security of body, family, and property. The third

need in the hierarchical ordering is the need to belong to a community such as family and friends. If these outlined needs are met, only then humans strive to fulfill their needs for esteem and self-actualization. Bowlby incorporated the need for food, security, and belonging into his Theory of Attachment (1969), according to which humans have instinctive psychological needs from birth such as the need for food, security, and warmth, which ideally are met by a preferred individual; initially between child and parents and later in life between adults. According to Bowlby the need for food is classified as incidental, while the need to be attached to a differentiated individual posits a major requirement. However, the threat of losing the preferred individual creates anxiety and actual loss sorrow and may lead to traumata. Both, anxiety and sorrow are likely to induce feelings of anger and depression (Bowlby, 1969, 1980). Attachment Theory gives an explanation as to which degree individuals engage in the social and physical world on a motivational and cognitive level (Schölmerich, 2000). In fact, Kenny, Gallagher, Alvarez-Salvat, and Silsby (2002) found that students reporting high affective maternal attachment performed better at school than those reporting low maternal attachment. Paternal attachment was negatively associated with depressive symptoms (Kenny et al., 2002).

Individuals experiencing a feeling of belonging share an emotional sense of connectedness with other individuals who they evaluate as important and vice versa. In their meta-analysis Cohen and Wills (1985) found that supportive and caring relationships of family and community members such as classmates in college, friends, and co-workers buffer feelings of stress as they are considered causal contributors to well-being (Cohen & Hoberman, 1983). Social support provides a major reservoir for resources that in turn help to cope with stress and present “one of the basic building blocks of social, psychological, and biological integrity” (Hobfoll, Freedy, Lane, & Geller, 1990, p. 2). Social connectedness was also related to low trait anxiety and greater social identification (Lee & Robbins, 1998), less depressive symptoms, greater well-being (Mauss et al., 2011), and self-efficacy (Walton, Cohen, David, & Spencer, 2011) in adults. Feeling connected to a preferred individual or a social group does not only show to have impact on a variety of psychological aspects as mentioned above but was also found to impact physiological dimensions as shown by Adams, Santo, and Bukowski (2011) who found that having a best friend present at an unpleasant event reduced the stress level of students, which was measured by the amount of cortisol. Another longitudinal study among college students found that social support predicted low levels of test anxiety, while the lack of social support was related to high cortisol levels (Conneely & Hughes, 2012). In fact, the ability to self-regulate suffers in individuals who feel

their social connectedness to be threatened (Baumeister, Twenge, & Nuss, 2002). How adverse environmental aspects affect the immune system, particularly gene expression and cancer biology becomes clear in a study by researchers from the Mind and Biology Institute in Chicago. Williams and colleagues (2009) separated cloned mice, hence genetically identical, into group-housing, while putting others into isolation. The social isolated mice were able to see the other mice but could not interact with them. Results show that the socially deprived mice developed a greater number of larger tumors, as their tumor growth was 3.3 times faster and their life expectancy was 40 percent lower than that of the mice in group-housing. Hence, social isolation in mice leads to stress, which in turn leads to genetic defects. Similar mechanisms can be assumed for humans, as women living in isolation show a change in their metabolism and die of cancer 68% more frequently than other women in the USA (University of Chicago, 2008).

Studies have shown that it is particularly in stressful situations where social support becomes a “life saver” for individuals. Among college students it was found that approaching examination increased stress and emotional distress (e.g., anxiety, insomnia, somatic symptoms, social and cognitive dysfunction, depression), which in turn were related with higher alcohol consumption in students who perceived low social support. However, for students who did perceive social support the alcohol consumption dropped although feeling stressed by the approaching examination (Steptoe, Wardle, Pollard, Canaan, & Davies, 1996). Another example for a stressful event is the frequent peer victimization and low social support from teachers, classmates, friends, and family, which exacerbate poor mental health of school children (Rigby, 2000). In fact, the lack of social support has shown to promote negative psychological states such as anxiety and depression, increasing the risk for diseases and mortality (Beehr & McGrath, 1992; Cacioppo & Patrick, 2008; Finch & Vega, 2003; Gaspar de Matos, Barrett, Dadds, & Shortt, 2003; Wit, Karioja, Rye, & Shain, 2011).

Contrary to the lack of social support, a study among elementary school students found that mutual best friendship protected children from becoming peer victims (Hodges, Boivin, Vitaro, & Bukowski, 1999). Based on the mentioned findings on social relationships and related feelings of connectedness and belonging, it can be deduced that high quality teacher-student and student-student relationships may function as buffer in stressful situations such as evaluation situations. However, this assumption needs to be verified quantitatively and cross-nationally, which is one goal of the current work.



## **1.2 Stress and test anxiety**

The last decades have been viewed retrospectively as the “age of anxiety” (Parker & Parish, 2001; Twenge, 2000) and the “age of stress” (Jackson, 2013), forecasting an even more rapid increase in stress and anxiety among humans. Among others, diminishing support from social networks as well as health and welfare systems are held responsible for increased levels of stress (World Health Organization, 1993). In fact, Fukuyama (1999) describes Western societies to increasingly loose social bonds and common values that hold people together and give stability. It is not only adolescents who suffer from being stressed due to expectations concerning their performance (Rice & Van Arsdale, 2010; Kaplan, Liu, & Kaplan, 2005), lack of social support (Mates & Allison, 1992), and because they evaluate their resources as too little to be able to cope with stressful situations (Leunga & Heb, 2010). Children also report elevated stress levels regarding for example overscheduling, stressful life events, and poor social support (Brown, Nobiling, Teufel, & Birch, 2011; Cowen, Pryor-Brown, Hightower, & Lotyczewski, 1991; Schraml, Perski, Grossi, & Simonsson-Sarnecki, 2011). Perceived stress among school and university students has shown to be related with physical and psychological impairment (e.g., eating disorders, nervousness, fatigue) (American Psychological Association, 2010), headache and abdominal pain (Alfven, Östberg, & Hjern, 2008) as well as elevated drinking and smoking behavior (Ng & Jeffery, 2003). Due to these severe health impairments, the World Health Organization (WHO) encourages governmental and non-governmental organizations to pay greater attention to causes and preventions of stress (WHO, 1993).

Individuals perceive and process stress producing environmental circumstances, events, and conditions differently and act according to former experience, environmental aspects, and personality characteristics (McGrath & Beehr, 1990). The influence of culture and community plays a major role for the development of stress as presented within the motivational stress theory termed Conservation of Resources Theory (COR Theory) (Hobfoll, 1988). While the threatening loss of valued resources is the principal component leading to feelings of stress, the objective and culturally construed nature of the environment determines feelings of stress, rather than the individual’s personal appraisal (Hobfoll, 2001, 1989; Hobfoll & Lilly, 1993). In this sense, the self is viewed as a product of for example nationality, gender, social status, education, etc., while in turn the encounter of stress primarily takes place within a social context involving social consequences (Hobfoll, 1989; Lyons, Mickelson, Sullivan, & Coyne, 1998). Hence, COR Theory equally takes into account environmental and internal processes based on the assumption that the individual is nested

within a certain context. Any attempt to separate the individual from its environment will, according to Hobfoll (2001), lead to a limited predictive capacity. Humans have an innate and learned desire to conserve their resources and to minimize any state that would threaten the security of these resources (Hobfoll, 1988; Lem, 1990). The loss of resources is unequally weighted in comparison to the gain of resources, as the prevention of resource loss demands further resources. Hence, the lack of resources leads to ongoing resource loss, while the presence of resources enables further resource gain (Hobfoll, Freedy, Lane, & Geller, 1990; Hobfoll & Lilly, 1993). While in COR Theory, humans strive to protect their own resources and identity as well as those of the community, the Transactional Stress Model (TSM) by Lazarus and Folkman (1987) focuses on the individual's appraisal of a situation regarding its motivational relevance and motivational congruence. As a primary appraisal, the person may answer the question "How important to me is what is happening (or might happen) in this situation?" to evaluate whether the encounter is relevant/non-relevant to the individual. By additionally evaluating the motivational congruence, the individual verifies whether the encounter is consistent or inconsistent with the person's desires or goals (Smith & Kirby, 2009; Smith & Lazarus, 1993). If the situation is evaluated as important, motivational relevance will be high, resulting in intense emotions as the individual cares about the issue, which has important implications for his/her goals. In contrast, motivational relevance will be low, if the situation is evaluated as irrelevant to personal goals (Smith & Lazarus, 1993). Subsequently, the individual evaluates his/her resources and options to cope with the situation evaluated as important, which is labeled as secondary appraisal. Coping may be problem-focused, enabling the individual to directly act upon the situation to accord with individual's desire. Emotion-focused coping describes the psychological adjustment to the situation by modifying one's interpretations, desires, and beliefs (Smith & Lazarus, 1993). Environmental demands may tax or exceed the resources of an individual, which consequently leads to stress. Hence, the person is challenged to balance between demands and resources, as consequences may be harmful if demands are not met or neutralized somehow (Lazarus & Launier, 1978). Within the TSM, Lazarus and Folkman (1984) distinguish three types of stress: harm, threat, and challenge. *Harm* refers to the psychological damage or loss that has already happened. The anticipation of forthcoming harm is referred to as *threat*, while a situation of *challenge* occurs when the person feels confident to master the encounter.

According to the TSM, the subjective interpretation of a threatening situation mainly contributes to the development of fear and anxiety (Lazarus, 1966, 1991). In fact, the model can be applied to the phenomenon of test anxiety in evaluation situations. With advancing

globalization and transition to an information and service society the pressure to perform connected with the fear of failure in evaluative situations increases (Achermann, Pecorari, Winkler Metzke, & Steinhausen, 2006; Steinbicker, 2011). The school is a particular venue of this evaluation culture and a reflection of society and its development at the same time. The modern society is increasingly understood as a “test-oriented” and “test-consuming” culture (Zeidner, 2004, p. 4), in which it is almost impossible not to be confronted with evaluations and to be assessed by others over the life span (cf. Sarason, 1959). Test anxiety can impact performance in achievement situations negatively (Cassady & Johnson, 2002; Deffenbacher & Deitz, 1978; Eum & Rice, 2011, Zeidner, 1998) and is most likely to occur during high-stakes testing (Segool, Carlson, Goforth, von der Embse, & Barterian, 2013). Additionally, test anxiety has shown to be related with poor motivation, personality development, and psychosomatic health (Cassady & Johnson, 2002; Elliot & McGregor, 1999; Eum & Rice, 2011; Macher, Paechter, Papousek, & Ruggeri, 2012; Rouxel, 1999). In general, test anxiety is experienced as stress (Schwarzer, 2000) and considered to be a specific category of anxiety observed in evaluation situations (Friedman & Bendas-Jacob, 1997). The multi-faceted phenomenon of test anxiety is comprised of cognitive and affective components (Friedman & Bendas-Jacob, 1997; Hodapp, Rohrman, & Ringeisen, 2011; Hoferichter, Raufelder, Ringeisen, Rohrman, & Bukowski, under review; Lowe, Grumbein, & Raad, 2011) and can be considered to be a negative, self-directed, and achievement generated emotion (Weiner, 2007).

Applying the Transactional Stress Model to test situations, students will evaluate an upcoming test as important if grades are essential to them (primary appraisal). Students may relate good grades with higher career chances, while pursuing a certain career may be a personal goal. As a consequence they might rank their resources in reference to a successful test taking as being sufficient or insufficient (second appraisal). It is the lack of resources that will result in stress and therefore in the development of test anxiety. Hence, test anxiety emerges as a consequence of cognitive evaluations of the test situation (Richter, 2009). In a subsequent step, students may choose to cope problem-oriented and study intense for the upcoming test. Students may also decide to cope emotion-oriented and adjust to the forthcoming encounter of having to take a test by changing their attitude toward the test. In this sense, they may tell themselves that the test will not be that important after all or that they will postpone their desire to achieve a good grade to another test or subject. Whatever they decide, their coping strategy will be successful or not, which in consequence will shape their experience with test situations in general and impact the perception and processing of

subsequent evaluations (Figure 1). According to Smith and Lazarus (1993), fear and anxiety result from feeling threatened and in danger, which implies the vulnerability of the individual. Feeling vulnerable to a certain degree can be a consequence of resources deficiencies, pessimistic attitudes, and inadequate or lacking of social support (Lazarus & Folkman, 1984).

Figure 1

*Transactional model applied to test situations and resulting test anxiety*

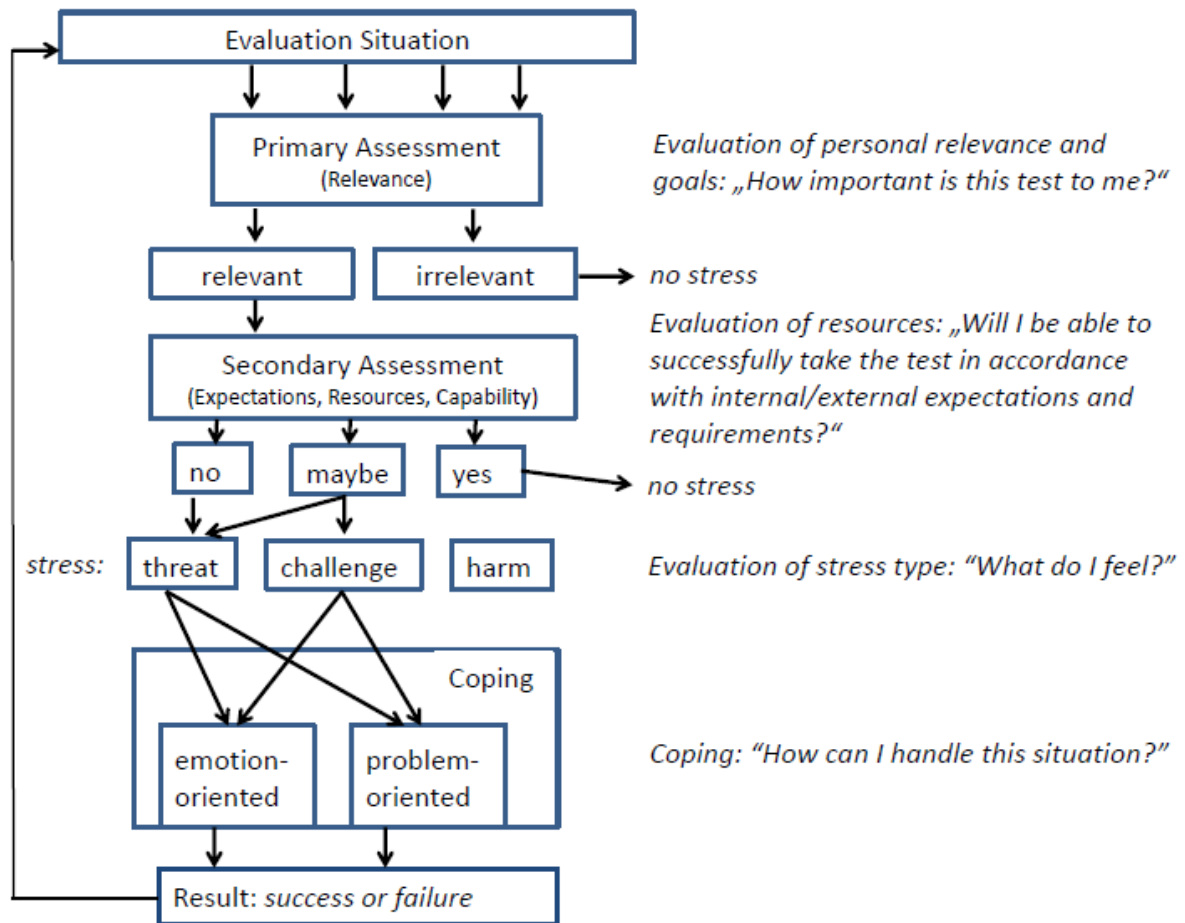


Figure 1. Own presentation based on the work of Lazarus and colleagues.

According to the Trait-State Anxiety Model by Spielberger (1972), anxiety can be distinguished into a situation-specific condition, referred to as *state anxiety* as well as into a personal feature, referred to as *trait anxiety*. State anxiety describes an emotional condition, which is marked by inner tension, disturbance, worry, nervousness, fear of future events and results into an increased activity of the autonomic nervous system (Hodapp et al., 2011). Anxiety as a temporary emotional state may vary over time in its intensity. Trait anxiety is described as a relative stable propensity to perceive situations as threatening and consequently

to react with increased levels of state anxiety. Hence, the occurrence of state anxiety depends on the individual evaluation of a situation, which in turn is a function of the person's level of trait anxiety (Spielberger, 1983). As the two components of anxiety are linked closely, a hybrid-model termed situation-specific type of trait anxiety was established to include both, state and trait anxiety into one model (Cattell, 1966; Spielberger, 1966; Spielberger, Vagg, Baker, Donham, & Westberry, 1980). In this sense, the development of test anxiety can be a consequence of an overall anxious personality (trait anxiety), triggered by the test situation itself (state anxiety), or can be a combination of both components (situation-specific personality trait). Schwarzer (2000) expands the definition on test anxiety by describing the latter to emerge as a consequence of a stressful experience in which the identity and the self-worth are being threatened.

In summary, if and to what extent a test situation is evaluated as threatening varies among individuals and depends on the school context and climate, personality aspects as well as past experiences, and the ability to successfully cope (Pekrun, 2001; Stöber, 2004; Zeidner, 1998). If the school climate lacks mutual respect, courtesy, and positive encouragement, students are more likely to report test anxiety (Eder, 1996, 2006; Katschnig & Hanisch, 1999; Schmalfeld, 2011; Tausch & Tausch, 1998; Winkel, 2009). In contrast, social support has shown to mitigate feelings of anxiety within the school context and work environment (Pekrun & Frese, 1992; Rost & Schermer, 2006). However, social support is not granted to all students, particularly for students who are characterized as easily irritated and tense, which is the case for students reporting high levels of neuroticism (Park et al., 2013). The overall tendency to be anxious and insecure increases not only the intensity of test anxiety (Fitch, 2004; Spielberger & Vagg, 1995) but influences the perceived availability of social support (cf. Brendgen et al., 2009; Bukowski, Laursen, & Hoza, 2010; Swickert & Owens, 2010). In general, personality traits impact the perception and evaluation of stressful encounters such as test situations, and consequently affect coping with test anxiety (cf. Endler, 1997; Frydenberg, 2002). Particularly high levels of neuroticism have been related to adverse effects on the perception of stress and the efficacy of coping strategies, which intensify test anxiety (McCrae, 1990; Schroeder, 2006; Uliaszek et al., 2010).

Hence, alongside the socio-historical context, classroom interactions, and genetic dispositions, control and value beliefs can be considered to be antecedents of an individual's assessment of achievement situations and may lead to stress and test anxiety (cf. Pekrun, Frenzel, Goetz, & Perry, 2007).

### **1.3 Achievement emotions and motivation**

Emotions in general portray inner psychological processes and display feelings, rather than cognitive components. Every emotion can be characterized according to a unique psychological affective experience (Frenzel, Götz, & Pekrun, 2009) and can be classified according to its valence as either positive or negative, preparing the individual to act accordingly. Emotions accompany learning processes and as such activate the limbic system, mainly the amygdala (Raufelder, Hoferichter, Pöhland, Golde, Lorenz, & Beck, under review) and influence the use of learning strategies, cognitive resources, motivation to learn, educational interest, and consequently the success of achievement (Krapp, 2000; Pekrun et al., 2007). Hence, emotions affect physiological aspects (e.g., skin conductance, heart rate, etc.), cognitive components (e.g., worrying thoughts during an exam), expressive components (e.g., facial expressions and body language), and are closely linked to motivation (Deci & Ryan, 2000; Frenzel et al., 2009). Although emotions and motivation are considered distinct concepts, they interact closely (Hascher, 2005). In the example of achievement situations, both emotions and motivation impact learning and performance (Pekrun & Schiefele, 1996; Pintrich, 2000). Emotions that pertain to achievement activities or achievement outcomes are referred to as achievement emotions (Pekrun, 2006). The latter are experienced in achievement relevant situations when individuals feel in control or out of control of achievement activities and associated outcomes that are evaluated as important to the person (Pekrun et al., 2007). Achievement emotions may include joy and pride when efforts lead to success in achievement situations, or shame or frustration when academic goals are not being achieved. In this sense, test anxiety as well as emotions oriented toward success and avoiding failure (achievement drive) can be considered as achievement emotions (Heckhausen, 1991; Pekrun et al., 2007; Zeidner, 2007). In fact, achievement-related anxiety in test situations as well as in learning related situations in class and at home was the emotion most often reported by both, school and university students (Pekrun, 2000). Furthermore, cross-national research related to achievement drive has come into focus again since international comparative studies such as the Programme for International Student Assessment (PISA), Third International Mathematics and Science Study (TIMSS), and other international comparative studies have been en vogue (cf. Guggenbühl, 2002). Additionally, competitive global environments have called to rethink the potential of human capital and are challenging individual and societal achievement. The importance of individual success measured by wage, prestige, and well-being (Card, 1999), related to a long-term economic growth and development (Hanushek & Kimko, 2000; Hanushek & Woessmann, 2012), increasingly

dominates political and educational debates, which are mainly initiated by members of the field of industrial psychology (Link, 2013).

To understand underlying motives and drives of achievement oriented behavior and emotions, I will pose and briefly discuss the question “What motivates humans to act?” in the following. According to McClelland, Atkinson, Clark, and Lowell (1976), the driving force of human behavior are motives, which are “formed by pairing cues with affective arousal or the conditions [...] that produce affective arousal” (p. 67). Hence, motives activate individuals to pursue their goal, which consists in the reduction of their needs (e.g., the need to receive social recognition from teachers and classmates) and consequently results in a reward situation with positive affect (e.g., receiving a good grade secures social recognition and therefore satisfies the so-called need). McClelland describes motives as relative stable personality characteristics, which are formed during early childhood experiences (1953) and remain stable over the life course (Meece, Glienke, & Askew, 2009). For example, in comparison to individuals with a low achievement motive, their counterparts derive more pleasure from experiencing success (McClelland, Atkinson, Clark, & Lowell, 1953), which in turn is consolidated by recurring success and experienced pleasure, similar to the flow-concept (see Csikszentmihalyi, 1975; described in the following). However, within the learning context, the achievement motive is closely linked with pressure to perform and the fear of failure experienced in test situations, which are associated with negative affect and may lead to anxiety. The latter may elicit coordinated avoidance responses, which continue until the situation changes, e.g., the test is over or the individual has adapted to the situation by changing his/her attitude toward the test situation (see also Lazarus Transactional Stress Model). Hence, motives are based on affect and are learned results of pairing cues (McClelland et al., 1976).

According to Atkinson (1974), achievement motivation is a learned drive, aiming at achieving success and avoiding failure, while achievement drive is a facet of achievement motivation (Petermann & Winkel, 2007). Hope for success and fear of failure accompany achievement emotions and in particular achievement drive (Atkinson & Feather, 1966; Frenzel et al., 2009). Achievement emotions such as achievement drive and test anxiety can be conceptualized as habitual and recurring emotions (Pekrun, 2006), also in a sense of recurring cues (see McClelland et al., 1976), while they are closely linked with personality (Atkinson, 1974; Zeidner, 1998; see also explanation of state and trait anxiety).

Already in 1962, Crandall, Katkowsky, and Preston formulated the basic goal of achievement behavior to be the attainment of approval and avoidance of disapproval. Hence,

socialization variables such as feedback from significant others influence achievement-related motives (Heckhausen, 1980). In fact, McClelland (1961) formulated the need for achievement (N-Ach) to refer to the desire to master challenges, succeed in competition, and to excel in activities evaluated as important compared to common standards. These motives however are related to fear of failure, pressure to perform, anxiety, reluctance to cooperate with peers, avoidance strategies, and cheating behavior (Atkinson, 1957; Midgley, Kaplan, & Middleton, 2001; Selkirk, Bouchey, & Eccles, 2011). As a matter of fact, there is a close link between the drive for achievement and test anxiety (Elliot & McGregor, 1999), while the shaping of achievement drive and the level of experienced test anxiety impact motivation (Zeidner, 1998).

An example of how achievement emotions are linked to motivation is outlined by the Yerkes-Dodson law (1908), which considers the impact of anxiety in test situations. According to this law, the anxiety experienced before or during an exam may activate students to perform at their best and therefore increase the drive for achievement and motivation. Achievement oriented students may feel triggered by activating test anxiety and feel motivated by challenging tasks. However, anxiety experienced before or during test situations may also inhibit students' performance and therefore impact motivation negatively (Yerkes & Dodson, 1908), depending on the evaluation of personal resources to successfully master the task (see Transactional Stress Model by Lazarus).

By matching motives, needs, and emotions in achievement situations, almost in parallel to Deci and Ryan's Self-Determination Theory (SDT) (Deci & Ryan, 1990), according to which individuals are (intrinsically) motivated when experiencing feelings of competence, social relatedness, and autonomy, Csikszentmihalyi and colleagues developed the flow-concept (1975, 1990). The flow experience includes the fusion of action and awareness of an individual, the centering of attention on and control of a specific, delimited environment as well as self-abandonment (Csikszentmihalyi & Schiefele, 1993). Hence, the individual engages into an activity mentally and physically with the highest intensity. To achieve a flow experience the person evaluates their ability as sufficient to meet the requirement of the task (challenge-skill balance; see also secondary appraisal of Transactional Stress Model). If both, ability and requirements are assessed as high by an individual, the chance of experiencing a flow effect increases (Massimini & Carli, 1988). If a task is little demanding, the individual may experience boredom, while a highly demanding activity may induce feelings of anxiety (Csikszentmihalyi & Schiefele, 1993; see also Yerkes-Dodson law). Furthermore, the action requirements and possibilities have to be clear, similar to rules



of a game, to make it possible for the individual to evaluate his/her action and resulting immediate consequences (Csikszentmihalyi, 1990). The perception of positive feelings motivates the individual to keep this particular condition stable or to bring about similar conditions (Abele, 1996; Cunningham, Shaffer, Barbee, Wolff, & Kelley, 1990). The experience of a flow is positively associated with performance in learning settings (Engeser & Rheinberg, 2008; Schüler, 2007). However, different studies yield inconsistent results as the presence of the challenge-skill balance, clear goal settings, and immediate feedback lead to a flow experience in only some individuals (Ellis, Voelkl, & Morris, 1994; Stroll & Lau, 2005). These inconsistencies may be explained by moderator variables (Rheinberg, 2008) suggested for example by Developmental Contextualism (Lerner, 1985, 2001) and Control-Value Theory (CVT) (Pekrun, 2006) as described in the following section.

#### **1.4 Developmental and motivational theories**

Developmental Contextualism addresses the following questions: “What kinds of changes characterize people in their course of development? Where do these changes come from? How do they relate to human development?” (Lerner, 1985, 1998, 2001). The person itself as well as the surrounding physical and social ecology of human life are considered to be active (Lerner, 2001). Hence, it is the interaction of person and context which shapes the quality of human behavior and psychological functioning. Consequently, the basic process of human development consists in the organism-context interaction in which the entire organism (including cells, tissues, etc.) interacts reciprocally with external contextual variables (Lerner, 1991). This assumption has been verified by research of the Mind and Biology Institute in Chicago cited in chapter 1.1, in which the social environment was shown to impact physical, biological changes in mice and humans. Not only physiological changes occur due to the dynamic interaction of person-context relationships but also psychological changes that include person’s perceptual, motivational, or cognitive development (Lerner, 2001). The person-context interaction is also referred to as a process of “fusion” (Lerner, 1985), underscoring the reciprocal and dynamic impact of individual and environment. In summary, the social, cultural, and historical background individuals grow up in shapes their physical and psychological appearance, including their attitudes, values, and beliefs (cf. Bronfenbrenner, 1979; Jovanovic & Lerner, 1999; Lerner, 2001).

This assumption is shared in part by Control-Value Theory (CVT), which particularly examines achievement emotions in order to establish a theoretically based taxonomy of achievement emotions. Pekrun and colleagues developed the CVT, which constitutes an

overarching approach to cognitive appraisal theories of achievement motivation by borrowing conceptually from Expectancy-Value Theory (Atkinson, 1957), Attribution Theory (Weiner, 1985), models involving the role of emotions on learning and achievement situations (Fredrickson, 2001; Pekrun & Schiefele, 1996; Zeidner, 1998) as well as aspects of perceived control (Lazarus, 1966; Patrick, Skinner, & Connell, 1993; Bandura, 1986). CVT is based on two appraisal dimensions: *subjective control* and *subjective value*. Subjective control denotes the perceived causal influence and expectancies of an agent over the achievement situation and associated outcomes (Pekrun, 2006). Subjective value describes the perceived valence of actions and outcomes, for example the assigned importance of an exam and related success. The assigned value to an achievement action can be either intrinsic or extrinsic in nature. If individuals follow an intrinsic subjective value, they might be interested in taking an exam out of interest and appreciate every chance to learn. In contrast, extrinsically motivated students may assign much importance to the test as instrumental utility, as they may be keen to achieve good grades, which consequently increase their career chances and in turn secure higher salary, etc. (see also Deci & Ryan, 1990).

The theory assumes that among individual determinants (e.g., cognitive resources, personality aspects, etc.) social factors such as family, school, university, and the work place impact achievement emotions and consequently individual control cognitions and values (Pekrun, 2000; Pekrun & Frese, 1992), as these social entities define success and failure and portray certain values (induction of values). Taking a closer look at how school and classroom environments can be powerful influential factors to control and value beliefs of students, Pekrun (2000) considers the following to be important impact factors: classroom instruction, control over complex tasks, autonomy support, expectancy, and feedback. By creating a stimulating learning environment through providing suitable learning material as well as emotional and informational support, students may enjoy school, learning, and performing more than students being exposed to a rather low stimulating environment (Fend, 2008; Pekrun, 2000). Hence, the intrinsic motivation of students may be rather high in such stimulating learning environments and contribute to a long-term development of positive emotions related to school issues (cf. Wentzel, 1993, 2009; Wentzel, Battle, Russell, & Looney, 2010). Furthermore, the complexity of tasks and defining criteria of a successful completion of tasks contribute to success or failure related emotions and in turn impact control and value beliefs (Pekrun, 2000; see also Transactional Stress Model, chapter 1.2). Perceived control over tasks has been shown to be related positively with attention, persistence in the face of difficulties, and effortful performance (Patrick, Skinner, & Connell,

1993; Weiner, 1985). The lack of perceived control may lead to feelings of test anxiety, as studies have shown that test anxious students tend to hold rather low control-beliefs over external threats including their own emotional and bodily reactions, which in turn cause them feelings of anxiety (Barlow, 2000, 2002; Rapee, Craske, Brown, & Barlow, 1996). Closely linked to perceived control are attributions of success and failure, which have been discussed in the context of Attribution Theory (Weiner, 1970, 1985, 1990). Based on this theory, individuals search for the cause of success and failure, similar to scientists seeking to understand the world, while naming ability, effort, luck, mood, and help/hindrances from others to be the most prevalent causes of success and failure (Graham & Weiner, 1996). In this sense, Weiner distinguishes three dimensions termed locus, stability, and controllability. While locus refers to whether the cause of success or failure is external or internal to the individual, stability describes the invariance of a cause over time, and controllability connotes to which extent the cause is subject to volitional change (Weiner, 1985). All three dimensions of Attribution Theory are closely related to motivation and emotion. Referring back to CVT, Pekrun (2006) states that the proposed theory includes among others aspects of Attribution Theory as well as perceived control approaches. Beyond these, control and value beliefs may also be influenced by autonomy support in learning environments that can be beneficial for the development of competences, competence-beliefs, and competence-related emotions (Deci & Ryan, 2000), which are positively related to intrinsic motivation (Deci, Vallerand, Pelletier, & Ryan, 1991; Reeve, 2002) and apply to the “flow experience” as described above (Csikszentmihalyi, 1990). Another aspect to influence control and value beliefs of students is the individual’s expectation to succeed in a given task and the evaluation of how important that task is for the person. The importance of the two aspects (expectation and value) for motivational processes has been postulated by Atkinson’s Expectancy-Value Theory (1957, 1983), according to which students may ask the following questions: “Can I do the task?”, “Do I want to do the task?” (Wigfield & Eccles, 2002; Pintrich, 2003). The individual’s need for achievement or the motive as well as the probability to successfully accomplish the task and a given incentive value of success impact achievement related emotions and the performance itself. If students expect to do poor on an upcoming important exam, which implies a reduction of success expectations, negative achievement emotions such as anxiety or hopelessness may be the consequence (Raufelder, Ringeisen, Schnell, & Rohrman, 2015). Hembree (1988) and Zeidner (1998) found that students’ test anxiety levels were positively related with failure expectations and negatively with academic self-concept of ability. Hence, by answering the aforementioned two proposed questions the emotional experience of

individuals (Pekrun, 2006) linked to a certain task is impacted and consequently shapes control and value beliefs accordingly. Pekrun (2000) states another impact factor to influence control and value beliefs of students, which is the feedback given to students after having performed a task. Feedback from teachers or peers may induce achievement-contingent emotions such as joy, pride, disappointment, shame, etc. (Pekrun, 2000). Recurring positive feedback may foster positive emotions related to achievement situations, while cumulative negative feedback may lead to feelings of test anxiety, shame, and hopelessness. In this sense, feedback may imply expectations regarding future achievement situations and influences the motivation to learn (Pekrun, 2000).

In summary, CVT is based on established attribution and cognitive motivational theories and focuses on control and value beliefs by including practical education based aspects. By postulating an overarching motivational theory, Pekrun (2000) stresses on the importance of social environmental factors for the development of achievement related emotions. With this approach, the author considers the individual's immediate environment, hence the social microsystem, which is embedded into the macrosystem of society (cf. Bronfenbrenner, 1979). The development of achievement emotions is dependent on cultural norms and values and therefore may systematically differ between school systems, economic systems as well as specific orientations and priorities set by politics and societies (Pekrun, 2000). In fact, a cross-cultural study between adolescent school students in Hong Kong and Germany found that students in Hong Kong reported significantly higher levels of anxiety symptoms compared to their German counterparts. Competition among students for good grades and being rewarded for performance correlated with anxiety symptoms among students from Hong Kong, only. Whereas German students reported increasing anxiety symptoms with increasing age (Essau, Leung, Conradt, Cheng, & Wong, 2008). Emotions derived from success and failure in achievement situations depend on the individual's appraisal of causes, ability, expectation, control, and values. Student's unique appraisals impact their learning behavior, task persistence, and effort of investment (activity-emotions) and consequently the outcome of these activities (outcome-emotions), which include the evaluation of performance by comparing the outcome to standards of quality (Pekrun et al., 2002; Pekrun, Elliot, & Maier, 2006).

Considering students' learning environments, achievement emotions can hardly be separated from social emotions emerging for example from student-student and teacher-student relationships. Achievement related emotions and social emotions can overlap as students compare their competences and performance to those of their peers (cf. Pekrun et al.,

2007; Weiner, 2007) and as teachers and peers set standards of quality as well as formulate and embody certain values. As such, if the student-student relationship as well as the teacher-student relationship are perceived as positive, learning environments in general as well as specific tasks are being related to stimulating achievement emotions such as joy, interest, and excitement (Achermann, Pecorari, Winkler, Metzke, & Steinhausen, 2006). Hence, social environments can be considered to shape individual's emotions, while the latter influence social environments. The reciprocal causation over time is influenced by positive feedback loops encouraging students to further involve into learning activities or by negative feedback loops inducing feelings of test anxiety and the motivation to avoid failure (Pekrun, 2006).

### **1.5 Desideratum**

The current PhD thesis enhances past research in several ways; by applying state of the art methods, taking on a cross-national perspective, considering both individual and contextual variables, using large sample sizes, and by considering the age group of secondary school students.

Up until today, mainly regression analysis with manifest variables (Finch & Vega, 2003; Lee & Robbins, 1998; Park et al., 2013; Rigby, 2000), group comparisons (ANOVA, MANOVA) (Gaspar de Matos et al., 2003; Murray & Greenberg, 2001; Stöber, 2004), or correlation analysis (Bester, 2007) have been conducted to investigate how social relationships would relate to either achievement emotions, personality aspects, stress, or motivation. Additionally, mainly university (Conneely & Hughes, 2012; Finch & Vega, 2003; Mauss et al., 2011; Walton et al., 2011) or elementary school students (Adams et al., 2011; Bukowski et al., 2010) from one country only have been part of those studies, while sample sizes are usually small ranging from about 90 to 300 participants (Bester, 2007; Lee & Robbins, 1998; Murray & Grenberg, 2001; Stöber, 2004, Wentzel et al., 2010).

By bringing together multiple individual and contextual aspects, an integrative approach is followed in all three studies presented, treating the variables of interest as complementary rather than competitive. Following this approach, the current PhD thesis attempts to extend and solidify past research. The importance of taking an integrative approach has been called for by many researchers (cf. Bronfenbrenner, 1979; Hobfoll, 2001; Lerner, 1998, 2001; Lewin, 1951; Pekrun, 2000, 2006), as the consideration of both individual and environmental factors increases the predictive capacity of models attempting to describe reality. Furthermore, by examining both, German and Canadian secondary school students, potential cross-national differences can be investigated and nation specific phenomena can be

detected. Although cross-national studies have found differences concerning the role of social relationships on school aspects (Cheng & Lam, 2013; Iyengar & Lepper, 1999; Vitoroulis, Schneider, Cerviño Vasquez, del Pilar Soteras de Toro, & Santana Gonzáles, 2012), the need for cross-national research is still not met in educational and psychology research (Beehr & McGrath, 1992; Parajes, 2007). The current PhD thesis addresses the request for cross-national research by examining the role of socio-motivational relationships for German and Canadian students and investigates the buffering hypothesis (Cohen & Wills, 1985) as well as the motivation typology (Raufelder et al., 2013) cross-nationally. By including large samples from Germany, Brandenburg ( $N = 1,088$ ) and Canada, Québec ( $N = 389$ ), a cross-national perspective can be consistently applied. This integrative and cross-national approach is backed up by applying state of the art methods such as structural equation modeling (SEM), multigroup latent moderated structural equations (MGLM), and multigroup confirmatory latent class analysis (MCLCA). The research methods present the most sophisticated methods to date in the discussed field of research. They allow the interpretation of complex models that, for example, examine simultaneously directed associations between multiple independent and dependent variables (e.g., SEM, MGLM). Furthermore, latent interaction effects across the two samples from Germany and Canada were modeled by taking into account the non-normality caused by the latent non-linear interaction terms (e.g., MGLM). Additionally, multiple latent groups were identified by examining response patterns that explain underlying inter-individual differences across German and Canadian secondary school students (e.g., MCLCA). Employing the mentioned advanced statistical methods it is aimed to obtain a higher consistency and predictive power of results.

Furthermore, the age group examined (about 14 years of age) is from particular interest, as it is during this time when puberty sets in and students transfer from primary school to secondary school, having to orient themselves in new peer constellations and facing academic challenges (Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991). During this time, students tend to be more susceptible to distress symptoms, hostile feelings (Ge, Conger, & Elder, 2001), social withdrawal (Laitinen-Krispijn, Van der Ende, Hazebroek-Kampschreur, & Verhulst, 1999), and elevated anxiety levels (Patton et al., 1996). Hence, it is important to study this age group to be able to understand mechanisms of action and derive conclusions about how socio-motivational relationships operate within the school context.

## 1.6 Design of the studies

This PhD thesis is embedded into the context of the project SELF (Socio-Emotional Learning Factors, [www.self-project.de](http://www.self-project.de)). The three studies presented here complement and relate to other research conducted within the project. Therefore, they contribute to a multidimensional picture of how socio-motivational relationships interact and impact various school variables and personality aspects including studies in several countries. This PhD thesis follows a quantitative approach that is supported by research of qualitative (e.g., interviews) and experimental designs (e.g., fMRT studies) within the project.

The main aim of this PhD thesis is to investigate how socio-motivational relationships between students as well as between students and teachers impact personality aspects and school variables on a cross-national level by investigating the following aspects:

Study 1: How does test anxiety relate to neuroticism and perceived stress among German secondary school students? Do socio-motivational relationships mediate feelings of test anxiety in neurotic and stressed students?

Study 2: Do socio-motivational relationships act as potential buffers for the relationship of achievement drive and test anxiety among German and Canadian students?

Study 3: Do socio-motivational relationships lead to a valid generic motivation typology among German and Canadian secondary school students?

The three studies rely on self-report and draw on the same database collected during the school year 2011/2012 in German secondary schools in the state of Brandenburg ( $N = 1,088$ ). The studies 2 and 3, presented in chapter 3 and 4, follow a cross-national approach with additional data collected in Canadian secondary schools in the state of Québec ( $N = 389$ ) in 2012/13.

To investigate the research questions, established measures were used. To draw conclusions on the role of social relationships for the variables of interest, the measures *student-student relationships* and *teacher-student relationships* were borrowed from the Programme for International Student Assessment (PISA, Kunter et al., 2002). According to the authors, student-student relationships account for the level of competition and social integration of students within a learning environment and are based on research about the school climate (Schulklima-Forschung). The latter research area also provides the basis for

the measurement of teacher-student relationships and covers the interest of the teachers for learning processes and the students as individuals. In their documentation of the measurements, Kunter and colleagues (2002) relate to research by Fend (1998) and state that both positive perceived student-student and teacher-student relationships promote well-being of students, which in consequence relates to a positive attitude toward learning.

Besides students' perceived relationship quality with other students and teachers, the measures *peers as positive motivators* and *teachers as positive motivators* (Raufelder, Drury, Jagenow, Hoferichter, & Bukowski, 2013) were included in the studies. The two subscales are part of the Relationships and Motivation scale (REMO), which was designed to measure adolescents' perceptions of peers and teachers as sources of scholastic motivation.

To measure achievement emotions such as *test anxiety* and *achievement drive* the scales were borrowed from the questionnaire Achievement Motivation for Students from 7<sup>th</sup> to 13<sup>th</sup> grade (FLM 7-13) by Petermann and Winkel (2007). According to the authors, achievement motivation plays a central role for the explanation of differences in the performance of students. To support students academically, so they would be able to successfully perform within the school context, it is desirable to increase students' achievement motivation. Particularly during adolescence, students' learning and performance motivation should be encouraged, as on the one hand it is during this time that important career chances are being built and on the other hand students are being confronted with pubertal changes related to a shift of interests and values that could lead to a decrease in achievement motivation (Petermann & Winkel, 2007).

To measure *neuroticism* as one of the personality traits of the big five, the subscale was borrowed from The Big Five Model of Personality and Primary Prevention in Adolescence (Fünffaktorielles Persönlichkeitsinventar, FFPI-J) by Szirmák (2005). According to the author, the aforementioned measurement with its short and simple item formulations is particularly applicable for young adolescents and therefore provides students with the opportunity to report on the topic directly, rather than asking parents or teachers about personality aspects.

To measure *perceived stress*, the scale was taken from the Global Measure of Perceived Stress (Cohen, Kamarck, & Mermelstein, 1983). According to the authors, the questionnaire is designed to measure the level to which situations in one's life are appraised as stressful; hence the focus lies on the individual's subjective measure of stress.



### 1.6.1 Study 1

Study 1, entitled *The mediating role of socio-motivational relationships in the interplay of perceived stress, neuroticism, and test anxiety among adolescent students* was published in the Journal Psychology in the Schools. The aim of the study was to bring together both individual and social aspects of test anxiety by investigating the relationships of neuroticism and test anxiety as well as perceived stress and test anxiety and relate them to socio-motivational relationships in school. As a starting point correlations were examined between neuroticism, perceived stress, test anxiety, student-student relationships, teacher-student relationships, peers as positive motivators, and teachers as positive motivators. It was further examined, whether the socio-motivational relationships would mediate the aforementioned relationships. In comparison to other research in the field of psychology and education, this integrative approach treats the variables of interest as complementary rather than competing, allowing for a more profound interpretation of the data.

Social relationships can function as source for support, particularly in stressful situations. To cope with anxiety and stress, social support has shown to be an effective way of coping (Beehr & McGrath, 1992; Cohen, 1992; Cohen & Wills, 1985) and has even been considered to be the main effective strategy to cope with test anxiety among students (Stöber, 2004). However, neurotic individuals report to receive less social support and higher levels of test anxiety in comparison to non-neurotic individuals, which makes them more vulnerable to feeling stressed and anxious (Ebstrup, Eplov, Pisinger, & Jørgensen, 2011; Fitch, 2004; McCrae, 1990; Szabó, 2011). Additionally, it was shown that dependent relationships, for example between teachers and students, were related to negative social outcomes and behavioral problems at school, while students scored lower on academic performance (Hamre & Pianta, 2001; Pianta & Nimetz, 1991; Sabol & Pianta, 2012).

Consulting the literature on the variables and correlates of interest, various fundamental questions remain that have been addressed in Study 1: Do socio-motivational relationships mediate the association between neuroticism and test anxiety? Do students who experience general stress have a tendency to experience elevated levels of test anxiety? How does perceived stress and neuroticism relate to socio-motivational relationships in school? To investigate the relationship between the variables of interest two structural equation models (SEM) were applied, including peers as positive and teachers as positive motivators (model A) as well as student-student and teacher-student relationships (model B) as potential mediators. SEM allow the investigation of simultaneously directed associations between multiple dependent and independent variables (Geiser, 2012). By extracting latent variables

error-free constructs can be built and the fit of the data obtained (Cohen, Cohen, West, & Aiken, 2003).

The study revealed that high quality student-student relationships mitigate feelings of test anxiety in neurotic students, which was not detected for the case of high quality teacher-student relationships. Furthermore, peers as well as teachers as positive motivators functioned as mediators in the association between neuroticism and test anxiety as well as perceived stress and test anxiety. However, instead of mitigating feelings of test anxiety, peers as positive motivators and teachers as positive motivators intensified feelings of test anxiety. Hence, the higher students scored on neuroticism, the more likely they were to perceive their peers and teachers as motivators, which in turn was associated with increased levels of test anxiety. Additionally, students with high stress levels in association with peers and teachers as positive motivators reported high levels of test anxiety.

The study indicates that relationships perceived as supportive, in this case high quality student-student relationships, are associated with low levels of test anxiety, while students who depend on peers and teachers for their own motivation report increased levels of test anxiety. The results of the study are discussed and implications for psychologists and school personnel are derived.

### **1.6.2 Study 2**

Study 2, entitled *Achievement and test anxiety – Two sides of the same coin? Testing the potential buffering role of socio-motivational relationships among German and Canadian secondary school students* was submitted to a peer review journal and is currently under review. Based on results of the first study, which is limited to German secondary school students in Brandenburg, the aim of the second study was to expand the knowledge about the impact of socio-motivational relationships on test anxiety by including a sample of Canadian secondary school students and by relating test anxiety to achievement drive.

Research on achievement drive has yielded inconsistent results in the context of education, as it has been shown to facilitate learning by relating to positive attitudes toward school, school engagement, academic efficacy, and adaptive behavior (Eccles, Wigfield, & Schiefele, 1998; Elliot, 1999; Harackiewicz, Barron, Tauer, & Elliot, 2002; March & Craven, 2005; Urdan, 1997). However, achievement drive has also been shown to be related to disruptive behavior, anxiety, fear of failure, and behavior of avoidance and therefore may induce feelings of stress for some students (Covington, 1992; Selkirk, Bouchey, & Eccles, 2011). Particularly fear of failure embodies a component of test anxiety, while test anxiety

represents a specific type of general anxiety (Hodapp et al., 2011). Furthermore, students reporting high levels of test anxiety have shown to apply less effective coping strategies such as avoidance behavior (Cortina, 2008).

By referring to the buffering hypothesis by Cohen and Wills (1985), according to which social relationships function as buffers in stressful situations, the question at hand was whether socio-motivational relationships function as potential buffers in the association of achievement drive and test anxiety. By including samples of secondary school students from Germany and Canada, a cross-national perspective was added.

Both, Germany and Canada have a federalist educational system and as such each state is given sovereignty over educational policies, spending, and programs. However, in both countries, a national consulting board advises the states to follow certain standards in education. As members of the Organization for Economic Co-operation and Development (OECD), both countries are committed to certain economic and educational goals and are considered to be part of the Western world (Triandis, 1995). As individualistic societies the countries are concerned with the concept of achievement related career aspirations, social status, and earnings (Ashby & Schoon, 2010; Kaplan & Maehr, 2007). Although Germany and Canada appear to share a similar focus concerning the economic and educational system, the development of achievement emotions (e.g., achievement drive, test anxiety) and social emotions (relationships with peers and teachers) may systematically differ across countries (Pekrun, 2000, 2006). Additionally, individual aspects such as success and failure in achievement situations depend on the individual's appraisal of causes, ability, expectation, control, values, and the comparison of student's performance outcomes with the performance of peers (Pekrun, 2000; Pekrun et al., 2006, see also chapter 1.4 on CVT).

To test the hypotheses whether

- (1) student-student relationships and teacher-student relationships and
- (2) peers as positive motivators and teachers as positive motivators

buffer the relationship between achievement drive and test anxiety among German and Canadian students, two multigroup latent moderated structural equations (MGLMS) were used. MGLMS allow investigating latent interaction effects across samples and represent an extension of ordinary structural equation models, as the non-normality caused by the latent non-linear interaction terms is being taken into account (Klein & Moosbrugger, 2000).

The study revealed that for German students, teacher-student relationships moderated the association between achievement drive and test anxiety, while for Canadian students this association was moderated by student-student relationships as well as teachers as positive

motivators. The degree to which the moderators acted as buffers was dependent on the level of achievement drive. For example, among German students, high quality teacher-student relationships do not protect against test anxiety among achievement oriented students and rather contribute to an increase of test anxiety. Yet for Canadian students, teachers who are perceived as motivators protect achievement oriented students from feelings of test anxiety, while high quality student-student relationships buffer feelings of test anxiety among both achievement oriented and non-achievement oriented students.

### **1.6.3 Study 3**

Study 3 entitled *Knowledge transfer or social competence? – A comparison of German and Canadian adolescent students on their socio-motivational relationships in school* was published in the Journal School Psychology International. Based on the literature as well as the findings of the first and second studies, research on socio-motivational relationships in the school context was continued by investigating the impact and the divergent role of these relationships for Canadian and German students. The cross-national differences found in Study 2 inspire further research on socio-motivational relationships with strong reference to educational settings. The previous research conducted implies that the educational setting in which students learn and develop their personality, skills, and values is a powerful component and shapes their perception of and attitudes toward teachers and peers and vice versa. Hence, as Pekrun (2006) postulates, social environments impact students' emotions, values, beliefs, and motivation, while at the same time students shape their environment.

Based on these premises, the third study refers to research by Raufelder, Jagenow, Drury, and Hoferichter (2013) who established a motivation typology based on a sample of German secondary school students, that was also used in Study 1 and 2. The motivation typology is based on a combinatoric approach relating the fundamental context roles of teachers and peers to the motivation of students. The motivation types (MT) follow theoretically from the possible kinds of interactions and were found for a large sample of German secondary school students as follows (Raufelder et al., 2013):

- (1) teacher-dependent MT,
- (2) peer-dependent MT,
- (3) teacher-and-peer-dependent MT, and
- (4) teacher-and-peer-independent MT

Further studies on the motivation typology revealed that the teacher-and-peer-dependent MT had a tendency to divulge personal information (Bünger & Raufelder, 2014), while having a strong desire to be engaged in the social context (Hoferichter & Raufelder, 2014). On an academic level, the teacher-and-peer-dependent MT exhibited higher intrinsic motivation, learning goals, and achievement drive compared to other motivation types (Jagenow, Raufelder, & Eid, 2014). The teacher-and-peer-independent MT reported to give much importance to assert his/her own rights while possessing the ability to cope with criticism from others (Bünger & Raufelder, 2014) and scored lower on test anxiety compared to all other motivation types (Jagenow et al., 2014). Students assigned to the peer-dependent MT tended to cooperate with peers in and outside of school and support others emotionally (Bünger & Raufelder, 2014; Hoferichter & Raufelder, 2014). Students of the teacher-dependent MT gave much importance to the teacher's competence as well as the emotional attachment with the teacher, while the subject itself recedes into the background (Hoferichter & Raufelder, 2014).

Based on the findings by Raufelder and colleagues (2013), the third study expands the cross-national research on educational context and learning processes by testing the motivation typology in a different educational system. Consulting the literature on German and Canadian school settings, some differences become clear. The German school setting is characterized by a competitive classroom environment (Graudenz & Randoll, 1997), while the performance of peers serves as an incentive for students' own performance (Kaufmann, 2007). The relationship toward teachers is rather impersonal and distant, while the focus lies on the subject, rather than on the relationship between students and teachers (Beckmann, 2000; Hesse, 2004). This orientation found among German schools is contrasted by the Canadian school setting, which stresses the importance of social skills, personal commitment, leadership, and team spirit (Vitoroulis et al., 2012; Wilson & Lam, 2004).

To investigate the aforementioned questions, a multigroup confirmatory latent class analysis (MCLCA) was conducted. MCLCA warrants the identification of latent groups (subgroups) based on a set of items. Different homogeneous class specific response patterns explain underlying inter-individual differences; hence constitute a specific latent class (Finch & Bronk, 2011; Geiser, 2012). Based on their response patterns, individuals are assigned to a specific latent class, while relating the number and nature of the class to external variables – in this case to country (Germany, Canada).

The study verified the existence of the motivation typology, as among Canadian students all four motivation types were present. However, the distribution of students being

assigned to a specific motivation type differed considerably from the German sample. While most of German students were assigned to belong to the peer-dependent MT (34%), most Canadian students were assigned to the teacher-and-peer dependent MT (57%). Further results are being discussed in light of the characteristics of the school settings.

## **1.7 Summary**

All three studies are linked by the research focus on the role of socio-motivational relationships in school, which in past research have been found to be a source of support, having a buffering effect in stressful situations and therefore provide an effective coping strategy. The initiation and maintenance of at least a minimum amount of social relationships is a powerful, universal, and influential human motive as social relationships meet the need to belong, which all humans share and thereby contribute to a healthy psychological and physical development of individuals.

By including individual (e.g., neuroticism) and contextual (e.g., socio-motivational relationships) variables in this PhD thesis, an integrative approach is followed with the help of state of the art statistical methods. The first study investigates German secondary school students and examines the question of how socio-motivational relationships mediate the association of neuroticism and test anxiety as well as stress and test anxiety. By following this scope and applying sophisticated quantitative analyses, Study 1 provides the basis for further cross-national research conducted in Study 2 and 3. Study 2 investigates the moderating role of socio-motivational relationships on achievement drive and test anxiety among German and Canadian students, while Study 3 examines the motivational typology cross-nationally by applying multigroup latent confirmatory class analysis.

In the following, all three studies are being presented in detail and results are discussed with reference to the specific context of students and the educational system in general.

## 1.8 References

- Abele, A. (1996). Zum Einfluss positiver und negativer Stimmung auf die kognitive Leistung [The influence of positive and negative mood on cognitive performance]. In J. Möller & O. Köller (Eds.), *Emotionen, Kognitionen und Schulleistung* (pp. 91–111). Weinheim, Germany: Beltz.
- Achermann, N., Pecorari, C., Winkler Metzke, C., & Steinhausen, H.-C. (2006). Schulklima und Schulumwelt in ihrer Bedeutung für psychische Störungen bei Kindern und Jugendlichen. Einführung in die Thematik [School climate and school environment and their significance for mental disorders in children and adolescence. Introduction to the subject]. In H.-C. Steinhausen (Ed.), *Schule und psychische Störungen* (Vol. 1). Stuttgart, Germany: Kohlhammer.
- Adams, R. E., Santo, J. B., & Bukowski, W. M. (2011). The presence of a best friend buffers the effects of negative experiences. *Developmental Psychology, 47*, 1786–1791. doi: 10.1037/a0025401
- Alfven, G., Östberg, V., & Hjern, A. (2008). Stressor, perceived stress and recurrent pain in Swedish schoolchildren. *Journal of Psychosomatic Research, 65*, 381–387. doi: 10.1016/j.jpsychores.2008.07.004
- Arnett, J. J. (2007). Emerging adulthood, a 21st century theory: A rejoinder to Hendry and Kloep. *Child Development Perspectives, 1*, 80–82. doi: 10.1111/j.1750-8606.2007.00018.x
- Ashby, J. S., & Schoon, I. (2010). Career success: The role of teenage career aspirations, ambition value and gender in predicting adult social status and earnings. *Journal of Vocational Behavior, 77*, 350–360. doi: 10.1016/j.jvb.2010.06.006
- American Psychological Association (2010). *The American Psychological Association's stress in America 2010 report*. Retrieved from: <https://www.apa.org/news/press/releases/stress/2010/national-report.pdf>.
- Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review, 64*, 359–412. doi: 10.1037/h0043445
- Atkinson, J. W. (1974). The mainstreams of achievement oriented activity. In J. W. Atkinson & J. O. Raynor (Eds.), *Motivation and achievement* (pp. 11–39). Washington, DC: Winston.
- Atkinson, J. W. (1983). Motivational determinants of risk-taking behavior. In C. D. Spielberger (Ed.), *Personality, motivation, and action. Selected papers* (pp. 101–119). New York, NY: Praeger Special Studies.

- Atkinson, J. W., & Feather, N. T. (1966). A theory of achievement motivation. *Australian Journal of Psychology*, *21*, 335–349. doi: 10.1080/00049536908257802
- Baker, J. A., Grant, S., & Morlock, L. (2008). The teacher-student relationship as a developmental context for children with internalizing or externalizing behavior Problems. *School Psychology Quarterly*, *23*, 3–15. doi: 10.1037/1045-3830.23.1.3
- Bandura, A. (1986). *Social foundations of thought and action*. Engelwood Cliffs, NJ: Prentice Hall.
- Barber, B. K., & Olsen, J. A. (1997). Socialization in context: connection, regulation, and autonomy in the family, school, and neighborhood, and with peers. *Journal of Adolescent Research*, *12*, 287–315. doi: 10.1177/0743554897122008
- Baumeister, R., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*, 497–529. doi: 10.1037/0033-2909.117.3.497
- Baumeister, R. F., Twenge, J. M., & Nuss, C. K. (2002). Effects of social exclusion on cognitive processes: Anticipated aloneness reduces intelligent thought. *Journal of Personality and Social Psychology Bulletin*, *83*, 817–827. doi: 10.1037/0022-3514.83.4.817
- Beckmann, H.-K. (2000). Lehrer(aus)bildung in Deutschland: Kontinuität, Wandel und Strukturprobleme [Teacher training in Germany: continuity, change and structural problems]. In P. H. Heidelberg (Ed.), *Aktuelle Schulsysteme: Portugal, Kroatien, Marokko, USA, Niederlande, Deutschland* (Vol. 59, pp. 40–58). Heidelberg, Germany: Institut für Weiterbildung.
- Beehr, T. A., & McGrath, J. E. (1992). Social support, occupational stress and anxiety. *Anxiety, Stress & Coping*, *5*, 7–19. doi: 10.1080/10615809208250484
- Bester, G. (2007). Personality development of the adolescent: peer group versus parents. *South African Journal of Education*, *27*(2), 177–190.
- Bowlby, J. (1969). *Attachment. Attachment and loss*. New York, NY: Basic Books.
- Bowlby, J. (1980). *Attachment and loss. Sadness and depression*. London, UK: Random House.
- Brendgen, M., Vitaro, F., Boivin, M., Girard, A., Bukowski, W. M., Dionne, G., Tremblay, R. E., Pérusse, D. (2009). Gene environment interplay between peer rejection and depressive behavior in children. *Journal of Child Psychology and Psychiatry*, *50*, 1009–1017. doi: 10.1111/j.1469-7610.2009.02052.x



- Bronfenbrenner, U. (1979). *The ecology of human development. Experiments by nature and design*. Harvard, MA: Harvard College.
- Brown, S. L., Nobiling, B. D., Teufel, J., & Birch, D. A. (2011). Are kids too busy? Early adolescents' perceptions of discretionary activities, overscheduling, and stress. *Journal of School Health, 81*, 574–580. doi: 10.1111/j.1746-1561.2011.00629.x
- Bukowski, W., Laursen, B., & Rubin, K. H. (2009). *Social and emotional development. Critical concepts in psychology* (Vol. 3). London, UK: Routledge.
- Bukowski, W. M., Laursen, B., & Hoza, B. (2010). The snowball effect: Friendship moderates escalations in depressed affect among avoidant and excluded children. *Development and Psychopathology, 22*, 749–757. doi: 10.1017/s095457941000043x
- Bünger, S., & Raufelder, D. (2015). Fungiert soziale Kompetenz als Prädiktor einer Motivationstypologie? [Does social competence predict a motivation typology?] *Empirische Pädagogik* (accepted for publication)
- Cacioppo, J. T., & Patrick, B. (2008). *Loneliness: human nature and the need for social connection*. New York, NY: W. W. Norton & Company.
- Card, D. (1999). The causal effect of education on earnings. In O. Ashenfelter & D. Card (Eds.), *Handbook of labor economics* (Vol. 3). Amsterdam, Netherlands: Elsevier.
- Cassady, J. C., & Johnson, R. E. (2002). Cognitive test anxiety and academic performance. *Contemporary Educational Psychology, 27*, 270–295. doi: 10.1006/ceps.2001.1094
- Cattell, R. B. (1966). Anxiety and motivation: theory and crucial experiments. In C. D. Spielberger (Ed.), *Anxiety and behavior* (pp. 23–62). New York, London: Academic Press.
- Cohen, S. (1992). Stress, social support, and disorder. In H. O. F. Veiel & U. Baumann (Eds.), *The meaning and measurement of social support* (pp. 109–124). New York, NY: Hemisphere Press.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. *Journal of Applied Social Psychology, 13*, 99–125. doi: 10.1111/j.1559-1816.1983.tb02325.x
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health & Social Behavior, 24*(4), 385–396.

- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98, 310–357. doi: 10.1037//0033-2909.98.2.310
- Conneely, S., & Hughes, B. M. (2012). Test anxiety and sensitivity to social support among college students: Effects on salivary cortisol. *Cognition, Brain, Behavior: An Interdisciplinary Journal*, 14(4), 295–310.
- Cortina, K. S. (2008). Leistungsängstlichkeit. [Performance anxiety]. In W. Schneider & M. Hasselhorn (Eds.), *Handbuch der Pädagogischen Psychologie* (Vol. 1, pp. 50–61). Göttingen, Germany: Hogrefe.
- Covington, M. V. (1992). *Making the grade: A self-worth perspective on motivation and school reform*. Cambridge, England: Cambridge University Press.
- Cowen, E. L., Pryor-Brown, L., Hightower, A. D., & Lotyczewski, B. S. (1991). Age Perspectives on the stressfulness of life-events for 10–12 year old children. *School Psychology Quarterly*, 6, 240–250. doi: 10.1037/h0088818. ISSN: 1045-3830
- Crandall, V. J., Katkowsky, W., & Preston, A. (1962). Motivational and ability determinants of young children's intellectual achievement behaviors. *Child Development*, 33(3), 643–661.
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety. The experience of play in work and games*. San Francisco, CA: Jossey-Bass Publications.
- Csikszentmihalyi, M. (1990). *Flow - the psychology of optimal experience*. New York, NY: Harper/Row.
- Csikszentmihalyi, M., & Schiefele, U. (1993). Die Qualität des Erlebens und der Prozess des Lernens [The quality of experience and the process of learning]. *Zeitschrift für Pädagogik*, 39(2), 207–221.
- Cunningham, M., Shaffer, D., Barbee, A., Wolff, P., & Kelley, D. (1990). Separate processes in the relation of elation and depression to helping: Social versus personal concerns. *Journal of Experimental Social Psychology of Education*, 26, 13–33. doi: 10.1016/0022-1031(90)90059-U
- Deci, E. L., & Ryan, R. M. (1990). *Intrinsic motivation and self-determination in human behavior* (Vol. 3). New York, NY: Plenum Press.
- Deci, E. L., & Ryan, R. M. (2000). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, 26, 325–346. doi: 10.1080/00461520.1991.9653137

- Deffenbacher, J. L., & Deitz, S. R. (1978). Effects of test anxiety on performance, worry, and emotionality in naturally occurring exams. *Psychology in the Schools, 15*(3), 446–450. doi: 10.1002/1520-6807(197807)15:3<446::aid-pits2310150326>3.0.co;2-b
- Ebstrup, J. F., Eplov, L. F., Pisinger, C., & Jørgensen, T. (2011). Association between the Five Factor personality traits and perceived stress: is the effect mediated by general self-efficacy? *Anxiety, Stress & Coping: An International Journal, 24*, 407–419. doi: 10.1080/10615806.2010.540012.
- Eccles, J. S., Wigfield, A., & Schiefele, U. (1998). Motivation to succeed. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology* (pp. 1017–1095). New York, NY: Wiley.
- Eder, F. (1996). *Schul-und Klassenklima* [School and class climate]. Innsbruck, Austria: Studien-Verlag.
- Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*, 169–189. doi: 10.1207/s15326985ep3403\_3
- Elliot, A. J., & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 76*, 628–644. doi: 10.1037/0022-3514.76.4.628
- Ellis, G. D., Voelkl, J. E., & Morris, C. (1994). Measurement and analysis issues with explanation of variance in daily experience using the flow model. *Journal of Leisure Research, 26*(4), 337–356.
- Endler, N. S. (1997). Stress, anxiety and coping: The multidimensional interaction model. *Canadian Psychology/Psychologie canadienne, 33*, 136–153. doi: 10.1037/0708-5591.38.3.136
- Engeser, S., & Rheinberg, F. (2008). Flow, performance and moderators of challenge-skill balance. *Motivation and Emotion, 32*, 158–172. doi: 10.1007/s11031-008-9102-4
- Essau, C. A., Leung, P. W. L., Conradt, J., Cheng, H., & Wong, T. (2008). Anxiety symptoms in Chinese and German adolescents: their relationship with early learning experiences, perfectionism, and learning motivation. *Depression & Anxiety, 25*, 801–810. doi: 10.1002/da.20334
- Eum, K., & Rice, K. G. (2011). Test anxiety, perfectionism, goal orientation, and academic performance. *Anxiety, Stress & Coping: An International Journal, 24*, 167–178. doi: 10.1080/10615806.2010.488723
- Fend, H. (1998). *Qualität im Bildungswesen: Schulforschung zu Systembedingungen, Schulprofilen und Lehrerleistung* [Quality in education: Education research on system

- conditions, school profiles and teacher performance]. Weinheim, Germany: Juventa Verlag.
- Fend, H. (2008). *Schule gestalten. Systemsteuerung, Schulentwicklung und Unterrichtsqualität* [Shaping school. System control, school development and teaching quality]. (Vol. 1). Wiesbaden: VS.
- Finch, B. K., & Vega, W. A. (2003). Acculturation stress, social support, and self-rated health among Latinos in California. *Journal of Immigrant Health, 5*, 109–117. doi: 10.1023/A:1023987717921
- Finch, W. H., & Bronk, K. C. (2011). Conducting confirmatory latent class analysis using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal, 18*, 132–151. doi: 10.1080/10705511.2011.532732
- Fitch, B. D. (2004). *A test of the relationship between personality traits and test anxiety*. Dissertation, Fielding Graduate University, Santa Barbara, CA.
- Flanagan, K. S., Erath, S. A., & Bierman, K. L. (2008). Unique associations between peer relationships and social anxiety in early adolescence. *Journal of Clinical Child and Adolescent Psychology, 37*, 759–769. doi: 10.1080/15374410802359700
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*, 218–226. doi: 10.1037/0003-066X.56.3.218
- Frenzel, A. C., Goetz, T., & Pekrun, R. (2009). Emotionen. In E. Wild & J. Möller (Eds.), *Pädagogische Psychologie* (pp. 205–234). Berlin, Germany: Springer.
- Friedman, I. A., & Bedas–Jacob, O. (1997). Measuring perceived test anxiety in adolescents: A self-report scale. *Educational and Psychological Measurement, 57*, 1035–1047. doi: 10.1177/0013164497057006012
- Frydenberg, E. (Ed.). (2002). *Beyond coping: meeting goals, visions, and challenges*. New York, NY: Oxford University Press.
- Fukuyama, F. (1999). *The great disruption: human nature and the reconstitution of social order*. New York, NY: Free Press.
- Gaspar de Matos, M., Barrett, P., Dadds, M., & Shortt, A. (2003). Anxiety, depression, and peer relationships during adolescence: Results from the Portuguese national health behaviour in school-aged children survey. *European Journal of Psychology of Education, 18*, 3–14. doi: 10.1007/BF03173600
- Geiser, C. (2012). *Data analysis with Mplus*. New York, NY: The Guilford Press.

- Graham, S., & Weiner, B. (1996). Theories and principles of motivation. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of Educational Psychology* (pp. 63–84). New York, NY: Macmillan.
- Graudenz, I., & Randoll, D. (1997). *So dänisch wie möglich, so deutsch wie nötig? Eine vergleichende Untersuchung zur Wahrnehmung von Schule durch Abiturienten* [As Danish as possible, so German as necessary? A comparative study of the perception of school through high school seniors]. Frankfurt/M, Germany: Böhlau.
- Guggenbühl, A. (2002). *Die PISA- Falle: Schulen sind keine Lernfabriken* [The PISA-trap: Schools are not learning factories]. Freiburg, Germany: Herder.
- Hamre, B. K., & Pianta, R. C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development*, 72, 625–638. doi: 10.1111/1467-8624.00301
- Hanushek, E. A., & Kimlo, D. D. (2000). Schooling, labor force quality, and the growth of nations. *American Economic Review*, 90(5), 1184–1208.
- Hanushek, E. A., & Woessmann, L. (2012). Do better schools lead to more growth? Cognitive skills, economic outcomes, and causation. *Journal of Economic Growth*, 17, 267–321. doi: 10.3386/w14633
- Harackiewicz, J. M., Barron, K. E., Tauer, J. M., & Elliot, A. J. (2002). Predicting success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through graduation. *Journal of Educational Psychology*, 94, 562–575. doi: 10.1037/0022-0663.94.3.562
- Harter, S. (1996). Teacher and classmate influences on scholastic motivation, self-esteem, and level of voice in adolescents. In J. Juvonen & K. Wentzel (Eds.), *Social Motivation - Understanding children's school adjustment* (pp. 11–42). Cambridge, England: University Press.
- Hascher, T. (2005). Emotionen im Schulalltag: Wirkungen und Regulationsformen [Emotions in everyday school life: Effects and regulation forms]. *Zeitschrift für Pädagogik*, 51(5), 610–625.
- Heckhausen, H. (1980). *Motivation und Handeln: Lehrbuch der Motivationspsychologie* [Motivation and action: Textbook of motivational psychology]. Berlin, Germany: Springer.
- Heckhausen, H. (1991). *Motivation and action*. New York, NY: Springer.
- Hembree, R. (1988). Correlates, causes, effects and treatment of text anxiety. *Review of Educational Research*, 58, 47–77. doi: 10.3102/00346543058001047

- Hesse, H.-G. (2004). Values and attitudes and their influence on education. In H. Döbert, E. Klieme & W. Sroka (Eds.), *Conditions of school performance in seven countries. A quest for understanding the international variation of PISA results* (pp. 302–304). Münster, Germany: Waxmann.
- Hobfoll, S. E. (1988). *The ecology of stress*. New York, NY: Hemisphere Publishing.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*, 513–524. doi: 10.1037/0003-066X.44.3.513
- Hobfoll, S. E. (2001). The influence of culture, community, and the nested-self in the stress process: Advancing conservation of resources theory. *Applied Psychology*, *50*, 337–421. doi: 10.1111/1464-0597.00062
- Hobfoll, S. E., Freedy, J., Lane, C., & Geller, P. (1990). Conservation of social resources: social support resource theory. *Journal of Social and Personal*, *7*, 465–478 doi: 10.1177/0265407590074004
- Hobfoll, S. E., & Lilly, R. S. (1993). Resource conservation as a strategy for community psychology. *Journal of Community Psychology*, *21*, 128–148. doi: 10.1002/1520-6629(199304)21:2<128::AID-JCOP2290210206>3.0.CO;2-5
- Hodapp, V., Rohrman, S., & Ringeisen, T. (2011). *PAF - Prüfungsangstfragebogen. Tests Info* [PAF – Test anxiety questionnaire. Tests Info]. Göttingen, Germany: Hogrefe.
- Hodges, E. V., Boivin, M., Vitaro, F., & Bukowski, W. M. (1999). The power of friendship: Protection against an escalating cycle of peer victimization. *Developmental Psychology*, *35*, 94–101. doi: 10.1037/0012-1649.35.1.94
- Hoferichter, F., & Raufelder, D. (2014). Ein Modell inter-individueller Unterschiede sozio-motivationaler Beziehungen von Sekundarschülern mit ihren Peers und Lehrern [A model of inter-individual differences, socio-motivational relationships of secondary school students with their peers and teachers]. In C. Tillack, J. Fetzer & D. Raufelder (Eds.), *Beziehungen in Schule und Unterricht - Teil 3 Soziale Beziehungen im Kontext von Motivation und Leistung* (Vol. Reihe Theorie und Praxis der Schulpädagogik Band 25, pp. 170–200). Immenhausen, Germany: Prolog.
- Hoferichter, F., Raufelder, D., Ringeisen, T., Rohrman, S., Bukowski, W. M. (under review). *Assessing the multi-faceted nature of test anxiety: The PAF-E – An English version of the German Test Anxiety Inventory PAF*.
- Jackson, M. (2013). *The age of stress. Science and the search for stability*. Oxford, UK: Oxford University Press.

- Jagenow, D., Raufelder, D., & Eid, M. (2014). A person-oriented approach to predict socio-motivational dependency in early adolescents. *Learning and Individual Differences*, 36, 173–179. doi: 10.1016/j.lindif.2014.07.017
- Jovanovic, J., & Lerner, R. M. (1999). Individual-contextual relationships and mathematics performance: Comparing American and Serbian Young Adolescents. In R. M. Lerner & J. Jovanovic (Eds.), *Cognitive and moral development and academic achievement in adolescence* (pp. 143–470). New York, NY: Garland Publishing.
- Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review*, 19, 141–184 doi: 10.1007/s10648-006-9012-5
- Kaplan, D., Liu, R., & Kaplan, H. (2005). School related stress in early adolescence and academic performance three years later: The conditional influence of self expectations. *Social Psychology of Education*, 8, 3–17. doi: 10.1007/s11218-004-3129-5
- Katschnig, T., & Hanisch, G. (1999). Schule ohne Angst – eine Utopie? [School without anxiety – a utopia?] In R. Olechowski & K. Garnitschnig (Eds.), *Humane Schule* (pp. 75–93). Frankfurt/ Main, Germany: Peter Lang Verlag.
- Kaufmann, A. (2007). Merkmale und Einstellungen von Schülern [Characteristics and attitudes of students]. In H. Ditton (Ed.), *Kompetenzaufbau und Laufbahnen im Schulsystem. Ergebnisse einer Längsschnittuntersuchung an Grundschulen* (pp. 117–143). Münster, Germany: Waxmann.
- Kenny, M. E., Gallagher, L. A., Alvarez-Salvat, R., & Silsby, J. (2002). Sources of support and psychological distress among academically successful inner-city youth. *Adolescence*, 37(145), 161–182.
- Klein, A., & Moosbrugger, H. (2000). Maximum likelihood estimation of latent interaction effects with the LMS method. *Psychometrika*, 65, 457–474. doi: 10.1007/BF02296338
- Krapp, A. (2000). Interest and human development during adolescence: an educational-psychological approach. In J. Heckhausen (Ed.), *Motivational psychology of human development* (pp. 109–128). Amsterdam, Netherlands: Elsevier Science.
- Kunter, M., Schümer, G., Artelt, C., Baumert, J., Klieme, E., Neubrand, M., Prenzel, M., Schiefele, U., Wolfgang, S., Stanat, P., Tillmann, K.-J., Weiß, M. (2002). *Dokumentation der Erhebungsinstrumente* [Documentation of the data collection instruments]. (Vol. 72). Berlin, Germany: Max-Planck-Institut für Bildungsforschung.

- Ladd, G. W., Kochenderfer, B. J., & Coleman, C. C. (1996). Friendship quality as a predictor of young children's early school adjustment. *Child Development, 67*, 1103–1118. doi: 10.1111/1467-8624.ep9704150186
- Laitinen-Krispijn, S., Van der Ende, J., Hazebroek-Kampschreur, A., & Verhulst, F. (1999). Pubertal maturation and the development of behavioural and emotional problems in early adolescence. *Acta Psychiatrica Scandinavica, 99*, 16–25. doi: 10.1111/j.1600-0447.1999.tb05380.x
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York, NY: McGraw-Hill.
- Lazarus, R. S. (1991). *Emotion and adaptation*. New York, NY: Oxford University Press.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality, 1*, 141–169. doi: 10.1002/per.2410010304
- Lazarus, R. S., & Launier, R. (1978). Stress-related transactions between person and environment. In L. A. Pervin & M. Lewis (Eds.), *Perspectives in Interactional Psychology* (pp. 287–327). New York, NY: Plenum Press.
- Leary, M. R. (2004). The sociometer, self-esteem, and the regulation of interpersonal behavior. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 373–391). New York, NY: Guilford Press.
- Leary, M. R., & Baumeister, R. F. (2000). The nature and function of self-esteem: Sociometer theory. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 32, pp. 1–62). San Diego, CA: Academic Press.
- Lee, R. M., & Robbins, S. B. (1998). The relationship between social connectedness and anxiety, self-esteem, and social identity. *Journal of Counseling Psychology, 45*, 338–345. doi: 10.1037/0022-0167.45.3.338
- Lem, S. (1990). *Philosophie des Zufalls Bd. II* [Philosophy of Chance vol. II], Berlin, Germany: Verlag Volk und Welt.
- Lerner, R. M. (1991). Changing organism-context relations as the basic process of development: A developmental contextual perspective. *Developmental Psychology, 27*, 27–32. doi: 10.1037/0012-1649.27.1.27
- Lerner, R. M. (1998). Theories of human development: Contemporary perspectives. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Vol. 1 (5th Ed.): Theoretical models of human development* (pp. 1–24). New York, NY: JohnWiley & Sons.



- Lerner, R. M. (2001). *Concepts and theories of human development* (3 ed.). Mahwah, NJ: Lawrence Erlbaum.
- Lerner, R. M., & Kauffman, M. B. (1985). The concept of development in contextualism. *Developmental Review*, 5, 309–333. doi: 10.1016/0273-2297(85)90016-4
- Leunga, G. S. M., & Heb, X. (2010). Resourcefulness: a protective factor buffer against the academic stress of school aged children. *Educational Psychology: An International Journal of Experimental Educational Psychology*, 30, 395–410. doi: 10.1080/01443411003682574
- Link, S. (2013). *Institutional determinants of student achievement microeconomic evidence*. München, Germany: Leibnitz-Institut für Wirtschaftsforschung.
- Lowe, P. A., Grumbein, M. J., & Raad, J. M. (2011). Examination of the psychometric properties of the test anxiety scale for elementary students (TAS–E) scores. *Journal of Psychoeducational Assessment*, 29, 503–514. doi: 10.1177/0734282910395894
- Macher, D., Paechter, M., Papousek, I., & Ruggeri, K. (2012). Statistics anxiety, trait anxiety, learning behavior, and academic performance. *European Journal of Psychology of Education*, 27, 483–498. doi: 10.1007/s10212-011-0090-5
- March, H. W., & Craven, R. G. (2005). A reciprocal effects model of the causal ordering of self-concept and achievement. New support for the benefits of enhancing self-concept. In H. W. Marsh, R. G. Craven & D. M. McInerney (Eds.), *International advances in self research: New frontiers for self research* (pp. 15–52). Greenwich, CT: Information Age.
- Maslow, A. H. (1943). Preface to motivation theory. *Psychosomatic Medicine*, 5(1), 585–592.
- Massimini, F., & Carli, M. (1988). The systematic assessment of flow in daily experience. In M. Csikszentmihalyi & I. S. Csikszentmihalyi (Eds.), *Optimal Experience. Psychological studies of flow in consciousness* (pp. 266–287). Cambridge, UK: Cambridge University Press
- Mates, D., & Allison, K. R. (1992). Sources of stress and coping responses of high school students. *Adolescence*, 27(106), 461–474.
- Mauss, I. B., Shallcross, A. J., Troy, A. S., John, O. P., Ferrer, E., Wilhelm, F. H., & Gross, J. J. (2011). Don't hide your happiness! Positive emotion dissociation, social connectedness, and psychological functioning. *Journal of Personality and Social Psychology*, 100, 738–748. doi: 10.1037/a0022410
- McClelland, D. C. (1961). *The Achieving Society*. New York, NY: D. Van Nostrand Company, Inc.

- McClelland, D. C., Atkinson, J. W., Clark, R., & Lowell, E. (1976). *The achievement motive*. New York, NY: Appleton, Centurz, Crofts.
- McClelland, D. C., Atkinson, J. W., Clark, R. A., & Lowell, E. L. (1953). *The achievement motive*. New York, NY: Appleton-Century Crofts.
- McCrae, R. R. (1990). Controlling neuroticism in the measurement of stress. *Stress Medicine*, 6, 237–241. doi: 10.1002/smi.2460060309
- McGrath, J. E., & Beehr, T. A. (1990). Time and the stress process: Some temporal issues in the conceptualization and measurement of stress. *Stress Medicine*, 6, 93–104. doi: 10.1002/smi.2460060205
- Meece, J. L., Glienke, B. B., & Askew, K. (2009). Gender and motivation. In K. Wentzel & A. Wigfield (Eds.), *Handbook on motivation at school* (pp. 411–432). New York, NY: Routledge, Taylor, and Francis.
- Midgley, C., Kaplan, A., & Middleton, M. J. (2001). Performance-approach goals: Good for what, for whom, under what circumstances, and at what cost? *Journal of Educational Psychology*, 93, 77–86. doi: 10.1037/0022-0663.93.1.77
- Mulligan, C. B. (1999). Galton versus the human capital approach to inheritance. *Journal of Political Economy*, 107, 184–224. doi: 10.1086/250108
- Murray, C., & Greenberg, M. T. (2001). Relationships with teachers and bonds with school: Social emotional adjustment correlates for children with and without disabilities. *Psychology in the Schools*, 38, 25–41. doi: 10.1002/1520-6807(200101)38:1<25::aid-pits4>3.0.co;2-c
- Ng, D. M., & Jeffery, R. W. (2003). Relationships between perceived stress and health behaviors in a sample of working adults. *Health Psychology*, 22, 638–642. doi: 10.1037/0278-6133.22.6.638
- Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research*, 70, 323–367 doi: 10.3102/00346543070003323
- Park, J., Kitayama, S., Karasawa, M., Curhan, K., Markus, H. R., Kawakami, N., Miyamoto, Y., Love, G. D., Coe, C. L., & Ryff, C. D. (2013). Clarifying the links between social support and health: Culture, stress, and neuroticism matter. *Journal of Health Psychology*, 18, 226–235 doi: 10.1177/1359105312439731
- Parker, M., & Parish, J. (2001). *The age of anxiety : conspiracy theory and the human sciences*. Oxford, UK: Blackwell
- Patrick, B. C., Skinner, E. A., & Connell, J. P. (1993). What motivates children's behavior and emotion? Joint effects of perceived control and autonomy in the academic domain.

- Journal of Personality and Social Psychology*, 65, 781–791. doi: 10.1037/0022-3514.65.4.781
- Patton, G., Hibbert, M., Carlin, J., Shao, Q., Rosier, M., Caust, J., & Bowes, G. (1996). Menarche and the onset of depression and anxiety in Victoria, Australia. *Journal of Epidemiology & Community Health*, 50, 661–666. doi: 10.1136/jech.50.6.661
- Pekrun, R. (2000a). A social-cognitive, control-value theory of achievement emotions. In J. Heckhausen (Ed.), *Motivational psychology of human development. Developing motivation and motivating development* (pp. 143–164). Amsterdam, Netherlands: Elsevier.
- Pekrun, R. (2000b). A social cognitive, control-value theory of achievement emotions. In J. Heckhausen (Ed.), *Motivational psychology of human development*. Oxford, UK: Elsevier.
- Pekrun, R. (2001). Test anxiety and academic achievement. In N. J. Smelser & P. B. Baltes (Eds.), *International Encyclopedia of the Social & Behavioral Sciences* (1st ed., pp. 15610–15614). Amsterdam, Netherlands: Elsevier.
- Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review*, 18, 315–341. doi: 10.1007/s10648-006-9029-9
- Pekrun, R., Elliot, A. J., & Maier, M. A. (2006). Achievement goals and discrete achievement emotions: A theoretical model and prospective test. *Journal of Educational Psychology*, 98, 583–597. doi: 10.1037/0022-0663.98.3.583
- Pekrun, R., Frenzel, A. C., Goetz, T., & Perry, R. P. (2007). The control-value theory of achievement emotions: An integrative approach to emotions in education. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in Education* (pp. 13–36). Amsterdam, Netherlands: Academic Press.
- Pekrun, R., & Frese, M. (1992). Emotions in work and achievement. In C. L. Cooper & I. T. Robertson (Eds.), *International review of industrial and organizational psychology* (Vol. 7, pp. 152–200). Chichester, UK: John Wiley & Sons.
- Pekrun, R., & Götz, T. (2006). Emotionsregulation: Vom Umgang mit Prüfungsangst [Emotion regulation: Coping with test anxiety]. In H. Mandl & H. F. Friedrich (Eds.), *Handbuch Lernstrategien* (pp. 248–258). Göttingen, Germany: Hogrefe.
- Pekrun, R., & Schiefele, U. (1996). Emotions- und motivationspsychologische Bedingungen der Lernleistung [Emotional and motivational psychology conditions of learning

- performance]. In F. E. Weinert (Ed.), *Psychologie des Lernens und der Instruktion* (pp. 153–180). Göttingen, Germany: Hogrefe.
- Petermann, F., & Winkel, S. (2007). *FLM 7-13 Fragebogen zur Leistungsmotivation für Schüler der 7. bis 13. Klasse* [FLM 7-13 questionnaire on achievement motivation for students in 7th to 13th grade]. Bern, Switzerland: Hogrefe.
- Pianta, R. C., & Nimetz, S. L. (1991). Relationships between children and teachers: Associations with classroom and home behavior. *Journal of Applied Developmental Psychology, 12*, 379–393. doi: 10.1016/0193-3973(91)90007-Q
- Pintrich, P. R. (2000). An achievement goal theory perspective on issues in motivation terminology, theory, and research. *Contemporary Educational Psychology, 25*, 92–104. doi: 10.1006/ceps.1999.1017
- Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology, 95*(4), 667–686.
- Rapee, R. M., Craske, M. G., Brown, T. A., & Barlow, D. H. (1996). Measurement of perceived control over anxiety related events. *Behavior Therapy, 27*, 279–293. doi: 10.1016/S0005-7894(96)80018-9
- Raufelder, D. (2014). Pubertät und Lernmotivation [Puberty and learning motivation]. *Lehren und Lernen, 40*(8/9), 16–21.
- Raufelder, D., Drury, K., Jagenow, D., Hoferichter, F., & Bukowski, W. (2013). Development and validation of the Relationship and Motivation (REMO) scale to assess students' perceptions of peers and teachers as motivators in adolescence. *Learning and Individual Differences, 24*, 182–189. doi: 10.1016/j.lindif.2013.01.001
- Raufelder, D., Hoferichter, F., Pöhland, L., Golde, S., Lorenz, R. C., & Beck, A. (under review). Students' socio-motivational relationships with teachers, amygdala response to teacher's negative facial expressions and relation to test anxiety.
- Raufelder, D., Jagenow, D., Drury, K., & Hoferichter, F. (2013). Social relationships and motivation in secondary school: Four different motivation types. *Learning and Individual Differences, 24*, 89–95. doi: 10.1016/j.lindif.2012.12.002
- Raufelder, D., Regner, N., Drury, K., & Eid, M. (2015). Does self-determination predict the school engagement of four different motivation types in adolescence? *Educational Psychology*. (advance online publication). doi: 10.1080/01443410.2015.1008405
- Raufelder, D., Ringeisen, T., Schnell, K., & Rohrmann, S. (2015). The impact of adolescents' self-efficacy and self-regulated goal attainment processes on school performance - do

- gender and test anxiety matter? *Learning and Individual Differences*. (advance online publication). doi: 10.1016/j.lindif.2014.12.008
- Reeve, J. (2002). Self-determination theory applied to educational settings. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 182–203). Rochester, NY: The University of Rochester Press.
- Rheinberg, F. (2008). Intrinsic motivation and flow-experience. In H. Heckhausen & J. Heckhausen (Eds.), *Motivation and action* (pp. 323–348). Cambridge, UK: Cambridge University Press.
- Rice, K. G., & Van Arsdale, A. C. (2010). Perfectionism, perceived stress, drinking to cope, and alcohol-related problems among college students. *Journal of Counseling Psychology*, *57*, 439–450. doi: 10.1037/a0020221
- Richter, V. (2009). *Beobachtet und bewertet werden. Leistungsangst aus evolutionärer Perspektive* [Being monitored and evaluated. Performance anxiety from an evolutionary perspective] (Vol. 3). Berlin, Germany: LIT Verlag.
- Rigby, K. (2000). Effects of peer victimization in schools and perceived social support on adolescent well-being. *Journal of Adolescence*, *23*, 57–68. doi: 10.1006/jado.1999.0289
- Roeser, R. W., Eccles, J. S., & Sameroff, A. J. (2000). School as a context of early adolescents' academic and social-emotional development: A summary of research findings. *The Elementary School Journal*, *100*, 443–471. doi: 10.1111/j.1467-8624.2005.00889.x
- Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher-student relationships on students' school engagement and achievement. A meta-analytic approach. *Review of Educational Research*, *81*, 493–529. doi: 10.3102/0034654311421793
- Rost, D. H., & Schermer, F. J. (2006). Leistungsängstlichkeit [Performance anxiety]. In D. H. Rost (Ed.), *Handwörterbuch Pädagogische Psychologie* (pp. 404–415). Weinheim, Germany: Psychologie Verlags Union.
- Rouxel, G. (1999). Path analyses of the relations between self-efficacy, anxiety and academic performance. *European Journal of Psychology of Education*, *14*, 403–421. doi: 10.1007/BF03173123
- Rubin, K. H., Bukowski, W. M., & Parker. (2006). Peer interactions, relationships, and groups. In N. Eisenberg, W. Damon & R. M. Lerner (Eds.), *Handbook of child*

- psychology* (Vol. Social, emotional, and personality development, pp. 197–219). Hoboken, NJ: John Wiley & Sons.
- Sabol, T. J., & Pianta, R. C. (2012). Recent trends in research on teacher–child relationships. *Attachment & Human Development*, *14*, 213–231. doi: 10.1080/14616734.2012.672262
- Sarason, I. G. (1959). Intellectual and personality correlates of test anxiety. *The Journal of Abnormal and Social Psychology*, *59*, 272–275. doi: 10.1037/h0042200
- Schmalfeld, A. (2011). „Ich wünsche mir, dass sich die Lehrer nicht überall einmischen und nicht immer gleich petzen!“ Wünsche von 12- bis 14-jährigen Mädchen und Jungen für eine peer-freundlichere Schule in der PIN-Studie [„I wish teachers would not interfere everywhere and would not always tell on me!“ Desires of 12- to 14-year-old girls and boys for a peer-friendly school in the PIN study]. In A. Ittel, H. Merkens & J. Zinnecker (Eds.), *Jahrbuch Jugendforschung* (pp. 101–125). Wiesbaden, Germany: Verlag für Sozialwissenschaften.
- Schölmerich, A. (2000). Attachment and behavioral inhibition: Two perspectives on early motivational development. In H. Heckhausen (Ed.), *Motivational Psychology of Human Development* (pp. 39–56). Amsterdam, Netherlands: Elsevier Science B.V.
- Schraml, K., Perski, A., Grossi, G., & Simonsson-Sarnecki, M. (2011). Stress symptoms among adolescents: The role of subjective psychosocial conditions, lifestyle, and self-esteem. *Journal of Adolescence*, *34*, 987–996. doi: 10.1016/j.adolescence.2010.11.010
- Schroeder, L. (2006). *What high-stakes testing means for the emotional well-being of students and teachers*. The Claremont Graduate University, Claremont. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2006-99007-080&site=ehost-live> Available from EBSCOhost psych database.
- Schüler, J. (2007). Arousal of flow-experience in a learning setting and its effects on exam-performance and affect. *Zeitschrift für Pädagogische Psychologie*, *21*, 217–227. doi: 10.1024/1010-0652.21.3.217
- Schwarzer, R. (2000). *Streß, Angst und Handlungsregulation* [Stress, anxiety and action regulation]. (Vol. 4). Stuttgart, Germany: W. Kohlhammer GmbH.
- Segool, N. K., Carlson, J. S., Goforth, A. N., von der Embse, N., & Barterian, J. A. (2013). Heightened test anxiety among young children: Elementary school student’s anxious responses to high-stakes testing. *Psychology in the Schools*, *50*, 489–499. doi: 10.1002/pits.21689

- Selkirk, L. C., Bouchey, H. A., & Eccles, J. S. (2011). Interactions among domain-specific expectancies, values, and gender: Predictors of test anxiety during early adolescence. *Journal of Early Adolescence, 31*, 361–389. doi: 10.1177/0272431610363156
- Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: self-affirmation theory. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 38, pp. 183–242). Oxford, UK: Elsevier Inc.
- Smith, C. A., & Kirby, L. D. (2009). Putting appraisal in context: Toward a relational model of appraisal and emotion. *Cognition and Emotion, 23*, 1352–1372. doi: 10.1080/02699930902860386
- Smith, C. A., & Lazarus, R. S. (1993). Appraisal components, core relational themes, and the emotions. *Cognition and Emotion, 7*, 233–269. doi: 10.1080/02699939308409189
- Spielberger, C. D. (1966). Theory and research on anxiety. In C. D. Spielberger (Ed.), *Anxiety and Behavior* (pp. 3–20). New York, NY: Academic Press.
- Spielberger, C. D. (1972). Anxiety: Current trends in theory and research. In C. D. Spielberger (Ed.), *Anxiety as an emotional state* (pp. 23–49). New York, NY: Academic Press.
- Spielberger, C. D. (1983). *Manual for the state-trait anxiety inventory* (Form V). Palo Alto, CA: Consulting Psychologists Press.
- Spielberger, C. D., & Vagg, P. R. (Eds.). (1995). *Test anxiety: Theory, assessment, and treatment*. Washington D.C.: Taylor & Francis.
- Spielberger, C. D., Vagg, P. R., Baker, L. R., Donham, G. W., & Westberry, L. G. (1980). Factor structure of the state-trait anxiety inventory. In I. G. Sarason & C. D. Spielberger (Eds.), *Stress and Anxiety* (Vol. 7, pp. 95–109). Washington D.C.: Hemisphere.
- Steinbicker, J. (2011). *Zur Theorie der Informationsgesellschaft: ein Vergleich der Ansätze von Peter Drucker, Daniel Bell und Manuel Castells*. [On the theory of the information society: a comparison of approaches of Peter Drucker, Daniel Bell and Manuel Castells] (Vol. 2). Wiesbaden, Germany: Verlag für Sozialwissenschaft.
- Steptoe, A., Wardle, J., Pollard, T. M., Cnaan, L., & Davies, G. J. (1996). Stress, social support and health-related behavior: A study of smoking, alcohol consumption and physical exercise. *Journal of Psychosomatic Research, 41*, 171–180. doi: 10.1016/0022-3999(96)00095-5

- Stöber, J. (2004). Dimensions of test anxiety: Relations to ways of coping with pre-exam anxiety and uncertainty. *Anxiety, Stress & Coping, 17*, 213–226. doi: 10.1080/10615800412331292615
- Stroll, O., & Lau, A. (2005). Flow-Erleben beim Marathonlauf. Zusammenhänge mit Anforderungspassung und Leistung [Flow experience during a marathon. Relationships with adjustment to requirements and performance]. *Zeitschrift für Sportpsychologie, 12*, 75–82. doi: 10.1026/1612-5010.12.3.75
- Swickert, R., & Owens, T. (2010). The interaction between neuroticism and gender influences the perceived availability of social support. *Personality and Individual Differences, 48*, 385–390. doi: 10.1016/j.paid.2009.10.033
- Szabó, M. (2011). The emotional experience associated with worrying: anxiety, depression, or stress? *Anxiety, Stress & Coping: An International Journal, 24*, 91–105. doi: 10.1080/10615801003653430
- Szirmak, Z. (2005). *The Big Five Model of personality and primary prevention in adolescence*. Dissertation. Free University Berlin, Berlin. Retrieved from: <http://www.diss.fu-berlin.de/2005/232/>.
- Tausch, R., & Tausch, A.-M. (1998). *Erziehungs-Psychologie. Begegnung von Person zu Person* [Educational Psychology. Encounter from person to person] (Vol. 11). Göttingen, Germany: Hogrefe.
- Triandis, H. C. (1995). *Individualism & collectivism. New directions in social psychology*. Boulder, CO: Westview Press.
- Twenge, J. M. (2000). The age of anxiety? The birth cohort change in anxiety and neuroticism. *Journal of Personality and Social Psychology, 79*, 1007–1021. doi: 10.1037/0022-3514.79.6.1007
- Uliaszek, A. A., Zinbarg, R. E., Mineka, S., Craske, M. G., Sutton, J. M., Griffith, J. W., Rose, R., Waters, A., Hammen, C. (2010). The role of neuroticism and extraversion in the stress–anxiety and stress–depression relationships. *Anxiety, Stress & Coping: An International Journal, 23*, 363–381. doi: 10.1080/10615800903377264
- University of Chicago (2008, March 20). Breast cancer in black women may be connected to neighborhood conditions, study suggests, *ScienceDaily*. Retrieved from <http://www.sciencedaily.com/releases/2008/03/080317164342.htm>.
- Urduan, T. C. (1997). Achievement goal theory: past results, future directions. In M. L. Maehr & P. Pintrich (Eds.), *Advances in Motivation and Achievement* (Vol. 10). London, UK: Jai Press Inc.



- Vitoroulis, I., Schneider, B. H., Cerviño Vasquez, C., del Pilar Soteras de Toro, M., & Santana Gonzáles, Y. (2012). Perceived parental and peer support in relation to Canadian, Cuban, and Spanish adolescents' valuing of academics and intrinsic academic motivation. *Journal of Cross-Cultural Psychology, 43*, 704–722 doi: 10.1177/0022022111405657
- Walton, G. M., Cohen, G. L., David, C., & Spencer, S. (2011). Mere belonging: The power of social connections. *Journal of Personality and Social Psychology, 102*, 513–532. doi: 10.1037/a0025731
- Weiner, B. (1972). Attribution theory, achievement motivation, and the educational process. *Review of Educational Research, 42*(2), 203–215.
- Weiner, B. (1985). An attributional theory of achievement and emotion. *Psychological Review, 92*, 548–573. doi: 10.1037/0033-295X.92.4.548
- Weiner, B. (1990). History of motivational research in education. *Journal of Educational Psychology, 82*, 616–622. doi: 10.1037/0022-0663.82.4.616
- Weiner, B. (2007). Examining emotional diversity in the classroom: An attribution theorist considers the moral emotions. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education. Educational psychology series* (pp. 75–88). San Diego, CA: Elsevier Academic Press.
- Wentzel, K. R. (1993). Motivation and achievement in early adolescence: The role of multiple classroom goals. *Journal of Early Adolescence, 13*, 4–20. doi: 10.1177/0272431693013001001
- Wentzel, K. R. (2009). Peer relationships and motivation at school. In K. Rubin, W. M. Bukowski & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups* (pp. 531–547). New York; NY: Guilford.
- Wentzel, K. R., Battle, A., Russell, S. L., & Looney, L. B. (2010). Social supports from teachers and peers as predictors of academic and social motivation. *Contemporary Educational Psychology, 35*, 193–202. doi: 10.1016/j.cedpsych.2010.03.002
- Wigfield, A., & Eccles, J. S. (2002). The development of competence beliefs, expectancies for success, and achievement values from childhood through adolescence. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 91–120). San Diego, CA: Academic Press.
- Wigfield, A., Eccles, J. S., Mac Iver, D., Reuman, D. A., & Midgley, C. (1991). Transitions during early adolescence: Changes in children's domain specific self-perceptions and

- general self-esteem across the transition to junior high school. *Developmental Psychology*, 27, 552–565. doi: 10.1037/0012-1649.27.4.552
- Williams, B., Pang, D., Delgado, B., Kocherginsky, M., Tretiakova, M., Krausz, T., Pan, D., He, J., McClintock, M. K., Conzen, S. D. (2009). A model of gene-environment interaction reveals altered mammary gland gene expression and increased tumor growth following social isolation. *Cancer Prevention Research*, 29, 850–861. doi: 10.1158/1940-6207.CAPR-08-0238
- Wilson, D. N., & Lam, T. C. M. (2004). Canada. In H. Döbert, E. Klieme & W. Sroka (Eds.), *Conditions of school performance in seven countries. A quest for understanding the international variation of PISA results* (pp. 15–64). Münster, Germany: Waxmann.
- Winkel, R. (2009). *Der gestörte Unterricht. Diagnostische und therapeutische Möglichkeiten*. Baltmannsweiler, Germany: Schneider Verlag Hohengehren.
- Wit, D. J. D., Karioja, K., Rye, B. J., & Shain, M. (2011). Perceptions of declining classmate and teacher support following the transition to high school: Potential correlates of increasing student mental health difficulties. *Psychology in the Schools*, 48, 556–572. doi: 10.1002/pits.20576
- World Health Organization (1993). *Approaches to stress management in the community setting: report on a WHO consultation*. Copenhagen, Denmark: WHO Archives.
- Yerkes, R. M., & Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology and Psychology*, 18, 459–482. doi: 10.1002/cne.920180503
- Zeidner, M. (1998). *Test anxiety. The state of the art*. New York, NY: Plenum Press.
- Zeidner, M. (2004). Test Anxiety. In C. D. Spielberger (Ed.), *Encyclopedia of applied psychology* (1st ed., pp. 545–556). Amsterdam, Netherlands: Elsevier Academic Press.
- Zeidner, M. (2007). Test anxiety in educational contexts: Concepts, findings, and future directions. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education. Educational psychology series* (pp. 165–184). San Diego, CA: Elsevier Academic Press.

## Chapter II / Study 1

### **The mediating role of socio-motivational relationships in the interplay of perceived stress, neuroticism, and test anxiety among adolescent students**

#### **2.1 Abstract**

In this study we examined whether socio-motivational relationships, such as student-student (SSR) and teacher-student relationships (TSR) as well as peers as positive motivators (PPM) and teachers as positive motivators (TPM) would mediate the association of perceived stress and test anxiety as well as neuroticism and test anxiety in 1,088 German students from grades seven and eight. Results from structural equation modeling (SEM) revealed that high quality SSR mediated the association of neuroticism and test anxiety, which was not the case for TSR. Furthermore, both PPM and TPM acted as mediators in all hypothesized associations. Interestingly, while high quality SSR mitigated feelings of test anxiety, PPM and TPM intensified test anxiety in neurotic and stressed students. The role of social relationships as protective factors as well as risk factors is discussed, as are the implications of the findings for educators, school psychologists, and teachers.

*Keywords:* test anxiety, stress, neuroticism, socio-motivational relationships, structural equation modeling, German secondary school students

Hoferichter, F., Raufelder, D., & Eid, M. (2014). The mediating role of socio-motivational relationships in the interplay of perceived stress, neuroticism, and test anxiety among adolescent students. *Psychology in the Schools, 51*, 736–752. doi: 10.1002/pits.21778

Der Artikel (Seiten 59-93) ist online verfügbar unter folgendem link:

<http://dx.doi.org/10.1002/pits.21778>

## Chapter III / Study 2

### Socio-motivational moderators – Two sides of the same coin?

#### Testing the potential buffering role of socio-motivational relationships on achievement drive and test anxiety among German and Canadian secondary school students

##### 3.1 Abstract

The current cross-national study investigates the potential buffering role of socio-motivational relationships for the association of achievement drive and test anxiety in secondary school students from Canada and Germany. Thousand eighty-eight students (54% girls,  $M_{age} = 13.71$ ,  $SD = .53$ , age span 12–15 years) from the state of Brandenburg and 389 students from Québec (55.9% girls,  $M_{age} = 13.43$ ,  $SD = .82$ , age span 12–16 years) were asked about their socio-motivational relationships with their teachers and peers, their drive for achievement, and test anxiety. Multigroup latent moderated structural equations (MGLMS) were conducted to test for the moderator role of socio-motivational relationships that would buffer feelings of test anxiety related to the drive for achievement. The analyses revealed the two-sided role socio-motivational relationships can have for students with different levels of achievement drive; intensifying or mitigating feelings of test anxiety. Thereby, the results of this study extend the buffering hypothesis by Cohen and Wills (1985). Cross-national differences between Canada and Germany were found concerning the studied moderators on the association of achievement drive and test anxiety: While for German students teacher-student relationships acted as moderator, for Canadian students student-student relationships and teachers acting as positive motivators displayed a moderator role. The findings are being discussed with reference to ongoing development of youth in the Western civilization.

*Keywords:* socio-motivational relationships, test anxiety, achievement drive, German and Canadian secondary school students, multigroup latent moderated structural equations

Hoferichter, F., Raufelder, D., & Eid, M. (2015). Socio-motivational moderators – Two sides of the same coin? Testing the potential buffering role of socio-motivational relationships on achievement drive and test anxiety among German and Canadian secondary school students. *Frontiers in Psychology*, 6. doi: 10.3389/fpsyg.2015.01675

## Socio-motivational moderators – Two sides of the same coin?

Testing the potential buffering role of socio-motivational relationships on achievement drive and test anxiety among German and Canadian secondary school students

The drive for achievement has been found to be a basic human need which includes the individual's desire to successfully accomplish challenges, succeed in competitions, and excel in activities evaluated as important (Atkinson, 1957; Covington, 1992; McClelland, Atkinson, Clark, & Lowell, 1976). Achievement drive has been defined in many different ways, yet it is usually described as a mentality by which individuals compare themselves and their performances to the standards of others against whom they stand in competition (Singh, 2011). It has also been understood as a combination of personality traits related to successful performances and/or failure-avoiding behavior (Atkinson, 1974) and has been conceptualized as task-oriented behavior (Ames, 1992; Nicholls, 1984), constituting a learned drive (Atkinson, 1957; McClelland, 1961). Based on the manifold definitions regarding achievement drive, the current study views the drive for achievement as a multifaceted construct.

### **3.2 Achievement (drive) in the Western World**

Taking a global perspective, achievement has become a core value (Ashby & Schoon, 2010) for it enables individual success and economic growth (Link, 2013; Schlotter, 2012). In particular, economic research investigating the role of schools as “market for education” (Misra, Grimes, & Rogers, 2012) promotes competitive academic environments. This in turn increases pressure on students by placing high value on their academic results in high-stake examinations (Ponzo, 2011). However, the economic imprint on educational settings, the introduction of the “education production function” (Hanushek, 1979), and the widespread use of the term “human capital“ collectively give the impression that individuals are merely the products and consumers of a superimposed economic system and not human beings with a complex psychological conscience. In the context of education, achievement is actively promoted as an absolute necessity and it is given high priority (Kaplan & Maehr, 2007). This notion is accompanied by teachers' beliefs and instructional practices which are mainly oriented toward mainstream cultural themes such as competition and individualism (Boykin, Tyler, & Miller, 2005; Tyler, Wade Boykin, & Walton, 2006).

In previous decades, the focus of research investigating motivation has shifted from questions of *what* and *how* people hope to achieve (Bandura, 1986) to *why* individuals are

motivated to achieve, i.e. to understand the purpose and motives behind achievement drive (Ames, 1992; Urdan, 1997; Wentzel, 1993). Qualitative studies in particular provide insight into *why* students strive for achievement (Hoferichter & Raufelder, 2014). Besides academic goals, such as learning, improving performance, demonstrating ability, and outperforming others, social goals, such as enhancing a sense of belonging, obtaining social approval by peers, teachers, parents, and gaining tangible rewards for academic performances, were identified as the main rationale for students' achievement drive (Dowson & McInerney, 2003; Hoferichter & Raufelder, 2014; Levy, Kaplan, & Patrick, 2004).

On a behavioral and cognitive level, the drive for achievement has been shown to play a divergent role: on the one hand, it is a prerequisite for successful learning, performance, and adaptive behavior (Pintrich & Schunk, 1996; Steinmayr & Spinath, 2008; Wang, Haertel, & Walberg, 1993; Weinstein, 1998) and is positively related to students' persistence, academic efficacy, positive attitudes toward school, school engagement, and a positive school self-concept (Eccles, Wigfield, & Schiefele, 1998; Elliot, 1999; Harackiewicz, Barron, Tauer, & Elliot, 2002; March & Craven, 2005; for a review see Urdan, 1997). On the other hand, some problematic outcomes have been found to be positively related to achievement drive, for example behavior of avoidance, anxiety, disruptive behavior, low retention of knowledge, and the use of superficial learning strategies (Covington, 1992; Selkirk, Bouchey, & Eccles, 2011), which are also elements of test anxiety (Cortina, 2008; Frydenberg, 2002; Zeidner, 1998). Hence, students who strive for academic achievement are eager to avoid failure and may feel constant pressure to perform well (cf. Atkinson, 1957; Midgley, Kaplan, & Middleton, 2001), which consequently induces feelings of test anxiety. The contradictory outcomes concerning achievement drive as summarized above constitute a challenge for researchers, educators, and society in general.

However, much research has found that the drive for achievement is accompanied by the fear of failure, which in turn is a major component of test anxiety (Elliot & McGregor, 1999; Hodapp & Benson, 1997; Zeidner, 1998). In fact, adolescent students reported that the main sources of stress in their daily school life included the pressure to perform, the fear of failure in evaluation situations, and worrying about the consequences of said failure (Seiffge-Krenke, 1995). Adding to these results, Pekrun (2000) found that achievement related anxiety was the most frequently reported emotion among school and university students.

### **3.3 Achievement drive and test anxiety in the school context**

Studies on academic motivation stress the importance of students' social environments (Eccles & Roeser, 2011; Pintrich & Schunk, 1996), as their motivation emerges from interactions within the school context, especially in the classroom (Ames, 1992; Urdan & Schoenfelder, 2006). As students advance from one grade to the next, their academic performances and competition with classmates enter the spotlight (Midgley, 1993; Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991), while they become increasingly aware of their own abilities and thus familiar with the concept of achievement (Nicholls, 1984; Nicholls & Miller, 1983). The notion that their learning environment is evolving and encouraging competition for the underlying goal of elevating or securing their social status has shown to invoke students' desire to work alone, reject cooperation with peers (Kaplan, 2004; Levy et al., 2004; Tossman, Kaplan, & Assor, 2008), and avoid seeking help from both teachers and peers. Seeking external help is largely perceived as a sign of weakness (Ryan, Gheen, & Midgley, 1998; Ryan & Pintrich, 1997). As a consequence, students' desire to succeed and avoid failure catapults them into a profound emotional conflict and ultimately tempts them to cheat (Anderman, Griesinger, & Westerfield, 1998; Schab, 1991), avoid novelty, and challenges (Gheen & Midgley, 1999). Students' fear of publicly revealing their incompetence poses a major threat to their person (Schwarzer, 2000) by inducing feelings of shame and insecurity, which often intensify test anxiety (Covington, 1992; Covington & Omelich, 1988; Elliot & McGregor, 1999; Elliot, McGregor, & Gable, 1999). Alongside personal characteristics (Hoferichter & Raufelder, 2013; Komarraju, Karau, Schmeck, & Avdic, 2011; Schwarzer, 2000) and previous negative experiences with evaluations (Pekrun, 2001), the occurrence and development of test anxiety is essentially influenced by peers and teachers (Biggs, Nelson, & Sampilo, 2010; Grills & Ollendick, 2002; Harter, 1996; Hoferichter, Raufelder, & Eid, 2014).

### **3.4 Environmental factors: socio-motivational relationships with peers and teachers**

Additionally, researchers found that students' perception of the school context and its various aspects influences their motivation to achieve as well as their test anxiety. In particular, supportive teachers and peers have been found to strengthen students' motivation (Wang & Eccles, 2013). Contrary to the promotion of inter-personal competition and social pressure, which are believed to help students reach their maximum potential (Misra et al., 2012; Ponzio, 2011), Roseth, Johnson, and Johnson (2008) found that high achievement and positive peer relationships were related to cooperative rather than competitive behavior. In a



host of studies, social support from teachers and peers have been found to promote intrinsic motivation, grade point average, school adjustment, well-being, lead to a decrease in test anxiety levels, and school dropout rates (Birch & Ladd, 1998; Buhs, Ladd, & Herald, 2006; Hoferichter & Raufelder, 2013; Hoferichter et al., 2014; Ladd, Kochenderfer, & Coleman, 1996; Perry, Donohue, & Weinstein, 2007; Rudasill, Gallagher, & White, 2010; Urdan & Schoenfelder, 2006; Wentzel, 2005; Wentzel, Battle, Russell, & Looney, 2010). In particular, studies have shown that positive relationships and feelings of belonging to a school context function as buffer and therefore protect individuals in stressful situations, for example during negative experiences in school and in risky situations (Adams, Santo, & Bukowski, 2011; Cohen & Wills, 1985; Johnson, Wood, Gooding, Taylor, & Tarrier, 2011; Stravynski & Boyer, 2001). Following this premise, Cohen and Wills (1985) formulated the buffering hypotheses, which postulates that relationships perceived as supportive, for example with classmates in college, friends, and co-workers, buffer feelings of stress.

Additionally, cross national studies have shown that peers and teachers are not only perceived as supportive and trustworthy individuals on an interpersonal level but are also viewed as a source of motivation, which students depend on for their own academic achievement (Hoferichter, Raufelder, Eid, & Bukowski, 2014; Raufelder, Jagenow, Drury, & Hoferichter, 2013). Further research in this field suggests that when students perceive their peers and teachers as motivators, they tend to experience higher test anxiety as they try to meet the expectations of peers and teachers (Hoferichter et al., 2014). Students also tend to avoid challenges and novelty when their teacher emphasizes the importance of demonstrating ability in the classroom (Gheen & Midgley, 1999). In this sense, students with dependent teacher or peer relationships tend to face behavioral and social problems at school and show poor academic performance (Hamre & Pianta, 2001; Pianta & Nimetz, 1991; Sabol & Pianta, 2012).

### **3.5 Cross-national findings**

Although the concepts of achievement drive and test anxiety have received much international scholarly attention (Areepattamannil, 2012; Bodas & Ollendick, 2005; De Castella, Byrne, Covington, & Graesser, 2013), both national and cross-national research has predominantly taken a narrow approach that focuses on individuals and regrettably neglects contextual variables, which may vary across countries (Bodas & Ollendick, 2005; Markus & Kitayama, 1991), as for example the impact of peers and teachers on students' achievement drive and test anxiety (cf. Shernoff & Schmidt, 2008). The educational setting wherein

students learn and develop their personality and individual competences has an incisive impact on motivation, social competence, and relationships with peers and teachers (Bünger & Raufelder, 2014; Fend, 1991; Hoferichter et al., 2014; Hurrelmann, 2006; Salili, Chiu, & Lai, 2001). For example, while Germany and Canada are both considered to be individualistic societies (Triandis, 1995) and as members of the Organization for Economic Co-operation and Development (OECD), both are committed to certain economic and educational goals, the transfer of knowledge and the scope for and maintenance of social relationships in school vary considerably between these two countries (for an overview see Hoferichter et al., 2014). For example, German students report a competitive classroom environment (Graudenz & Randoll, 1997) and generally perceive the scholastic performance of their peers as an incentive for their own performance (Kaufmann, 2007; Raufelder et al., 2013). The relationship between students and their teachers is generally loose and impersonal as the emphasis of German schools lies on the transfer of knowledge (Beckmann, 2000; Graudenz & Randoll, 1997; Hesse, 2004). In contrast, Canadian schools stress the development and maintenance of social skills, for example with peers and teachers, which consequently helps build a supportive scholastic environment (Wilson & Lam, 2004). One particular cross-national study found that Canadian students especially value social support from friends at school, which was related to high levels of intrinsic achievement motivation (Vitoroulis, Schneider, Cerviño Vasquez, del Pilar Soteras de Toro, & Santana Gonzáles, 2012).

Given the scarcity of cross-national studies on the interplay between achievement drive and test anxiety within the field of education and psychology (Midgley, Kaplan, & Middleton, 2001; Stankov, 2010), we address this gap by considering both Canadian and German secondary school students. According to Kinga and McInerney (2014), although culture influences basic motivational processes, cross-national differences have barely been considered and the need to “culturalize educational psychology” is still present (Pajares, 2007). Moreover, in light of the buffering hypothesis (Cohen & Willis, 1985), we investigated whether socio-motivational relationships, such as teacher-student relationships, student-student relationships, teachers acting as positive motivators, and peers acting as positive motivators, can function as moderators in the relationship between achievement drive and test anxiety. In other words: Do socio-motivational relationships buffer feelings of test anxiety related to the drive for achievement?

**Hypothesis 1:** We hypothesize that social relationships with peers and teachers moderate the association between achievement drive and test anxiety among Canadian and German secondary school students.

**Hypothesis 2:** We hypothesize that motivational relationship with peers and teachers moderate the association between achievement drive and test anxiety across the two samples.

## 3.6 Method

### 3.6.1 Participants and procedure

During the school year of 2011/2012 and 2012/2013, a total of 1477 seventh and eighth grade students from Germany and Canada participated in the current study. One thousand and eighty-eight German secondary school students (54% girls, 46% boys) ( $M_{age} = 13.71$ ,  $SD = .53$ , age span 12–15 years) from the state of Brandenburg evaluated a set of given statements addressing their socio-motivational relationships with peers and teachers, test anxiety, and achievement drive. The schools were selected at random, after the governmental Department of Education, Youth and Sport for Brandenburg gave permission to conduct the study. Since German law prohibits obtaining information about a third party's socio-economic status (SES), we could not ask our participants about their parents' or guardians' financial situation or educational background.

Alongside the German participants, 389 secondary school students from Québec also participated in the study (56% girls, 44% boys) ( $M_{age} = 13.43$ ,  $SD = .82$ , age span 12–16 years). Various institutions authorized the questionnaire: the ethic commission of Concordia University, the English Montréal School Board (EMSB) and the governing board of each participating school. The Canadian students answered the same questionnaire as the German students, albeit in English.

In both countries, parental permission was obtained and students were informed that the survey was anonymous, confidential, and that their participation was entirely voluntary. Data collection took place on two consecutive days in classrooms or in the cafeteria.

### 3.6.2 Measures

**Achievement Drive (AD).** This subscale is part of the questionnaire Achievement Motivation for students (Petermann & Winkel, 2007). The scale consists of eight items and features a reliability of  $\alpha = .82$  for the German sample and  $\alpha = .81$  for the Canadian sample. Examples of the questions posed to students include: “I make an effort so that my performance is better than the average” and “I prefer to work on tasks that challenge me”.

Their answers were classified on a 5-point Likert scale ranging from 1 (*not true at all*) to 5 (*absolutely true*).

**Test anxiety (TX).** This subscale is also part of the questionnaire Achievement Motivation for students (Petermann & Winkel, 2007). The scale consists of four items and shows a reliability of  $\alpha = .72$  for the German sample and  $\alpha = .71$  for the Canadian sample. Questions include “I get very nervous before exams”, and “I am afraid to fail when I have to solve a difficult task”, while answers were classified on a 5-point Likert scale ranging from 1 (*not true at all*) to 5 (*absolutely true*).

**Peers as Positive Motivators (PPM).** This subscale is part of the Relationships and Motivation (REMO) scale (Raufelder, Drury, Jagenow, Hoferichter, & Bukowski, 2013) and consists of nine statements, such as “When my friends learn, I am also motivated to learn more” or “My friends and I motivate each other to make an effort at school”. This subscale has a reliability of  $\alpha = .80$  for German students and  $\alpha = .83$  for Canadian students. Students answered questions on a 4-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*).

**Teachers as Positive Motivators (TPM).** This subscale was also taken from the REMO scale (Raufelder et al., 2013) and consists of six items with a reliability of  $\alpha = .78$  for German students and  $\alpha = .76$  for Canadians. Students were asked to answer statements, such as “I will make more of an effort in a subject when I think the teacher believes in me” or “When a teacher helps me, I try to do well in the subject”. The answers to the questions ranged from 1 (*strongly disagree*) to 4 (*strongly agree*) on a 4-point Likert scale.

**Student-Student Relationships (SSR).** This measure assesses a sense of belonging and the inclusion into the class structure. The instrument was borrowed from the Programme for International Student Assessment (PISA) (Kunter et al., 2002) and has an internal reliability of  $\alpha = .70$  for German students and  $\alpha = .72$  for Canadians. Students rated six statements, such as “In our class there are some students that receive little attention from others” and “You easily become an outsider when you are not doing what the class believes to be right” on a 4-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). The negative items were converted for the current analyses. Thus, high quality SSR describe a tendency to deny negative group behavior such as exclusion, while low quality SSR encode the perception of an excluding class setting, hence a problematic interaction between individuals and groups.

**Teacher-Student Relationships (TSR).** This scale was also borrowed from the PISA (Kunter et al., 2002) and has an internal reliability of  $\alpha = .78$  for the German sample and  $\alpha = .83$  for the Canadian sample. On a 4-point Likert scale from 1 (*strongly disagree*) to 4

(*strongly agree*) students were asked to rate five statements, such as “Most of the teachers treat me fairly” and “When I need additional help, I get it from my teachers”.

### **3.7 Statistical analyses**

In order to test the hypotheses, parcels were built from the scales PPM, TPM, SSR, TSR, AD, and TX to ensure that all measurement information would enter the multigroup moderated structural equations. Subsequently, all items of the measures were transformed into two parcels each. Hence, the nine items from the PPM scale were transformed into two parcels consisting of four and five items each (PPMP1, PPMP2). The six items of the TPM scale were also transformed into two parcels consisting each of three items (TPMP1, TPMP2), the six items of the SSR scale were transformed into two parcels consisting of three items each (SSRP1, SSRP2), the items of the TSR scale were transformed into two parcels consisting of three and two items each (TSRP1, TSRP2). Furthermore, the eight items of the AD scale were transformed into two parcels with each four items (ADP1, ADP2), and the four items of the TX scale were transformed into two parcels with each two items (TXP1, TXP2). Working with parcels is advantageous as the original large number of items is being reduced, yielding stable solutions by preventing potential spurious correlations and variance sharing (Little, Cunningham, Shahar, & Widaman, 2002).

#### **3.7.1 Multigroup latent moderated structural equations (MGLMS)**

Multigroup latent moderated structural equation models (MGLMS) in Mplus 7 (Muthén & Muthén, 1998–2013) were used to test the hypothesized relations between all variables of interest and to investigate latent interaction effects across the German and Canadian samples. In particular, two MGLMS were conducted to test (1) the moderating role of student-student relationships and teacher-student relationships as well as (2) the moderating role of peers as positive motivators and teachers as positive motivators for the association of achievement drive and test anxiety among German and Canadian students using a step-wise latent moderated structural equations (LMS) technique (Klein & Moosbrugger, 2000) respectively.

Latent moderated structural equations represent an extension of ordinary structural equation models (SEM), as they explicitly take into account the non-normality caused by the latent non-linear interaction terms (Klein & Moosbrugger, 2000). Simulation studies have proven that LMS provide efficient parameter estimators and a reliable model difference test,

showing no indication of bias of standard errors (Klein, 2000; Klein & Muthén, 2007; Moosbrugger, Schermelleh-Engel, Kelava, & Klein, 2009).

As no perfect fit statistic can be obtained for models that include latent interactions, three models without interaction terms were considered first in order to determine the model fit of the corresponding measurement model: Measurement invariance was tested by comparing an (1) unrestricted measurement model with a (2) weak measurement model by using the  $\chi^2$ -difference test (Satorra & Bentler, 2001). In the unrestricted measurement model, factor loadings and intercepts are free with no restriction whatsoever, i.e. the factor loadings and the intercepts may differ across both countries. In the weak measurement model, equal factor loadings but free intercepts among German and Canadian students are assumed. A non-significant  $\chi^2$  - difference indicates measurement invariance, rendering a comparison between the two country samples feasible.

Subsequently, the weak measurement model with group differences between the two nations was compared with a (3) strong measurement model without group differences by using the  $\chi^2$ -difference test (Satorra & Bentler, 2001). The strong measurement model enforces equal factor loadings and intercepts across both groups of students. A significant  $\chi^2$  - difference test indicates pronounced group differences such that (2) the weak measurement model describes the data better than the strong measurement model does and can thus be used for further analysis.

The model fit was estimated in Mplus using four primary fit indices as recommended by Hu and Bentler (1999): Chi-Square Test of Model Fit ( $\chi^2$ ), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI).

Finally, an extended model was derived from the best identified model (unrestricted, weak, or strong measurement model) through the addition of interaction terms. In order to determine which model would fit the data best – the model with interaction terms or the model without interaction terms – both models were compared by means of a log-likelihood difference test (Geiser, 2012; Satorra & Bentler, 2001).

## **3.8 Results**

### **3.8.1 Model (A) – student-student relationships/ teacher-student relationships (SSR/TSR)**

In order to determine which model had the best data fit, the unrestricted model ( $\chi^2$  (24) = 36.10,  $p < .001$ , CFI = .99, TLI = .98, RMSEA (90% CIs) = .03 (.01-.04)) was compared to the weak measurement model ( $\chi^2$  (28) = 37.36,  $p < .001$ , CFI = .99, TLI = .99, RMSEA (90%

CI) = .02 (.01-.04)), which was then compared to the strong measurement model ( $\chi^2$  (32) = 81.21,  $p < .001$ , CFI = .97, TLI = .95, RMSEA (90% CI) = .05 (.03-.06)) by running a chi-square difference test. When comparing the unrestricted model with the weak measurement model, the  $\chi^2$  - difference test did not reach a level of significance ( $\chi^2$  (4) = 1.62,  $p = .81$ ), which confirms weak measurement invariance. When comparing the weak measurement model with the strong measurement model, the  $\chi^2$  - difference test yielded a significance level ( $\chi^2$  (4) = 52.52,  $p < .001$ ), suggesting that the strong measurement model fits the data significantly worse than the weak measurement model. In other words, we can confirm weak measurement invariance and are therefore able to draw conclusions about the association of variables across Germany and Canada (Geiser, 2012; Yuan & Bentler, 2004).

### **3.8.2 Model (B) – peers as positive motivators/ teachers as positive motivators (PPM/TPM)**

Similar analyses were conducted for model (B), comparing the unrestricted measurement model ( $\chi^2$  (24) = 52.05,  $p < .001$ , CFI = .99, TLI = .98, RMSEA (90% CI) = .04 (.03-.05)) to the weak measurement model ( $\chi^2$  (28) = 59.28,  $p < .001$ , CFI = .99, TLI = .98, RMSEA (90% CI) = .04 (.03-.05)). When doing so, the difference test did not reach a level of significance ( $\chi^2$  (4) = 7.432,  $p = .115$ ) thus confirming weak measurement invariance. Furthermore, the weak measurement model was compared to the strong measurement model, ( $\chi^2$  (32) = 97.20,  $p < .001$ , CFI = .98, TLI = .96, RMSEA (90% CI) = .05 (.04-.06)) by running a chi-square difference test to identify any essential cross-national differences. By comparing the weak measurement model with the strong measurement model, the difference test revealed a significant difference ( $\chi^2$  (4) = 41.05,  $p < .001$ ), meaning that the strong measurement model fits the data worse than the weak measurement model does. Consequently, we are able to draw conclusions about the association of variables across Germany and Canada.

### **3.8.3 Multigroup latent moderated structural equation 1 (MGLMS 1 with SSR & TSR as moderators)**

Interaction terms were added to the weak measurement model to test the hypothesis that SSR and TSR moderate the association between achievement drive and test anxiety. Consequently, the weak measurement model without interaction terms was compared with the weak measurement model with interaction terms by applying a log-likelihood difference test to evaluate which model would fit the data best. The difference test revealed a better data fit

for the model with interaction terms (MGLMS 1) than for the model without interaction terms ( $\chi^2(4) = 20.83, p < .001$ ),

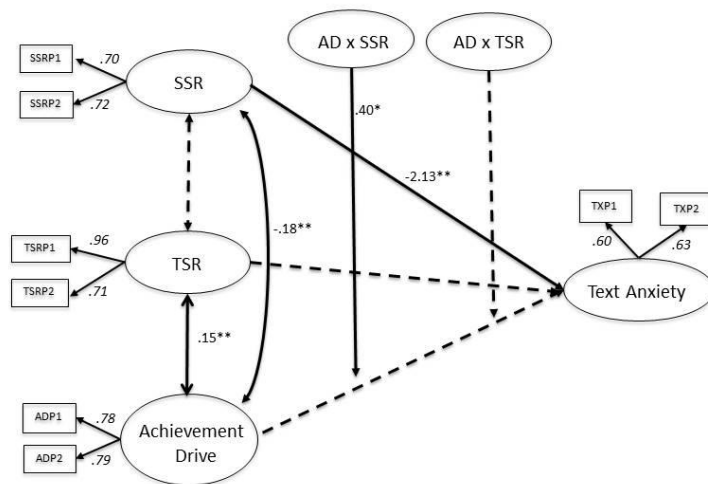
For Canadian students, SSR moderate the association between achievement drive and test anxiety ( $B = .40, SE = .13, p < .05$ ), whereas TSR were not identified as a significant moderator. Additional direct effects can be derived from the MGLMS 1 (Figure 1). Among Canadian students, the association between SSR and test anxiety is significant ( $B = -2.13, SE = .50, p < .001$ ). Hence, the better students perceive their relationship with other students to be, the less they report feelings of test anxiety.

As Figure 1.1 illustrates, students with rather low quality SSR tend to report high levels of test anxiety over the whole range of achievement drive, with test anxiety decreasing with increasing achievement drive. In contrast, students with rather high SSR report substantially lower levels of test anxiety. In this case test anxiety practically does not vary with changing achievement drive any more. Hence, the perception of high quality student-student relationships buffers feelings of test anxiety in students over the entire range of achievement drive. In turn, students who report rather low quality relationships with their peers start off with higher levels of test anxiety, which decrease with increasing achievement drive but remain clearly above test anxiety levels of students with higher SSR. In conclusion, SSR buffer the association of achievement drive and test anxiety for Canadian students, independent of their levels of achievement drive.



Figure 1

*Interaction of achievement drive, student-student relationships, teacher-student relationships, and test anxiety for Canadian secondary school students as referred to as MGLMS 1*

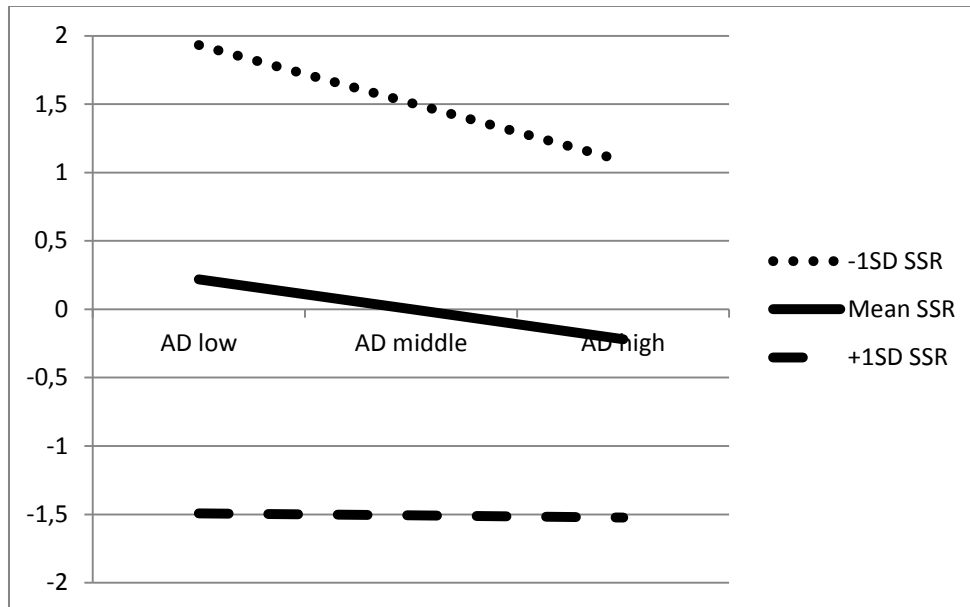


*Figure 1.* Multigroup latent moderated structural equations (MGLMS) for the Canadian sample. Significant effects are shown as unstandardized coefficients (B), bold pathways are significant at  $*p < .05$ ,  $**p < .001$ ; dotted pathways are not significant. Factor loadings are standardized (based on the standardized results of the weak measurement model seen as the final model only reports unstandardized results).

*Note.* TSR = teacher-student relationships; SSR = student-student relationships; AD = achievement drive

Figure 1.1

*Interaction of achievement drive, student-student relationships, and test anxiety for Canadian secondary school students as referred to as MGLMS 1*



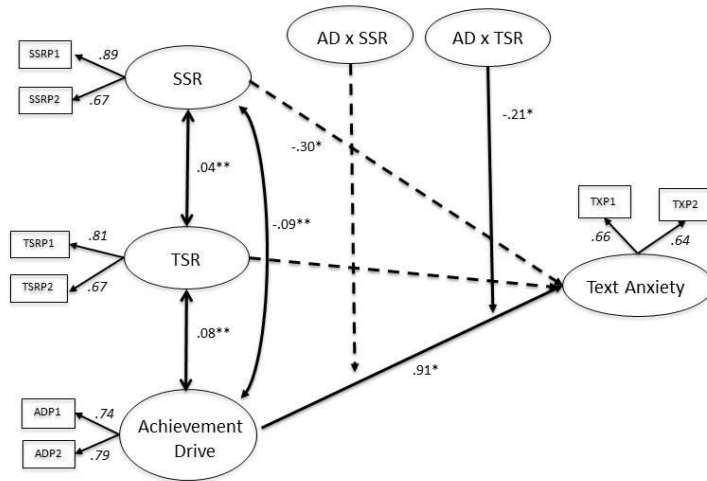
*Figure 1.1* Representation of student-student relationships (SSR) as moderator in the association of achievement drive (AD) and test anxiety (TX) for Canadian secondary school students; the Y-axis measures test anxiety and the X-axis indicates achievement drive.

When investigating the moderating role of social relationships among German secondary school students, TSR emerged as moderator ( $B = -.21, SE = .11, p < .05$ ), while SSR did not moderate the association between achievement drive and test anxiety. Additional direct effects can be derived from the MGLMS 1 for German secondary school students (see Figure 2). In detail, achievement drive is positively related to test anxiety ( $B = .91, SE = .46, p < .05$ ), indicating that students oriented to achieve also show higher levels of test anxiety.

The results depicted in Figure 2.1 indicate that German secondary school students who report low achievement drive and high quality TSR experience increased test anxiety compared to students who have a low achievement drive and low quality TSR. With increasing achievement drive the reported levels of test anxiety increase, irrespective of the quality of TSR, while the slopes of all student groups are similar. In summary, TSR act as moderator in the association between achievement drive and text anxiety, however it cannot be interpreted as a buffer.

Figure 2

*Interaction of achievement drive, student-student relationships, teacher-student relationships, and test anxiety for German secondary school students as referred to as MGLMS 1*

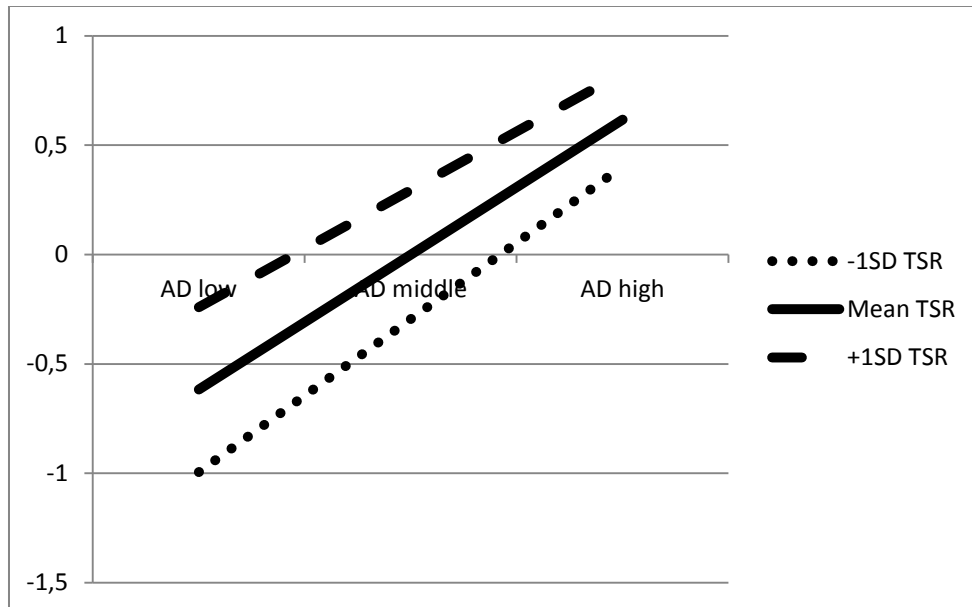


*Figure 2.* Multigroup latent moderated structural equations (MGLMS) for the German sample. Significant effects shown as unstandardized coefficients (B), bold pathways are significant at  $*p < .05$ ,  $**p < .001$ ; dotted pathways are not significant. Factor loadings are standardized (based on the standardized results of the weak measurement model seen as the final model only reports unstandardized results).

*Note.* TSR = teacher-student relationships; SSR = student-student relationships; AD = achievement drive

Figure 2.1

*Interaction of achievement drive, teacher-student relationships, and test anxiety for German secondary school students as referred to as MGLMS 1*



*Figure 2.1.* Representation of teacher-student relationships (TSR) as moderator in the association between achievement drive (AD) and test anxiety (TX) among German secondary school students; the Y-axis measures test anxiety and the X-axis indicates achievement drive.

### 3.8.4 Multigroup latent moderated structural equation 2 (MGLMS 2 with PPM & TPM as moderators)

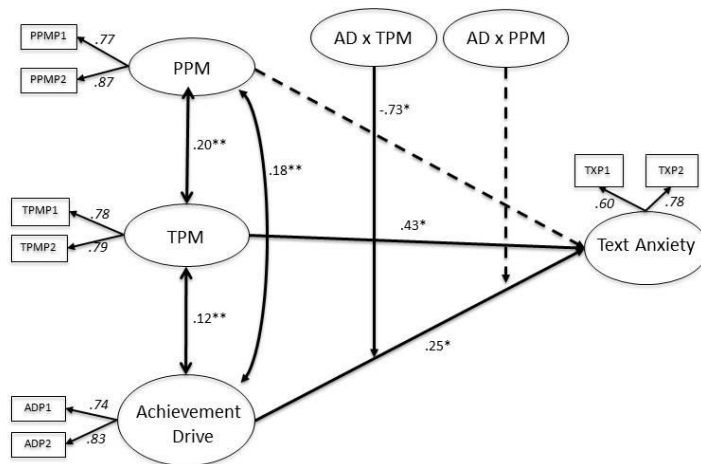
The hypothesis that PPM and TPM would moderate the association between achievement drive and test anxiety (MGLMS 2) among German and Canadian secondary school students was tested, following a similar procedure to that used for the MGLMS 1: interaction terms were added to the weak measurement model (MGLMS 2), which was compared to a model without interaction terms using the log-likelihood difference test to evaluate which model would fit the data best. Having reached a level of significance ( $\chi^2(4) = 11.93, p < .05$ ) the model with interaction terms (MGLMS 2) was favored.

Upon examining the Canadian data for potential moderators, TPM were found to moderate the association between achievement drive and test anxiety ( $B = -.73, SE = .28, p < .05$ ). Furthermore, the MGLMS 2 revealed significant direct effects (Figure 3). For Canadian students, achievement drive is related to test anxiety ( $B = .25, SE = .12, p < .05$ ), indicating that the more students are oriented toward achievement, the more they report of test anxiety. Additionally, TPM and test anxiety are significantly related ( $B = .43, SE = .21, p < .05$ ). Hence, students who depend on teachers in their role as motivators tend to have high test anxiety levels.

As depicted in Figure 3.1, students scoring low on achievement drive and low on teachers as positive motivators also report low on test anxiety. Whereas, students who report low achievement drive while relying on their teachers as a source of motivation tend to have higher levels of test anxiety. With increasing achievement drive the reported levels of test anxiety increase for students with average and below average TPM. In contrast, levels of text anxiety do not increase with higher achievement drive for students with a high level of TPM. There is a trend toward lower text anxiety with increasing achievement drive for this subgroup of students. In summary, the tendency of increasing levels of test anxiety with increasing achievement drive (see Figure 3 for the direct effect) is neutralized and to some extent reversed by a perception of teachers acting as positive motivators, thus displaying nicely the buffering effect of TPM.

Figure 3

*Interaction of achievement drive, teachers as positive motivators, peers as positive motivators, and test anxiety among Canadian secondary school students as referred to as MGLMS 2*

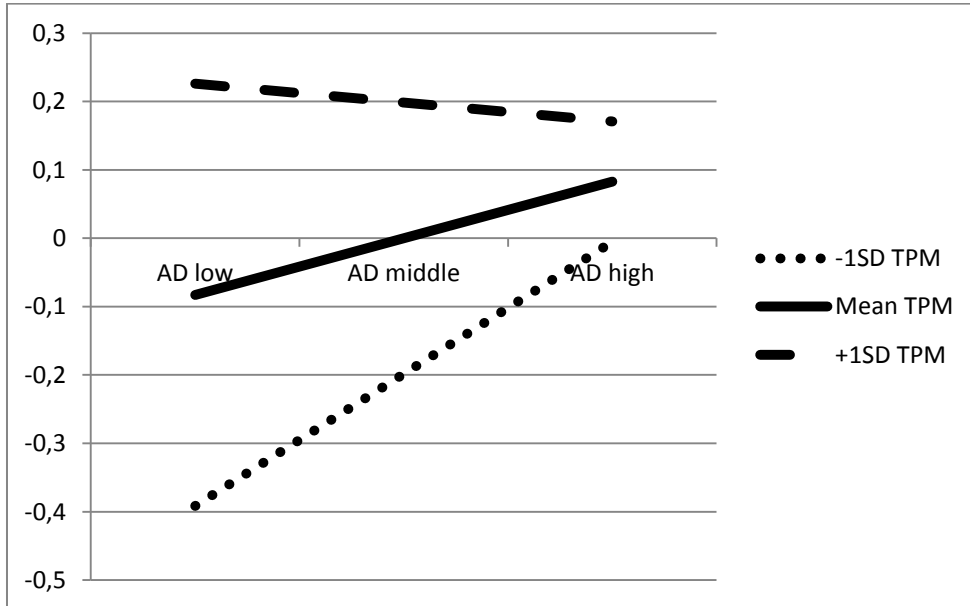


*Figure 3.* Multigroup latent moderated structural equations (MGLMS) for the Canadian sample. Significant effects shown as unstandardized coefficients (B), bold pathways are significant at  $*p < .05$ ,  $**p < .001$ ; dotted pathways are not significant. Factor loadings are standardized (based on the standardized results of the weak measurement model seen as the final model only reports unstandardized results).

*Note.* PPM= peers as positive motivators; TPM= teachers as positive motivators; AD = achievement drive

Figure 3.1

*Interaction of achievement drive, teachers as positive motivators, and test anxiety among Canadian secondary school students as referred to as MGLMS 2*



*Figure 3.1.* Representation of teachers as positive motivators (TPM) as moderator in the association between achievement drive (AD) and test anxiety (TX) among Canadian secondary school students; the Y-axis shows test anxiety and the X-axis shows achievement drive.

Among German students, neither TPM nor PPM were found to moderate the association between achievement drive and test anxiety (Figure 4). Direct effects of the MGLMS 2 reveal a significant relationship between achievement drive and test anxiety ( $B = .15, SE = .05, p < .05$ ). Similar to Canadian students, the more students are oriented toward achievement, the more they report of test anxiety. Furthermore, there is a significant association between TPM and test anxiety ( $B = .31, SE = .10, p < .05$ ), indicating that students who depend on teachers in their role as motivators tend to have high test anxiety levels.

Figure 4

*Interaction of achievement drive, teachers as positive motivators, peers as positive motivators, and test anxiety among German secondary school students as referred to as MGLMS 2*

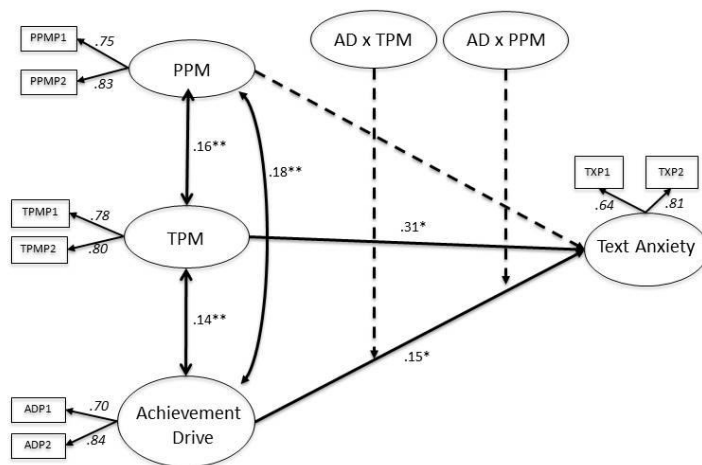


Figure 4. Multigroup latent moderated structural equations (MGLMS) for the German sample. Significant effects shown as unstandardized coefficients (B), bold pathways are significant at  $*p < .05$ ,  $**p < .001$ ; dotted pathways are not significant. Factor loadings are standardized (based on the standardized results of the weak measurement model seen as the final model only reports unstandardized results).

Note. PPM= peers as positive motivators; TPM= teachers as positive motivators; AD = achievement drive

### 3.9 Discussion

The current study examined the relationship between achievement drive and test anxiety among Canadian and German secondary school students. Moreover, it explored the potential of socio-motivational relationships, such as student-student relationships, teacher-student relationships, peers as positive motivators, and teachers as positive motivators, in buffering the association of achievement drive and test anxiety. To our knowledge, no such study was implemented to date. To test our original hypotheses, two multigroup latent moderated structural equations (MGLMS) were examined.

#### 3.9.1 The buffering role of student-student and teacher-student relationships among Canadian and German secondary school students

The first hypothesis was partially confirmed since student-student relationships significantly moderated the relationship between achievement drive and test anxiety for



Canadian students and teacher-student relationships acted as moderator among German secondary school students. However, teacher-student relationships did not moderate this association among Canadian students and student-student relationships were not found to act as moderator among German students.

Canadian students who experienced high quality student-student relationships, hence perceived the class environment as inclusive and supportive tended to report the lowest test anxiety levels in comparison to students with average or below average student-student relationships. Various studies have found that peers help students orient themselves along mutual educational expectations and trajectories, values, behavior as well as school adjustment (Espelage, Holt, & Henkel, 2003; Hussong, 2002; Kiuru, Aunola, Vuori, & Nurmi, 2007; McGloin, Sullivan, & Thomas, 2014), while reciprocal enforcement and socialization takes place (Harris, 1995; Shin & Ryan, 2014). The prospect of gaining prestigious status is given in case peer values are being followed and certain behavior is being demonstrated (Rubin, Bukowski, & Parker, 2006). Hence, peers' academic success is an incentive for students to boost their academic performance (Kaufmann, 2007). In fact, with increasing levels of achievement drive, students who felt part of a peer groups continued to report low test anxiety levels as found among Canadian students. Hence, they perceived their student-student relationships as protector against feelings of test anxiety. In fact, students perceiving high quality peer relationships showed increased well-being, self-esteem, and decreased levels of test anxiety (cf. Arnett, 2007; Flanagan, Erath, & Bierman, 2008; Hoferichter et al., 2014; Leary & Baumeister, 2000).

Canadian students who simultaneously experienced low achievement drive and poor quality student-student relationships reported high levels of test anxiety. These students might not be as engaged in school and learning activities with their classmates as they may have different priorities other than to excel academically and to engage in social relationships with classmates. With increasing levels of achievement drive, test anxiety levels tended to decrease, however still being higher than of students with high quality student-student relationships. It can be assumed that the student group reporting high achievement orientation and low quality student-student relationships is more confident about their performance, hence showing lower test anxiety scores than students with low achievement drive and low quality peer relationships.

German students who reported low achievement drive and simultaneously perceived a high quality relationship with their teachers, tended to report a high degree of test anxiety in comparison to students with low achievement drive and low quality teacher-student

relationships. However, even for the first mentioned student type the test anxiety levels appeared to be below average. Students might feel that they have to fulfill teacher's expectations, which in turn lead to higher levels of test anxiety. In fact, research has indicated the existent link between expectations set by significant others and high levels of test anxiety as well as low school performance (cf. Gill, 1999; Zeidner, 1998; Zohar, 1998). Furthermore, German students also reported increasing test anxiety levels with increasing achievement drive, irrespective of their relationship quality with teachers. This result was confirmed by the significant positive association between achievement drive and test anxiety. Numerous research indicates that the desire to achieve is accompanied by the fear of failure (Elliot & McGregor, 1999; Hodapp & Benson, 1997; Zeidner, 1998) and pressure to perform (cf. Atkinson, 1974; Singh, 2011), while in turn the latter represent the main stressors in daily school life (Seiffge-Krenke, 1995).

In summary, student-student relationships buffered feelings of test anxiety related to achievement drive among Canadian students, while for German students their teacher-student relationships acted as moderator but intensified feelings of test anxiety. Canadian teachers see the provision of teacher and peer support for students' academic and personal development as well as the development of moral and civil values as constituting an integral part of their teaching profession (Hesse, 2004; Hoferichter et al., 2014). In contrast, the teacher-student relationship for German secondary school students can be described as rather impersonal (Hesse, 2004) and is characterized by an imbalance of power between students and teachers (Raufelder, 2007). This could explain why achievement oriented students with ranging quality of teacher-student relationships tend to report high test anxiety levels, while no pattern of mitigation deriving from teacher-student relationships could be found.

### **3.9.2 The buffering role of teachers as positive motivators among Canadian secondary school students**

The second hypothesis was also partially confirmed as teachers as positive motivators moderated the association between achievement drive and test anxiety among Canadian secondary school students only. Students with low achievement drive who turned to their teachers for motivation, experienced higher test anxiety levels compared to low achievement oriented students who did not rely on their teachers for motivation. Hence, students that gain their motivation from their relationships with teachers may feel pressured to meet teachers' expectations in test situations (Hoferichter et al., 2014). Further research indicates that students who mainly depend on teachers to feel motivated tend to report higher test anxiety as

well as negative social interactions, including behavioral problems at school (Hamre & Pianta, 2001; Hoferichter et al., 2014; Pianta & Nimetz, 1991; Sabol & Pianta, 2012). Other students who are neither eager to excel at school tasks nor do they turn to their teachers for their own motivation, are less test anxious. Seen as the prospect of attaining academic success and being able to relate to the teacher might not appeal to them, they might not be all that sensitive to scholastic matters in general. For students relying on their teachers to motivate them, levels of test anxiety slightly decreased with increasing achievement drive. In this case it is students' relationships with their teachers that motivate them in school and thus buffer the effect of achievement drive on test anxiety. In addition to these findings, William (1980) found that high achieving students tend to identify with their teachers more than low achieving students. Seen as these students are eager to succeed, their motivating relationship with teachers dampens the development of test anxiety. This finding supports the buffering hypothesis, according to which social relationships protect individuals from the detrimental effects of stressful situations, which in the current study are pressure to perform and the avoidance of failure as components of achievement drive (Adams, Santo, & Bukowski, 2011; Cohen & Wills, 1985; Johnson, Wood, Gooding, Taylor, & Tarrier, 2011; Stravynski & Boyer, 2001). In fact, high achieving students who lack a motivating relationship with their teachers report higher test anxiety with increasing achievement drive as they do not profit from their teachers in this respect.

Further research would be well advised to evaluate other related aspects that might add to this model. For example, personality aspects such as neuroticism have been shown to be related to high anxiety levels (Chamorro-Premuzic, Ahmetoglu, & Furnham, 2008) and test anxiety in particular (Fitch, 2004; Hoferichter & Raufelder, 2013, Spielberger & Vagg, 1995), while conscientiousness and agreeableness are predictors of close and non-conflictual relationships (Zee, Koomen, & Van der Veen, 2013). Furthermore, social exclusion and feelings of isolation and loneliness are all factors that might contribute to the development of test anxiety (Bukowski, Laursen, & Hoza, 2010; Gaspar de Matos, Barrett, Dadds, & Shortt, 2003; Lee & Robbins, 1998).

### **3.10 Conclusions**

In summary, this study reveals the qualitative impact of socio-motivational relationships on secondary school students' achievement drive and test anxiety measured in Canada and Germany. Contrary to mere economic models of students' educational environments mentioned in the introduction (cf. Hanushek, 1979; Misra et al., 2012; Ponzo,

2011), this study provides a model of key interactions in the school context that work to support academic performances and alleviate negative outcomes such as test anxiety. In particular, this study reveals how teacher-student relationships, student-student relationships, and teachers as positive motivators can lead to contradictory outcomes depending on students' attitude toward achievement drive. Moreover, these variables and their respective effects may vary across nations, in this case Canada and Germany. The contradicting buffering effects of socio-motivational relationships present themselves as two sides of the same coin and contribute to cross-national research. For instance, in the German sample high quality teacher-student relationships do not protect against test anxiety among achievement oriented students but contribute to a further increase of test anxiety. Yet in Canada, teachers perceived as positive motivators protect achievement oriented students from feeling test anxious. Additionally, among Canadian students, student-student relationships buffer feelings of test anxiety.

The results of this study may be of use to teachers and educators by helping them alleviate students' test anxiety through careful consideration of individual differences and increased awareness of group dynamics and team spirit in school, which are founded on socio-motivational relationships. This study aims to disentangle the relationship between achievement drive and test anxiety by considering the role of socio-motivational relationships among Canadian and German secondary school students. Its results address the alarming trend observed by Schab (1991) among students of the Western hemisphere: students mention fear of failure as being the most common reason for cheating on tests and homework, while viewing dishonesty as a necessity and attributing successful career paths to fraudulent activities. In the long term, the promotion of competition and egocentric activities as opposed to cooperation with peers seems to remain a dominant trend in contemporary educational models. McClelland already identified this trend in his often cited work on the "Achieving Society" (1961), which has not lost its validity in the fifty years since its original publication (McClelland, 2010).

The trend to surpass competitors by all means may be deeply rooted in contemporary Western societies and might have contributed to the general increment of school-related anxiety observed over the last decades (Spielberger & Rickman, 1990; Twenge, 2000). To counteract this trend, socio-motivational relationships may buffer test anxiety related to achievement drive as observed in the case of Canadian students who are oriented toward teachers acting as motivators as well as for those who report high quality student-student relationships. With the variables studied, the buffering role of socio-motivational relationships

for German students could not be established as it was established for Canadian students, because German students, perceiving high and low quality teacher-student relationships displayed increasing test anxiety levels with increasing achievement drive. No moderator has been found in Germany to mitigate feelings of test anxiety related to achievement drive.

### **3.10.1 Strengths, limitations, and future directions**

This study compares the buffering effect of socio-motivational relationships in the association between achievement drive and test anxiety among Canadian and German students. By disclosing both possible buffering outcomes, i.e. intensifying or dampening test anxiety that emerges from achievement drive, the findings contribute to the literature and provide practical implications for schools. The buffering hypothesis proposed by Cohen and Wills (1985), which assumes that social relationships generally mitigate stressful situations, is hereby extended. The current study reveals the dual effect of socio-motivational relationships in school contexts, which function as buffers in the interplay of achievement drive and test anxiety, varying across Canada and Germany. This study follows a contextual and cross-national approach, which has rarely been used in the disciplines of education and psychology (cf. Bodas & Ollendick, 2005; Markus & Kitayama, 1991; Shernoff & Schmidt, 2008), by acknowledging socio-motivational relationships as potential buffers among Canadian and German students. Readers should be aware of the current study's limitation when interpreting its results. The study applies to adolescent students between 12 and 16 years of age from Québec and Brandenburg, who commented on their socio-motivational relationships with their teachers and peers, their drive for achievement, and test anxiety. Due to the cross-sectional nature of our data, causal effects must not be derived from the results provided.

With our study, we hope to invoke further contextual and cross-national studies, as we believe this approach to be particularly fruitful to the field of education and psychology. Prospective studies may build on this study by including different age groups (e.g., elementary students) from various countries (e.g., China, South Africa, Russia, etc.) and therefore accounting for different educational systems, informed by many sources (reports from teachers, peers, parents, etc.), and following a longitudinal design with multiple measurement points over time.

### 3.11 References

- Adams, R. E., Santo, J. B., & Bukowski, W. M. (2011). The presence of a best friend buffers the effects of negative experiences. *Developmental Psychology, 47*, 1786–1791. doi: 10.1037/a0025401
- Ames, C. (1992). Classrooms: goals, structures, and student motivation. *Journal of Educational Psychology, 84*, 261–271. doi: 10.1037/0022-0663.84.3.261
- Anderman, E. M., Griesinger, T., & Westerfield, G. (1998). Motivation and cheating during early adolescence. *Journal of Educational Psychology, 90*(1), 84–93.
- Areepattamannil, S. (2012). Mediation role of academic motivation in the association between school self-concept and school achievement among Indian adolescents in Canada and India. *Social Psychology of Education, 15*, 367–386. doi: 10.1007/s11218-012-9187-1
- Ashby, J. S., & Schoon, I. (2010). Career success: The role of teenage career aspirations, ambition value and gender in predicting adult social status and earnings. *Journal of Vocational Behavior, 77*, 350–360. doi:10.1016/j.jvb.2010.06.006
- Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review, 64*, 359–412. doi: 10.1037/h0043445
- Atkinson, J. W. (1974). The mainstreams of achievement oriented activity. In J. W. Atkinson & J. O. Raynor (Eds.), *Motivation and achievement* (pp. 11–39). Washington, DC: Winston.
- Bandura, A. (1986). *Social foundations of thought and action*. Engelwood Cliffs, NJ: Prentice Hall.
- Beckmann, H.-K. (2000). Lehrer(aus)bildung in Deutschland: Kontinuität, Wandel und Strukturprobleme [Teacher training in Germany: continuity, change and structural problems]. In P. H. Heidelberg (Ed.), *Aktuelle Schulsysteme : Portugal, Kroatien, Marokko, USA, Niederlande, Deutschland* (Vol. 59, pp. 40–58). Heidelberg, Germany: Institut für Weiterbildung.
- Biggs, B. K., Nelson, J. M., & Sampilo, M. L. (2010). Peer relations in the anxiety-depression link: test of a mediation model. *Anxiety, Stress & Coping: An International Journal, 23*, 431–447. doi: 10.1080/10615800903406543
- Birch, S. H., & Ladd, G. W. (1998). Children's interpersonal behaviors and the teacher-child relationship. *Developmental Psychology, 34*, 934–946. doi: 10.1037/0012-1649.34.5.934

- Bodas, J., & Ollendick, T. H. (2005). Test anxiety: A cross-cultural perspective. *Clinical Child & Family Psychology Review*, 8, 65–88. doi: 10.1007/s10567-005-2342-x
- Boykin, A. W., Tyler, K. M., & Miller, O. (2005). In search of cultural themes and their expressions in the dynamics of classroom life. *Urban Education*, 40, 521–549. doi: 10.1177/0042085905278179
- Buhs, E. S., Ladd, G. W., & Herald, S. L. (2006). Peer exclusion and victimization: Processes that mediate the relation between peer group rejection and children's classroom engagement and achievement? *Journal of Educational Psychology*, 98, 1–13. doi: 10.1037/0022-0663.98.1.1
- Bukowski, W. M., Laursen, B., & Hoza, B. (2010). The snowball effect: Friendship moderates escalations in depressed affect among avoidant and excluded children. *Development and Psychopathology*, 22, 749–757. doi: 10.1017/s095457941000043x
- Bünger, S., & Raufelder, D. (2014). Moderiert die soziale Kompetenz adoleszenter Schüler den Zusammenhang zwischen ihren schulischen Peer-Beziehungen und ihrer Motivation? [Does social competence of adolescent students moderate the link between their peer relationships and motivation?] *Diskurs Kindheits- und Jugendforschung*, 9(3), 337–351.
- Chamorro-Premuzic, T., Ahmetoglu, G., & Furnham, A. (2008). Little more than personality: Dispositional determinants of test anxiety (the Big Five, core self-evaluations, and self-assessed intelligence). *Learning and Individual Differences*, 18, 258–263. doi: 10.1016/j.lindif.2007.09.002
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98, 310–357. doi: 10.1037//0033-2909.98.2.310
- Cortina, K. S. (2008). Leistungsängstlichkeit [Performance Anxiety]. In W. Schneider & M. Hasselhorn (Eds.), *Handbuch der Pädagogischen Psychologie* (Vol. 1, pp. 50–61). Göttingen, Germany: Hogrefe.
- Covington, M. V. (1992). *Making the grade: A self-worth perspective on motivation and school reform*. Cambridge, UK: Cambridge University Press.
- Covington, M. V., & Omelich, C. L. (1988). Achievement dynamics: The interaction of motives, cognitions, and emotions over time. *Anxiety Stress and Coping*, 1, 165–183. doi: 10.1080/08917778808248717
- De Castella, K., Byrne, D., Covington, M., & Graesser, A. C. (2013). Unmotivated or motivated to fail? A cross-cultural study of achievement motivation, fear of failure, and student disengagement. *Journal of Educational Psychology*, 105, 861–880. doi:

- Dowson, M., & McInerney, D. M. (2003). What do students say about their motivational goals?: Towards a more complex and dynamic perspective on student motivation. *Contemporary Educational Psychology, 28*, 91–113. doi: 10.1016/S0361-476X(02)00010-3
- Eccles, J. S., & Roeser, R. W. (2011). Schools as developmental contexts during adolescence. *Journal of Research on Adolescence, 21*, 225–241. doi: 10.1111/j.1532-7795.2010.00725.x
- Eccles, J. S., Wigfield, A., & Schiefele, U. (1998). Motivation to succeed. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology* (pp. 1017–1095). New York, NY: Wiley.
- Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*, 169–189. doi: 10.1207/s15326985ep3403\_3
- Elliot, A. J., & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 76*, 628–644. doi: 10.1037/0022-3514.76.4.628
- Elliot, A. J., McGregor, H. A., & Gable, S. (1999). Achievement goals, study strategies, and exam performance: A mediational analysis. *Journal of Educational Psychology, 91*, 549–563. doi: 10.1037/0022-0663.91.3.549
- Espelage, D. L., Holt, M. K., & Henkel, R. R. (2003). Examination of peer-group contextual effects on aggression during early adolescence. *Child Development, 74*, 205–220. doi: 10.1111/1467-8624.00531
- Fend, H. (1991). Schule und Persönlichkeit: Eine Bilanz der Konstanzer Forschungen zur “Sozialisation in Bildungsinstitutionen” [School and personality: A review of the Constance research group on “socialization in educational institutions”]. In R. Pekrun & H. Fend (Eds.), *Schule und Persönlichkeit. Ein Resümee der Längsschnittforschung* (pp. 9–32). Stuttgart, Germany: Ferdinand Enke.
- Fitch, B. D. (2004). *A test of The relationship between personality traits and test anxiety*. (Doctoral Dissertation), Fielding Graduate University, Santa Barbara, CA.
- Frydenberg, E. (Ed.). (2002). *Beyond coping: meeting goals, visions, and challenges*. New York, NY: Oxford University Press.
- Gaspar de Matos, M., Barrett, P., Dadds, M., & Shortt, A. (2003). Anxiety, depression, and peer relationships during adolescence: Results from the Portuguese national health behaviour in school-aged children survey. *European Journal of Psychology of Education, 18*, 3–14. doi: 10.1007/BF03173600



- Geiser, C. (2012). *Data analysis with Mplus*. New York, London: The Guilford Press.
- Gheen, M. H., & Midgley, C. (1999). "I'd rather not do it the hard way": Student and classroom characteristics relating to eighth graders' avoidance of academic challenge. Paper presented at the annual meeting of the American Educational Research Association Meeting, Montreal, Canada.
- Gill, S., & Reynolds, A. J. (1999). Educational expectations and school achievement of urban African American Children. *Journal of School Psychology, 37*, 403–424. doi: 10.1016/S0022-4405(99)00027-8
- Graudenz, I., & Randoll, D. (1997). *So dänisch wie möglich, so deutsch wie nötig? Eine vergleichende Untersuchung zur Wahrnehmung von Schule durch Abiturienten* [As Danish as possible, so German as necessary? A comparative study of the perception of school through high school seniors]. Frankfurt/M, Germany: Böhlau.
- Grills, A. E., & Ollendick, T. H. (2002). Peer victimization, global self-worth, and anxiety in middle school children. *Journal of Clinical Child & Adolescent Psychology, 31*, 59–68. doi: 10.1207/S15374424JCCP3101\_08
- Hamm, J. A., Hoffman, A., & Farmer, T. W. (2012). Peer culture of academic effort and achievement in adolescence: Why they matter, and what teachers can do about them. In A. M. Ryan & G. W. Ladd (Eds.), *Peer relationships and adjustment at school* (pp. 219-250). Charlotte, NC: Information Age Publishing.
- Hanushek, E. A. (1979). Conceptual and empirical issues in the estimation of educational production functions. *The Journal of Human Resources, 14*(3), 351–388.
- Harackiewicz, J. M., Barron, K. E., Tauer, J. M., & Elliot, A. J. (2002). Predicting success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through graduation. *Journal of Educational Psychology, 94*, 562–575. doi: 10.1037/0022-0663.94.3.562
- Harris, J. R. (1995). Where is the child's environment? A group socialization theory of development. *Psychological Review, 102*, 458–489. doi: 10.1037/0033-295X.102.3.458
- Harter, S. (1996). Teacher and classmate influences on scholastic motivation, self-esteem, and level of voice in adolescents. In J. Juvonen & K. Wentzel (Eds.), *Social Motivation - Understanding children's school adjustment* (pp. 11–42). Cambridge, UK: University Press.
- Hesse, H.-G. (2004). Values and attitudes and their influence on education. In H. Döbert, E. Klieme & W. Sroka (Eds.), *Conditions of school performance in seven countries. A*

- quest for understanding the international variation of PISA results* (pp. 302–304). Münster, Germany: Waxmann.
- Hodapp, V., & Benson, J. (1997). The multidimensionality of test anxiety: A test of different models. *Anxiety, Stress and Coping, 10*, 219–244. doi: 10.1080/10615809708249302
- Hoferichter, F., & Raufelder, D. (2013). Examining the role of social relationships in the association between neuroticism and test anxiety – results from a study with German secondary school students. *Educational Psychology, 33*, 1–18. doi: 10.1080/01443410.2013.849326
- Hoferichter, F., & Raufelder, D. (2014). Ein Modell inter-individueller Unterschiede sozio-motivationaler Beziehungen von Sekundarschülern mit ihren Peers und Lehrern [A model of inter-individual differences, socio-motivational relationships of secondary school students with their peers and teachers]. In C. Tillack, J. Fetzer & D. Raufelder (Eds.), *Beziehungen in Schule und Unterricht - Teil 3 Soziale Beziehungen im Kontext von Motivation und Leistung* (Vol. Reihe Theorie und Praxis der Schulpädagogik Band 25, pp. 170–200). Immenhausen: Prolog.
- Hoferichter, F., Raufelder, D., & Eid, M. (2014). The mediating role of socio-motivational relationships in the interplay of perceived stress, neuroticism, and test anxiety among adolescent students. *Psychology in the Schools, 51*, 736–752. doi: 10.1002/pits.21778
- Hoferichter, F., Raufelder, D., Eid, M., & Bukowski, W. (2014). Knowledge transfer or social competence? - A comparison of German and Canadian adolescent students on their socio-motivational relationships in school. *School Psychology International, 35*, 627–648. doi: 10.1177/0143034314552345
- Hurrelmann, K. (2006). *Einführung in die Sozialisationstheorie* [Introduction to the theory of socialization]. Weinheim, Germany: Beltz.
- Hussong, A. M. (2002). Differentiating peer contexts and risk for adolescent substance use. *Journal of Youth and Adolescence, 31*, 207–220. doi: 10.1023/a:1015085203097
- Johnson, J., Wood, A. M., Gooding, P., Taylor, P. J., & Tarrier, N. (2011). Resilience to suicidality: The buffering hypothesis. *Clinical Psychology Review, 31*, 563–591. doi: 10.1016/j.cpr.2010.12.007
- Kaplan, A. (2004). Achievement goals and intergroup relations. In P. R. Pintrich & M. L. Maehr (Eds.), *Advances in research on motivation and achievement: Motivating Students, Improving Schools* (Vol. 13, pp. 97–136). Bingley, UK: Emerald.

- Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review*, *19*, 141–184. doi: 10.1007/s10648-006-9012-5
- Kaufmann, A. (2007). Merkmale und Einstellungen von Schülern [Characteristics and attitudes of students]. In H. Ditton (Ed.), *Kompetenzaufbau und Laufbahnen im Schulsystem. Ergebnisse einer Längsschnittuntersuchung an Grundschulen* (pp. 117–143). Münster, Germany: Waxmann.
- Kiuru, N., Aunola, K., Vuori, J., & Nurmi, J. E. (2007). The role of peer groups in adolescents' educational expectations and adjustment. *Journal of Youth and Adolescence*, *36*, 995–1009. doi: 10.1177/0165025408098014
- Klein, A. (2000). *Moderatormodelle. Verfahren zur Analyse von Moderatoreffekten in Strukturgleichungsmodellen* [Moderator models. Methods for the analysis of moderator effects in structural equation models]. Hamburg, Germany: Dr. Kovac.
- Klein, A., & Moosbrugger, H. (2000). Maximum likelihood estimation of latent interaction effects with the LMS method. *Psychometrika*, *65*, 457–474. doi: 10.1007/BF02296338
- Klein, A. G., & Muthén, B. O. (2007). Quasi maximum likelihood estimation of structural equation models with multiple interaction and quadratic effects. *Multivariate Behavioral Research*, *42*, 647–673. doi: 10.1080/00273170701710205
- Kinga, R. B., & McInerney, D. M. (2014). Culture's consequences on student motivation: capturing cross-cultural universality and variability through personal investment Theory. *Educational Psychologist*, *49*, 175–198. doi: 10.1080/00461520.2014.926813
- Komarraju, M., Karau, S. J., Schmeck, R. R., & Avdic, A. (2011). The Big Five personality traits, learning styles, and academic achievement. *Personality and Individual Differences*, *51*, 472–477. doi: 10.1016/j.paid.2011.04.019
- Kunter, M., Schümer, G., Artelt, C., Baumert, J., Klieme, E., Neubrand, M., Manfred, P., Schiefele, U., Schneider, W., Stanat, P., Tillmann, K.-J., Weiß, M. (2002). *Dokumentation der Erhebungsinstrumente* [Documentation of the data collection instruments]. (Vol. 72). Berlin, Germany: Max-Planck-Institut für Bildungsforschung.
- Ladd, G. W., Kochenderfer, B. J., & Coleman, C. C. (1996). Friendship quality as a predictor of young children's early school adjustment. *Child Development*, *67*, 1103–1118. doi: 10.1111/1467-8624.ep9704150186
- Lee, R. M., & Robbins, S. B. (1998). The relationship between social connectedness and anxiety, self-esteem, and social identity. *Journal of Counseling Psychology*, *45*, 338–345. doi: 10.1037/0022-0167.45.3.338

- Levy, I., Kaplan, A., & Patrick, H. (2004). Early adolescents' achievement goals, social status, and attitudes towards cooperation with peers. *Social Psychology of Education, 7*, 127–159. doi: 10.1023/B:SPOE.0000018547.08294.b6
- Link, S. (2013). *Institutional determinants of student achievement microeconomic evidence*. Munich, Germany: Leibnitz-Institut für Wirtschaftsforschung.
- Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 151–173.
- March, H. W., & Craven, R. G. (2005). A reciprocal effects model of the causal ordering of self-concept and achievement. New support for the benefits of enhancing self-concept. In H. W. Marsh, R. G. Craven & D. M. McInerney (Eds.), *International advances in self research: New frontiers for self research* (pp. 15–52). Greenwich, CT: Information Age.
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review, 98*, 224–253. doi: 10.1037/0033-295X.98.2.224
- McClelland, D. C. (1961). *The achieving society*. New York, NY: D. Van Nostrand Company, Inc.
- McClelland, D. C., Atkinson, J. W., Clark, R., & Lowell, E. (1976). *The achievement motive*. New York, NY: Appleton, Centurz, Crofts.
- McGloin, J., Sullivan, C., & Thomas, K. (2014). Peer influence and context: The interdependence of friendship groups, schoolmates and network density in predicting substance use. *Journal of Youth and Adolescence, 43*, 1436–1452. doi: 10.1007/s10964-014-0126-7
- Midgley, C. (1993). Motivation and middle level schools. In P. Pintrich & M. L. Maehr (Eds.), *Advances in motivation and achievement* (Vol. 8, pp. 219–276). Greenwich, CT: JAI Press.
- Misra, K., Grimes, P. W., & Rogers, K. E. (2012). Does competition improve public school efficiency? A spatial analysis. *Economics of Education Review, 31*, 1177–1190. doi: 10.1016/j.econedurev.2012.08.001
- Moosbrugger, H., Schermelleh-Engel, K., Kelava, A., & Klein, A. G. (2009). Testing multiple nonlinear effects in structural equation modeling: A comparison of alternative estimation approaches. In T. Teo & M. S. Khine (Eds.), *Structural Equation Modelling*

- in educational research: Concepts and applications* (pp. 103–136). Rotterdam, NL: Sense Publishers.
- Muthén, L. K., & Muthén, B. (1998–2013). *Mplus user's guide. Seventh edition*. Los Angeles, CA: Muthén & Muthén.
- Muthén, L. K., & Muthén, B. O. (2010). *Mplus Guide. Statistical analysis with latent variables. User's guide*. Los Angeles, CA: Muthén & Muthén.
- Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review*, *91*, 328–346. doi: 10.1037/0033-295X.91.3.328
- Nicholls, J. G., & Miller, A. T. (1983). The differentiation of the concepts of difficulty and ability. *Child Development*, *54*, 951–959.
- Pajares, F. (2007). Culturalizing educational psychology. In F. Salili & R. Hoosain (Eds.), *Culture, motivation, and learning: A multicultural perspective* (pp. 19–42). Charlotte, NC: Information Age.
- Pekrun, R. (2000). A social-cognitive, control-value theory of achievement emotions. In J. Heckhausen (Ed.), *Motivational psychology of human development. Developing motivation and motivating development* (pp. 143–164). New York, NY: Elsevier.
- Pekrun, R. (2001). Test anxiety and academic achievement In N. J. Smelser & P. B. Baltes (Eds.), *International Encyclopedia of the Social & Behavioral Sciences* (1st ed., pp. 15610–15614). New York, NY: Elsevier.
- Perry, K. E., Donohue, K. M., & Weinstein, R. S. (2007). Teaching practices and the promotion of achievement and adjustment in first grade. *Journal of School Psychology*, *45*, 269–292. doi: 10.1016/j.jsp.2007.02.005
- Pintrich, P. R., & Schunk, D. H. (1996). *Motivation in education: Theory, research, and applications*. Engewoods Cliffs, NJ: Pentice-Hall.
- Ponzo, M. (2011). The effects of school competition on the achievement of Italian students. *Managerial and Decision Economics*, *32*, 53–61. doi: 10.1002/mde.1517
- Raufelder, D. (2013). *Vier Motivationstypen: interindividuelle Unterschiede in sozio-motivationalen Beziehungen* [4 Motivational types: inter-individual differences in socio-motivational relationships]. Paper presented at the 14. Fachgruppentagung der Fachgruppe Pädagogische Psychologie (PAEPS) der Deutschen Gesellschaft für Psychologie (DGPs), Hildesheim, Germany.

- Raufelder, D. (2007). *Von Machtspielen zu Sympathiegesten. Das Verhältnis von Lehrern und Schülern im Bildungsprozess* [Of power games to sympathy gestures. The relationship of teachers and students in the educational process]. Marburg, Germany: Tectum.
- Raufelder, D., Drury, K., Jagenow, D., Hoferichter, F., & Bukowski, W. (2013). Development and validation of the Relationship and Motivation (REMO) scale to assess students' perceptions of peers and teachers as motivators in adolescence. *Learning and Individual Differences, 24*, 182–189. doi: 10.1016/j.lindif.2013.01.001
- Raufelder, D., Jagenow, D., Drury, K., & Hoferichter, F. (2013). Social relationships and motivation in secondary school: Four different motivation types. *Learning and Individual Differences, 24*, 89–95. doi: 10.1016/j.lindif.2012.12.002
- Roseth, C. J., Johnson, D. W., & Johnson, R. T. (2008). Promoting early adolescents' achievement and peer relationships: The effects of cooperative, competitive, and individualistic goal structures. *Psychological Bulletin, 134*, 223–246. doi: 10.1037/0033-2909.134.2.223
- Rubin, K. H., Bukowski, W. M., & Parker. (2006). Peer interactions, relationships, and groups. In N. Eisenberg, W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology* (Vol. Social, emotional, and personality development, pp. 197–219). Hoboken, NJ: John Wiley & Sons.
- Rudasill, K. M., Gallagher, K. C., & White, J. M. (2010). Temperamental attention and activity, classroom emotional support, and academic achievement in third grade. *Journal of School Psychology, 48*, 113–134. doi: 10.1016/j.jsp.2009.11.002
- Ryan, A. M., Gheen, M. H., & Midgley, C. (1998). Why do some students avoid asking for help? An examination of the interplay among students' academic efficacy, teachers' social-emotional role, and the classroom goal structure. *Journal of Educational Psychology, 90*, 1–8. doi: 10.1037/0022-0663.90.3.528
- Ryan, A. M., & Pintrich, P. R. (1997). “Should I ask for help?” The role of motivation and attitudes in adolescents' help seeking in math class. *Journal of Educational Psychology, 89*, 329–341. doi: 10.1037/0022-0663.89.2.329
- Salili, F., Chiu, C.-y., & Lai, S. (2001). The influence of culture and context on students' motivational orientation and performance. In F. Salili, C.-y. Chiu & Y.-y. Hong (Eds.), *Student motivation: The culture and context of learning. Plenum series on human exceptionalism* (pp. 221–247). Dordrecht, Netherlands: Kluwer Academic Publishers.
- Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*, 507–514. doi: 10.1007/BF02296192

- Schab, F. (1991). Schooling without learning: Thirty years of cheating in high school. *Adolescence*, 26(104), 839–847.
- Schlotter, M. (2012). *Educational production in preschools and schools-microeconomic evidence from Germany*. München, Germany: Leibnitz-Institut für Wirtschaftsforschung.
- Schwarzer, R. (2000). *Stress, Angst und Handlungsregulation* [Stress, anxiety and action regulation]. (Vol. 4). Stuttgart, Germany: Kohlhammer.
- Seiffge-Krenke, I. (1995). *Stress, coping, and relationships in adolescence*. Mahwah, NJ: Erlbaum.
- Selkirk, L. C., Bouchey, H. A., & Eccles, J. S. (2011). Interactions among domain-specific expectancies, values, and gender: Predictors of test anxiety during early adolescence. *Journal of Early Adolescence*, 31, 361–389. doi: 10.1177/0272431610363156
- Shernoff, D., & Schmidt, J. (2008). Further evidence of an engagement-achievement paradox among U.S. high school students. *Journal of Youth and Adolescence*, 37, 564–580. doi: 10.1007/s10964-007-9241-z
- Shin, H., & Ryan, A. (2014). Friendship networks and achievement goals: An examination of selection and influence processes and variations by gender. *Journal of Youth and Adolescence*, 1–12. doi: 10.1007/s10964-014-0132-9
- Singh, K. (2011). Study of achievement motivation in relation to academic achievement of students *International Journal of Educational Planning & Administration*, 1(2), 161–171.
- Spielberger, C. D., & Rickman, R. L. (1990). Assessment of state and trait anxiety. In N. Sartorius, V. Andreoli, G. Cassano, L. Eisenberg, P. Kielkolt, P. Pancheri & G. Racagni (Eds.), *Anxiety: Psychobiological and clinical perspectives* (pp. 69–83). New York, NY: Hemisphere Publishing.
- Spielberger, C. D., & Vagg, P. R. (Eds.). (1995). *Test anxiety: Theory, assessment, and treatment*. Washington, DC: Taylor & Francis.
- Steinmayr, R., & Spinath, B. (2008). Sex differences in school achievement: what are the roles of personality and achievement motivation? *European Journal of Personality*, 22, 185–209. doi: 10.1002/per.676
- Stravynski, A., & Boyer, R. (2001). Loneliness in relation to suicide ideation and parasuicide: A population-wide study. *Suicide & Life-Threatening Behavior*, 31, 32–40. doi: 10.1521/suli.31.1.32.21312

- Tossman, I., Kaplan, A., & Assor, A. (2008). Academic achievement goal structures and young adolescents' biased preferences for peers as cooperation partners: A longitudinal study. *Revue Internationale de Psychologie Sociale*, *1*(2), 181–215.
- Triandis, H. C. (1995). *Individualism & collectivism. New directions in social psychology*. Boulder, CO: Westview Press.
- Twenge, J. M. (2000). The age of anxiety? The birth cohort change in anxiety and neuroticism, 1952–1993. *Journal of Personality and Social Psychology*, *79*, 1007–1021. doi: 10.1037/0022-3514.79.6.1007
- Tyler, K. M., Wade Boykin, A., & Walton, T. R. (2006). Cultural considerations in teachers' perceptions of student classroom behavior and achievement. *Teaching and Teacher Education*, *22*, 998–1005. doi: 10.1016/j.tate.2006.04.017
- Urduan, T., & Schoenfelder, E. (2006). Classroom effects on student motivation: Goal structures, social relationships, and competence beliefs. *Journal of School Psychology*, *44*, 331–349. doi: 10.1016/j.jsp.2006.04.003
- Urduan, T. C. (1997). Achievement Goal Theory: Past results, future directions. In M. L. Maehr & P. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10). London, UK: Jai Press.
- Vitoroulis, I., Schneider, B. H., Cerviño Vasquez, C., del Pilar Soteras de Toro, M., & Santana Gonzáles, Y. (2012). Perceived parental and peer support in relation to Canadian, Cuban, and Spanish adolescents' valuing of academics and intrinsic academic motivation. *Journal of Cross-Cultural Psychology*, *43*, 704–722 doi: 10.1177/0022022111405657
- Wang, M.-T., & Eccles, J. S. (2013). School context, achievement motivation, and academic engagement: A longitudinal study of school engagement using a multidimensional perspective. *Learning and Instruction*, *28*, 12–23. doi: 10.1016/j.learninstruc.2013.04.002
- Wang, M., Haertel, G., & Walberg, H. (1993). Toward a knowledge base for school learning. *Review of Educational Research*, *63*, 249–294. doi: 10.3102/00346543063003249
- Weinstein, R. S. (1998). Promoting positive expectations in schooling. In N. Lambert & B. McCombs (Eds.), *How students learn: Reforming schools through learner-centered education* (pp. 81–111). Washington, DC: American Psychological Association.
- Wentzel, K. R. (1993). Motivation and achievement in early adolescence: The role of multiple classroom goals. *Journal of Early Adolescence*, *13*, 4–20. doi: 10.1177/0272431693013001001



- Wentzel, K. R. (2005). Peer relationships, motivation, and academic performance at school. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 279–296). New York, NY: The Guilford Press.
- Wentzel, K. R., Battle, A., Russell, S. L., & Looney, L. B. (2010). Social supports from teachers and peers as predictors of academic and social motivation. *Contemporary Educational Psychology, 35*, 193–202. doi: 10.1016/j.cedpsych.2010.03.002
- Wigfield, A., Eccles, J. S., Mac Iver, D., Reuman, D. A., & Midgley, C. (1991). Transitions during early adolescence: Changes in children's domain specific self-perceptions and general self-esteem across the transition to junior high school. *Developmental Psychology, 27*, 552–565. doi: 10.1037/0012-1649.27.4.552
- Williams, P. (1980). Adolescent identification and academic achievement: Reporting the awareness of similarity to role models. *Journal of Youth and Adolescence, 9*, 315–321. doi: 10.1007/bf02087983
- Zee, M., Koomen, H. M. Y., & Van der Veen, I. (2013). Student-teacher relationship quality and academic adjustment in upper elementary school: The role of student personality. *Journal of School Psychology, 51*, 517–533. doi: 10.1016/j.jsp.2013.05.003
- Zeidner, M. (1998). *Test anxiety. The state of the art*. New York, NY: Plenum Press.
- Zohar, D. (1998). An additive model of test anxiety: Role of exam-specific expectations. *Journal of Educational Psychology, 90*, 330–340. doi: 10.1037/0022-0663.90.2.330

## Chapter IV / Study 3

### Knowledge transfer or social competence? A comparison of German and Canadian adolescent students on their socio-motivational relationships in school

#### 4.1 Abstract

This cross-national study investigates the perception of the impact of students' relationships toward teachers and peers on scholastic motivation in a total sample of 1477 seventh and eighth grade German (n = 1,088) and Canadian (n = 389) secondary school students. By applying multigroup confirmatory latent class analysis in Mplus we confirmed four different motivation types: (1) teacher-dependent, (2) peer-dependent, (3) teacher-and-peer-dependent, (4) teacher-and-peer-independent motivation types in Québec, Canada, as they were found in a preliminary study among German students in the state of Brandenburg (Raufelder, Jagenow, Drury, & Hoferichter, 2013). However, across the two samples, the class sizes varied considerable. The largest group among Canadian students was composed of teacher-and-peer-dependent students, followed by teacher-and-peer-independent students, while the largest group among German students was constituted by peer-dependent students, followed by teacher-and-peer-independent students. In both settings the teacher-dependent motivation type constituted the smallest group. These results manifest the different impacts of social environmental variables on the motivation of German and Canadian students, having practical implications for school psychologists and educators in general.

*Keywords:* motivation typology, relationships in school, multigroup confirmatory latent class analysis, Canadian and German secondary school students

Hoferichter, F., Raufelder, D., Eid, M., & Bukowski, W. (2014). Knowledge transfer or social competence? A comparison of German and Canadian adolescent students on their socio-motivational relationships in school. *School Psychology International*, 35, 627–648. doi: 10.1177/0143034314552345

<http://dx.doi.org/10.1177/0143034314552345>

## Knowledge transfer or social competence? A comparison of German and Canadian adolescent students on their socio-motivational relationships in school

Classroom settings function not only as educational arenas but also as a powerful social environment dominated by interactions between students and teachers (Harter, 1996; Anderson, Christenson, Sinclair & Lehr, 2004; Roeser, Eccles, & Sameroff, 2000). Social interactions within the school context affect different academic factors including students' motivation (Brekelmanns & Wubbels, 1991; Burack et al., 2013; Juvonen & Wentzel, 1996; Studsrød & Bru, 2012; Wentzel, Battle, Russel, & Looney 2010; Wubbels & Brekelmanns, 2005). Based on these premises, Raufelder, Jagenow, Drury, and Hoferichter (2013) have described the importance of inter-individual differences concerning the role of peers and teachers for students' motivation. Through an analysis of students' scholastic motivation and social relationships with peers and teachers conducted in the state of Brandenburg, Germany, the researchers identified four different motivation types (MT) with the following distribution in percentage: teacher-dependent MT (10%), peer-dependent MT (34%), teacher-and-peer-dependent MT (27%), and teacher-and-peer-independent MT (29%) (Raufelder et al., 2013). The results indicated that the teacher-dependent MT, the peer-dependent MT as well as the teacher-and-peer-dependent MT experience social relationships as an important source of motivation. In contrast, the motivation of the teacher-and-peer-independent MT did not appear to be dependent on social relationships, meaning that for example, teaching style, teacher's awareness of student's scholastic progress and abilities as well as peer learning behavior were not essential for the motivation of students of this motivation type. These results are in line with Lerner's theory of Developmental Contextualism (1986, 1991, 1992, 1998), which views the individual as being embedded in a social context as it interacts constantly with its environment and vice versa. In this way, adolescent life is perceived to be a multifaceted developmental system involving dynamic and reciprocal relations, while person-context relations may constitute the basic process of development (Lerner, 1986, 1991). Similar to Lerner's approach, Lewin (1951) had previously defined motivation as a function of both, the person *and* the social setting (cf. Rheinberg, Vollmeyer, & Burns, 2000).

Following this person-context interdependence, we were interested in potential differences in adolescent students' perception of peers and teachers as source of motivation among Canadian and German students – two nations labeled as individualistic societies (Basabe & Ros, 2005; Triandis, 1995) but with significantly different educational systems, including different social settings (cf. Beckmann, 2000; Graudenz & Randol, 1997; Kopp & Schmitt, 2004). In addition, this study aimed at investigating whether the four motivation types noted by Raufelder and colleagues

(2013) would also exist for Canadian secondary school students. The necessity for exploring cross-national differences in students' interaction has been posed by Beehr and McGrath (1992), as peers and teachers interact with each other differently within different educational systems (Bronfenbrenner, 1979; Chen, 2008; Lerner, 1991). The current study provides insight for both teachers and school psychologists concerning cross-national variations of perceived social environments related to motivation.

In the following section we will explain educational aspects of both Germany and Canada by briefly commenting on the design of the educational system as well as the role of peers and teachers.

## **4.2 Germany and Canada**

Both societies are part of the Western world and members of the Organisation for Economic Co-operation and Development (OECD) since 1961. Looking at both countries' educational systems, a national Ministry of Education is absent, for each country is divided into states or provinces that are given sovereignty to decide on educational issues as well as procedures for implementing state wide educational standards. However, in Germany the Kultusministerkonferenz (Conference of Ministers of Culture), which is a joint assembly of ministers of education and research, gives directives to the states by stipulating educational standards. In Canada the Council of Ministers of Education of Canada has been aiming to extend co-operations between the states since its foundation in 1967 (Wilson & Lam, 2004).

## **4.3 Germany**

In 2012 Germany spent 5.3 % of its Gross Domestic Product (GDP) on all levels of education, falling well below the average spending of OECD countries (6.2% of the GDP; OECD, 2012). When the results of the first Programme for International Student Assessment (PISA) survey were published in 2000, revealing mediocre to poor results in reading and mathematical literacy of German students, voices were raised about the quality of classroom methods and teaching techniques, including calls for quality assurance and the monitoring of schools (Döbert, 2002). The German public ascribes a rather low social status to teachers; the quality of teaching, the restrictive autonomy of teachers, and the limited pedagogical mandate on educational decision-making are part of a controversial job profile (Etzold, 2000).

The focus of the educational system reflects German cultural characteristics, including the orientation toward autonomy, self-control, and control of its surrounding (Kopp & Schmitt, 2004). In fact, among secondary school students the school is viewed as a platform to recognize personal

needs and ideas (Graudenz & Randoll, 1997), while students wish to be respected as independent and self-sufficient individuals (Hesse, 2004). A national survey, portraying German youth, found that the majority gave increasing importance to 'sticking out of the crowd', insisting on personal uniqueness and singularity (Fritzsche, 2000). In this sense, the ties between the individuals are loose, while everyone is expected to look after themselves and their immediate family, being responsible for school outcomes and his/her career (Hesse, 2004).

To be appreciated by teachers, 54% of German students feel that they have to demonstrate high performance, while only 31% of students feel that their teachers generally appreciate them. In the same study Graudenz and Randoll (1997) found that 14% of German secondary students feel that the competition for good grades affected their peer relationships negatively, while 70% agreed that their peers are only interested in their own scholastic progression.

The school climate in German schools is competitive and while findings indicate that high achieving peers are not looked up to by some students (Hannover & Kühnen, 2002), other studies indicate that high achievers are honored by their peers (Horstkemper, 1995). Although there is variation among the youth, one aspect almost all students agree upon is the importance of getting along with their peers. Students are clearly oriented toward their peers when it comes to decision-making or pursuing activities (Fritzsche, 2000), as it is very important for them to have good friends that appreciate them (Shell, 2006). In fact, students are longing for appreciation from peers to a high degree (Hesse, 2004; Levitt, 2005). Furthermore, various students view the scholastic performance of their peers (no matter whether high or low) as incentive for their own performance (Kaufmann, 2007; Raufelder et al., 2013).

Yet, the orientation toward social relationships in school does not present the main focus of the educational system, which is designed to focus mainly on the cognitive development of the students (Kopp & Schmitt, 2004), while precision is given priority over originality (Hesse, 2004). In line with these findings a survey about the motives of being a teacher revealed that secondary school teachers were motivated by the subject, rather than by working with youth (Terhart, 2001). Particularly secondary school teachers tend to see themselves primarily as historian, philologist, mathematician, etc., rather than viewing themselves as educators or pedagogues (Beckmann, 2000). Teaching is, therefore, rated as rather impersonal as the main focus of the lesson is given to the subject matter (Beckmann, 2000; Graudenz & Randoll, 1997; Hesse, 2004). Among German parents a similar orientation concerning school was found, as 96 % of parents see the primary purpose of school in acquiring knowledge (Toyama-Bialke, 2000).

The family, reflecting community values in general (cf. Pebley, Goldman, & Rodríguez, 1996), has a considerable impact on the educational career of the child, as the social class of the

family determines expectations and decision-making, concerning tracking and subsequently the educational career of their children (Büchner & Krüger, 1996; Maaz, Trautwein, Lüdtke, & Baumert, 2008; Nauck & Bertram, 2001; Stecher, 1999). In Germany, students' academic opportunities and success are highly dependent on the social origin of their family (Bracey, 2004; Maaz, Baumert, & Trautwein, 2010; PISA Consortium, 2013; Solga & Dombrowski, 2009). The early tracking system (at the age of about 10 or 12 years, depending on the state), which predetermines educational and vocational careers, promotes disparity between students from educationally deprived and privileged families (Baumert & Maaz, 2012). Once students follow a certain school track, only very few of all secondary school students change to a school type with a higher tracking system. For every upward change in the school tracking, five downward changes follow (Autorengruppe Bildungsberichterstattung, 2008). However, as the stratification within the German educational system has been criticized severely (Muñoz, 2007), the states are moving toward reducing the track system.

#### **4.4 Canada**

Canada's educational system was ranked one of the best in the 20<sup>th</sup> century and is still among the top systems according to most of the PISA scores. As assessed in PISA 2012, Canada unites high performance levels with equity in educational opportunities and therefore has been characterized as having a low-cost and high-quality educational system (Hopkins, 2013; PISA Consortium, 2013). Canada's educational system is designed to be progressive and child-centered (Wilson & Lam, 2004), although there have been movements within the past years toward a teacher-directed model (Laferriere, 2001; Wilson, 1993); for example by giving fewer electives and providing obligatory core subjects in order to prepare students for vocational careers. The dominant key points in Canadian education, including teacher training, are defined as "cultivation of mind, vocational preparation, moral and civil development, and individual development" (Wilson & Lam, 2004, p. 23). In 2012, Canada spent 6.1 % of its GDP on education, which is 0.8% more than the spending in Germany. As in many countries, in Canada the socio economic status (SES) is related to schooling opportunities (Ferguson, Bovaird, & Mueller, 2007; Finnie, Childs, & Wismer, 2011). However, PISA 2012 revealed a weak relationship between socio-economic status and student performance among Canadian students. Similar results have been found in a comparative study between Australian and Canadian students, indicating that the association between socio-economic status and students' math and reading tests was stronger in Australian students than in Canadian students (Perry & McConney, 2013). While students' socio-economic status was related to academic achievement in both countries, Canadian students performed better. This may be due to

the Canadian school system, which gives much importance to social relationships and social competencies, creating a supportive environment (Wilson & Lam, 2004). The strong impact of the learning context was confirmed by Salili, Chiu, and Lai (2001), when they found that the context of learning moderated the effect of cultural influences in Chinese Canadian and European Canadian students living in Canada, influencing students' motivation and achievement.

Looking at the role of parents, in comparison with German parents, Canadian parents' involvement in educational decision-making is anchored deeply through establishments, including school boards and school advisory councils (Wilson & Lam, 2004). In addition, the development of social skills is viewed as at least as central as students' academic achievement – evaluating students' personal development and social competence as one of the key factors of education (Cheah & Chirkov, 2008).

In fact, a national survey portraying students' opinion on school issues showed that the cognitive engagement in school was lower than social engagement, as in most cases students did not see the relevance of schoolwork to their future (Willms, Friesen, & Milton, 2009). Comparative studies with countries such as Spain and Cuba have shown that particularly Canadian students value social support from friends at school, which was related to high levels of intrinsic academic motivation (Vitoroulis et al., 2012). Following an individual perspective, a Canadian study found three different profiles of students on the basis of school adjustment and social relationships during the transition to middle school (Duchesne, Ratelle, & Roy, 2012). Although all three groups (well-adjusted, socioemotionally adjusted, socially adjusted) evaluated their peer and teacher relationships to be satisfactory, their school adjustment and coping with school demands varied among the groups, indicating that the perception of social relationships may have different impact on school variables.

Results from the PISA (2000, 2003, 2006, 2009, 2012) showed that Canadian participants scored well above the OECD-average in reading, mathematics, and science, while on a national level Québec ranked first in mathematics and second highest in science and reading (EQAQ, 2001). National comparative studies with students aged 13 to 16 years have shown that Québec's students did particularly well in mathematic problem solving and reading, outperforming all other provinces (EQAQ, 2000).

The high quality results of Canadian students reflected in PISA seem contradictory to their low cognitive engagement reported, while the latter constitutes a challenge for the Canadian educational system. However, being aware of student voices, Canada is consequently focusing on subjects linked to vocational careers as part of a sustainable development (Hopkins, 2013).

## 4.5 Hypotheses

To sum up, German and Canadian secondary school students seem to differ in their perception of peers and teachers in the school context, which might be based on different emphases in the educational systems of both countries. German students tend to focus on peers as motivational support as well as on their individuality, whereas the relationships with teachers are described as informal and distant. This tendency is in line with the concept of the German educational system, which is dominated by knowledge transfer and impersonal teacher-student relationships as well as with the specific distribution of the motivation typology among German students. In particular, the peer-dependent MT was found to be the largest group with 34%, followed by the teacher-and-peer-independent MT with 29%, while the teacher-dependent MT constituted the smallest group (10%) (Raufelder et al., 2013). In contrast, Canadian secondary school students tend to perceive both peers and teachers as supportive. In addition, the Canadian educational system emphasizes the importance of the social environment by focusing and maintaining the development of social skills.

Based on these cross-national differences among the role of peers and teachers in the educational system and the established motivation typology in Germany, the following two hypotheses were developed and tested: (1) Four different motivation types (MT) can be identified among Canadian students. (2) The distribution of the students within the typology varies among the countries. In the Canadian sample, the teacher-and-peer-dependent MT is expected to be the largest group, followed by the teacher-and-peer-independent MT.

## 4.6 Method

### 4.6.1 Participants and procedure

A total of 1,477 seventh and eighth grades students from Germany and Canada participated in this study during the school years 2011/2012 and 2012/2013. The study was conducted in the state of Brandenburg, in the northeastern part of Germany where the population is mainly German speaking. A total of 1,088 German secondary students (54% girls, 46% boys) ( $M_{\text{age}} = 13.7$ ,  $SD = 0.53$ , age span 12 –15 years) answered questions about their socio-motivational relationships with peers and teachers. Schools were randomly selected with permission from the governmental Department of Education, Youth and Sport of Brandenburg. Information about participants' socio-economic status (SES) was not obtained, as the law in Germany does not allow asking a first party about information of a third party (e.g., asking students about the financial situation or the educational attainment of parents).



A total of 389 Canadian secondary students (56% girls, 44% boys) ( $M_{\text{age}} = 13.4$ ,  $SD = 0.80$ , age span 12-16 years) participated in the study. About 58.2% of the students spoke primarily English at home, 29.6% spoke primarily French at home and 12.3% other languages. Due to missing values the percentages do not add up to 100% in all cases.

The Canadian students from randomly selected English schools in Québec answered the same questionnaire as the German students but did so in English. Parental permission was acquired after obtaining permission from the English Montréal School Board (EMSB) and governing board of each school. Additionally, the ethics commission of the Concordia University authorized the questionnaire.

In Germany as well as in Canada parents and students were informed that the survey would be voluntarily, anonymous, and confidential as they were asked for consent. Data collection took place in classrooms or the cafeteria on two consecutive days.

#### 4.6.2 Measures

**Peers as Positive Motivators (PPM).** This subscale is part of the Relationships and Motivation (REMO) scale (Raufelder, Drury, Jagenow, Hoferichter, & Bukowski, 2013) and consists of nine statements, such as “When my friends learn, I am also motivated to learn more” or “My friends and I motivate each other to make an effort at school”. The subscale’s reliability in the German sample is Cronbach’s alpha ( $\alpha$ ) = 0.80 and in the Canadian sample Cronbach’s alpha = 0.83. Students answered questions on a bimodal 4-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*).

**Teachers as Positive Motivators (TPM).** This subscale was also taken from the REMO scale (Raufelder et al., 2013) and consists of six items that have an internal consistency of  $\alpha = 0.78$  in the German sample and  $\alpha = 0.76$  in the Canadian sample. Students were asked to evaluate statements, such as “I will make more of an effort in a subject when I think the teacher believes in me” or “When a teacher helps me, I try to do well in the subject” on a bimodal 4-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*).

As the original scale was a German scale two professional translators did a Brislin back-translation (Brislin, 1970), independent from each other. Additionally, a pilot study with about 100 native English speaking high school students in Germany from an international school (where the main language is English) was conducted to validate the questionnaire.

### 4.6.3 Statistical analyses

In order to examine the above-mentioned hypotheses a multigroup confirmatory latent class analysis (MCLCA) was conducted to identify the possible four motivation types in both Canadian and German students, testing for measurement equivalence by applying an unrestricted, semi-restricted and fully-restricted model. Furthermore, we analyzed the distribution of students among the classes.

### 4.7 Multigroup confirmatory latent class analysis (MCLCA)

Through the application of latent class analysis (LCA) it is possible to identify latent groups (subgroups) based on a set of items. Different homogeneous class specific response patterns explain underlying inter-individual differences and subsequently constitute a specific latent class (cf. Geiser, 2012; Finch & Bronk, 2011; Hoijtink, 2001). By applying LCA it is possible to assign individuals based on their response pattern to specific latent classes and relate the number and nature of the classes to external variables such as the country (i.e., Germany, Canada) (Eid & Lischetzke, 2013). According to Eid, Langeheine, and Diener (2003), LCA is a suitable measure in the field of cross-national research to analyze within- and between-national differences (Eid & Diener, 2001; Eid & Lischetzke, 2013). As the results of the preliminary study provide a strong *a priori* knowledge about the number and nature of the latent classes (Raufelder et al., 2013), we applied confirmatory latent class analysis (CLCA) (Eid et al., 2003; Hoijtink, 2001; Laudy, Boom, & Hoijtink, 2005). Based on *a priori* ordering restriction of four latent classes as found in Germany the application of CLCA is suitable to test specific hypothesis about the response structure in the observed variables (Finch & Bronk, 2011). Just as in the German preliminary study (Raufelder et al., 2013), parcels were built from the PPM and TPM scales and were integrated in the CLCA. Thus, the nine items from the PPM scale were transformed into three parcels with each three items (PPM1, PPM2, PPM3) and the six items from the TPM scale were transformed into three parcels with each two items (TPM1, TPM2, TPM3). Working with parcels is advantageous as the original large number of items (in this case nine and six items) is being reduced (in this case to three and three parcels), yielding stable solutions by preventing potential spurious correlations and variance sharing (Little, Cunningham, Shahar, & Widaman, 2002). Following the approach of the preliminary study (Raufelder et al., 2013), we dichotomized the parcels based on the median split, as suggested when conducting latent class analysis in Mplus (Finch & Bronk, 2011; Geiser, 2012; Muthén & Muthén, 1998–2013). The original median split found in the German sample of 2.6 for all peer parcels (PPM1-PPM3) and 3.0 for all teacher parcels (TPM1-TPM3) was adopted for the Canadian sample. In the current sample, the requirements to apply LCA are met as the number of

items is small (6 parcels), the items have a small number of categories (dichotomization of the 4-point Likert scale) and the sample size is large (1477 students) (Eid et al., 2003).

In order to scrutinize potential cross-national differences concerning typological structures with country as the grouping variable, we applied a multigroup CLCA (Eid et al., 2003; Eid & Lischetzke, 2013; Janssen & Geiser, 2012). To test for potential differences among German and Canadian students and measurement equivalence, a stepwise analysis was used by applying: (1) unrestricted models, (2) semi-restricted models, and (3) fully-restricted models which subsequently were compared on the basis of the Bayesian Information Criterion (BIC), which takes into account both the complexity of the model as well as the goodness of fit (Laudy et al., 2005; Schwarz, 1978). In various studies the BIC has been shown to be the best descriptive index concerning the evaluation of estimated models, best indicator to estimate the number of classes and in comparison to other information criteria BIC shows a consistent performance (Magidson & Vermunt, 2004; Nylund, Asparouhov, & Muthén, 2007), being superior to other fit indices (Yang, 2006).

In the first step, the unrestricted model in which all parameters are free assumes that the number of classes and their size may differ among countries, placing no restriction on the parameters whatsoever. In a second step, the semi-restricted model was applied, assuming an equal number of classes among countries, pursuing measurement invariance. In this model the conditional response probabilities were set equal across the countries. In a third step, the fully-restricted model was applied, assuming both equal number of classes and equal class sizes across countries. In the latter model both the conditional response probabilities as well as the class size were held equal across countries (cf. Janssen & Geiser, 2012).

We started the analysis with a two-class solution, increasing the number of classes until a good model fit (BIC) was attained (Laudy et al., 2005). The lowest value of the BIC indicates the best model fit when comparing different models. We consequently compared the BIC value of all modeled class solutions for the unrestricted, semi-restricted, and fully restricted models (see Table 1). The MCLCA models were estimated with Mplus full information maximum likelihood (FIML) to account for missing data using Mplus version 7.0. (Muthén & Muthén, 1998-2013).

Table 1

*Bayesian Information Criteria (BIC) for multigroup confirmatory latent class analysis (MCLCA)*

Classes	unrestricted	semi-restricted	fully-restricted
Class 2	12708.063	12667.965	12759.708
Class 3	12471.370	12395.536	12482.931
Class 4	12427.734	<b>12302.714</b>	12388.745
Class 5	12504.815	12338.011	12432.882

*Note:* unrestricted model = all parameters are free across Germany and Canada; semi-restricted model = conditional response probabilities are set equal across the countries, assuming equal number of classes, but not equal class sizes; fully-restricted-model = the conditional response probabilities as well as the class sizes are set equal across the countries

## 4.8 Results

### 4.8.1 Multigroup confirmatory latent class analysis (MCLCA)

The analysis show that the four-class solution of the semi-restricted model has the best model fit (BIC = 12302.715) and is superior in comparison to all other estimated models (see Table 1). This result indicates that across the German and Canadian participants the number of classes is equal (i.e., four different motivation types exist in both countries; see Figure 1). However, the semi-restricted model also indicates a variation in class sizes across countries. In Germany, out of 1,084 secondary students, 107 students (10%) are classified as teacher-dependent; 292 students (27%) are assigned to the teacher-and-peer-dependent motivation type; 317 students (29%) are identified as teacher-and-peer-independent; and 368 students (34%) are assigned to the peer-dependent motivation type. In Canada out of 395 secondary students, 37 students (9%) are classified as teacher-dependent; 224 students (57%) are assigned to the teacher-and-peer-dependent motivation type; 77 students (20%) are assigned to the teacher-and-peer-independent group; and 57 students (14%) are assigned to the peer-dependent motivation type (see Table 2).

Table 2

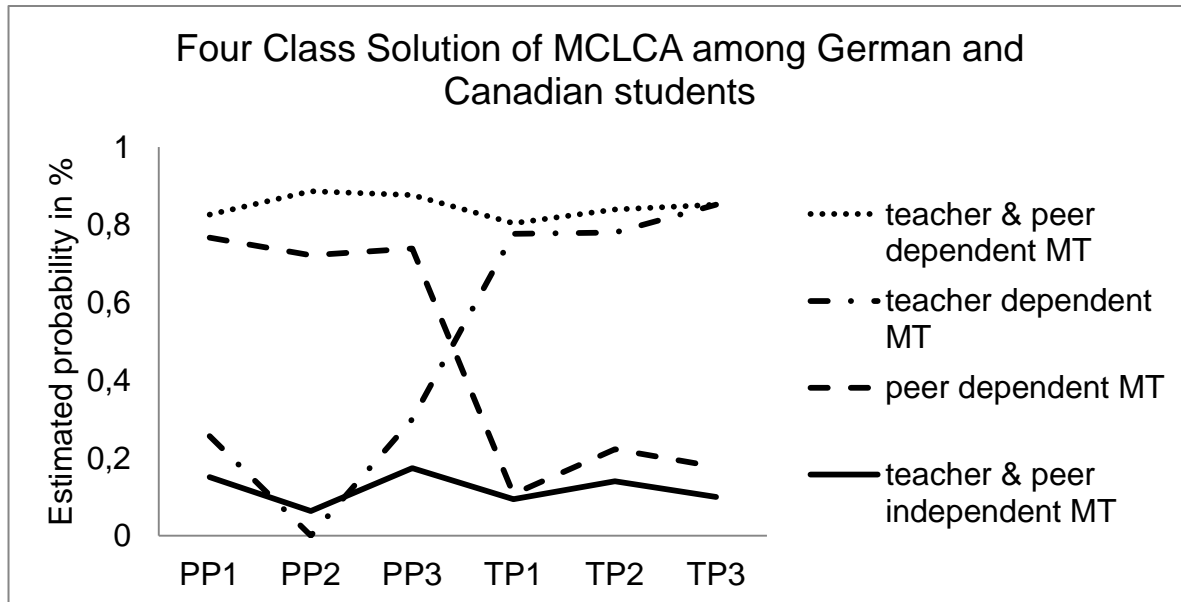
*Class description and class size per country*

Class type	class size			
	Germany (total = 1,084)		Canada (total = 395)	
	N	%	N	%
teacher-dependent MT	107	10	37	9
teacher & peer-dependent MT	292	27	224	57
peer-dependent MT	368	34	57	14
teacher & peer-independent MT	317	29	77	20

*Note.* MT = motivation type; N = total number of students assigned to a certain class; % = estimated percentage of class size

Figure 1

*Confirmatory latent class analysis of socio-motivational relationships for students in Germany and Canada*



*Figure 1.* X-axis shows three parcels “Peers as Positive Motivators” (PP1-PP3) and three parcels “Teachers as Positive Motivators” (TP1-TP3). The Y-axis shows the probability of agreement with the clusters. *Note.* MCLCA = multigroup confirmatory latent class analysis

#### 4.9 Discussion

We examined the importance of teachers and peers for the scholastic motivation of secondary school students from Germany and Canada. These nations have been selected as point of interest as both highly industrially developed countries share common features concerning their orientation toward individualistic societies in the Western world. In spite of these similarities, the emphasis of the educational systems varies, as educators in Germany tend to prioritize the transfer of knowledge independent of personal relationships, while in Canada, along with cognitive skills, social competences are a key focus within the educational system. Based on these variations across Germany and Canada, strong cross-national differences in the role of peers and teachers on students’ motivation have been assumed.

By using multigroup confirmatory latent class analysis (MCLCA), we were able to confirm four different motivation types (MT) among Canadian students: (1) teacher-dependent MT, (2) peer-dependent MT, (3) teacher-and-peer-dependent MT, and (4) teacher-and-peer-independent MT. These results are in line with previous research (Raufelder, 2007; Raufelder et al., 2013;

Hoferichter & Raufelder, 2014), in which inter-individual differences among students were found concerning the impact of teachers and peers on motivational patterns. The current study extends this research by addressing cross-national aspects within the motivation typology: *Although the pattern of the typology is the same in both countries, German and Canadian students differ in the distribution of the typology.* The following paragraphs will discuss each type and its distribution in both countries.

#### **4.9.1 Teacher-and-peer-dependent motivation type (MT)**

We found that in Canada 57% of the secondary school students were assigned to the student group that was oriented toward teachers *and* peers, constituting the biggest group among Canadians, whereas in Germany this group only consisted of 27% (Raufelder et al., 2013). These results reflect the orientation of the school community as well as the design of the educational system in each country. While Canadian parents, teachers, and students focus on maintaining and developing social skills (Cheah & Chirkov, 2008; Wilson & Lam, 2004), German school personnel, parents, and students focus on cognitive skills (Beckmann, 2000; Kopp & Schmitt, 2004; Terhart, 2001). Canadian parents stated that social competencies would be at least as important as the cognitive development of students, while German parents evaluated the primary purpose of schools as acquiring knowledge (Toyama-Bialke, 2000). While teacher training in Canada is rather student-centered, including aspects of leadership, community, and commitment of student learning (Wilson & Lam, 2004), teacher training in Germany is more subject-based, including the promotion of a self-determined and individually oriented learning (Hesse, 2004).

#### **4.9.2 Teacher-and-peer-independent motivation type (MT)**

We found that 20% of the Canadian students were assigned to the group of teacher-and-peer-independent MT. As Canada is oriented toward an individualistic society, characterized by independence and self-determinant behavior (Basabe & Ros, 2005; Triandis, 1995), this MT constitutes the second largest group among Canadians. Among German students, 29% were assigned to this group (Raufelder et al., 2013), as Germany along with Canada is oriented toward an individualistic society, emphasizing individual and self-determined learning within the educational system (Hesse, 2004), promoting once more the idea of uniqueness and singularity among German youth (Fritzsche, 2000).

### **4.9.3 Peer-dependent motivation type (MT)**

Students assigned to the peer-dependent MT relate to peers as a source of motivation. In Canada, 14% of all students were assigned to this group. The reason for the rather small size of the group may be the fact that most of the Canadian students do not solely rely on peers as motivational source but on both teachers *and* peers as represented by the large size of the group teacher-and-peer-dependent MT (57%). Among German students 34% of all participants were assigned to this MT, constituting the largest group (Raufelder et al., 2013).

The large size of this group among German students is reflected in the results of a national survey (Shell, 2006), which found that the vast majority of students ascribe importance to peers who appreciate them. In line with these results, students orient themselves toward peers when it comes to school performance, conduct, and decision-making (Fritzsche, 2000; Kaufmann, 2007).

### **4.9.4 Teacher-dependent motivation type (MT)**

In both countries, the smallest group is constituted by the teacher-dependent MT. In Canada the reason for the teacher group being so small (9%) may be that most students consider both teachers and peers as equally important for their motivation (see teacher-and-peer-dependent MT, 57%). In Germany, this group may be rather smaller (10%) (Raufelder et al., 2013), as students' relationships with teachers are based on the educational material rather than the emotional support potentially to be gained from teachers (Hesse, 2004). In general, there is a contemporary orientation toward peers replacing an orientation directed toward the teacher, which was more commonplace in early school years (Brown, 1990; Csikszentmihalyi & Larson, 1984; Levitt, 2005; Rohrbeck, 2003).

## **4.10 Conclusions**

These findings indicate that besides individual perspectives and preferences, cross-national differences might be underlying factors in motivational processes. The Canadian educational school system focuses on both teachers *and* peers as essential sources of adolescent students' motivation, which is underlined by the finding that almost 60% of the Canadian students have been identified as teacher-and-peer-dependent MT. Students assigned to the teacher-and-peer-dependent MT were found to report higher levels of intrinsic motivation, learning goals, and achievement drive in comparison to all other motivation types (Jagenow, Raufelder, & Eid, 2014). Furthermore, the success of this motivational strategy, where social relationships and their impact on students' motivation and learning processes are considered, is supported by the excellent PISA results of Canadian students.



The study clearly shows that the social environment, particularly a certain orientation and frame of the educational system, may be linked to specific roles assigned to peers and teachers in the motivational context across countries. Along with the theory of Developmental Contextualism (Lerner, 1991) and studies that point to the strong impact of learning contexts on motivation and achievement (Juvonen & Wentzel, 1996; Ryan & Patrick, 2001; Salili et al., 2001), it is striking how much impact social environmental factors have for the development of humans and their perception of themselves, peers, and teachers.

Methodological limitations exist in this study; first, the sample sizes vary considerably across the two countries. Second, as the study involves students from Québec, the results may not be transferred to high school students from other Canadian provinces, as Québec may not be representative of Canada as a whole. Accordingly, the results obtained for students living in the state of Brandenburg are neither transferable to Germany. Third, the study relies solely on self-report measures. However, in psychological research self-report measures have been shown to be valid methods (Chan, 2009). Nevertheless, apart from paper/pencil tests, further methods could be applied to validate the results gained from the current study.

Practical implications for the school context can be derived from the discovered structure and impact of motivational key factors. School psychologists should be aware of the variation of students' perception concerning the quality and role of peers and teachers for their individual motivational process. For example, the existence of motivation types, the specific social interconnectivity in class, the class climate, which is formed in part by the teachers' attitude toward and interaction with students, are factors that should enter the analysis of school psychologists dealing with motivational problems of students.

The resulting effect of socio-motivational relationships on school variables may be heterogeneous (Hoferichter, Raufelder, & Eid, 2013). When working with youth, it is important to understand that during adolescence, inter-individual differences become more pronounced, including the students' perception of themselves and others as well as the ascribed importance of school tasks (Covington & Dray, 2002; Thorkildsen, Nolen, & Fournier, 1994; Zusho & Pintrich, 2001). As shown in this study, the person-context relation varies considerably among students (Erickson, 1980; Lerner, 1998), which often results in a mismatch between students' individual needs and the actual opportunities provided in their school environment (Eccles, Lord, & Midgley, 1991; Eccles et al., 1993a; Eccles et al., 1993b). This mismatch can be mitigated by stronger sensitization of school psychologists about this issue. It is therefore not surprising that students' scholastic motivation and school outcomes are mainly determined by the individual perception of the classroom social context that youth experiences (Ryan & Patrick, 2001). In general, our results

confirm Boekaert's postulate (2001) that there is still much to learn about individual preferences when it comes to motivational aspects.

This study contributes to the field of research on inter-individual differences in students' scholastic motivation by considering teachers and peers as essential environmental factors. Furthermore, cross-national differences were investigated among secondary school students in Germany and Canada. The identified motivation typology implies strong inter-individual and cross-national differences, which provide important evidence that motivation is based on the dynamic and reciprocal person-context relations of the individuals (Lerner, 1986, 1998, 1991). Therefore, the role peers and teachers play on students' scholastic motivation is not solely constituted by students' individual perception but also by educational aspects such as the implicit institutional roles of both peers and teachers.

#### 4.11 References

- Anderson, A. R., Christenson, L. R., Sinclair, M. F., & Lehr, C. A. (2004). Check & Connect: The importance of relationships for promoting engagement with school. *Journal of School Psychology, 42*, 95–113. doi: 10.1016/j.jsp.2004.01.002
- Autorengruppe Bildungsberichterstattung (2008). *Bildung in Deutschland 2008. Ein indikatorengestützter Bericht mit einer Analyse zu Übergängen im Anschluss an den Sekundarbereich I* [Education in Germany 2008. An indicator-based report with an analysis of transitions following the secondary education]. Retrieved from: [http://www.bildungsbericht.de/daten2008/bb\\_2008.pdf](http://www.bildungsbericht.de/daten2008/bb_2008.pdf)
- Basabe, N., & Ros, M. (2005). Cultural dimensions and social behavior correlates: Individualism-Collectivism and Power Distance. *Revue Internationale de Psychologie Sociale, 18*(1), 189–225.
- Baumert, J., Klieme, E., Neubrand, M., Prenzel, M., Schiefele, U., Schneider, W., Stanat, P., Tillmann, K.-J., Weiß, M. (2001). *PISA 2000. Basiskompetenzen von Schülerinnen und Schülern im internationalen Vergleich* [Basic skills of students in international comparison]. Opladen, Netherlands: Leske & Budrich.
- Baumert, J., & Maaz, K. (2012). Migration und Bildung in Deutschland [Migration and Education in Germany]. *Die Deutsche Schule, 104*(n/a), 279–302.
- Beckmann, H.-K. (2000). Lehrer(aus)bildung in Deutschland: Kontinuität, Wandel und Strukturprobleme [Teacher(formation)training in Germany: continuity, change and structural problems]. In P. H. Heidelberg (Ed.), *Aktuelle Schulsysteme: Portugal, Kroatien,*

- Marokko, USA, Niederlande, Deutschland* (Vol. 59, pp. 40–58). Heidelberg, Germany: Institut für Weiterbildung.
- Beehr, T. A., & McGrath, J. E. (1992). Social support, occupational stress and anxiety. *Anxiety, Stress & Coping*, 5, 7–19. doi: 10.1080/10615809208250484
- Boekaerts, M. (2001). Motivation, learning, and instruction. In N. J. Smelser & P. B. Baltes (Eds.), *International Encyclopedia of the Social & Behavioral Sciences* (Vol. 15, pp. 10112–10117). Amsterdam, Netherlands: Elsevier.
- Bracey, G. W. (2004). Looking at adolescents through international assessments. In T. Urda & F. Pajares (Eds.), *Educating Adolescents: Challenges and Strategies* (pp. 131–177). Greenwich, CT: IAP.
- Brekelmans, M., & Wubbels, T. (1991). Student and teacher perceptions of interpersonal teacher behaviour: A Dutch perspective. *The Study of Learning Environments*, 5(n/a), 19–30.
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1, 185–216 doi: 10.1177/135910457000100301
- Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: University Press.
- Brown, B. B. (1990). Peer groups and peer culture. In S. S. Feldman & G. R. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 171–196). Cambridge, MA: Harvard University Press.
- Büchner, P., & Krüger, H.-H. (1996). Schule als Lebensort von Kindern und Jugendlichen. Zur Wechselwirkung von Schule und außerschulischer Lebenswelt [School as a place of life of children and adolescents. For the interaction of school and extracurricular living environments]. In P. Büchner, B. Fuhs & H.-H. Krüger (Eds.), *Vom Teddybär zum ersten Kuß. Wege aus der Kindheit in Ost- und Westdeutschland* (pp. 201–224). Opladen, Netherlands: Leske & Budrich.
- Burack, J. A., D'Arrioso, A., Ponizovsky, V., Troop-Gordon, W., Mandour, T., Tootoosis, C., Robinson, S., Iarocci, G., Fryberg, S. (2013). 'Friends and grades': Peer preference and attachment predict academic success among Naskapi youth. *School Psychology International*, 34, 371–386. doi: 10.1177/01430343124446888
- Chan, D. (2009). So why ask me? Are self-report data really that bad? In C. E. Lance & R. J. Vandenberg (Eds.), *Statistical and Methodological Myths and Urban Legends: Doctrine, Verity and Fable in Organizational and Social Sciences* (pp. 309–336). New York, NY: Routledge.

- Cheah, C. S. L., & Chirkov, V. (2008). Parents' personal and cultural beliefs regarding young children: A cross-cultural study of aboriginal and Euro-Canadian mothers. *Journal of Cross-Cultural Psychology, 39*, 402–423. doi: 10.1177/0022022108318130
- Chen, J. J.-L. (2008). Grade-level differences: relations of parental, teacher and peer support to academic engagement and achievement among Hong Kong students *School Psychology International, 29*, 183–198. doi: 10.1177/0143034308090059
- Consortium, P. (2013). *PISA 2012 Results in Focus. What 15-year-olds know and what they can do with what they know: OECD*. Retrieved from: <http://www.oecd.org/pisa/keyfindings/pisa-2012-results-overview.pdf#page=1&zoom=auto,0,794>
- Covington, M. V., & Dray, E. (2002). The developmental course of student motivation: A need-based approach. In A. Wigfield & J. S. Eccles (Eds.), *Development of Achievement Motivation* (pp. 33–56). San Diego, CA: Academic Press.
- Csikszentmihalyi, M., & Larson, R. (1984). *Being adolescent: Conflict and growth in the teenage years*. New York, NY: Basic Books.
- Döbert, H. (2002). Deutschland [Germany]. In H. Döbert, W. Hörner, B. v. Kopp & W. Mitter (Eds.), *Grundlagen der Schulpädagogik. Die Schulsysteme Europas* (pp. 92–113). Hohengehren, Germany: Schneider Verlag
- Duchesne, S., Ratelle, C. F., & Roy, A. (2012). Worries about middle school transition and subsequent adjustment: The moderating role of classroom goal structure. *The Journal of Early Adolescence, 32*, 681–710. doi: 10.1177/0272431611419506
- Eccles, J. S., Lord, S., & Midgley, C. (1991). What are we doing to early adolescents? The impact of educational contexts on early adolescents. *American Journal of Education, 99*, 521–542. doi: 10.1086/443996
- Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Maclver, D. (1993a). Development during adolescence: The impact of stage-environment fit on young adolescent's experiences in schools and families. *American Psychologist, 48*(2), 90–101.
- Eccles, J. S., Wigfield, A., Midgley, C., Reuman, D., Maclver, D., & Feldlaufer, H. (1993b). Negative effects of traditional middle schools on students' motivation. *The Elementary School Journal, 93*(5), 553–574.
- Eid, M., & Diener, E. (2001). Norms for experiencing emotions in different cultures: Inter- and intranational differences. *Journal of Personality and Social Psychology, 81*, 869–885. doi: 10.1037//0022-3514.81.5.869

- Eid, M., Langeheine, R., & Diener, E. (2003). Comparing typological structures across cultures by multigroup latent class analysis: A primer. *Journal of Cross-Cultural Psychology, 34*, 195–210. doi: 10.1177/0022022102250427
- Eid, M., & Lischetzke, T. (2013). Statistische Methoden der Auswertung kulturvergleichender Studien [Statistical methods for analyzing comparative cultural studies]. In P. Genkova, T. Ringeisen & F. T. L. Leong (Eds.), *Handbuch Stress und Kultur: interkulturelle und kulturvergleichende Perspektiven* (pp. 189–206). Wiesbaden, Germany: VS.
- EQAO. (2000). *School achievement indicators program (SAIP)1999 science assessment*. Toronto, ON: Education Quality and Accountability Office.
- EQAO. (2001). *Programme for international student achievement (PISA) and youth in transition survey (YITS) 2000 report*. Toronto, ON: Education Quality and Accountability Office.
- Erickson, E. H. (1980). *Identity and the life cycle*. New York, NY: Norton.
- Etzold, S. (2000). Die Leiden der Lehrer [The suffering of the teacher]. *Zeit Online*. Retrieved from: [http://www.zeit.de/2000/48/Die\\_Leiden\\_der\\_Lehrer](http://www.zeit.de/2000/48/Die_Leiden_der_Lehrer)
- Ferguson, H. B., Bovaird, S., & Mueller, M. P. (2007). The impact of poverty on educational outcomes for children. *Paediatrics & Child Health, 12*(8), 701–706.
- Finch, W. H., & Bronk, K. C. (2011). Conducting confirmatory latent class analysis using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal, 18*, 132–151. doi: 10.1080/10705511.2011.532732
- Finnie, R., Childs, S., & Wismer, A. (2011). *Access to postsecondary education: How Ontario compares*. Toronto, Canada: Toronto: Higher Education Quality Council of Ontario.
- Fritzsche, Y. (2000). Modernes Leben: Gewandelt, vernetzt und verkabelt [Modern life: changed, networked and wired]. In A. Fischer, Y. Fritzsche, W. Fuchs-Heinritz & R. Münchmeier (Eds.), *Jugend 2000. 13. Shell Jugendstudie* (Vol. 1, pp. 180–219). Opladen, Netherlands: Leske & Budrich.
- Geiser, C. (2012). *Data analysis with Mplus*. New York, NY: The Guilford Press.
- Graham, S., Taylor, A. Z., & Hudley, C. (1998). Exploring achievement values among ethnic minority early adolescents. *Journal of Educational Psychology, 90*, 606–620. doi: 10.1037/0022-0663.90.4.606
- Graudenz, I., & Randoll, D. (1997). *So dänisch wie möglich, so deutsch wie nötig? Eine vergleichende Untersuchung zur Wahrnehmung von schule durch Abiturienten* [As Danish as possible, as German as necessary? A comparative study of the perceptions of school through high school students]. Frankfurt/M, Germany: Böhlau.
- Harter, S. (1996). Teacher and classmate influences on scholastic motivation, self-esteem, and

- level of voice in adolescents. In J. Juvonen & K. Wentzel (Eds.), *Social Motivation - Understanding children's school adjustment* (pp. 11–42). Cambridge, UK: University Press.
- Hannover, B., & Kühnen, U. (2002). Der Einfluss independenter und interdependenten Selbstkonstruktion auf die Informationsverarbeitung im sozialen Kontext [The influence independent and interdependent self-construction on the processing of information in the social context]. *Psychologische Rundschau*, *53*(2), 61–76.
- Hesse, H.-G. (2004). Values and attitudes and their influence on education. In H. Döbert, E. Klieme & W. Sroka (Eds.), *Conditions of school performance in seven countries. A quest for understanding the international variation of PISA results* (pp. 302–304). Münster, Germany: Waxmann.
- Hoferichter, F., & Raufelder, D. (2014). Ein Modell inter-individueller Unterschiede sozio-motivationaler Beziehungen von Sekundarschülern mit ihren Peers und Lehrern [A model of inter-individual differences in secondary school students' socio-motivational relationships with their peers and teachers]. *Schulpädagogik heute. Beziehungen in Schule und Unterricht*, *9*(n/a), 1–25.
- Hoferichter, F., Raufelder, D., & Eid, M. (2013). The mediating role of socio-motivational relationships in the interplay of perceived stress, neuroticism, and test anxiety among adolescent students. *Psychology in the Schools*, *51*, 736–752. doi: 10.1002/pits.21778
- Hojtink, H. (2001). Confirmatory latent class analysis: Model selection using bayes factors and (pseudo) likelihood ratio statistics. *Multivariate Behavioral Research*, *36*, 563–588. doi: 10.1207/S15327906MBR3604\_04
- Hopkins, C. (2013). Education for sustainable development in formal education in Canada. In R. McKeown & V. Nolet (Eds.), *Schooling for Sustainable Development in Canada and the United States* (Vol. 4, pp. 23–36). Dordrecht, Netherlands: Springer.
- Horstkemper, M. (1995). *Schule, Geschlecht und Selbstvertrauen. Eine Längsschnittstudie über Mädchensozialisation in der Schule* [School, gender, and self-confidence. A longitudinal study of girls' socialization in school] (Vol. 3). Weinheim, Germany: Juventa Verlag.
- Jagenow, D., Raufelder, D., & Eid, M. (2014). A person-oriented approach to predict socio-motivational dependency in early adolescents. *Learning and Individual Differences*, *36*, 173–179. doi: 10.1016/j.lindif.2014.07.017
- Janssen, A. B., & Geiser, C. (2012). Cross-cultural differences in spatial abilities and solution strategies- an investigation in Cambodia and Germany. *Journal of Cross-Cultural Psychology* *43*, 533–557. doi: 10.1177/0022022111399646

- Juvonen, J., & Wentzel, K. R. (1996). *Social motivation: Understanding children's school adjustment*. New York, NY: Cambridge University Press.
- Kaufmann, A. (2007). Merkmale und Einstellungen von Schülern [Characteristics and attitudes of students]. In H. Ditton (Ed.), *Kompetenzaufbau und Laufbahnen im Schulsystem. Ergebnisse einer Längsschnittuntersuchung an Grundschulen* (pp. 117–143). Münster, Germany: Waxmann.
- Kopp, B. v., & Schmitt, J. (2004). The roles of family and school. In H. Döbert, E. Klieme & W. Sroka (Eds.), *Conditions of school performance in seven countries. A quest for understanding the international variation of PISA results* (pp. 300–302). Münster, Germany: Waxmann.
- Laferriere, T. (2001). Improving teacher education in Québec. *Asia-Pacific Journal of Teacher Education and Development*, 4(1), 13–35.
- Laudy, O., Boom, J., & Hoijtink, H. (2005). Bayesian computational methods for inequality constrained latent class analysis. In L. A. v. d. Ark, M. A. Croon & K. Sijtsma (Eds.), *New developments in categorical data analysis for the social and behavioral sciences* (pp. 63–82). Mahwah, NJ: Lawrence Erlbaum Associates.
- Lerner, R. M. (1986). *Concepts and theories of human development* (Vol. 2). New York, NY: Random House.
- Lerner, R. M. (1991). Changing organism–context relations as the basic process of development: A developmental contextual perspective. *Developmental Psychology*, 27, 27–32. doi: 10.1037/0012-1649.27.1.27
- Lerner, R. M. (1992). *Final solutions: Biology, prejudice, and genocide*. University Park, PA: Pennsylvania State University Press.
- Lerner, R. M. (1998). Theories of human development: Contemporary perspectives. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Vol. 1 (5th Ed.): Theoretical models of human development* (pp. 1–24). New York, NY: JohnWiley & Sons.
- Levitt, M. J. (2005). Social relations in childhood and adolescence: The convoy model perspective. *Human Development*, 48, 28–47. doi: 10.1159/000083214
- Lewin, K. (1951). *Field theory in social science*. Chicago, IL: University of Chicago Press.
- Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling: A Multidisciplinary Journal*, 9(2), 151–173.
- Maaz, K., Baumert, J., & Trautwein, U. (2010). Genese sozialer Ungleichheit im institutionellen Kontext der Schule: Wo entsteht und vergrößert sich soziale Ungleichheit? [Genesis of

- social inequality in the institutional context of school: Where do social inequality arise and increase?]) In K. Maaz, J. Baumert, C. Gresch & N. McElvany (Eds.), *Der Übergang von der Grundschule in die weiterführende Schule. Leistungsgerechtigkeit und regionale, soziale und ethnisch-kulturelle Disparitäten* (Vol. Bildungsforschung Band 34, pp. 27–85). Berlin, Germany: Bundesministerium für Bildung und Forschung (BMBF).
- Maaz, K., Trautwein, U., Lüdtke, O., & Baumert, J. (2008). Educational transitions and differential learning environments: How explicit between-school tracking contributes to social inequality in educational outcomes. *Child Development Perspectives*, 2, 99–106. doi: 10.1111/j.1750-8606.2008.00048.x
- Magidson, J., & Vermunt, J. (2004). Latent class models. In D. Kaplan (Ed.), *Handbook of quantitative methodology for the social sciences* (pp. 175–198). Newbury Park, CA: Sage.
- Muñoz, V. (2007). *Implementation of general assembly resolution 60/251 of 15 March 2006*, entitled “Human Rights Council”: United Nations. Retrieved from: [http://www.ub.fu-berlin.de/service\\_neu/ubpubl/mitarbeiter/dbe/UDHR60/Munoz-report.pdf](http://www.ub.fu-berlin.de/service_neu/ubpubl/mitarbeiter/dbe/UDHR60/Munoz-report.pdf)
- Muthén, L. K., & Muthén, B. (1998–2013). *Mplus user’s guide. seventh edition*. Los Angeles, CA: Muthén & Muthén.
- Nauck, B., & Bertram, H. (2001). *Familiäre Lebensbedingungen von Kindern in Deutschland* [Family living conditions of children in Germany]. Opladen, Germany: Leske & Budrich.
- Nees, G. (2000). *Germany: Unraveling an enigma*. Boston, MS: Nicholas Brealey Publishing.
- Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal*, 14, 535–569. doi: 10.1080/10705510701575396
- OECD (2012). *Education at a glance:OECD indicators 2012. Germany*. Organisation for Economic Co-operation and Development. Retrieved from: <http://www.oecd.org/edu/EAG2012%20-%20Country%20note%20-%20Germany.pdf>.
- OECD (2010). *PISA 2009 Ergebnisse: Was Schülerinnen und Schüler wissen und können: Schülerleistungen in Lesekompetenz, Mathematik und Naturwissenschaften* [PISA 2009 Results: What students know and can do: Student performance in reading, mathematics and science]. München, Germany: Bertelsmann Verlag
- Pebley, A. R., Goldman, N., & Rodríguez, G. (1996). Prenatal and delivery care and childhood immunization in Guatemala: Do family and community matter? *Demography*, 33, 231–247. doi: 10.2307/2061760



- Perry, L. B., & McConney, A. (2013). School socioeconomic status and student outcomes in reading and mathematics: A comparison of Australia and Canada. *Australian Journal of Education*, 57, 124–140. doi: 10.1177/0004944113485836
- Raufelder, D. (2007). *Von Machtspielen zu Sympathiegesten. Das Verhältnis von Lehrern und Schülern im Bildungsprozess* [From power games to sympathy gestures. The relationship of teachers and students in the educational process]. Marburg, Germany: Tectum Verlag.
- Raufelder, D., Drury, K., Jagenow, D., Hoferichter, F., & Bukowski, W. (2013). Development and validation of the Relationship and Motivation (REMO) scale to assess students' perceptions of peers and teachers as motivators in adolescence. *Learning and Individual Differences*, 24, 182–189. doi: 10.1016/j.lindif.2013.01.001
- Raufelder, D., Jagenow, D., Drury, K., & Hoferichter, F. (2013). Social relationships and motivation in secondary school: Four different motivation types. *Learning and Individual Differences*, 24, 89–95. doi: 10.1016/j.lindif.2012.12.002
- Rheinberg, F., Vollmeyer, R., & Burns, B. B. (2000). Motivation and self-regulated learning. In J. Heckhausen (Ed.), *Motivational Psychology of Human Development. Developing Motivation and Development* (Vol. 131, pp. 81–108). Amsterdam, Netherlands: Elsevier.
- Roeser, R. W., Eccles, J. S., & Sameroff, A. J. (2000). School as a context of early adolescents' academic and social-emotional development: A summary of research findings. *The Elementary School Journal*, 100, 443–471. doi: 10.1111/j.1467-8624.2005.00889.x
- Rohrbeck, C. (2003). Peer relationships, adolescence. In T. P. Gullotta, M. Bloom, J. Kotch, C. Blakely, L. Bond, G. Adams, C. Browne, W. Klein & J. Ramos (Eds.), *Encyclopedia of Primary Prevention and Health Promotion* (pp. 808–812). New York, NY: Springer.
- Ryan, A. M., & Patrick, H. (2001). The Classroom social environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal*, 38, 437–460. doi: 10.2307/3202465
- Salili, F., Chiu, C., & Lai, S. (2001). The influence of culture and context on students' motivational orientation and performance. In F. Salili, C.-y. Chiu & Y.-y. Hong (Eds.), *Student motivation: The culture and context of learning. Plenum series on human exceptionality* (Vol. 221–247). Dordrecht, Netherlands: Kluwer Academic Publishers.
- Schwarz, G. (1978). Estimating the dimension of a model. *Annals of Statistics*, 6, 461–464. doi: 10.1214/aos/1176344136
- Shell. (2006). Außerordentlich wichtige Dinge im Leben [Extremely important things in life]. Retrieved from: <http://de.statista.com/statistik/daten/studie/177151/umfrage/ausserordentlich-wichtige-dinge-im-leben/>.

- Solga, H., & Dombrowski, R. (2009). *Soziale Ungleichheiten in schulischer und außerschulischer Bildung. Stand der Forschung und Forschungsbedarf. Arbeitspapier 171* [Social inequalities in formal and non-formal education. Research and research needs. Working Paper 171]. Düsseldorf, Germany: Hans Böckler Stiftung.
- Stecher, L. (1999). Bildungsehrgeiz der Eltern, soziale Lage und Schulbesuch der Kinder [Educational ambition of parents, social situation and education of children]. In R. K. Silbereisen & J. Zinnecker (Eds.), *Entwicklung im sozialen Wandel* (pp. 337–356). Weinheim, Germany: Beltz.
- Steinberg, L., Dornbusch, S. M., & Brown, B. B. (1992). Ethnic differences in adolescent achievement: An ecological perspective. *American Psychologist*, *47*, 723–729. doi: 10.1037/0003-066X.47.6.723
- Studsrød, I., & Bru, E. (2012). Upper secondary school students' perceptions of teacher socialization practices and reports of school adjustment. *School Psychology International*, *33*, 308–324. doi: 10.1177/0143034311412841
- Terhart, T. (2001). *Lehrerberuf und Lehrerbildung: Forschungsbefunde, Problemanalysen, Reformkonzepte* [Teaching profession and teacher education: Research findings, problem analysis, reform concepts]. Weinheim, Germany: Beltz.
- Thorkildsen, T. A., Nolen, S. B., & Fournier, J. (1994). What is fair? Children's critiques of practices that influence motivation. *Journal of Educational Psychology*, *86*, 475–486. doi: 10.1037/0022-0663.86.4.475
- Toyama-Bialke, C. (2000). *Jugendliche Sozialisation und familiäre Einflüsse in Deutschland und Japan* [Youth socialization and family influences in Germany and Japan]. Köln, Germany: Böhlau.
- Triandis, H. C. (1995). *Individualism & collectivism. New directions in social psychology*. Boulder, CO: Westview Press.
- Vitoroulis, I., Schneider, B. H., Cerviño Vasquez, C., del Pilar Soteras de Toro, M., & Santana Gonzáles, Y. (2012). Perceived parental and peer support in relation to Canadian, Cuban, and Spanish adolescents' valuing of academics and intrinsic academic motivation. *Journal of Cross-Cultural Psychology*, *43*, 704–722 doi: 10.1177/0022022111405657
- Wentzel, K. R., Battle, A., Russell, S. L., & Looney, L. B. (2010). Social supports from teachers and peers as predictors of academic and social motivation. *Contemporary Educational Psychology*, *35*, 193–202. doi:10.1016/j.cedpsych.2010.03.002

- Willms, J. D., Friesen, S., & Milton, P. (2009). *Executive summary. What did you do in school today? Transforming classrooms through social, academic, and intellectual engagement*. Toronto, NO: Canadian Education Association.
- Wilson, D. N. (1993). Reforming technical and technological education. *The Vocational Aspect of Education*, 45, 265–284. doi: 10.1080/0305787930450307
- Wilson, D. N., & Lam, T. C. M. (2004). Canada. In H. Döbert, E. Klieme & W. Sroka (Eds.), *Conditions of school performance in seven countries. A quest for understanding the international variation of PISA results* (pp. 15–64). Münster, Germany: Waxmann.
- Wubbels, T., & Brekelmans, M. (2005). Two decades of research on teacher-student relationships in class. *International Journal of Educational Research*, 43, 6–24. doi: 10.1016/j.ijer.2006.03.003
- Yang, C. (2006). Evaluating latent class analysis in qualitative phenotype identification. *Computational Statistics & Data Analysis*, 50, 1090–1104. doi: 10.1016/j.csda.2004.11.004
- Zusho, A., & Pintrich, P. R. (2001). Motivation in the second decade of life. In T. Urdañ & F. Pajares (Eds.), *Adolescence and Education* (Vol. 1, pp. 163– 200). Greenwich, CT: Information Age Publishing.

## **Chapter V**

### **General Discussion**

The overall aim of this PhD thesis was to investigate the role of socio-motivational relationships, between students as well as between students and teachers for personality aspects and school related variables on a cross-national level. Study 1 was motivated by the question how neuroticism and perceived stress would relate to test anxiety and how socio-motivational relationships would function as mediators to mitigate feelings of test anxiety among neurotic and stressed students from a German sample. Study 2 investigated the moderator role of socio-motivational relationships for the association of achievement drive and test anxiety among German and Canadian secondary school students. Study 3 investigated whether a motivation typology based on socio-motivational relationships would exist among Canadian students, as it has been found for German students.

#### **5.1 Review of main findings**

Various studies investigated the impact of supportive relationships in school for the well-being of students, including social and emotional adjustment (Murray & Greenberg 2001), competence behavior (Pianta & Nimetz, 1991), school engagement, achievement (Roorda et al., 2011), and self-worth (Leary, 2004; Sherman & Cohen, 2006). However, only few studies investigated how social support would relate to test anxiety. These studies have mainly been focusing on college and university students (Conneely & Hughes, 2012; Stöber, 2004). It has also been known that highly anxious students tend to report higher levels of test anxiety (Spielberger & Vagg, 1995), indicating that test anxiety is a relatively stable personality trait and a function of neuroticism (Chamorro-Premuzic et al., 2008; Fitch, 2004). Additionally, researchers have found a high covariance between neuroticism and stress, indicating their interdependent nature (Murberg & Bru, 2007). Over the last decades, the consciousness about stress entered daily life, while the phrase “to be stressed out” became part of the colloquial language and the media picked up this trend by proclaiming a new age in human history (Ayoto, as cited in Jackson, 2013). Being aware of the presence of stress, the American Psychological Association (APA) (2010) advises schools, parents, and other participants involved to be aware of stress by taking it seriously and to implement stress reducing programs, as stress, equal to test anxiety, presents a risk factor for health and psychological well-being (Cohen, Schwartz, Bromet, & Parkinson, 1991; Kenny, Gallagher, Alvarez-Salvat, & Silsby, 2002; Zorumski, Paul, Izumi, Covey, & Mennerick, 2013).

The aforementioned research and results emerged from the fields of educational, personality, social, and developmental research, while an integrative approach, examining the interactions between the variables of interest has not yet been investigated (cf. Cassidy, 1999). Hence, following an integrative approach of the disciplines, Study 1 was motivated by the question how socio-motivational relationships would relate to neuroticism, stress, and test anxiety. By applying structural equation models it was tested whether socio-motivational relationships (student-student relationships, teacher-student relationships, peers as positive motivators, and teachers as positive motivators) would function as mediators in the association between neuroticism and test anxiety as well as perceived stress and test anxiety and consequently mitigate feelings of test anxiety in neurotic and stressed secondary school students from Germany. The results of the first study indicate that high quality student-student relationships are related to low levels of test anxiety in neurotic and non-neurotic students. Hence, the current results expand research by Connelly and Hughes (2012) as well as Stöber (2004), who found that supportive relationships were related to low levels of test anxiety. While both studies are limited to small sample sizes ( $N = 49$ ;  $N = 162$ ) and the age group of college and university students, the current PhD thesis uses a large sample of 1,088 adolescent students from Germany. In addition, Studies 2 and 3 include an adolescent sample of 389 students from Canadian secondary schools. Furthermore, the results of Study 1 suggest that students scoring high on neuroticism report rather low quality relationships with their peers. In fact, it is documented that personality aspects impact the number of peer relationships and conflicts with peers but not vice versa (Asendorpf & Wilpers, 1998). Particularly for neurotic individuals, conflicts and insecurity with peers seem to be common, while in contrast the transition to a partnership leads to a decrease in levels of neuroticism (Neyer & Asendorpf, 2001). This indicates that the vicious circle of scoring high on neuroticism and reporting poor peer relationships, while poor quality relationships lead to further insecurity, anxiety, emotional and behavioral problems, could be penetrated by succeeding to initiate and maintain social relationships, as indicated by the results of Study 1. The current findings serve psychologists and school personnel to be aware of the importance of peer relationships for students' personal development and may encourage participants to initiate and maintain peer relationships within the classroom and the school environment, for example by commencing group activities or by organizing school trips that involve all class members. It was further shown that students scoring high on neuroticism also reported to have high quality teacher-student relationships. This indicates that neurotic students may search more intensely for role models and a stable anchor, which they find represented in their teachers (cf. Wentzel, 2009) but not in their peers. Hence, teachers should be made aware of their far-reaching and influential role. For some students, particularly for neurotic students, teachers act

as role models, which places a lot of responsibility on them as they may be perceived as coaches and guide students along their personal and professional development. Additionally to these findings, stressed students tend to report low quality relationships with their teachers and therefore lack a supportive teacher-student relationship. An explanation for this finding could be that teachers do not approach stressed students accordingly, so they would relate to the teacher as a trustworthy person. Another explanation could be that stressed students are so much involved in and taken up by daily stressors, that they find their relationship toward teachers as a burden on top of things and do not have the ability to approach the teachers accordingly.

Further, results of Study 1 indicate that neurotic students tend to relate to peers and teachers for their own motivation, which in turn is related to high levels of test anxiety. As Study 1 demonstrates, test anxiety levels in stressed students are also determined by the perception of peers and teachers as motivators. Hence, students who rely on peers and teachers for their own motivation show increased levels of test anxiety, as their relationships toward peers and teachers can be characterized as dependent. Dependent relationships in school have shown to have unfavorable consequences and are associated with negative social outcomes, exhibition of behavioral problems at school as well as low academic performance and competencies (Hamre & Pianta, 2001; Pianta & Nimetz, 1991; Sabol & Pianta, 2012). The current study expands the latter mentioned research by examining social relationships that turned out to be of dependent character in relation to neuroticism, stress, and test anxiety.

In summary, results of Study 1 demonstrate how supportive relationships with peers mitigate feelings of test anxiety in neurotic and non-neurotic students, while dependent relationships with peers and/or teachers as positive motivators are associated with increased levels of test anxiety, particularly among neurotic and stressed students. If the need to belong is met, in this case by peers, students feel connected, secure, and supported, which helps them cope with feelings of test anxiety. In line with other studies (Conneely & Hughes, 2012; Stöber, 2004), social support has shown to be a relevant coping strategy in the context of evaluation situations, even among neurotic students (cf. Park et al., 2013). However, if relationships in school are characterized by a dependent nature, students in general (independent of their stress level and level of neuroticism) are more likely to report high levels of test anxiety. Yet, cross-national research by Park and colleagues (2013) indicate that the perception of social support and stress may differ across societies (e.g., American vs. Japanese) and is influenced by personality aspects (high neuroticism vs. low neuroticism).

Based on the literature, findings of Study 1, and by taking into account the existence of cross-national differences in the perception of social support and stress (cf. Park et al., 2013), Study

2 examined the role of socio-motivational relationships for the association of achievement drive and test anxiety among German and Canadian secondary school students. Achievement drive has become a core value in Western educational systems, receives high priority, and is promoted as necessity in schools (Kaplan & Maehr, 2007). Achievement drive is characterized by striving for success, avoiding failure, demonstrating ability, and outperforming others, while at the same time achievement oriented students are striving to obtain social approval by peers (Dowson & McInerney, 2003; Levy, Kaplan, & Patrick, 2004). Hence, from this characterization it can be assumed that achievement oriented students find themselves in a dilemma; on the one hand they strive for individual success and on the other hand the need to belong and receive approval by their peers is well pronounced. It seems likely that these two aspects oppose each other.

It is therefore not surprising, that achievement drive is associated with components of test anxiety, including fear of failure, anxiety, and behavior of avoidance (Covington, 1992; Selkirk, Bouchev, & Eccles, 2011). In fact, Pekrun (2000) found that achievement related anxiety was the emotion most frequently mentioned among school and university students. In search for a coping strategy that would buffer feelings of test anxiety related to achievement drive, the buffering hypothesis was tested in the current research for German and Canadian students. According to the buffering hypothesis (Cohen & Wills, 1985), supportive relationships function as buffer in stressful situations. As test anxiety is known to evolve from feeling stressed, which in turn results from the individual's evaluation of a primary and secondary appraisal (see chapter 1.2; Smith & Lazarus, 1993; Lazarus, 1966), Study 2 investigated whether socio-motivational relationships would buffer feelings of test anxiety related to achievement drive. By applying multigroup latent moderated structural equations (MGLMS), cross-national differences were found among German and Canadian secondary students.

The results of Study 2 indicate that among Canadian students, student-student relationships impact feelings of test anxiety for the entire spectrum of achievement drive. At this point, the aforementioned dilemma becomes clear as achievement oriented students are keen to succeed and outperform others, who they stand in competition with (Singh, 2011), while at the same time, students strive to fulfill their need to belong (see chapter 1.1). From the results of Study 2 it can be deduced that social relationships with classmates buffer feelings of test anxiety in both achievement oriented and non-achievement oriented Canadian students as they feel they belong to a community. Research by Vitoroulis and colleagues (2012) found that particularly among Canadian in comparison to Spanish and Cuban students, receiving social support by their peers in school was ranked very high, which is reflected by the results of Study 2. This effect is not found among German students, which might be explained by the finding that the classroom environment is rather

competitive (Graudenz & Randoll, 1997), while peers are perceived as incentive for student's own performance (Kaufmann, 2007) and not as supportive. The results of Study 2 further indicate, that among German students, teacher-student relationships serve as moderator for the relationship between achievement drive and test anxiety. Beyond, both achievement drive and test anxiety are significantly related in the SEM. Hence, the more students are oriented toward achievement drive, the higher they score on test anxiety, while teacher-student relationships, independent of their quality, intensify feelings of test anxiety and do function as moderator but not as buffer. This finding aligns with studies on the teacher-student relationship among German students, which is described as impersonal and distant (Beckmann, 2000; Graudenz & Randoll, 1997; Hesse, 2004), while students are well aware of the imbalance of power, for example concerning the grade system, which gives the decision-making authority to the teacher (Raufelder, 2007).

Yet for Canadian students, who perceive teachers as a source of motivation, the teacher as motivator protects achievement oriented students from feeling test anxious. Hence, students who feel motivated through their teachers show decreased levels of test anxiety with increasing levels of achievement drive. Achievement oriented students may identify with their teachers, which serves as a coping strategy in evaluation situations. A similar idea was investigated by Williams (1980), who found that high-achievers identified more with their teachers than low-achievers.

In summary, socio-motivational relationships present themselves as two sides of the same coin, while having different and opposing impact on levels of test anxiety among achievement oriented students from Germany and Canada. The buffering hypothesis (Cohen & Wills, 1985) applies to achievement oriented Canadian students who perceive their teachers as source of motivation, as feelings of test anxiety are decreasing. The hypothesis also applies to achievement oriented Canadian students who find themselves in a good relationship with their peers. Hence, the findings of Study 2 expand the buffering hypothesis, as the mentioned relationships with peers buffer feelings of test anxiety independent of the level of achievement drive among Canadian students. Additionally, the buffering hypothesis does not seem to be internationally applicable, as Study 2 indicated cross-national differences concerning the perception of socio-motivational relationships in school and consequently their interplay with achievement drive and test anxiety. Although German achievement oriented students reported their relationship toward teachers to be positive, they reported high levels of test anxiety, contrary to what one would expect from the buffering hypothesis. Hence, the buffering hypothesis should be extended by taking particular environmental and contextual factors into account. Such factors like the school context, with its strategic curricula, institutional relationships that may imply hierarchies and visions on a social level can vary substantially between countries.



In summary, the notion of striving for success, competing for grades and recognition by outperforming others seems to be deeply embedded in contemporary Western societies and may be an omnipresent and influential factor, contributing to the increment of achievement related anxiety (cf. Spielberger & Rickman, 1990; Twenge, 2000). The results also show that environmental factors based on the orientation of the school system, values, and norms influence the way socio-motivational relationships are being perceived and consequently how they impact achievement emotions (cf. Pekrun, 2006).

Based on these cross-national findings and the fact that the educational environment shapes students social and cognitive competences, influences their motivation at school, and their relationships with peers and teachers (Bünger & Raufelder, 2014; Fend, 1991; Hurrelmann, 2006; Salili, Chiu, & Lai, 2001), Study 3 was motivated by the question whether the motivation typology based on socio-motivational relationships found among German secondary school students (Raufelder, Jagenow, Dury, & Hoferichter, 2013) would be applicable to Canadian secondary school students as well. This can be seen as part of a universality test in order to establish a fundamental motivation typology in school contexts, which is based on the identification of relevant social motivation factors and their combinatorial selections. As Study 2 implies, teachers and peers within the educational context are perceived differently among German and Canadian students and consequently have different impact on students' development. Hence, the social context functions as a powerful arena as it shapes perceptions, attitudes, values, emotions, and beliefs (cf. Pekrun, 2006). The question at hand is whether teachers and peers are perceived as motivational source in the same manner among German and Canadian students. By applying a multigroup confirmatory latent class analysis, the same latent groups (subgroups) as found among German students could be identified among Canadian students. While the number of classes is equal across the two groups, their class sizes vary across the countries as indicated below:

- (1) teacher-dependent motivation type (MT) (class size: Germany = 10%; Canada = 9%)
- (2) peer-dependent MT (class size: Germany = 34%; Canada = 14%)
- (3) teacher-and-peer-dependent MT (class size: Germany = 27%; Canada = 57%)
- (4) teacher-and-peer-independent MT (class size: Germany = 29%; Canada = 20%)

According to the results of Study 3, the smallest group among both countries is the teacher-dependent MT. For German secondary school students, this finding can be explained by a rather distant and impersonal relationship between teacher and student (Beckmann, 2000; Graudenz & Randoll, 1997; Hesse, 2004). However, with increasing grade level and approaching school leaving exam, students become even more aware of the dependent nature the relationship with teachers

implies, which leads to an increase in the number of students being assigned to the teacher-dependent MT (Jagenow, Raufelder, & Eid, 2015). In turn, among Canadian students, the small group size of the teacher-dependent MT as well as the peer-dependent MT may be explained by the finding that students do not solely depend on teachers or peers for their motivation but relate to both teachers and peers. In fact, the teacher-and-peer-dependent MT constitutes the largest group among Canadian students. This finding aligns with research indicating that the development of social skills and community values represents a central idea of the educational system and is viewed as at least as important as academic achievement (Cheah & Chirkov, 2008). Hence, students are oriented toward both their peers and teachers for a motivational source, which in turn relates to high levels of intrinsic motivation, learning goals, and achievement drive compared to other motivation types (Jagenow, Raufelder, & Eid, 2014). These characteristics may have led to the excellent PISA results Canadian students repeatedly demonstrate (cf. OECD, 2007, 2010, 2013).

The largest group among German students is constituted by the peer-dependent MT. In fact, the educational environment in Germany is described as rather competitive, which corresponds with the needs of the peer-dependent MT. In a qualitative study (Hoferichter & Raufelder, 2014), students of this motivation type emphasized that the competition with their peers in class motivates them to learn, while at the same time, they long for recognition and approval from their peers (cf. Fritzsche, 2000).

The teacher-and-peer-independent MT constitutes the second largest group among German and Canadian students. This group is characterized by the need for autonomy (Hoferichter & Raufelder, 2014; Bünger & Raufelder, 2014), and low levels of test anxiety compared to other motivation types (Jagenow et al., 2014). Although both educational systems differ in their priorities and orientations, what they have in common is the promotion of unique and independent individuals, which is reflected by the large size of this motivation group (Fritzsche, 2000; Wilson & Lam, 2004).

In summary, the results of Study 3 indicate that cross-national differences may be underlying factors in motivational processes. Motivation emerges from the dynamic and reciprocal person-context interactions of individuals (cf. Lerner, 1986, 1991; Lewin, 1951). While the Canadian educational system places much importance on the development of social skills, which is reflected by the large group of the teacher-and-peer-dependent MT, German schools are characterized by competition among students and a power distance between students and teachers, which is indicated by the large number of students assigned to the peer-dependent MT and the small group of teacher-dependent MT, while the size of the latter motivation type increases with approaching school leaving exams (Jagenow et al., 2015). All studies presented in this PhD thesis

indicate the strong and diverse impact of learning contexts on personality aspects, achievement emotions, and motivation. The educational environment implies specific roles assigned to peers and teachers, which in turn define the spectrum and character of interactions between all parties, which may largely differ across countries.

## **5.2 Implications for science and society**

### **5.2.1 Theoretical implications**

As Jovanovic and Lerner (1999, p. 143) put it “Young adolescents’ academic development occurs within a multilevel social context.” The scientists refer to the multilevel social context by including communal, societal, and cultural aspects as well as proximal family, and school levels that impact students’ development. This implies that individuals may differ in their individual context relationships and academic development across varying educational systems (see Developmental Contextualism by Lerner, 1985, 1986, 2001). In line with Developmental Contextualism, Pekrun (2000) stresses the importance of contextual aspects for the development of achievement related emotions by formulating the Control-Value Theory (CVT). By considering the individual’s immediate environment, the author acknowledges that there are systematic differences between students from different classrooms, schools, school systems, countries, et cetera.

The results of the presented PhD thesis align with Pekrun (2000) as well as with Developmental Contextualism, as the findings indicate a strong impact of the educational context wherein students learn on their achievement emotions, motivation, and personality aspects varying across countries, e.g., Germany and Canada. The existent theories (Lerner, 1985, 1986, 1987; Pekrun, 2000) could therefore be expanded by investigating the role of socio-motivational relationships constituting students’ environment, for neuroticism, perceived stress, test anxiety, achievement drive, and motivation among secondary school students from Germany and Canada. It was found that the perception of the social context (student-student relationships, teacher-student relationships, peers as positive motivators, teachers as positive motivators) differs among German and Canadian students and consequently impacts their academic adjustment accordingly. These differences can be attributed to contextual aspects such as the orientation of the educational system, the role ascribed to students and teachers, and the implementation of certain learning targets and values.

Furthermore, theoretical implications of the current PhD thesis involve the application of the buffering hypotheses (Cohen & Wills, 1985), which is closely linked to the idea of ‘the need to belong’ being one basic psychological need of humans (Baumeister & Leary, 1995; Bowlby, 1969;

Osterman, 2001; Maslow, 1943). By outlining the importance of social relationships and the need to belong in chapter 1, and by investigating in detail the role of socio-motivational relationships in all three studies presented, the far-reaching power of social relationships and consequently for the personal development could be clearly demonstrated. By investigating the buffering hypothesis on a cross-national level within the school context, the theory could be expanded. Since cross-national differences were found among German and Canadian students, it can be assumed that firstly, different attributions are ascribed to social groups (e.g., peers, teachers) within the school context due to differences in the orientation of the educational system. Secondly, in this sense, social groups meet the need to belong differentially, which thirdly, leads to a diverse impact of social groups on achievement emotions, motivation, and neuroticism. Socio-motivational relationships in school may be perceived as supportive or pressuring, which depends on the individual students past experience, values, norms, and beliefs (see also CVT).

Furthermore, the PhD thesis confirmed the theory of motivation types for Canadian students as previously posed for German students by Raufelder and colleagues (2013) and thereby expands this typology cross-nationally. By investigating both German and Canadian students the results allow for sophisticated nation specific statements concerning socio-motivational relationships, which can be attributed to the particular orientation of the educational system. Furthermore, the findings support the postulated concept of socio-motivational (in-)dependence by Raufelder (2014), indicating that there are students with a socio-motivational dependence, whose own motivation is affected by the motivation, learning behavior, and perceived support of others. In contrast, there are students, whose motivation remains unaffected by the motivation, learning behavior, and perceived support of others, thereby assigning them to the category of socio-motivational independence (Raufelder, 2014; Raufelder, Regner, Drury, & Eid, 2015).

### **5.2.2 Implications for society**

No matter if we are parents, teachers, psychologists, politicians, or simply just members of a society, we should all ask ourselves the following questions: How do we want members of our society to live and work? What competences do humans need to meet the challenges of a global world, to be able to creatively solve societal problems, to take responsibility for their own action and the action of others? What values, beliefs, and attitudes should an individual possess in order to be able to integrate into a multicultural society? How can education be advanced and secured for all in a democratic, free-thinking, and critical society, which is motivated by a vision of the common good? And how can those values be passed onto the next generation?

Education is a stabilizing factor for a democratic society, as it forms the basis for an active participation of their members. Likewise, the promotion of every individual and his or her potential through education has a strong impact on the social life and the orientation of society. Students spend many hours in educational settings, which makes school not only a place to obtain theoretical and practical knowledge but is also a place for learning social skills and community values. Teachers and school administrators play a key role in relaying such values, norms, and attitudes to students. However, current debates about the educational mission of modern schools leave the impression that discussing standards of excellence and an overall goal for schools by theoretically exemplifying various options, may not reach the heart of those in responsible positions. Miller (2011) cites a German teacher who claimed: “I don’t teach students, I teach biology and chemistry”. Statements like those imply the lack of knowledge about teaching and the lack of empathy for students. How can teaching be successful if its basis, the presence of high qualitative social relationships, is absent?

The current PhD thesis demonstrates the importance of social relationships in schools for the well-being of students, which is related to students’ carefree development according to their abilities and interests. Students’ personal development toward responsible adults can be secured by meeting the needs of individuals through supporting and coaching their personal journey. Teachers, who are interested in the welfare of their students, contribute to the success of their students. Whereas taking advantage of a position that grants authority of one individual above another, through the use of fear, pressure, and the threat of consequences, it is doubtful students will be educated to take responsibility, make decisions for the common good, and secure the freedom of society. By investigating socio-motivational relationships among Canadian and German schools, it becomes clear that students vary in their needs, perceptions, and orientations. Hence, there is no homogeneity among students, which becomes even more pronounced as they grow older and change views, values, etc. (cf. Lerner, 2001). Heterogeneity among students calls for the need to individually approach students by constantly re-evaluating and re-adjusting the social educational setting as learning happens in a social dynamic context.

This PhD thesis outlined the importance of the need to belong as a common human need that protects us from physical and psychosocial harm. If we succeed to initiate and maintain supportive social relationships that are free from any condition placed upon them, we are able to supply students with the basic ground on which education and development can grow further. Students experience school not only as a context to obtain knowledge but also as a space of life and experience (Nölle, 1995). To meet the demand of a school being both a “cognitive place” and “living place” (cf. Miller, 2011), the “science of relationships” becomes an integral part of teacher

trainings. Further, programs that are designed to focus on the sensitization and practice of social skills should be implemented in the school context. Existing programs to broaden skills of teachers and student group training in each class can be used to promote social competences of all involved in the school context, and specifically to strengthen the teacher-student and student-student relationships. Programs such as “Social Skills Training in Groups” (GSK), “School Training of Social Competence” (SOKO), or “Social Learning” (cf. Ittel & Raufelder, 2009) should be implemented in schools and teacher trainings. Also, a critical review of teachers’ own previously and currently experienced social relationships in the educational context might be an essential starting point of teacher training programs and workshops, which can be granted for example by participating in supervisions. Furthermore, within the educational context as well as outside school, the respectful and mindful contact of all parties should be understood as the basis for successful learning. Only if students and teachers feel connected to the school community, they can work efficiently, succeed professionally, and live up to their potential. It is striking that among Canadian secondary school students the perception of high quality student-student relationships as well as teachers who are perceived as motivational sources buffer feelings of test anxiety with increasing levels of achievement drive. Hence, peers are being perceived as supportive and trustworthy, while teachers in their role as motivators are perceived as role models, accompanying students in their academic careers. However, among German students, no such buffers could be found. In contrast, teacher-student relationships, independent of their perceived quality, intensified feelings of test anxiety with increasing levels of achievement drive among German secondary school students. Furthermore, the fact that almost 60% of all Canadian students investigated consider themselves to be a teacher-and-peer dependent motivation type, which is positively associated with intrinsic motivation, learning goals, and achievement drive (Jagenow et al., 2014), while among German secondary school students, only 27% were found to belong to this group, represents an alarming sign. Politicians, educational scientists, psychologists, and school personnel are well advised to recognize these cross-national findings as well as the need to adjust and re-think the orientation of the educational system and the function of socio-motivational relationships for motivation and learning processes.

Is it the orientation toward community values in Canada and the “German Angst” among German students that reveal their face in the data? Up until now, mainly hard facts about the educational systems have been collected by researchers (structure of educational system, population distribution, mobility, income-situation, migration background, college and university enrolment, etc.), while examining attitudes and values of students and teachers has been rare (Autorengruppe Bildungsberichterstattung, 2008; PISA Consortium, 2013). The current PhD thesis presents one

building block of the investigation of socio-motivational relationships in the school context that has not been carried out in this form so far. The results found encourage further research to follow a cross-national perspective examining attitudes, values, and beliefs of all parties involved in educational settings, which in the current studies could be measured indirectly by focusing on the mediating, moderating, and motivational role of socio-motivational relationships across Germany and Canada.

### **5.3 Strength and limitations**

This cumulative PhD thesis presents an enhancement to past research, as sophisticated state of the art methods are being applied, which allow for high consistency and predictive power of the models presented in all three studies. These methods also allow for an integrative approach of individual and environmental variables, which are being examined cross-nationally. By including German and Canadian secondary school students, past research that focused only on one particular nation could be enhanced. In this sense, the role of socio-motivational relationships could be tested across the two nations as well as the buffering hypothesis (Cohen & Wills, 1985) and the motivation typology (Raufelder et al., 2013). By using large sample sizes of secondary school students, the results allow for solid interpretations of the data concerning this age group.

However, as in all research, the studies presented disclose few limitations. Due to the cross-sectional nature of the data, causal conclusions cannot be drawn. Future studies are advised to follow a longitudinal design to be able to make statements about changes and relation of variables over time. Additionally, the studies are limited to the age group of secondary school students from particular areas of Germany (Brandenburg) and Canada (Québec) and therefore a broad interpretation of the results being valid for all age groups and whole nations is not advised. Prospective research may build on the current results and examine various age groups (e.g., kindergarten, elementary school, high school, adults in vocational trainings) from different countries (e.g., South America, South Africa, China, Russia, etc.) as well as from collective instead of individualistic societies to account for the variety of educational systems. Furthermore, the data is based on self-report data only, while future research may be advised to include reports from third parties, such as teachers, peers, and parents to be able to draw an even more detailed picture of how socio-motivational relationships relate to different aspects across countries.

### **5.4 Future directions**

With the aim to understand the correlates of socio-motivational relationships within the school context, the current PhD thesis followed an integrative and cross-national approach.

However, to further understand the mechanisms of action, I would like to encourage researchers from various disciplines to collaborate by following an interdisciplinary and multi-method approach. By bringing together expertise, for example from the field of psychology, educational science, sociology, biology, philosophy, etc., it would be possible to overcome discipline boundaries and profit from the knowledge and methods of each professional. Only by collaborating will it be possible to integrate different approaches and variables that are presented in the complexity of human nature in a consistent way. By observing humans' nature carefully, being embedded into a macro system of a social and institutional environment, we could succeed to understand what motivates individuals, what constrains them, and what can be done to support the development of physically and mentally healthy individuals.

In particular, social relationships and their impact on motivation and learning processes should be examined across different countries, as students from different cultural backgrounds have shown to have quite distinct needs when it comes to achievement emotions. For example, Anglo-American children are generally motivated if they are allowed to make personal choices, while Asian children are motivated if a trustworthy authority figure or their peers make the choice for them (Iyengar & Lepper, 1999). While Western students strive for social approval, Chinese students are motivated to please their parents and teachers (Cheng & Lam, 2013). And while self-concept and academic achievement have shown to correlate positively in Western research of achievement motivation (Marsh, 1990; Schunk, 1990), East Asian students tend to report rather low self-esteem but high academic performance (Kaiser, Leung, Romberg, & Yaschenko, 2002; Stevenson, Lee, Chen, & Lummis, 1990). Aside from examining cross-national differences, family and community members as well as teachers and peers should be given a voice in subsequent studies on social relationships and achievement emotions. In this context, it is furthermore advised to examine various age groups and by applying a follow up design, researchers would be able to make assumptions about certain age groups and their development over time. It is known that for example teacher-student relationships change from elementary to secondary school (Harter, 1996; Lynch & Cicchetti, 1997), as do peer relationships (Kaplan, 2004; Levy, Kaplan, & Patrick, 2004). However, students' need to relate to adults and peers remains strong from preschool to grade 12 (Crosnoe, Johnson, & Elder, 2004; Bukowski, Laursen, & Rubin, 2009).

The findings presented here demonstrate the contextual influence on the perception and interpretation of socio-motivational relationships in school. Consequently, relevant factors defining the educational and communal context will finally shape the educational outcome on an individual level as well. With the current PhD thesis, I hope to ignite interdisciplinary discussions about the importance of social relationships in school and education. Researchers, school psychologists, and



educators are invited to rethink the significance of human relationships and how they may serve to support learning processes in students across different countries.

## 5.5 General conclusions

The following conclusions can be drawn from the results of Study 1, 2, and 3. The term “German students” refers to secondary school students from Brandenburg, Germany and the term “Canadian students” refers to secondary school students from Québec, Canada only.

1. Perceived high quality student-student relationships mitigate the association of neuroticism and test anxiety among German students (Study 1).
2. Neurotic German students tend to relate to peers and teachers for their own motivation, which in turn is related to high levels of test anxiety. The test anxiety levels in stressed students are also influenced by the perception of peers and teachers as motivators (Study 1).
3. High quality student-student relationships buffer feelings of test anxiety independent of the level of achievement drive in Canadian students (Study 2).
4. Canadian students, who perceive their relationships with students to be of low quality, report higher levels of test anxiety independent of their levels of achievement drive in comparison to students with high quality student-student relationships (Study 2).
5. German students report increasing levels of test anxiety with increasing levels of achievement drive independent of the quality of their teacher-student relationships. Hence, teacher-student relationships do not buffer feelings of test anxiety associated with achievement drive but intensify test anxiety levels (Study 2).
6. Canadian students, who perceive their teachers as a source of motivation, report lower test anxiety levels with increasing achievement drive. Hence, teachers perceived as positive motivators protect students against feelings of test anxiety associated with achievement drive (Study 2).
7. The motivation typology found among German students (Raufelder et al., 2013) can be confirmed for Canadian students. However, the class sizes of the four motivation types vary considerably across the two samples (Study 3).
8. Among Canadian students, the largest group of the motivation typology consists of the teacher-and-peer-dependent motivation type (57%), while among German students the largest group consists of the peer-dependent motivation type (34%) (Study 3).

9. The second largest group of the motivation typology is constituted by the teacher-and-peer-independent motivation type among Canadian (20%) and German (29%) students (Study 3).
10. The teacher-dependent motivation type constitutes the smallest group among Canadian (9%) and German (10%) students (Study 3).
11. The group of Canadian students assigned to the peer-dependent motivation type has a class size of 14% (Study 3).
12. The group of German students assigned to the teacher-and-peer-dependent motivation type has a class size of 27% (Study 3).

## 5.6 References

- American Psychological Association (2010). *The American Psychological Association's stress in America 2010 report*. Retrieved from: <https://www.apa.org/news/press/releases/stress/2010/national-report.pdf>.
- Asendorpf, J. B., & Wilpers, S. (1998). Personality effects on social relationships. *Journal of Personality and Social Psychology*, *74*, 1531–1544. doi: 10.1037/0022-3514.74.6.1531
- Autorengruppe Bildungsberichterstattung (2008). *Bildung in Deutschland 2008. Ein indikatorengestützter Bericht mit einer Analyse zu Übergängen im Anschluss an den Sekundarbereich I* [Education in Germany 2008. An indicator-based report with an analysis of transition subsequent to secondary education]. Bielefeld, Germany: Bertelsmann Verlag.
- Baumeister, R., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*, 497–529. doi: 10.1037/0033-2909.117.3.497
- Beckmann, H.-K. (2000). Lehrer(aus)bildung in Deutschland: Kontinuität, Wandel und Strukturprobleme [Teacher training in Germany: continuity, change and structural problems]. In P. H. Heidelberg (Ed.), *Aktuelle Schulsysteme : Portugal, Kroatien, Marokko, USA, Niederlande, Deutschland* (Vol. 59, pp. 40–58). Heidelberg, Germany: Institut für Weiterbildung.
- Bowlby, J. (1969). *Attachment. Attachment and loss*. New York, NY: Basic Books.
- Bukowski, W., Laursen, B., & Rubin, K. H. (2009). *Social and emotional development. Critical concepts in psychology* (Vol. 3). London, UK: Routledge.
- Bünger, S., & Raufelder, D. (2014). Moderiert die soziale Kompetenz adoleszenter Schüler den Zusammenhang zwischen ihren schulischen Peer-Beziehungen und ihrer Motivation? [Does social competence of adolescent students moderate the association between scholastic peer relationships and motivation?] *Diskurs Kindheits- und Jugendforschung*, *9*(3), 337–351.

- Cassidy, T. (1999). *Stress, cognition and health*. London: Routledge.
- Chamorro-Premuzic, T., Ahmetoglu, G., & Furnham, A. (2008). Little more than personality: Dispositional determinants of test anxiety (The Big Five, core self-evaluations, and self-assessed intelligence). *Learning and Individual Differences, 18*, 258–263. doi: 10.1016/j.lindif.2007.09.002
- Cheah, C. S. L., & Chirkov, V. (2008). Parents' personal and cultural beliefs regarding young children: A cross-cultural study of aboriginal and Euro-Canadian mothers. *Journal of Cross-Cultural Psychology, 39*, 402–423. doi: 10.1177/0022022108318130
- Cheng, R. W.-Y., & Lam, S.-F. (2013). The interaction between social goals and self-construal on achievement motivation. *Contemporary Educational Psychology, 38*, 136–148. doi: 10.1016/j.cedpsych.2013.01.001
- Cohen, S., Schwartz, J. E., Bromet, E. J., & Parkinson, D. K. (1991). Mental health, stress, and poor health behaviors in two community samples. *Preventive Medicine, 20*(2), 306–315.
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*, 310–357. doi: 10.1037//0033-2909.98.2.310
- Conneely, S., & Hughes, B. M. (2012). Test anxiety and sensitivity to social support among college students: Effects on salivary cortisol. *Cognition, Brain, Behavior: An Interdisciplinary Journal, 14*(4), 295–310.
- Covington, M. V. (1992). *Making the grade: A self-worth perspective on motivation and school reform*. Cambridge, UK: Cambridge University Press.
- Crosnoe, R., Johnson, M. K., & Elder, G. H. (2004). Intergenerational bonding in school: The behavioral and contextual correlates of student-teacher relationships. *Sociology of Education, 77*, 60–81. doi: 10.1177/003804070407700103
- Dowson, M., & McInerney, D. M. (2003). What do students say about their motivational goals?: Towards a more complex and dynamic perspective on student motivation. *Contemporary Educational Psychology, 28*, 91–113. doi: 10.1016/S0361-476X(02)00010-3
- Fend, H. (1991). Schule und Persönlichkeit: Eine Bilanz der Konstanzer Forschungen zur „Sozialisation in Bildungsinstitutionen“ [School and personality: A review of research in Constance „Socialization in educational institutions“]. In R. Pekrun & H. Fend (Eds.), *Schule und Persönlichkeit. Ein Resümee der Längsschnittforschung* (pp. 9–32). Stuttgart, Germany: Ferdinand Enke Verlag.
- Fitch, B. D. (2004). *A test of the relationship between personality traits and test anxiety*. Dissertation, Fielding Graduate University, Santa Barbara, CA.

- Fritzsche, Y. (2000). Modernes Leben: Gewandelt, vernetzt und verkabelt [Modern life: changed, networked and wired]. In A. Fischer, Y. Fritzsche, W. Fuchs-Heinritz & R. Münchmeier (Eds.), *Jugend 2000. 13. Shell Jugendstudie* (Vol. 1, pp. 180–219). Opladen, Netherlands: Leske & Budrich.
- Graudenz, I., & Randoll, D. (1997). *So dänisch wie möglich, so deutsch wie nötig? Eine vergleichende Untersuchung zur Wahrnehmung von Schule durch Abiturienten*. [As Danish as possible, so German as necessary? A comparative study of the perception of school through high school seniors]. Frankfurt/M, Germany: Böhlau.
- Hamre, B. K., & Pianta, R. C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development*, 72, 625–638. doi: 10.1111/1467-8624.00301
- Harter, S. (1996). Teacher and classmate influences on scholastic motivation, self-esteem, and level of voice in adolescents. In J. Juvonen & K. Wentzel (Eds.), *Social Motivation - Understanding children's school adjustment* (pp. 11–42). Cambridge, UK: University Press.
- Hesse, H.-G. (2004). Values and attitudes and their influence on education. In H. Döbert, E. Klieme & W. Sroka (Eds.), *Conditions of school performance in seven countries. A quest for understanding the international variation of PISA results* (pp. 302–304). Münster, Germany: Waxmann.
- Hoferichter, F., & Raufelder, D. (2014). Ein Modell inter-individueller Unterschiede sozio-motivationaler Beziehungen von Sekundarschülern mit ihren Peers und Lehrern [A model of inter-individual differences, socio-motivational relationships of secondary school students with their peers and teachers]. In C. Tillack, J. Fetzer & D. Raufelder (Eds.), *Beziehungen in Schule und Unterricht - Teil 3 Soziale Beziehungen im Kontext von Motivation und Leistung* (Vol. Reihe Theorie und Praxis der Schulpädagogik Band 25, pp. 170–200). Immenhausen, Germany: Prolog.
- Hurrelmann, K. (2006). *Einführung in die Sozialisationstheorie* [Introduction into the theory of socialisation]. Weinheim, Germany: Beltz.
- Ittel, A., & Raufelder, D. (2009). *Lehrerrolle- Schülerrolle. Wie Interaktion gelingen kann* [Teacher's role - student's role. How interaction can be successful]. Göttingen, Germany: Vandenhoeck & Ruprecht.
- Iyengar, S. S., & Lepper, M. R. (1999). Rethinking the value of choice: A cultural perspective on intrinsic motivation. *Journal of Personality and Social Psychology of Education*, 76, 349–366. doi: 10.1037/0022-3514.76.3.349

- Jackson, M. (2013). *The age of stress. Science and the search for stability*. Oxford, UK: Oxford University Press.
- Jagenow, D., Raufelder, D., & Eid, M. (2015). The development of socio-motivational dependency from early to middle adolescence. *Frontiers in Psychology*. doi: 10.3389/fpsyg.2015.00194 (Advance online publication)
- Jagenow, D., Raufelder, D., & Eid, M. (2014). A person-oriented approach to predict socio-motivational dependency in early adolescents. *Learning and Individual Differences*, *36*, 173–179. doi: 10.1016/j.lindif.2014.07.017
- Jovanovic, J., & Lerner, R. M. (1999). Individual-contextual relationships and mathematics performance: Comparing American and Serbian Young Adolescents. In R. M. Lerner & J. Jovanovic (Eds.), *Cognitive and Moral Development and Academic Achievement in Adolescence* (pp. 143–470). New York, NY: Garland Publishing.
- Kaiser, G., Leung, F. K. S., Romberg, T., & Yaschenko, I. (2002). International comparisons in mathematics education: An overview. In G. Kaiser, E. Luna & I. Huntley (Eds.), *International Comparisons in Mathematics Education* (Vol. 1, pp. 631–646).
- Kaplan, A. (2004). Achievement goals and intergroup relations. In P. R. Pintrich & M. L. Maehr (Eds.), *Advances in research on motivation and achievement: Motivating Students, Improving Schools* (Vol. 13, pp. 97–136 ). Bingley, UK: Emerald.
- Kaplan, A., & Maehr, M. L. (2007). The Contributions and prospects of goal orientation theory. *Educational Psychology Review*, *19*, 141–184 doi: 10.1007/s10648-006-9012-5
- Kaufmann, A. (2007). Merkmale und Einstellungen von Schülern [Characteristics and attitudes of students]. In H. Ditton (Ed.), *Kompetenzaufbau und Laufbahnen im Schulsystem. Ergebnisse einer Längsschnittuntersuchung an Grundschulen* (pp. 117–143). Münster, Germany: Waxmann.
- Kenny, M. E., Gallagher, L. A., Alvarez-Salvat, R., & Silsby, J. (2002). Sources of support and psychological distress among academically successful inner-city youth. *Adolescence*, *37*(145), 161–182.
- Lazarus, R. S. (1966). *Psychological Stress and the Coping Process*. New York, NY: McGraw-Hill.
- Leary, M. R. (2004). The sociometer, self-esteem, and the regulation of interpersonal behavior. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 373–391). New York, NY: Guilford Press.
- Lerner, R. M. (2001). *Concepts and theories of human development* (Vol. 3). Mahwah, NJ: Lawrence Erlbaum.

- Lerner, R. M. (1986). *Concepts and theories of human development* (Vol. 2). New York, NY: Random House.
- Lerner, R. M. (1991). Changing organism-context relations as the basic process of development: A developmental contextual perspective. *Developmental Psychology, 27*, 27–32. doi: 10.1037/0012-1649.27.1.27
- Lerner, R. M., & Kauffman, M. B. (1985). The concept of development in contextualism. *Developmental Review, 5*, 309–333. doi: 10.1016/0273-2297(85)90016-4
- Levy, I., Kaplan, A., & Patrick, H. (2004). Early adolescents' achievement goals, social status, and attitudes towards cooperation with peers. *Social Psychology of Education, 7*(2), 127–159.
- Lewin, K. (1951). *Field theory in social science*. Chicago, IL: University of Chicago Press.
- Lynch, M., & Cicchetti, D. (1997). Children's relationships with adults and peers: An examination of elementary and junior high school students. *Journal of School Psychology, 35*, 81–99. doi: 10.1016/S0022-4405(96)00031-3
- Marsh, H. W. (1990). The causal ordering of academic self-concept and academic achievement: A multiwave, longitudinal panel analysis. *Journal of Educational Psychology, 82*, 646–656. doi: 10.1037/0022-0663.82.4.646
- Maslow, A. H. (1943). Preface to motivation theory. *Psychosomatic Medicine, 5*(1), 585–592.
- Miller, R. (2011). *Beziehungsdidaktik* [didactics of relationships] (Vol. 5). Weinheim, Germany: Beltz.
- Murberg, T. A., & Bru, E. (2007). The role of neuroticism and perceived school-related stress in somatic symptoms among students in Norwegian junior high schools. *Journal of Adolescence, 30*, 203–212. doi: 10.1016/j.adolescence.2006.02.001
- Murray, C., & Greenberg, M. T. (2001). Relationships with teachers and bonds with school: Social emotional adjustment correlates for children with and without disabilities. *Psychology in the Schools, 38*, 25–41. doi: 10.1002/1520-6807(200101)38:1<25::aid-pits4>3.0.co;2-c
- Neyer, F. J., & Asendorpf, J. B. (2001). Personality-relationship transaction in young adulthood. *Journal of Personality and Social Psychology, 81*, 1190–1204. doi: 10.1037/0022-3514.81.6.1190
- Nölle. (1995). *Schüler sehen Schule anders* [Students view school differently]. Frankfurt/Main, Germany: Peter Lang.
- Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research, 70*, 323–367 doi: 10.3102/00346543070003323
- Park, J., Kitayama, S., Karasawa, M., Curhan, K., Markus, H. R., Kawakami, N., Miyamoto, Y., Love, G. D., Coe, C. L., & Ryff, C. D. (2013). Clarifying the links between social support

- and health: Culture, stress, and neuroticism matter. *Journal of Health Psychology*, 18, 226–235. doi: 10.1177/1359105312439731
- Pekrun, R. (2000). A social-cognitive, control-value theory of achievement emotions. In J. Heckhausen (Ed.), *Motivational psychology of human development. Developing motivation and motivating development* (pp. 143–164). Amsterdam, Netherlands: Elsevier.
- Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review*, 18, 315–341. doi: 10.1007/s10648-006-9029-9
- Pianta, R. C., & Nimetz, S. L. (1991). Relationships between children and teachers: Associations with classroom and home behavior. *Journal of Applied Developmental Psychology*, 12, 379–393. doi: 10.1016/0193-3973(91)90007-Q
- PISA Consortium (2013). *PISA 2012 Results in Focus. What 15-year-olds know and what they can do with what they know*. Retrieved from: <http://www.oecd.org/pisa/keyfindings/pisa-2012-results.htm>
- Raufelder, D. (2007). *Von Machtspielen zu Sympathiegesten. Das Verhältnis von Lehrern und Schülern im Bildungsprozess* [Of power games to sympathy gestures. The relationship of teachers and students in the educational process]. Marburg, Germany: Tectum Verlag.
- Raufelder, D., Jagenow, D., Drury, K., & Hoferichter, F. (2013). Social relationships and motivation in secondary school: Four different motivation types. *Learning and Individual Differences*, 24, 89–95. doi: 10.1016/j.lindif.2012.12.002
- Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher-student relationships on students' school engagement and achievement. A meta-analytic approach. *Review of Educational Research*, 81, 493–529. doi: 10.3102/0034654311421793
- Sabol, T. J., & Pianta, R. C. (2012). Recent trends in research on teacher-child relationships. *Attachment & Human Development*, 14, 213–231. doi: 10.1080/14616734.2012.672262
- Salili, F., Chiu, C.-y., & Lai, S. (2001). The influence of culture and context on students' motivational orientation and performance. In F. Salili, C.-y. Chiu & Y.-y. Hong (Eds.), *Student motivation: The culture and context of learning. Plenum series on human exceptionalism* (pp. 221–247). Dordrecht, Netherlands: Kluwer Academic Publishers.
- Schunk, D. H. (1990). Self-concept and school achievement. In C. Rogers & P. Kutnick (Eds.), *The social psychology of the primary school* (pp. 70–91). London, UK: Routledge.

- Selkirk, L. C., Bouchey, H. A., & Eccles, J. S. (2011). Interactions among domain-specific expectancies, values, and gender: predictors of test anxiety during early adolescence. *Journal of Early Adolescence, 31*, 361–389. doi: 10.1177/0272431610363156
- Sherman, D. K., & Cohen, G. L. (2006). The Psychology of self-defense: self-affirmation theory. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 38, pp. 183–242). Oxford, UK: Elsevier Inc.
- Singh, K. (2011). Study of achievement motivation in relation to academic achievement of students. *International Journal of Educational Planning & Administration, 1*(2), 161–171.
- Smith, C. A., & Lazarus, R. S. (1993). Appraisal components, core relational themes, and the emotions. *Cognition and Emotion, 7*, 233–269. doi: 10.1080/02699939308409189
- Spielberger, C. D., & Rickman, R. L. (1990). Assessment of state and trait anxiety. In N. Sartorius, V. Andreoli, G. Cassano, L. Eisenberg, P. Kielkolt, P. Pancheri & G. Racagni (Eds.), *Anxiety: Psychobiological and clinical perspectives* (pp. 69–83). New York, NY: Hemisphere Publishing.
- Spielberger, C. D., & Vagg, P. R. (Eds.). (1995). *Test anxiety: Theory, assessment, and treatment*. Washington D.C.: Taylor & Francis.
- Stevenson, H. W., Lee, S.-Y., Chen, C., & Lummis, M. (1990). Mathematics achievement of children in China and the United States. *Child Development, 61*, 1053–1066. doi: 10.1111/j.1467-8624.1990.tb02841.x
- Stöber, J. (2004). Dimensions of Test Anxiety: Relations to Ways of Coping with Pre-Exam Anxiety and Uncertainty. [Article]. *Anxiety, Stress & Coping, 17*, 213–226. doi: 10.1080/10615800412331292615
- Twenge, J. M. (2000). The age of anxiety? The birth cohort change in anxiety and neuroticism. *Journal of Personality and Social Psychology, 79*, 1007–1021. doi: 10.1037/0022-3514.79.6.1007
- Vitoroulis, I., Schneider, B. H., Cerviño Vasquez, C., del Pilar Soteras de Toro, M., & Santana Gonzáles, Y. (2012). Perceived parental and peer support in relation to Canadian, Cuban, and Spanish adolescents' valuing of academics and intrinsic academic motivation *Journal of Cross-Cultural Psychology, 43*, 704–722 doi: 10.1177/0022022111405657
- Wentzel, K. R. (2009). Student's relationships with teachers as motivational contexts. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation in school* (pp. 301–322). New York, NY: Routledge.



- Williams, P. (1980). Adolescent identification and academic achievement: Reporting the awareness of similarity to role models. *Journal of Youth and Adolescence*, 9, 315–321. doi: 10.1007/bf02087983
- Wilson, D. N., & Lam, T. C. M. (2004). Canada. In H. Döbert, E. Klieme & W. Sroka (Eds.), *Conditions of school performance in seven countries. A quest for understanding the international variation of PISA results* (pp. 15–64). Münster, Germany: Waxmann.
- Zorumski, C. F., Paul, S. M., Izumi, Y., Covey, D. F., & Mennerick, S. (2013). Neurosteroids, stress and depression: Potential therapeutic opportunities. *Neuroscience & Biobehavioral Reviews*, 37, 109–122. doi: 10.1016/j.neubiorev.2012.10.005

## **Acknowledgements**

I would like to thank the Konrad-Adenauer Foundation, particularly Dr. Daniela Tandecki and Dr. Gernot Uhl, for supporting and encouraging my research.

I would especially like to thank Prof. Michael Eid and Dr. Diana Raufelder for giving me the opportunity to be part of an engaged research group and for supervising me in the course of my PhD thesis. Thank you Diana for involving me to the fullest into the project SELF, for sharing and pursuing visions, ideas, and goals as well as for engaging in informal research discussions on our great and fruitful Impala coffee breaks and for being a friend.

I am very thankful for the unconditional support and love of my parents and brother whom I can always count on.

I am also very thankful for the endless support I receive from my husband, Dr. Andreas Hoferichter - you are a constant source of joy, inspiration, and love. Keep on rocking in a free world!

Finally, I wish to thank my dear friend Babett Mesecke with whom I can share everything with - thank you for your positive and loving attitude, for always believing in me and the things I do.

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