

The Role of Dysfunctional Peer Relationships and Academic Failure in the Development and Progression of Aggression: A Longitudinal Perspective

by

Janis Moritz Jung

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

Faculty of Human Sciences
University of Potsdam

October 2016

First supervisor: Prof. Dr. Barbara Krahe
Second supervisor: Prof. Dr. Petra Warschburger

Published online at the
Institutional Repository of the University of Potsdam:
URN urn:nbn:de:kobv:517-opus4-394477
<http://nbn-resolving.de/urn:nbn:de:kobv:517-opus4-394477>

Acknowledgment

This doctoral dissertation is part of the Graduate College “*Intrapersonal developmental risk factors in childhood and adolescence: A longitudinal perspective*” funded by the German Research Foundation (GRK 1668). The completion of this PhD thesis would not have been possible without the valuable contribution of several people whom I would like to thank.

First of all, I would like to express my sincere gratitude to my supervisor Prof. Dr. Barbara Krahe who supported and encouraged me throughout this dissertation. I am very grateful for her interest in my work, her enthusiasm, motivation, and immense knowledge in aggression research. Thank you for being my mentor and allowing me to grow as a scientist.

I would like to thank my colleagues at the Department of Psychology at the University of Potsdam - Brigitta, Daniela, Evi, Fabian, Helena, Isabell, Johannes, Paulina and Robert – for their emotional, motivational, and practical support and for making Golm a more enjoyable place.

A special thanks goes to my family: my parents who showed understanding at every stage of my personal and academic life and who encouraged me to strive toward achieving my goals; my brothers I know I can always count on.

Last but not least, I would like to thank my girlfriend Zoé for her patience, love, and support in practical and emotional domains. Thank you for just being there.

The present PhD thesis is based on the following studies:

1. Jung, J., Krahe, B., Bondü, R., Esser, G., & Wyschkon, A. (2016). Dynamic progression of antisocial behavior in childhood and adolescence: A three-wave longitudinal study from Germany. *Journal of Applied Developmental Science*. Advance online publication. doi: 10.1080/10888691.2016.1219228
2. Jung, J., Krahe, B., & Busching (2016). Beyond the positive reinforcement of aggression: Peers' acceptance of aggression promotes aggression via external control beliefs. *International Journal of Behavioral Development*. Advance online publication. doi:10.1177/0165025416671613
3. Jung, J., Krahe, B., & Busching (in press). Differential risk profiles for reactive and proactive aggression: A longitudinal latent-profile analysis. *Social Psychology*.

Table of Contents

ABSTRACT	6
INTRODUCTION	7
1 AGGRESSION	10
1.1 DEFINITION	10
1.2 TYPOLOGY OF AGGRESSIVE BEHAVIOR	11
1.3 EXPLANATORY MODELS OF AGGRESSION	13
1.4 NORMATIVE DEVELOPMENT OF AGGRESSION IN CHILDHOOD AND ADOLESCENCE	18
2 PEER RELATIONSHIPS AND AGGRESSION	21
2.1 DEVELOPMENT OF PEER RELATIONSHIPS IN CHILDHOOD AND ADOLESCENCE	21
2.2 SOCIAL REJECTION AND AGGRESSION	23
2.3 AFFILIATION WITH DEVIANT PEERS AND AGGRESSION	28
3 ACADEMIC FAILURE AND AGGRESSION	32
3.1 AGGRESSION TO ACADEMIC FAILURE	32
3.2 ACADEMIC FAILURE TO AGGRESSION	33
3.3 SIGNIFICANT ASPECTS IN THE LINK BETWEEN ACADEMIC FAILURE AND AGGRESSION	34
4 LOCUS OF CONTROL	35
4.1 DEVELOPMENT OF CONTROL BELIEFS	35
4.2 LOCUS OF CONTROL AND AGGRESSION	37
5 RESEARCH QUESTIONS	38
5.1 OVERVIEW OF STUDY 1	39
5.2 OVERVIEW OF STUDY 2	40
5.3 OVERVIEW OF STUDY 3	40
6 STUDY 1: DYNAMIC PROGRESSION OF ANTISOCIAL BEHAVIOR IN CHILDHOOD AND ADOLESCENCE: A THREE-WAVE LONGITUDINAL STUDY FROM GERMANY	42
7 STUDY 2: BEYOND THE POSITIVE REINFORCEMENT OF AGGRESSION: PEERS' ACCEPTANCE OF AGGRESSION PROMOTES AGGRESSION VIA EXTERNAL CONTROL BELIEFS	74
8 STUDY 3: DIFFERENTIAL RISK PROFILES FOR REACTIVE AND PROACTIVE AGGRESSION: A LONGITUDINAL LATENT-PROFILE ANALYSIS	100
9 GENERAL DISCUSSION	132
9.1 A DEEPER UNDERSTANDING OF DEVELOPMENTAL PATHWAYS OF ANTISOCIAL AND AGGRESSIVE BEHAVIOR	132
9.2 THE ROLE OF AFFILIATION WITH DEVIANT PEERS IN THE DEVELOPMENT OF AGGRESSION	134

9.3 THE DEVELOPMENT OF REACTIVE AND PROACTIVE AGGRESSION	136
9.4 THE ROLE OF MODERATING FACTORS IN THE DEVELOPMENT OF AGGRESSION	138
9.5 PRACTICAL IMPLICATIONS	140
9.6 STRENGTHS AND LIMITATIONS	141
9.7 CONCLUSION	143
10 REFERENCES	144
EIDESSTATTLICHE ERKLÄRUNG	163

Abstract

Background: Aggression is a severe behavioral problem that interferes with many developmental challenges individuals face in middle childhood and adolescence. Particularly in the peer and in the academic domain, aggression inhibits the individual from making important learning experiences that are predictive for a healthy transition into adulthood. Furthermore, the resulting developmental deficits have the propensity to feedback and to promote aggression at later developmental stages. The aim of the present PhD thesis was to investigate pathways and processes involved in the etiology of aggression by examining the interrelation between multiple developmental problems in the peer and in the academic domain. More specifically, the relevance of affiliation with deviant peers as a driving mechanism for the development of aggression, factors promoting the affiliation with deviant peers (social rejection; academic failure), and mechanisms by which affiliation with deviant peers leads to aggression (external locus of control) were investigated.

Method: The research questions were addressed by three studies. Three data waves were available for the first study, the second and third study were based on two data waves. The first study specified pathways to antisocial behavior by investigating the temporal interrelation between social rejection, academic failure, and affiliation with deviant peers in a sample of 1,657 male and female children and adolescents aged between 6 and 15 years. The second study examined the role of external control beliefs as a potential mediator in the link between affiliation with deviant peers and aggression in a sample of 1,466 children and adolescents in the age of 9 to 19 years, employing a half-longitudinal design. The third study aimed to expand the findings of Study 1 and Study 2 by examining the differential predictivity of combinations of developmental risks for different functions of aggression, using a sample of 1,479 participants in the age between 9 and 19 years. First, profiles of social rejection, academic failure, and affiliation with deviant peers were identified, using latent profile analysis. Second, prospective pathways between risk-profiles and reactive and proactive aggression were investigated, using latent path analysis.

Results: The first study revealed that antisocial behavior at T1 was associated with social rejection and academic failure at T2. Both mechanisms promoted affiliation with deviant peers at the same data wave, which predicted deviancy at T3. Furthermore, both an indirect pathway via social rejection and affiliation with deviant peers and an indirect pathway via academic failure and affiliation with deviant peers significantly mediated the link between antisocial behavior at the first and the third data wave. Additionally, the proposed pathways generalized across genders and different age groups. The second study yielded that external control beliefs significantly mediated the link between affiliation with deviant peers and aggression, with affiliation with deviant peers at T1 predicting external control beliefs at T2 and external control beliefs at T1 predicting aggressive behavior at T2. Again, the analyses provided no evidence for gender and age specific variations in the proposed pathways. In the third study, three distinct risk groups were identified, made up of a large non-risk group, with low scores on all risk measures, a group characterized by high scores on social rejection (SR group), and a group with the highest scores on measures of affiliation with deviant peers and academic failure (APAF group). Importantly, risk group membership was differentially associated with reactive and proactive aggression. Only membership in the SR group at T1 was associated with the development of reactive aggression at T2 and only membership in the APAF group at T1 predicted proactive aggression at T2. Additionally, proactive aggression at T1 predicted membership in the APAF group at T2, indicating a reciprocal relationship between both constructs.

Conclusion: The results demonstrated that aggression causes severe behavioral deficits in social and academic domains which promote future aggression by increasing individuals' tendency to affiliate with deviant peers. The stimulation of external control beliefs provides an explanation for deviant peers' effect on the progression and intensification of aggression. Finally, multiple developmental risks were shown to co-occur within individuals and to be differentially predictive of reactive and proactive aggression. The findings of this doctoral dissertation have possible implications for the conceptualization of prevention and intervention programs aimed to reduce aggression in middle childhood and adolescence.

Introduction

Middle childhood and adolescence are associated with a variety of normative developmental challenges. School transitions, forming friendships, establishing first romantic relationships, as well as children's and adolescents' striving for autonomy and emancipation from parents are developmental tasks that are fundamental for the acquisition of significant social, emotional, and cognitive skills (Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006). However, just as childhood and adolescence are important milestones in a successful and healthy transition into adulthood, they are also susceptible to disruptions (Fergusson, Horwood, & Lynskey, 1993). Particularly aggressive behavior has been shown to interfere with many developmental challenges individuals face in this period and to prevent children and adolescents from making important social experiences that are predictive of a successful development (Bierman, 2004; Chen, Huang, Chang, Wang, & Li, 2010; Eidelman, Silvia, & Biernat, 2006). Furthermore, the resulting developmental deficits not only are problematic in themselves but also are essential ingredients in a negative cycle where aggressive behavior causes behavioral shortcomings, which feedback and increase the likelihood for aggressive behavior at later developmental stages (Hinshaw, 2008; Masten et al., 2005). Aggression in childhood and adolescence, accordingly, is not a transient phenomenon, but tends to persist and to spread, thereby causing a gradual accumulation of negative life experiences across development.

The disruptive quality of aggression is particularly salient in the peer and in the school domain. Both schools and peer groups are important learning environments in which individuals acquire fundamental academic and interpersonal skills as well as socially approved norms and values (Bierman, 2004; Catalano & Hawkins, 1996). Furthermore, in middle childhood and adolescence, individuals spend the majority of their waking hours within the peer group and often those peer interactions take place within schools (Csikszentmihalyi & Larson, 1984; Parker et al. 2006). Peer and school adaptation, accordingly, is a significant aspect in children's and adolescents' life. Aggressive individuals, however, have been shown to frequently fail in establishing stable and functional peer relationships, they are often socially marginalized, and chronically experience problems meeting school's academic demands (Bierman, 2004; Fite, Wimsatt, Vitulano, Rathert, and Schwartz, 2012). Additionally, aggressive children and adolescents tend to affiliate with peers who show a higher acceptance of aggression. This selective affiliation with deviant peers has been shown to be a crucial mechanism for the persistence and chronification of aggression across the life course (Allen, Porter, McFarland, Marsh, & McElhaney, 2005; Lacourse, Nagin, Tremblay, Vitaro, & Claes, 2003; Werner & Crick, 2004).

Although a plethora of studies indicate that aggressive behavior causes severe problems in normative social and academic domains and that the resulting behavioral deficits have the propensity to corroborate future aggression, less is known about how distinct developmental problems connect,

how they interrelate across time, and, most importantly, how they combine to developmental pathways of aggression. The major aim of the present PhD thesis was to fill this gap by investigating the dynamics between aggression and problems in the peer and the academic domain. More specifically, the relevance of affiliation with deviant peers as a driving mechanism for the development of aggression, factors promoting the affiliation with deviant peers (social rejection; academic failure), and mechanisms by which affiliation with deviant peers leads to aggression (external locus of control) were investigated.

Ecological models of human development provide a promising framework for investigating the progression of aggression (Bronfenbrenner, 1979). From an ecological perspective, neither isolated causes within the individual nor in the environment may sufficiently explain the development of psychopathology. Instead, the understanding of the etiology of problem behavior requires the simultaneous investigation of both attributes of the person and the environment and, even more important, the synergistic interplay between both (Masten, 2006; Sameroff, 2012). For example, in their social interactional model of antisocial behavior, Patterson, DeBaryshe, and Ramsey (1989) argue that due to their disruptiveness, antisocial and aggressive children are frequently rejected from normative peers and fail in school. Both mechanisms are hypothesized to promote that the socially marginalized and academically unsuccessful child selectively affiliates with deviant peers who tend to reinforce deviancy and thereby increase the likelihood for future antisocial behavior. The model not only demonstrates the high relevance of affiliation with deviant peers in the etiology of antisocial and aggressive behavior but also specifies the deviant peer group as a gathering place for individuals who are struggling in normative domains.

Research of the past decades has generated a large body of evidence on the developmental links between social rejection, academic failure, affiliation with deviant peers and aggression (Dodge et al., 2003; Fite, Wimsatt, Vitulano, Rathert, & Schwartz, 2012; Mathys, Hyde, Shaw, & Born, 2013). However, a comprehensive analysis of the interrelation of all three aspects across time was still missing. Hence, the first aim of this doctoral dissertation was to examine the interplay between social rejection, academic failure, and affiliation with deviant peers in the etiology of antisocial and aggressive behavior as proposed by the social interactional model (Study 1).

Although the selective affiliation with deviant peers has been shown to be crucial for the progression and chronification of aggression, mediating mechanisms have been almost exclusively explained from a social learning perspective (Dishion et al., 1996). In these explanations, it is argued that deviant peers reinforce aggressive behaviors through verbal or nonverbal feedback, while tending to ignore or even to punish prosocial behaviors. However, given the complexity of human development, it is unlikely that the differential reward of aggressive behavior and punishment of

conventional behavior alone may account for deviant peers' influence on the development of aggression. Hence, the second aim of this doctoral dissertation was to analyze an additional mediating process in the link between affiliation with deviant peers and aggression, namely the relevance of external control beliefs (Study 2).

The spreading characteristic of aggressive behavior suggests a high comorbidity of problem behavior in childhood and adolescence. In fact, evidence from epidemiological studies indicates that developmental problems tend to co-occur within individuals whereby particularly aggression has been shown to frequently come along with deficits in social, cognitive, and emotional domains (Fergusson et al., 1993; Ihle & Esser, 2002). However, despite the high comorbidity of developmental risks, research in the past decades has predominately analyzed the effect of single risks on the development of aggression. By contrast, evidence on the effect of combinations of risk factors is scarce. Furthermore, more recent research suggests that there are dispositional differences in individuals' motives to aggress (Dodge & Coie, 1987). Whereas some individuals behave aggressively because they are frustrated (reactive aggression), others use aggression as a goal-directed strategy to attain desired outcomes (proactive aggression). Although a large body of evidence is showing that distinct motives of aggression are differentially related to patterns of maladjustment (Card & Little, 2006), less is known about the predictivity of constellations of risk factors for the different motives of aggression. Accordingly, a third aim of this thesis was to investigate the effect of combinations of social rejection, academic failure, and affiliation with deviant peers on the development of reactive and proactive aggression, adopting a person- as opposed to a variable-centered methodological approach (Study 3).

The following sections provide a theoretical overview of relevant constructs in the etiology of aggression and aim to lead to the research questions addressed by this PhD thesis.

The first chapter sets the stage by providing a social psychological definition of aggression that was adopted for the present thesis and introduces to the different manifestations of aggressive behavior. In addition, prominent psychological models of the development of aggression are presented. It will become clear that various mechanisms and processes may account for the effect of problems in the peer and the academic domain on aggressive behavior in middle childhood and adolescence. The chapter ends with a description of the normative development and different developmental patterns of aggression across the life course.

The second chapter is concerned with the relevance of peer relationships in the etiology of aggression. The chapter begins with a description of the normative development of peer relationships in middle childhood and adolescence, which provides the theoretical foundation for understanding peer influences from a psychopathology perspective. The following sections focus on experiences of social rejection and affiliation with deviant peers as developmental risks in the etiology of aggressive

behavior. It is demonstrated that aggression not only is a major cause but also a significant consequence of adverse peer interactions. Additionally, the relevance of potential moderating influences on the links between social rejection and aggression and affiliation with deviant peers and aggression, respectively, are discussed.

The third chapter focuses on the role of academic failure in the etiology of aggression. It is explained why aggressive individuals frequently fail at school and why aggressive behavior may predict academic failure even after controlling for relevant “third” variables. Additionally, it is discussed that academic failure may promote future aggression by increasing aggressive individuals’ tendency to affiliate with deviant peers.

The fourth chapter is concerned with external control beliefs as a potential mediating mechanism in the link between affiliation with deviant peers and aggression. Whereas most theorists highlight the role of social reinforcement processes, this chapter illustrates that multiple mechanisms may account for the relationship between affiliation with deviant peers and aggression.

The fifth chapter specifies the research questions that were addressed by the three studies, included in the following chapters. Chapter 6 covers the first study which was concerned with a longitudinal analysis of the social interactional model proposed by Patterson et al. (1989). The second study, included in Chapter 7, investigated the relevance of external control beliefs as a potential mediator in the link between affiliation with deviant peers and aggression. Chapter 8 includes the third study of this doctoral dissertation which complemented the findings of the first and second study by investigating the effect of combinations of social rejection, academic failure, and affiliation with deviant peers on the development of reactive and proactive aggression.

The ninth chapter provides a summary of the three studies and a discussion of the main findings. Additionally, implications for interventions as well as strengths and limitations of the study results are discussed.

1 Aggression

1.1 Definition

Aggression is a subtype of a broader class of antisocial behaviors that have in common violations against prevailing personal or societal norms (Stoff, Breiling, & Maser, 1997). Among the numerous attempts to uniformly conceptualize and define aggressive behavior (Harré & Lamb, 1986), one widely accepted social psychological definition of interpersonal aggression is provided by Baron and Richardson (1994) who specify aggression as “any form of behavior directed toward the goal of harming or injuring another living being that is motivated to avoid such treatment” (p.7). Distinct from

classic behaviorist conceptualizations (e.g., Buss, 1961) which define aggression primarily by its noxious consequences, Baron and Richardson (1994) highlight the motivational and anticipatory component of aggressive behavior. The underlying intent to harm is critical for defining an aggressive act, irrespective of whether the perpetrator actually inflicted harm on the target person, or not. Unintended harm, resulting through lack of foresight or by accident, is thereby not aggressive. Additionally, accentuating the interpersonal nature of aggression and the target person's motivation to avoid the harmful treatment, excludes self-harming behavior as well as intentional harmful behavior that is performed with the target person's consent, such as in the case of medical treatment or pain administered in sexual masochism (C. A. Anderson & Bushman, 2002; Krahé, 2013).

It is important to note that whereas some researchers distinguish between destructive and constructive qualities of aggressive behavior, arguing that under some conditions, some expressions of aggression can be perceived as less negative and sometimes even as "good" or "healthy" (Romi & Itskowitz, 1990), in the present thesis the supposed positive aspect of aggression, most often referred to as assertiveness, is intentionally excluded.

1.2 Typology of aggressive behavior

Aggression is a multifaceted construct that may be differently expressed. Thus, to improve the understanding of its etiology and to facilitate more theoretically focused research, it is useful to classify aggression along various meaningful dimensions (Krahé, 2013; Parrott & Giancola, 2007). As for the present research purpose, distinguishing between distinct forms (relational vs. physical) and, particularly, between distinct functions (reactive vs. proactive) of aggressive behavior is relevant, both subtypes are described in more detail in the sections to follow.

1.2.1 Forms of aggression

Relational and physical aggression refer to differences in the aggressive behavior's response modality. Relational aggression is defined as "behaviors that harm others through damage (or threat of damage) of relationships or feelings of acceptance, friendship, or group inclusion" (Crick, 1996, p.77). Behavioral examples are gossiping, spreading rumors, or intentionally excluding someone from group interactions. Although some authors use the term *indirect* aggression interchangeably when referring to relational aggression (as the aggressive behavior can be inflicted covertly, without the victim knowing about the perpetrator's identity), in the present thesis it is highlighted that relational aggression may involve both indirect and direct acts. By contrast, physical aggression is exclusively a direct and overt form of aggressive behavior and necessarily involves a face-to-face interaction between the target and the perpetrator (Krahé, 2013). Physical aggression includes all kinds of

behaviors that intentionally harm a target through the threat or use of physical force, such as hitting, pushing, or shooting someone.

Factor-analytic studies support the discriminant dimensionality of relational and physical aggression, indicating that both forms of aggression are, in fact, conceptually distinct constructs (Björkqvist, Lagerspetz, & Kaukiainen, 1992; Vaillancourt, Brendgen, Boivin, & Tremblay, 2003). Additionally, the two-factor structure has been shown to be stable across cohorts, time, and genders (Vaillancourt et al., 2003).

1.2.2 Functions of aggression

Reactive versus proactive aggression refer to the underlying intent or motivation to aggress (Dodge & Coie, 1987; Parrott & Giancola, 2007). Reactive aggression is conceptualized as a defensive behavior in reaction to a perceived threat, stressor, or provocation. Synonyms are “impulsive”- or “hot-blooded”-aggression as reactive aggression typically involves a low degree of planning and is frequently accompanied by intense emotional states, such as anger, rage, or hostility (Vitaro, Brendgen, & Barker, 2006). Conceptually, reactive aggression is in line with frustration-aggression theory and its reformulation into a more general affect-based model of aggression, which argues that negative affect, and particularly anger triggers aggressive responses (Berkowitz, 1989, 2012a; Dollard, Miller, Doob, Mowrer, & Sears, 1939). Whereas the primary purpose of reactive aggression is to eliminate the source of frustration by inflicting harm on the perpetrator, in proactive aggression interpersonal harm serves a superordinate goal. More specifically, proactive aggressive individuals use aggression as an interpersonal strategy to attain desired outcomes, such as reputation, social dominance, or access to material or psychological reward. Due to its instrumental character, proactive aggressive behavior is often referred to as “cold-blooded”- or “deliberate”-aggression and is commonly explained by social learning theory, arguing that aggression is driven by the contingency distribution of the social environment and the anticipation of reward, resulting from the aggressive behavior (Bandura, 1973, 1983).

Although reactive aggression is more prevalent than proactive aggression (Fite & Colder, 2007; Fite, Raine, Stouthamer-Loeber, Loeber, & Pardini, 2009), both functions are highly correlated. In a meta-analysis reviewing 36 studies, Card and Little (2006) reported a sample-weighted average correlation of $r = .68$. This correlation, however, was partially dependent on the source of information used in the analyses. Whereas parents-, peers-, and self-reports yielded similar high associations between both functions, the overlap sharply decreased when observation techniques were used ($r = .24$). These findings indicate that lay persons have difficulties to distinguish between motives for aggression, even when judging their own behaviors. Furthermore, results from both confirmatory and exploratory factor analyses support the conceptual distinctiveness of both constructs, showing that

scale items of reactive and proactive aggression load on two separate factors (K. Brown, Atkins, Osborne, & Milnamow, 1996; Poulin & Boivin, 2000a; Raine et al., 2006).

Reactive and proactive aggression are differentially related to different aspects of social maladjustment (Card & Little, 2006; Merk, de Castro, Koops, & Matthys, 2005). Primarily reactive aggression is related to biases in the encoding phase of the information processing chain (Dodge & Coie, 1987), to problems in emotion regulation, and internalizing symptoms, such as depression, sadness, or anxiety (Card & Little, 2006; Raine et al., 2006; Vitaro, Brendgen, & Tremblay, 2002). By contrast, proactive aggressive individuals show biases in the behavior selection stage of the information processing chain, which is associated with positive outcome expectations for aggressive behavior (Vitaro et al., 2006). Additionally, foremost proactive aggression is related to psychopathy, interpersonal manipulations, delinquency, and substance abuse in early adulthood, such as heavy smoking and drinking (Card & Little, 2006; Pulkkinen, 1996; Raine et al., 2006). Whereas both functions are related to peer problems, reactive aggression has been shown to be stronger associated with rejection and victimization than proactive aggression (Card & Little, 2006; Poulin & Boivin, 1999).

1.3 Explanatory models of aggression

Understanding the mechanisms and processes underlying aggressive behavior is critical both from a conceptual and applied perspective. Researchers in the past decades have proposed several distinct explanatory models of aggression, focusing on both biological and psychological mechanisms. Whereas biological approaches examine hormonal, genetic, or neurological causes of aggression, psychological explanations primarily focus on the role of affect and features of the cognitive information processing that promote aggressive impulses. As for the present research, psychological approaches are of particular relevance, the most prominent models are briefly described below. It is important to note that the different explanatory models are not mutually exclusive or competing. Instead, each approach stresses a certain aspect of aggression, thereby illustrating the complexity of aggression as a social behavior (Krahé, 2013).

1.3.1 Frustration-aggression theory and cognitive neoassociation theory

Frustration-aggression theory considers frustrating experiences, defined as situational constraints interfering with the attainment of personally significant goals, as the proximal causes of aggressive behavior (Dollard et al., 1939). Aggression is considered as a compulsive mean to eliminate the source of frustration and, thereby, enable goal attainment. Whereas, in its early conceptualization a deterministic link between frustration and aggression was supposed, arguing that "aggression is always a consequence of frustration" and "frustration always leads to some form of aggression" (Dollard et al., 1939, p. 1), Miller (1941) provided a revised probabilistic version of the theory, stating that

frustration merely increases the likelihood for aggressive behavior and that aggression is only one of several possible responses to frustration. Expanding frustration-aggression theory by examining the question, when people are likely to aggress, Berkowitz (1964) highlighted the presence of aggression- or anger-related cues in the frustrating situation. Stimuli with an inherently aggressive meaning may heighten the accessibility of aggression-related concepts and, thereby, increase the tendency to aggress. Furthermore, in his cognitive neoassociation theory, Berkowitz (1989, 1993, 2012a) proposed that frustration should be considered as part of a broader class of subjective experiences, such as physical pain, uncomfortable temperatures, or social stress, that may be labeled as *aversive* and have the potential to elicit negative affect. In cognitive neoassociation theory, affect, memories, and behavioral tendencies are linked together in memory within an associative network whereby the activation of one concept spreads among associative links to related concepts and increases their excitation level, too (Collins & Loftus, 1975). Berkowitz (1993) argued that negative affect automatically stimulates thoughts, memories, physiological, and motor responses associated with aggression but also thoughts, memories, physiological, and motor responses associated with the tendency to escape from the aversive situation. These immediate fight or flight reactions trigger more specific emotional states of rudimentary anger or rudimentary fear, whereby the relative strength of the two response classes is determined by learned, situational, and genetic aspects (Berkowitz, 1990). Following these initial primitive reactions, higher order cognitive processes begin to operate, involving appraisals and attributional processes. In this more elaborate stage, the individual interprets the rudimentary feelings in relation to the situational circumstances and decides on the appropriateness of various feelings and actions. Such deliberate thoughts may produce more differentiated feelings of anger or fear, but also may intensify or suppress the behavioral tendencies associated with the initial rudimentary feelings. For example, angry or irritated responses are especially likely if an individual considers the frustrating experience to be deliberate rather than the result of accidental or and external circumstances and, hence, retaliatory aggression is considered as an appropriate reaction. Cognitive neoassociation theory is particularly apt to explain hostile aggression, although the principles of priming and spreading activation within an associative network may also explain other facets of aggression (C. A. Anderson & Bushman, 2002).

1.3.2 Social learning theory

Social learning approaches to aggressive behavior accentuate the importance of social experiences in the acquisition of aggression, which is, such as for other complex social behaviors, the result of either instrumental or observational learning processes (Bandura, 1983). Instrumental learning involves performing the critical behavior and directly experiencing the either positive or negative consequences. Depending on the reinforcement contingency of the social environment, aggressive

behavior is more or less likely to become an immanent part of an individual's behavioral repertoire. For example, individuals who repeatedly experience social or material reward when behaving aggressively, learn that aggression is an effective mean to attain access to desired resources and are more ready to engage in aggressive behavior in the future. Bandura (1983) argues that virtually all direct learning experiences may also occur on a vicarious basis by the observation and imitation of significant role models' behaviors. Thus, merely witnessing others engaging in aggression, increases the tendency for imitative aggressive responses in the observer. Comparable to instrumental learning principles, the vicarious reinforcement contingency is also critical in the imitative learning process of aggression. For example, Bandura, Ross, and Ross (1963) showed that imitative aggressive responses in school children were especially likely to occur when the witnessed aggressive role model was rewarded instead of punished for his aggressive behavior. The acquisition of aggressive behavior via direct or indirect social learning mechanisms is useful for understanding family or peer influences in the development of aggression in childhood and adolescence.

1.3.3 Social cognitive approaches

Cognitive processes play a key role in explanatory models of aggression. Whereas Berkowitz (1993) emphasized the relevance of deliberate attributional cognitions in the differentiation of rudimentary feelings of anger or fear, Bandura (1986) expanded his social learning approach by including cognitive elements in his theory, arguing that an individual's cognitive evaluation of environmental attributes as well as his or her own competence (self-efficacy) are crucial ingredients in the development and manifestation of aggressive behavior. Social cognitive approaches to human aggression further stress the importance of dysfunctional characteristics in the perception and interpretation of social events as well as biases in the selection of appropriate behavioral responses. Particularly script theory (Huesmann, 1988, 1998) and the social information processing model proposed by Crick and Dodge (1994) have gained considerable attention in the past decades and significantly contributed to the understanding of the etiology of aggression.

1.3.3.1 Script theory

Huesmann (1988, 1998) proposed that social behavior in general, and aggression in particular, is to a great extent controlled by cognitive scripts that are learned during an individual's early development. A cognitive script is a specific type of an abstract knowledge structure that guides behavior by containing information about the "appropriate sequences of events in a particular context" (Schank & Abelson, 1977, p. 41). Accordingly, cognitive scripts inform about what events are likely to happen in a situation, about the base rates of different kinds of social behaviors, as well as their consequences. Scripts may be learned either by personal experience or, on a vicarious basis, by observation and are, more or less likely, retrieved when the situational cues overlap with the original situation when the

script was encoded. However, the activation of an aggressive script does not necessarily imply that the individual engages in aggressive behavior. Huesmann (1988) argued that, once retrieved, scripts are evaluated in reference to the individual's normative beliefs and self-regulating internal standards for behavior. Thus, foremost individuals without any internal reservations or prohibitions against aggression are likely to apply aggressive scripts (Eron, 1997). The relevance of normative beliefs on script evaluation is critical for explaining the influence of deviant peers on the manifestation of aggression in childhood and adolescence. The persistent endorsement of aggression within the deviant peer group may support the development of beliefs that aggression is a normative behavioral strategy for solving interpersonal problems and, eventually, increase the likelihood to aggress.

1.3.3.2 Social information processing

Crick and Dodge (1994) suggested that individuals engage in a sequence of information processing steps when faced with a particular situation. In the first step, the *encoding of cues*, the individual selectively attends to aspects of the internal or external environment and transforms the percept into a mental representation. The second step, the *interpretation of cues*, involves attributions about intent and causality as well as other interpretative processes, such as the evaluation of goal-attainment and past performance, as well as self- and other-evaluations. During the third step, the *clarification of goals*, individuals identify and select their desired outcome for the situation. Those goal orientations may either preexist prior to the situation or may be constructed on-line in the immediate context and in response to the situational constraints. In the fourth step, the *response access or construction*, it is hypothesized that, depending on the selected goals, individuals access possible behavioral responses from memory or generate new behaviors, if the situation is novel. Next, in the *response decision* phase, the individual evaluates the previously accessed or generated responses and selects the most promising behavior for enactment. This decision depends on both the outcome expectancy associated with the response and on the individual's evaluation of his or her ability to engage in the behavior and its contextual appropriateness. In the sixth and final step, the selected response is enacted, which triggers certain environmental reactions that again may re-initiate a chain of information processing steps. Crick and Dodge (1994) argued that in each stage potential biases in the information processing may promote aggressive behavior. For example, some individuals are prone to misjudge and interpret the intent of others' ambiguous behaviors as hostile rather as benign and therefore are more likely to engage in aggression. It has been shown that this, commonly known as *hostile attribution bias*, plays an important role in the chronification process of aggressive behavior (Dodge, 2006).

1.3.4 Social interactionist theory of coercive actions

In social interactionist theory (Tedeschi & Felson, 1994) aggression is embedded into a broader theoretical framework of *coercive actions* to focus attention on the social causes and instrumental

character of aggressive behavior. Threats, bodily force, and punishments are coercive actions that are intentionally taken to inflict harm on, or to obtain compliance from an unwilling target person. It is argued that harm and compliance are proximate outcomes of coercive actions that have no intrinsic value but are instrumental to attain desired terminal outcomes or *motives* that eventually serve three major goals: (a) to control the behavior of others, (b) to restore justice, and (c) to assert and protect positive identities (Tedeschi & Felson, 1994, p. 348). Social interaction theory hypothesizes that coercive actions, even when they seem highly impulsive and mindless, result from a decision making process in which the actor decides to use coercive or other types of behavior by evaluating the “value of the outcome, expectations about success in achieving that outcome, expectations about incurring costs, and the negative value of the costs” (Tedeschi & Felson, 1994, p. 350). For example, if the perceived costs of harmful behavior are high or the actor lacks ability to successfully perform the behavior, the likelihood of coercive actions is decreased. Referring to social learning and social-cognitive principles, social interactionist theory also considers learning experiences and normative or moral beliefs in the decision making process. Past experiences with similar situations informs about the expected costs and gains from coercive and non-coercive actions. Furthermore, individuals with moral qualms about the use of coercive actions are less likely to engage in harming behaviors than persons who experienced coercion as an effective and appropriate mean to attain desired outcomes. By considering coercive actions as deliberate and instrumental, social interactionist theory goes beyond most other theories of aggressive behavior. In this vein, coercive actions are one form of social influence that are motivated by higher-level goals and that are strategically applied in interpersonal situations.

1.3.5 Summary

The common theme of theoretical approaches to aggression is that cognitive and affective processes are central aspects in the development and manifestation of aggressive behavior. Each approach has the potential to explain different aspects of peer and school problems in the etiology of aggression. Whereas frustration-aggression theory is particularly apt to illustrate the direct effect of social rejection or aversive experiences at school on the likelihood to engage in aggression, social learning theory may explain the relevance of deviant peers’ social reinforcement of deviancy in the development of aggressive behavior. Additionally, social cognitive theories provide important insights into the mental processes involved in aggression and demonstrate that being situated within a deviant peer group may promote the learning of aggressive schemata and scripts. By including aggression affirmative beliefs as well as aggressive behavioral routines, these knowledge structures, once retrieved, influence individuals’ perception and behavior in a variety of situations. Finally, social interactionist theory complements the previous theoretical approaches by highlighting the deliberate

and instrumental character of aggression. As will be described in more detail in the sections to follow, particularly within deviant peer groups, aggressive behavior is a functional mean to escape from peers' coercive intrusions. In summary, the understanding of the relevance of peer and school problems in the etiology of aggression has to take account of the multiple processes and mechanisms by which adverse experiences in school or within the peer group may affect the development and persistence of aggressive behavior across the life course.

1.4 Normative development of aggression in childhood and adolescence

Aggression in childhood and adolescence is, at least to some degree, age-normative and typically different developmental phases are associated with characteristic manifestations of aggressive behavior (Loeber & Hay, 1997). First precursors of aggression emerge when individuals firstly interact with their social world. In the age of 3 months, infants are able to identify facial configurations of anger in adults and with cognitive maturation and the improved understanding of cause-effect relationships, most infants begin to show signs of frustration and anger in the second half of their first year of life (Izard et al., 1995; Krahé, 2013; Loeber & Hay, 1997). Temper tantrums and the use of physical force in interpersonal conflicts peak in the second and third year of life and then decline until preschool age and middle childhood (Broidy et al., 2003; Crick, Casas, & Mosher, 1997). In fact, children who do not follow this normative reduction of physical aggression in middle childhood are at risk for aggressive behavior to persist into adolescence (Tremblay et al., 2005). Simultaneously to the decline in physical aggression, relational forms of aggression begin to emerge and children increasingly use relationship processes to harm others, such as social exclusion or gossiping (Underwood, 2004).

Whereas in infancy and toddlerhood gender differences in aggression are negligible, boys and girls begin to differ in their use aggressive behavior in the early school years. Although some studies indicate that males use more physical aggression and females use more relational forms of aggressive behavior, in a meta-analysis Card, Stucky, Sawalani, and Little (2008) found that although boys scored significantly higher on measures of physical aggression, the association between gender and relational aggression was too small to be considered meaningful. Accordingly, these findings support the contention that boys are generally more prone to use aggressive behavior than girls. However, this difference is mainly due to males' predominance in physical aggression. By contrast, the findings do not support the assumption that females are more relationally aggressive than boys and instead suggest that boys and girls show similar levels of this form of aggressive behavior.

As the importance of intimate relationships increases in late childhood and early adolescence (B. B. Brown, 1990; Parker & Asher, 1993), children predominantly use relational instead of physical forms of aggression to harm others and establish dominance within the peer group (Pellegrini & Long, 2002; Zimmer-Gembeck, Geiger, & Crick, 2005). One explanation for the shift of physically to

relationally aggressive strategies is that with increasing age, young people become aware of the inappropriateness of overt aggression and subsequently replace them with more covert forms of aggressive behavior (Tremblay, 1999). In this vein, Björkqvist et al. (1992) suggested that the age-dependent use of different forms of aggression varies as a function of the individual's cognitive maturity. Manipulating and relationally harming others requires complex cognitive skills and the understanding of the dynamics of social relationships (Vaillancourt, 2005).

In adolescence and early adulthood, significant changes in the intensity and consequences of aggressive behavior emerge. Besides the increase in physical strength and the potential availability of weapons, aggressive individuals' tendency to affiliate with similar aggressive peers contributes to an escalation of aggression (R. B. Cairns & Cairns, 1984; Dishion, Véronneau, & Myers, 2010; Loeber & Hay, 1997). Those peer groups not only show a higher acceptance of deviant behavior than normative peers but also mutually reinforce their aggressive behavior (Dishion et al., 1996; Dodge, Dishion, & Lansford, 2006). As will be described in more detail in section 2.3, the positive reinforcement of aggressive behavior by deviant peers is crucial for the persistence and chronification of aggression throughout lifetime.

The higher control over negative emotional reactions, such as rage or anger (Kochanska, Murray, & Harlan, 2000), suggests that reactive aggression might decrease across the development, while goal-directed, proactive aggression might increase. Contrary to this assumption, however, Barker, Tremblay, Nagin, Vitaro, and Lacourse (2006) did not find an increase in proactive aggression during adolescence. Instead both reactive and proactive aggression tended to decline over the course of development.

1.4.1 Stability and change of aggressive behavior

Aggressive behavior has been shown to be particularly stable and persistent. Reviewing 16 studies with time lags between 6 months and 21 years, Olweus (1979) reported disattenuated stability coefficients for male aggressiveness ranging from $r = 0.98$ over a 1-year period to $r = 0.36$ over a period of 18 years. Temcheff et al. (2008) found that peer-nominated aggression in childhood significantly predicted self-reported family violence for both genders 30 years later. Comparing the long-term continuity of aggression for males and females in Finland and the United States, Kokko, Pulkkinen, Huesmann, Dubow, and Boxer (2009) found that in both countries and for both genders peer-nominated aggression in school age was significantly linked to self-reports of physical aggression in middle adulthood. Similar findings are reported in a 40-year longitudinal study by Huesmann, Dubow, and Boxer (2009). Using peer nominated aggression as a measure of aggression at age 8 and self-reports of aggression at the follow-up measures at age 19, 30, and 48, Huesmann et al. (2009) found moderate levels of stability of physical aggression for both males and females. Furthermore, the continuity

coefficients for the same time lag linearly increased with participants' age, indicating that aggression increasingly becomes an immanent part of the individual's behavioral repertoire. In summary, there is a relative stability of the ordering of individuals on measures of aggression over time and those individuals who behave highly aggressive during one age range are likely to show high levels of aggression at later developmental stages. Accordingly, aggression in childhood and adolescence is not a transient phenomenon that regulates and dissolves across development, but tends to persist and to cause long lasting impairments later in life (Krahé, 2013).

It is important to note that high stability coefficients do not imply that there is no change in aggressive behavior in childhood and adolescence. For example, Martino, Ellickson, Klein, McCaffrey, and Edelen (2008) identified four distinct trajectories of aggression in a sample of 1,877 youths in Grades 7 to 11. Although most participants showed stable high or low levels of aggression, a substantial proportion of adolescents showed a decrease or even an increase in aggression across a period of four years. Similarly, in her taxonomy of developmental patterns of aggressive and antisocial behavior, Moffitt (1993, 2007) distinguishes between *life-course-persistent* and *adolescence-limited* deviancy. The life-course-persistent trajectory is characterized by an early onset of antisocial behavior, typically associated with neuropsychological problems, such as cognitive deficits, hyperactivity, or a difficult temperament. These individual liabilities are typically exacerbated by an adverse family environment, comprising aspects such as a high degree of conflict and coercion, an inadequate parenting style, or poverty. In later developmental phases the social environment expands beyond the family and antisocial children increasingly experience problems with peers or at school. It is argued that those transactions between the child and his or her social environment gradually contribute to an accumulation of negative life experiences and "construct a disordered personality with hallmark features of physical aggression and antisocial behavior persisting to midlife" (Moffitt, 2007, p.50). By contrast, individuals included in the adolescence-limited trajectory do not engage in antisocial behavior prior to adolescence. Additionally, they are not affected by neuropsychological deficits and commonly come from relatively normal family backgrounds. Furthermore, Moffitt argues that deviancy in puberty is virtually a normative pattern of behavior that results from adolescents increasing dissatisfaction with the mismatch between their social status as a child and their biological maturation ("maturity gap"). In this vein, antisocial behavior is considered as an expression of adolescents' desire for independence and autonomy from parents and other adults, which is typically given up when they turn into adulthood. As attributes of the individual or the family do not play a major role in the prediction of short-term adolescent deviancy, it is suggested that adolescence-limited aggression is triggered by the peer environment whereby the individual imitates or mimics his or her peers' deviant and delinquent behaviors.

In summary, although aggression tends to become less prevalent across the developmental course, not all individuals follow this normative decline. Particularly those individuals who show an early onset and persistent pattern of aggression are at risk for various developmental problems.

2 Peer relationships and aggression

Peers are an important socializing factor in childhood and adolescence (Bierman, 2004). Friendships with peers provide opportunities for self-disclosure, encourage the learning of important interpersonal skills, such as cooperation and communication, and provide emotional and practical support (Newcomb & Bagwell, 1995; Parker et al., 2006). Having friends is significant for children's and adolescents' well-being and psychosocial adjustment across different domains, indicating that positive peer experiences are fundamental for a healthy development. By contrast, persistent difficulties in interactions with peers may negatively affect individuals' development and a host of studies showed that negative peer experiences, such as victimization or peer rejection, are associated with numerous negative life outcomes and may even lead to clinically significant behavioral and affective disorders (Ladd & Troop-Gordon, 2003). However, friendships differ in their adaptive quality and sometimes even seemingly positive peer experiences may constitute a developmental risk (Parker et al., 2006). This negative aspect of peer relationships is particularly relevant in the etiology of aggressive behavior, where it has been shown that friendships between aggressive peers often involve a high degree of conflict and coercion (Dishion, Andrews, & Crosby, 1995; Hawley, Little, & Card, 2007). Accordingly, to understand the relevance of peer relationships in the development of aggressive behavior, it is not only necessary to consider whether the child has friends but also to take account of the characteristics and dynamics of his or her peer relationships (Hartup & Stevens, 1997, 1999).

2.1 Development of peer relationships in childhood and adolescence

In the following sections the relevance of peer relationships in the etiology of aggressive behavior are discussed. First, findings on the normative development of peer relationships from middle childhood to late adolescence are reviewed, which provide the foundations for understanding peer relationships from a psychopathology perspective. Subsequently, two aspects of dysfunctional peer relationships are described that have been shown to be linked to the development of aggressive behavior, namely peer rejection and affiliation with deviant peers.

2.1.1 Peer relationships in middle childhood

Peer relationships fundamentally change in middle and late childhood which covers the period between 6 and 11 up to 12 years. With the entry in formal schooling, opportunities to interact with characteristically diverse peers significantly increase and children are confronted with peers of different social backgrounds, ages, races, and ethnicities (Parker et al., 2006). The variability in

characteristics of peers gives rise to interindividual differences in power and popularity and in middle childhood polydyadic social groups are formed on the basis of shared behavioral and dispositional attributes (Kupersmidt, DeRosier, & Patterson, 1995; McHale, Dariotis, & Kauh, 2003). The subjective importance of social groups increases at least until adolescence and in the age of 11 most children report to be members of groups and that most of their social interactions take place in social groups (Rubin, Bukowski, & Parker, 1998). With group formation, negative views of out-group members emerge and children generally favor members of the same group over members of other social groups (Nesdale, 2004). However, this undifferentiated intergroup bias becomes more complex in the age 5 to 16 when children become more sensitive to individual characteristics of both in-group and out-group members and also to deviates of the prevailing social rules and norms (Killen, Lee-Kim, McGlothlin, & Stangor, 2002). Especially older children in this period tend to favor popular out-group members over unpopular, norm-deviating in-group members (“black sheeps”).

Friendships in middle childhood are almost imperatively between children of the same gender (Sroufe, Bennett, Englund, Urban, & Shulman, 1993), which raises the questions of whether male and female friendships differ in regard of certain characteristics. In fact, some authors attributed a lower etiological relevance to male than to female friendships as females often report to spend more time thinking about their friends, to experience more intimacy, as well as emotional support (Parker & Asher, 1993). However, evidence on gender differences in same-sex friendships is inconclusive and sometimes even reverse, which led researchers to conclude that male and female friendships are comparable in regard of closeness, intimacy, support, and longevity (Berndt & Hanna, 1995; Parker et al., 2006).

2.1.2 Peer relationships in adolescence

Many developments in peer relationships of middle childhood continue and intensify in adolescence. However, some developmental trends cease or even reverse in this period. Generally, the importance of peer interactions further increases in adolescence (Pardini, Loeber, & Stouthamer-Loeber, 2005). Adolescents spend about one third of their waking hours with peers, which is approximately twice the time they spend with their parents or other adults (Csikszentmihalyi & Larson, 1984). Additionally, with adolescents’ increasing desire for independence and autonomy, peer interactions become less supervised by adults than in middle childhood (Patterson et al., 1989).

Belonging to social groups or cliques is particularly salient in adolescence and a significant predictor of adolescents’ psychosocial adjustment and well-being. Most groups are formed on a homophily criteria (Berger & Rodkin, 2012; Kandel, 1978), based on the similarity of the individuals’ genders, ethnicity, or social status as well as behavioral dimensions, such as academic achievement, sportiness, or aggression (R. B. Cairns & Cairns, 1994; Ryan, 2001). Besides selection processes,

socialization processes also contribute to the high within-group homophily in adolescence, implying that the similarity in cliques is not only the result of preexisting similarities but also of frequent group interactions.

In addition to cliques, which normally consist of only 3 to 10 members, in adolescence the concepts of peer culture and crowds gain in importance (Parker et al., 2006). Crowds are larger collectives of stereotyped individuals that do not necessarily spend time together but share similar attitudes, interests, or types of life style. In contrast to cliques, crowd membership is not exclusively a choice of the individual but a decision of the larger peer context and not seldom adolescents are involuntarily assigned to negatively connoted crowds, such as brains, loners, or rogues (B. B. Brown & Klute, 2003). Most adolescents are aware of their crowd membership and many identify with the crowd they are assigned to, indicating that peer culture is a significant aspect of adolescents' self-identity. Although group cohesion is not as strong as in cliques, peer culture has a significant organizing effect on social life by constraining adolescents' potential pool of social interactions. Accordingly, many adolescents report that their close friendships as well as their cliques were formed within their larger peer culture (B. B. Brown & Klute, 2003).

Although friendships provide rich opportunities for self-disclosure, intimacy, and provide practical and emotional support, the increased significance of peer relationships in middle childhood and adolescence also bears some developmental challenges and vulnerabilities. For example, the desire for acceptance and belonging makes children particularly sensitive to experiences of social exclusion. Children in this period spend enormous time and energy to ensure that they are liked by their peers and to prevent rejection. Some children's desire for acceptance even turns into a hypersensitivity against social exclusion and they tend to overreact to even minor signs of negligence. Unfortunately, those children's inappropriate and maladjusted behavior makes them especially prone for social exclusion by peers (Bondü & Krahé, 2015). The desire to belong and to be accepted by peers also provides an explanation for the rapid increase in behavioral conformity in middle childhood and adolescence. Children in this period are less autonomous of their peers and friends than they were at younger ages and conform to sometimes even questionable behavioral standards, such as substance abuse or other risk taking behaviors. In fact, peer pressure toward antisocial behavior and the socializing influence of a deviant peer culture partially explains the age normative increase in antisocial behavior in adolescence as proposed by Moffitt (1993).

2.2 Social rejection and aggression

Social rejection refers to deliberate behaviors that exclude an individual child from peer activities (Parker et al., 2006; Williams, 2007). Rejecting behaviors range from passively ignoring another child, to the active termination of relationships, or the denial of a child's access to desired resources such as

toys, friends, or information (Asher, Rose, & Gabriel, 2001). Often the rejected child serves as the peer group's scapegoat, experiences bullying and abuse, and is actively disliked by other group members (Frude, 1993; Lev-Wiesel, Sarid, & Sternberg, 2013). The diversity of social rejection is illustrated by Asher, Park, and Gabriel (2001), who differentiate between 32 types of rejecting behaviors in six major categories including: (1) terminating interactions with a child or excluding a child from peer interactions (e.g. ignoring, sending away, refusal of offer), (2) denial a child's access to desired resources (e.g. toys, friends, information), (3) aggression (e.g. physical, verbal, damaging a child's property), (4) dominance (e.g. bossiness, contradicting a child's words), (5) moral disapproval (e.g. blaming), and (6) involving third parties (e.g. supporting parties that reject the child, telling adults about the child's improper behavior).

Social rejection is highly prevalent in middle childhood and adolescence. Wang, Iannotti, and Nansel (2009) found that 23.6% of males and 27.4% of females in Grades 6 through 10 experienced social isolation at school and were deliberately ignored or excluded from peer interactions. Similarly, in a retrospective study one third of young adults reported traumatic experiences of social rejection in adolescence (Lev-Wiesel, Nuttman-Shwartz, & Sternberg, 2006). From a developmental perspective, children's cognitive maturation and improved understanding of social relationships may partially account for the normative increase in social rejection. As outlined above, instead of harming others by hitting or pushing, children in this period increasingly use relational forms of aggression and harm others by manipulating social relationships or exclusion (Björkqvist et al., 1992; Tremblay, 1999). Additionally, children's increased sensitivity for deviates of social norms may result in the punishment of individuals who do not follow the rules. Hence, rejection is a powerful interpersonal strategy to gain control over social relationships and to push deviant individuals into conformity (Abrams, Marques, Bown, & Henson, 2000).

Social rejection is relatively stable across middle childhood and adolescence similarly for males and females (Hardy, Bukowski, & Sippola, 2002). Typically, popular children remain popular, whereas unpopular and rejected children remain rejected and even if peer status changes in this period, rejected children rarely become popular (Brendgen, Vitaro, Bukowski, Doyle, & Markiewicz, 2001; Coie & Dodge, 1983; Parker et al., 2006). Peer status becomes even more stable as children grow older, indicating that the relationship patterns between the child and his or her social environment consolidate across development (Cillessen, Bukowski, & Haselager, 2000). Additionally, there is evidence that peer rejection is not only stable across time but also persists across different social contexts (Bierman, 2004), suggesting that individuals' dispositions and characteristics may substantially account for peer rejection in middle childhood and adolescence.

2.2.1 Causes of social rejection

Children are rejected by their peers for multiple reasons. Exclusion may be based on an individual child's gender, race, ethnicity, or his or her cultural background that are often markers of a minority status within the larger peer context (Killen, Rutland, & Jampol, 2009). Additionally, certain behavioral characteristics are linked to social rejection in middle childhood and adolescence. Among lacking prosocial skills and lacking social competence, particularly aggressive behavior has been shown to be a major cause of social rejection and children who do not follow the normative decline of aggression in middle childhood are at risk to become chronically rejected and victimized in this period (Bierman, 2004; Eidelman et al., 2006; Fite et al., 2012; Patterson et al., 1989).

One explanation for the link between aggressive behavior and social rejection is that aggression violates prevailing social norms and values (Catalano & Hawkins, 1996). Most children agree that aggression is disruptive and an illegitimate mean for solving interpersonal conflicts. Thus, most social groups in this period hold norms that prescribe prosocial behavior and apply sanctions against those individuals who behave in an antisocial or aggressive way (Catalano & Hawkins, 1996). However, it has been shown that not all kinds of aggression lead to social rejection by peers and that not all peer groups equally provide sanctions for aggressive behavior. Additionally, there is evidence that the link between aggression and social rejection varies as a function of an individual's age or gender, pointing to the necessity to consider potential moderating factors when analyzing the relationship between aggression and social rejection.

2.2.1.1 Moderating effects of gender and age

Although among both males and females, aggression is associated with social rejection, the picture becomes more complicated when taking account of the different types of aggressive behavior. For example, Salmivalli, Kaukiainen, and Lagerspetz (2000) observed that only for adolescent girls, but not for adolescent boys, physical aggression was significantly associated with social rejection. Relational aggression, by contrast, negatively correlated with social rejection for females, whereas no significant associations were found for boys. These findings suggest that social rejection predominantly appears when the respective behavior is collectively evaluated as non-normative for a person. Considering that males and females differ in the frequency of physical and relational aggression, it seems that foremost the type of aggression that does not fit the prevailing gender stereotype causes social rejection by peers (Crick, 1997).

Although it has been reported that males and females show similar levels of reactive and proactive aggression (Connor, Steingard, Anderson, & Melloni Jr, 2003; Marsee et al., 2014), there is still need for further evidence on gender differences in the link between the functions of aggression and social rejection.

Studies analyzing the moderating influence of chronological age suggest significant developmental changes in the link between aggression and social rejection (Asher & McDonald, 2009). Whereas most children in elementary school negatively respond to aggressive behavior, this relationship becomes less consistent in middle childhood and sharply declines between third and sixth grade (Boivin, Hymel, & Hodges, 2001). It is argued that the larger organizational structure in middle school provides more opportunities for aggressive children to interact with similar aggressive individuals who are less rejecting of aggression (Cillessen & Mayeux, 2004). Hence, the formation of aggressive peer groups in middle childhood and the tendency of aggressive children to befriend each other may weaken the aggression-rejection link (Dishion et al., 1995). Similarly, due to the normative increase of antisocial and aggressive behavior in late childhood and adolescence (Moffitt, 1993), aggression may be perceived as less deviant as at earlier ages. Accordingly, in adolescence even the larger peer context may show a higher tolerance of aggression and, hence, be less rejecting of aggressive individuals. In fact, some findings even suggest that aggression in adolescence is moderately associated with higher peer status (Rodkin, Farmer, Pearl, & Van Acker, 2000).

2.2.1.2 Relevance of reactive and proactive aggression

A number of studies suggest that certain types of aggression are more strongly related to social rejection than others. Considering the functions of aggression, it has been found that foremost reactive, and not necessarily proactive, aggression is associated with social withdrawal, low social preference, and peer rejection (Fite, Hendrickson, Rubens, Gabrielli, & Evans, 2013; Poulin & Boivin, 2000b). Some authors even argue that the negative emotionality observed in reactive aggressive individuals is partially mediated by social rejection as reactive aggressive individuals are often isolated from their peer group (Day, Bream, & Pal, 1992; Dodge & Coie, 1987; Prinstein & Cillessen, 2003). In fact, there is evidence that proactive aggressive individuals are sometimes identified as “cool” and popular by their peers. For example, Prinstein and Cillessen (2003) observed that proactive relational and overt aggression was positively associated with high popularity, whereas reactive overt aggression was negatively related to ratings of popularity and social preference.

2.2.1.3 Relevance of social context

There is a large body of evidence that not all groups equally provide sanctions for aggressive individuals by excluding them from peer interactions. By contrast, depending on the social context, aggressive individuals, similarly to prosocial individuals, may be well-liked (Pellegrini, Bartini, & Brooks, 1999) and hold high social status (Hawley & Vaughn, 2003; Rodkin et al., 2000). For example, Boivin and Vitaro (1995) argue that the relationship between aggression and rejection should only exist if aggressive behavior is considered as non-normative within the peer group. Congruent with this assumption, the authors could not observe a link between aggression and social rejection within peer groups that

showed a higher tolerance and acceptance for aggression and within which aggression was a normative behavior. In fact, deviant peer groups may even provide punishments for showing prosocial behavior or refusals to engage in aggression (Patterson et al., 1989). These findings imply that aggression may be functional in some social contexts (Cillessen & Mayeux, 2004; Little, Brauner, Jones, Nock, & Hawley, 2003; Rodkin & Wilson, 2007).

2.2.2 Consequences of social rejection

Social rejection is a fundamental threat to humans' need to belong, to be accepted, and liked by their social environment (Baumeister & Leary, 1995). Experiences of social rejection are highly aversive and distressing and have been found to negatively affect psychological well-being and to promote later adjustment problems (Hinshaw, 2008; Laird, Jordan, Dodge, Pettit, & Bates, 2001; Masten et al., 2005). Today, there is a large body of evidence showing that social rejection is prognostic for the development and persistence of aggressive behavior in childhood and adolescence (Dodge et al., 2003; Leary, Twenge, & Quinlivan, 2006). Social rejection has been found to predict aggression for males and females (Dodge et al., 2003) and for different age groups (Lansford, Malone, Dodge, Pettit, & Bates, 2010; Zimmer-Gembeck et al., 2005). Especially children who chronically experience peer rejection are at risk for aggression at later developmental stages (Laird et al., 2001).

Different mechanisms may account for the causal link from social rejection to aggression. First, frustration associated with experiences of social rejection may stimulate negative affective states, such as anger or hostility, which increase the likelihood for aggressive impulses. This explanation in terms of cognitive neoassociationist theory (Berkowitz, 2012a) assumes that social rejection primarily triggers reactive or hostile aggression. Second, some researchers argue that children who are repeatedly exposed to rejection and derogation develop biases in the encoding phase of the information processing chain. Those children become more sensitive to possible cues of social rejection and tend to interpret ambiguous social behavior as deliberately hostile (Dodge et al., 2003). Again, this hostile attribution bias is more strongly related to reactive than proactive aggression (Hubbard, Dodge, Cillessen, Coie, & Schwartz, 2001). Third, one of the major drawbacks associated with social rejection is that rejected children are deprived of opportunities for the learning of normative social skills and behaviors (Kupersmidt & DeRosier, 2004). As outlined above, peer relationships are an important socializing unit for the internalization of significant social skills, such as regulating emotions, or resolving conflicts. Hence, aggressive-rejected children that anyway lack prosocial skills fail to learn and internalize more socially valued behaviors and age-appropriate problem solving strategies.

The causal link between social rejection and aggression is crucial as it promotes exactly those behaviors that initially lead to the child's exclusion from peer activities. Additionally, at least partly due

to the chronic frustration and rejection experienced in interaction with conventional peers, aggressive-rejected individuals tend to actively select social milieus that are more approving of aggression. As will be described in the following section, this selective affiliation with deviant peers is critical in the development and chronification of aggressive behavior in childhood and adolescence.

2.3 Affiliation with deviant peers and aggression

Although commonly rejected by normative peers, most aggressive children are not completely isolated from their social environment. Instead, in middle childhood and adolescence aggressive children are often clustered within social groups or cliques that show similar levels of aggression (Dishion, Patterson, Stoolmiller, & Skinner, 1991; Fergusson & Horwood, 1999). Within such deviant peer groups, aggressive behavior is considered as more normative than among conventional peers and, hence, more accepted, tolerated, or even encouraged by the peer environment (Dishion et al., 1996). Besides early parental influences, involvement with deviant peers is one of the strongest predictors for later antisocial and aggressive behavior that has been shown to remain significant even after controlling for prior levels of aggression (Allen et al., 2005; Berger & Rodkin, 2012; Espelage, Holt, & Henkel, 2003; Lacourse et al., 2003). Furthermore, association with deviant peers is related to various adjustment problems endemic to adolescent populations, such as substance abuse, delinquency, and school dropout (Dishion & Owen, 2002; Dishion, Reid, & Patterson, 1988; Patterson & Dishion, 1985).

Vitaro, Brendgen, and Wanner (2005) analyzed different trajectories of deviant peer affiliation in late childhood and early adolescence and identified four distinct affiliation profiles: A large *never group* with children who basically never affiliated with deviant friends throughout the study period, a *declining group*, which was characterized by high levels of deviant peer affiliation in the age of 10 but a gradual decline afterwards, an *early affiliative group*, which reported high levels of deviant peer affiliation in the age of 11, and a *late affiliative group*, which had similar levels of deviant peer affiliation as the never group in the age of 10 but then showed a steady increase until the age of 13. Group membership was significantly related to gender, with more boys than girls in the early affiliative and the declining group and more girls than boys in the never group. No significant gender differences, however, occurred in the late affiliative group. Importantly, each profile showed distinct correlational patterns to variables of social maladjustment. Among the four affiliation profiles, particularly the early affiliative group showed high levels of delinquency, disruptiveness, academic failure, and problems in parent-child relationships. These findings are suggesting that it is important to take account of the timing when children affiliate with deviant peers as it is predictive for distinct developmental problems.

Two interrelated processes may account for the high intragroup correlation of aggressive behavior in middle childhood and adolescence (Kandel, 1978). First, children and youths have a

tendency to selectively affiliate with peers who show similar behavioral proclivities and attitudes. From this perspective, membership in a deviant peer group is an epiphenomenon of the individual's disposition and, hence, not necessarily causally related to the etiology of aggressive behavior. Second, due to socialization processes, children and their friends become more similar over time. This perspective assumes that aggression is a learned behavior and, hence, affiliation with deviant peers is a sufficient cause for the development of aggression. Both processes will be described in more detail in the following sections.

2.3.1 Selection processes

Individuals have a tendency to seek social settings that provide a maximum of reinforcement for a minimum of social energy (Domjan, 1998). Accordingly, individuals prefer social groups that are behavioral compatible and, at the same time, do not ask for behaviors that are nonexistent or weak in their repertoire (R. B. Cairns & Cairns, 1994). It is not surprising, hence, that aggressive children, who often lack prosocial skills, have a natural preference for selecting similarly aggressive peers (Fergusson & Horwood, 1999). The selective affiliation with deviant peers already occurs as early as in preschool and elementary school years (Snyder et al., 2005). This tendency, however, accelerates in middle and high school years, when children have the opportunity to interact with more diverse peers (Fergusson & Horwood, 1999; Snyder, 2002).

Researchers analyzing factors that promote children's selection of a deviant peer group, have highlighted the relevance of adverse experiences in the family and in the peer context (Dishion et al., 1991; Patterson et al., 1989). Among detrimental parent-child interactions and coercive family dynamics, social exclusion and a weak bonding with conventional peers have been shown to promote children's association with deviant peers (Elliott, Huizinga, & Ageton, 1985). For example, Dishion et al. (1991) found that among low parental monitoring, particularly social rejection in the age of 10 predicted affiliation with deviant peers in the age of 12. Accordingly, children who chronically experience frustration in interactions with conventional peers are at risk for the selective affiliation with deviant peers (Dishion, Poulin, & Burraston, 2001; Patterson et al., 1989).

2.3.2 Socialization processes

There is compelling evidence that individuals who frequently spend time together gradually become more similar over time (Kandel, 1978). The socializing influence of the environment has been shown for a diversity of attitudes and behaviors, including aggression. Today, a plethora of studies show that deviant peers may shape and amplify antisocial and aggressive behavior through various mechanisms, such as selective reinforcement and punishment processes, model learning, or coercive friendship dynamics (Snyder, 2002).

Deviant peers tend to reward aggressive behavior through laughter, reputation, or other forms of social or material reward (Dishion & Tipsord, 2011; Mathys et al., 2013; Snyder, 2002; Weiss et al., 2005). Accordingly, whereas most groups consider aggression as a severe violation of their prevailing social norms and values, within the deviant peer group, aggression is a normative behavior and a functional mean to attain personally valued and desired outcomes. In this vein, the deviant peer group provides social acceptance and reinforcement particularly for those individuals who have problems with attaining reinforcement through conventional means (E. Anderson, 2002). Furthermore, deviant peers tend to ignore or sometimes even to sanction prosocial behaviors. These differential reinforcement and punishment processes of aggressive and prosocial behaviors, often labeled as *deviancy training*, make the deviant peer context to a significant micro-systematic predictor for the persistence and escalation of aggression in childhood and adolescence (Dishion et al., 1996; Dishion & Tipsord, 2011; Tremblay, Mâsse, Vitaro, & Dobkin, 1995; West & Farrington, 1977). For example, Dishion et al. (1996) coded videotaped sessions of boys' interactions in terms of general topic and reaction of the listener and found a contingency between deviant talk and positive reinforcement (e.g. laughter) in delinquent adolescents. Additionally, the verbal reinforcement of deviant behavior predicted self-reports of delinquency two years later. It is important to note that the social learning of aggressive behavior within the deviant peer group may also occur on a vicarious basis (Bandura et al., 1963; Bandura, 1983). As outlined above, merely witnessing peers' successful engagement in aggression may be sufficient for increasing aggressive tendencies in the observer.

A second explanation for the peer group's socializing influence on aggression may be found in deviant peers' coercive friendship dynamics (Dishion et al., 1995). Aggressive children have been shown to be particularly bossy and dominant in interactions with their friends and frequently use aversive behaviors to get their will. Within such coercive friendships, aggressive behavior may be a functional mean to escape from or terminate the aversive intrusions by the interaction partner and, hence, is negatively reinforced by the elimination of unpleasant experiences. For example, Kupersmidt, Burchinal, and Patterson (1995) showed that conflicts in deviant peer friendships predicted later antisocial behavior above and beyond the effects of social rejection and best friend's aggressiveness. It is interesting to note that the characteristics of aggressive individuals' friendships hold a certain degree of similarity to their early coercive relationship experiences with parents and other family members (Patterson et al., 1989).

Some theorists argue that deviant peers' socializing influence may be particularly salient for children whose social reinforcement is limited in interactions with normative peers (Dishion, Piehler, & Myers, 2008). Thus, socially marginalized children might be particularly susceptible for deviant peers' reinforcement of norm-violating behaviors. Additionally, analyzing moderating aspects in the social

learning of aggressive behavior, Vitaro, Brendgen, and Tremblay (2000) reported that individuals with low family attachment and support are more prone to the adverse influences of a deviant peer environment.

In line with contemporary models of developmental psychopathology (Masten & Cicchetti, 2010), in the present PhD thesis it is argued that selection and socialization processes operate simultaneously in the link between aggression and affiliation with deviant peers. Accordingly, aggressive individuals who frequently show deficits in normative domains are likely to select social groups that show a higher acceptance of aggressive behavior. At the same time, social learning processes contribute to the chronification and persistence of aggression in middle childhood and adolescence.

2.3.3 Significant aspects in the link between affiliation with deviant peers and aggression

A number of studies suggest that some variables may augment or diminish the influence of selection and socialization processes, such as children's gender or age. Additionally, the association between affiliation with deviant peers and aggression has been shown to differ for distinct subtypes of aggression. In the following sections, the role of moderating factors in the peer-aggression link are discussed.

2.3.3.1 Moderating effect of gender and age

Espelage et al. (2003) reported high intraclass correlations for different types of aggression in both male and female adolescent friendships, indicating that both boys and girls affiliate with deviant peers. Additionally, boys and girls were found to be similarly susceptible to influences of deviant peers (Elliot et al., 1985; Laird et al., 2001). However, the picture becomes more complicated when taking account of the different types of aggression. For example, Werner and Crick (2004) analyzed selection influences in relational and physical aggression among male and female 2nd to 4th graders and found that, whereas individual level of relational aggression predicted friends' level of relational aggression for both boys and girls, individual level of physical aggression predicted friends' physical aggression only for boys but not for girls across a period of one year.

The influence of peers on individuals' development increases during childhood and is particularly powerful in pre- and adolescence (Pardini et al., 2005). In this period, adolescents spend most of their time within the peer group, mostly without any supervision from parents or other adults. The increasing significance of peer relationships suggests that the socializing influence of deviant peers might be particularly salient for older children. Accordingly, it has been shown that the effect of deviant peers peaks around age of 14 and declines afterwards (B. B. Brown, 1990; Steinberg & Monahan, 2007).

2.3.3.2 Relevance of reactive and proactive aggression

Some authors suggest that deviant peers' similarity in aggression should apply to proactive, but not necessarily reactive, aggression. For example, Poulin and Boivin (2000b) argued that proactively aggressive individuals select each other as friends because they endorse the use of aggression as a behavioral strategy. Similarly, as proactive aggression is motivated by the reinforcement contingency of the social environment, deviant peers' differential reward of aggressive behavior should predominantly promote the development of proactive aggression. In line with this hypothesis, Poulin and Boivin (2000b) found between-friend similarity only in proactive but not reactive aggression. However, evidence on the moderating effect of the functions of aggression is still inconclusive. In one study by Brendgen, Vitaro, Tremblay, and Wanner (2002), friends' aggression predicted both delinquency related violence (mostly proactive) and dating violence (mostly reactive). These findings suggest that more evidence is needed for understanding the relevance of the underlying motive of aggression in the link between and deviant peers and aggressive behavior.

3 Academic failure and aggression

Schools are important socializing instances in middle childhood and adolescence. By teaching fundamental academic skills as well as socially accepted norms and behaviors, schools aim to prepare children and adolescents for a successful professional career and pave the way for a healthy transition into adulthood. Thus, adaption to the school environment is an important milestone in children's and adolescents' development. Aggressive behavior has been shown to be strongly associated with problems in school (Fite et al., 2012; Masten et al., 2005). Aggressive individuals often underperform, fail to establish functional and positive relationships with their schools, teachers, and classmates, and are less willing to adopt and internalize the school's norm system (Catalano & Hawkins, 1996). Due to the educational significance of schools, in both academic and social domains, and the negative consequences that may result from school failure, it is important to understand how aggression and academic problems are interrelated in children's and adolescents' development.

There are mainly two mechanisms that may explain the link between academic failure and aggression. First, the disruptive quality of aggressive behavior may interfere with learning in classroom and schools' no-tolerance policy of aggression. Second, the frustration associated with failure in school may promote aggressive behavior via the frustration-aggression link and via aggressive individuals' tendency to seek social settings that show a higher acceptance of aggressive behavior.

3.1 Aggression to academic failure

It has repeatedly been shown that aggressive and antisocial behavior precede academic difficulties in school (Chen et al., 2010; Fite et al., 2013). For example, Fite et al. (2012) found that rule-breaking

behavior negatively predicted academic performance two months later. Similarly, Masten et al. (2005) reported that externalizing problems in childhood undermined academic performance in adolescence. Importantly, this effect remained significant even after controlling for individual differences on measures of cognitive functioning. This finding is important as it rules out the alternative explanation that the shared variance of aggression and academic failure is caused by a third variable, which merely creates an illusion of a causal relationship between both constructs.

Most theorists argue that aggressive children's undercontrolled behavior undermines academic performance directly by negatively affecting their academic meta-skills (Patterson et al., 1989). From this perspective, aggressive individuals generally spend less time on teacher-assigned tasks, they are often unwilling to answer questions, and frequently skip school. However, given its disruptive quality, aggression may also indirectly affect academic performance via its detrimental effects on the relationship between the student and his or her teacher (Blankemeyer, Flannery, & Vazsonyi, 2002). It has been shown that the quality of the student-teacher relationship is highly predictive of school related outcomes, such as school satisfaction, motivation, or academic success (Baker, 1999; Connell & Wellborn, 1991).

3.2 Academic failure to aggression

Although in the first school years, evidence on the causal link from academic failure to aggression is not as conclusive as evidence on the causal link from aggression to academic failure, in secondary school, academic problems have been shown to significantly predict correlates of antisocial behavior, such as affiliation with deviant peers (Dishion et al., 1991). In a meta-analysis, Maguin and Loeber (1996) found that children with low academic achievement were highly at risk for rule-breaking behavior and violent offenses. Additionally, evidence from intervention studies illustrates that measures aimed to boost children's academic performance may reduce offending and other risk-taking behaviors (D. J. Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999).

Besides the frustration associated with academic failure, one explanation for the relationship between low performance at school and aggression is that children who chronically fail in academic tasks fail to establish strong bonds with the academic institution (Catalano & Hawkins, 1996). Those children are unlikely to learn and internalize socially approved values, norms, and behaviors that are fundamental to be successful in normative domains. Additionally, due to the limited social reinforcement in class, aggressive individuals may seek social contexts or groups that provide a higher acceptance aggression. This selective affiliation with deviant peers is, as outlined above, a crucial aspect for the progression and intensification of aggressive behavior. Finally, schools have a tendency to place individuals with similar academic skills into the same classroom (Dishion et al., 1991). Given that aggressive children frequently fail in academic tasks, they are likely to be clustered with

schoolmates who show similar levels of behavioral and academic problems and who tend to socially reinforce aggressive or other forms of disruptive behaviors.

3.3 Significant aspects in the link between academic failure and aggression

3.3.1 Moderating effects of gender and age

Due to males' higher frequency of aggression and its detrimental effect on academic engagement, learning, and teacher-child relationships, boys may be particularly at risk for academic underachievement. However, mean level differences do not necessarily imply gender specific variations in the pathways between aggression and academic achievement. In fact, most studies found no evidence for a potential moderating effect of individuals' gender, indicating that aggressive behavior predicts future academic failure, equally for boys and girls (Chen et al., 2010; Masten et al., 2005; Stipek & Miles, 2008).

Evidence on the moderating effect of individual's age on the link between aggression and academic failure suggests that particularly younger children's academic performance is affected by aggressive behavior. For example, Masten et al. (2005) found that externalizing behavior predicted academic achievement only in the period between childhood and adolescence but not for later developmental phases. Similar results are reported by Chen et al. (2010) who found stronger associations between aggression in Grade 2 and academic achievement in Grade 4 than between aggression in Grade 4 and academic achievement in Grade 6. These findings suggest that children's academic abilities become more stable and internally organized across time and, hence, less susceptible to external disruptions.

3.3.2 Relevance of reactive and proactive aggression

There is evidence that reactive aggression is more strongly related to academic problems than proactive aggression, indicating the necessity to take account of the underlying function of aggression when analyzing its link with academic achievement. Dodge, Lochman, Harnish, Bates, and Pettit (1997) observed that attention problems and biases in the information processing chain were associated with reactive, but not proactive, aggressive behavior. Similarly, some studies showed that only reactive aggression is linked to deficits in verbal intelligence and executive functioning (Connor et al., 2003; Fite et al., 2013). For example, Arsenio, Adams, and Gold (2009) found that reactive aggression was associated with lower verbal abilities and attention deficits which mediated the link between reactive aggression and social-cognitive correlates (e.g. hostile attribution bias). The same pattern could not be observed for proactive aggression. Finally, Little et al. (2003) found that, in contrast to exclusively proactively aggressive individuals, participants who scored high on reactive or on both reactive and proactive aggression showed maladaptive patterns across different outcomes, including low school

performance. Given that proactive aggression is a goal-oriented behavior that depends on an individual's foresight and skillful planning it is not surprising that proactive aggression is not, or sometimes even positively associated with cognitive functioning (Arsenio et al., 2009). However, as outlined above, low verbal abilities and social-cognitive biases alone may not account for the relationship between academic achievement and aggression (Masten et al., 2005), indicating that multiple mechanisms are involved in the aggression-achievement link. One candidate is low school motivation (Covington, 2000) which has been shown to be more strongly related to proactive than reactive aggression. For example, Raine et al. (2006) found that boys' low school motivation in childhood predicted proactive, but not reactive, aggression in adolescence. In summary, more evidence is needed on the link between reactive and proactive aggression and academic achievement.

4 Locus of control and aggression

As outlined above, affiliation with deviant peers plays a significant role in the etiology of aggression. Whereas the underlying mechanisms have been most commonly explained from a social learning perspective, in this section, the mediating role of an external locus of control in the link between deviant peers and aggression is discussed.

Locus of control refers to the degree to which individuals locate the causes for environmental events within or outside the self (Rotter, 1966, 1990). Individuals with an internal locus of control perceive outcomes to be based on their own behaviors, whereas individuals with an external locus of control consider outcomes to be the result of external influences that are beyond their volitional control, such as fate, luck, chance, or under the control of powerful others. Whereas in Rotter's original social learning formulation only a global differentiation between internal and external locus of control was taken into account, more recent research accentuates the domain specificity of locus of control and its potential to vary across different contexts. For example, Connell (1985) differentiated between three specific behavioral domains (cognitive, social, physical) and one general domain of control beliefs, arguing that each dimension has characteristic correlative patterns and follows distinct developmental pathways.

4.1 Development of control beliefs

In middle childhood and early adolescence control beliefs significantly change. Generally, judgments about the causes of events become more differentiated, indicating that children develop a higher sensitivity for the causal mechanisms in their environment (Skinner, Chapman, & Baltes, 1988). Additionally, desired and undesired outcomes are to a lesser degree perceived to be the result of external influences, such as of powerful others or unknown sources, than in younger ages (Connell, 1985; Krampen, 1989; Skinner et al., 1988). At the same time, locus of control tends to become more

internal in middle childhood and adolescence (E. Cairns, McWhirter, Duffy, & Barry, 1990; Krampen, 1989).

Evidence on gender differences on measures of locus of control is mixed. Studying a sample of 14- and 15-year old males and females, Manger and Eikeland (2000) found that girls showed higher scores on measures of internal locus of control than boys. Congruently, Connell (1985) observed that males scored significantly higher on subscales related to external locus of control than females. However, other studies reported no significant gender differences (e.g. Chubb, Fertman, & Ross, 1997) and in a meta-analysis, Feingold (1994) did not find noteworthy differences in measures of locus of control between males and females. Nonetheless, the issue of gender differences in locus of control is still under debate, indicating the need for further research.

Locus of control is only moderately stable in childhood and adolescence (Jackson, Frick, & Dravage-Bush, 2000; Krampen, 1989). For example, E. Cairns et al. (1990) reported stability coefficients for a generalized measure of locus of control ranging between $r = .42$ and $r = .60$ for males and between $r = .37$ and $r = .50$ for females across a period of 18 months. Similarly, Kulas (1996) observed a moderate but significant stability of $r = .31$ for male and female adolescents across a two-year period. These results suggest that control beliefs are subject to significant developmental dynamics in childhood and adolescence, indicating the necessity to understand the mechanisms that are involved in the etiological process of locus of control.

Studies analyzing social influences on the development of control beliefs highlight the relevance of the contingency distribution of the environment (Skinner, Zimmer-Gembeck, & Connell, 1998; Skinner, 1996). Environmental contingency refers to the degree to which a specific behavior is consistently and discriminately followed by the same social reaction. It has been shown that individuals with a healthy sense of internal control predominantly report to be grown up in a warm, benevolent, and supportive family environment. Parents were highly contingent in their own behaviors and responded consistently to their children's wishes and needs (Krampen, 1989; Watson, 1966; Yates, Kennelly, & Cox, 1975). By contrast, the development of external control beliefs is associated with a critical and punitive family environment, in which parents respond inconsistently and unpredictably to their children's actions (Grolnick, Ryan, & Deci, 1991; Grolnick & Ryan, 1992). Although the family environment is an important socializing unit in infancy and early childhood, its influence gradually decreases in middle childhood and adolescence. At the same, the socializing influence of peers increases (Pardini et al., 2005). However, a systematic analysis of the socializing effect of the peer environment on the development of control beliefs is still missing. Thus, it remains an interesting research question whether certain characteristics of the peer group, such as a high acceptance of aggressive behavior, support the development of external control beliefs. In fact, there is some

evidence that interactions between deviant peers are often chaotic and disorganized, thereby lacking a clear contingency between a behavior and its social reaction (Dishion, Nelson, Winter, & Bullock, 2004). Accordingly, for individuals situated within a deviant peer context, it might be difficult to predict the consequences of their own and their peers' behaviors. Furthermore, this non-contingency of the deviant peer environment might promote the development of an external locus of control.

4.2 Locus of control and aggression

The subjective experience of control is significantly related to psychological functioning and physical and mental well-being (Seligman, 1975; Skinner et al., 1998). By contrast, individuals who frequently experience that they are unable to control environmental outcomes are at risk for various developmental problems. Whereas most research focused on the relationship between control beliefs and internalizing psychopathology, such as depressive or anxious symptoms (McCauley, Mitchell, Burke, & Moss, 1988), evidence on the link between an external locus of control and externalizing psychopathology, such as antisocial or aggressive behavior, is less conclusive. For example, Jackson et al. (2000) observed that individuals with both internalizing and externalizing symptoms scored significantly higher on ratings of external locus of control than individuals with only internalizing symptoms. By contrast, Romi and Itskowitz (1990) found that individuals with an internal locus of control reacted to a frustrating event more often with aggression than individuals with an external locus of control. The link between control beliefs and aggression becomes even more complex when taking account of potential moderating variables, such as children's gender or the specific domain of control beliefs. For example, Österman et al. (1999) reported that physical, indirect, and verbal forms of aggression were significantly related to a global measure of external locus of control in male, but not in female, adolescents. By contrast, a study of children aged between 8 and 11 years found significant associations between an overall score of external control beliefs and aggression for girls, but not for boys (Halloran et al., 1999). For boys, the relationship even tended to be reversed, indicating that males who perceived themselves as unable to control environmental outcomes showed less aggression. Finally, Han, Weisz, and Weiss (2001) found a significant relationship between aggression and external locus of control only in the social and physical, but not in the academic domain for children and adolescents aged between 7 and 17 years. Evidence on the potential moderating influence of age in the link between an external locus of control and aggression is still missing. In summary, evidence on the link between external locus of control and aggression is inconclusive, indicating the need for further research that takes account of the domain specificity of control beliefs and the role of potential moderating influences, such as individuals' gender or age.

In summary, the evidence reviewed so far indicates that the non-contingency of deviant peers' interactions may promote the development of external control beliefs. Furthermore, chronically

experiencing that environmental outcomes are outside one's volitional control may be highly aversive and frustrating, thereby stimulating aggressive responses via the frustration-aggression link (Berkowitz, 1989, 2012b). Together these findings suggest that external locus of control is a potential mediator in the link between affiliation with deviant peers and aggression.

5 Research questions

The theoretical introduction in the previous sections aimed to illustrate that aggression interferes with success in important normative domains in children's and adolescents' life. The disruptive characteristic of aggression has been argued to be particularly problematic in the peer and the school domain, which are, in addition to the family, important socializing instances in middle childhood and adolescence. Aggressive individuals have been shown to be at risk to become socially marginalized within the peer group, to fail at school, and to develop dysfunctional relationships with similarly aggressive peers. Particularly the latter was argued to be a crucial aspect for the persistence and intensification of aggression. Additionally, it was discussed that peer problems and failure at school have the propensity to promote future aggressive behavior, indicating that aggression and difficulties in school and within the peer group are mutually reinforcing. Due to the high relevance of deviant peers in the etiological process of aggression, external locus of control was discussed as an additional mediating process that may explain the link between affiliation with deviant peers and aggressive behavior besides social reinforcement mechanisms. Finally, it was shown that the relationships between aggressive behavior and problems in the peer and in the academic domain may substantially change, when taking account of the underlying motives or functions of aggression. The aim of this PhD thesis was to go beyond the previous findings on the role of distinct developmental risks in the peer and the academic domain by providing a more detailed analysis of their interrelations, while taking account of potential mediating and moderating variables. More specifically, the three longitudinal studies included in this PhD thesis addressed the following main research goals:

First, to provide a deeper understanding of developmental pathways of antisocial and aggressive behavior in middle childhood and adolescence by investigating the dynamic interplay between social rejection, academic failure, and affiliation with deviant peers over time (Study 1).

Second, to gain more knowledge about the role of peers in the etiology of aggression by examining processes, specifically the role of control beliefs, that mediate the link between affiliation with deviant peers and aggressive behavior (Study 2).

Third, to provide further insights into the development of reactive and proactive aggression by investigating the predictivity of specific constellations of dysfunctional peer relationships and failure in the academic domain (Study 3).

The empirical part of the present PhD thesis is based on data from a longitudinal study on intrapersonal risk factors for the development of psychopathological behavior in childhood and adolescence (PIER; Potsdamer Intrapersonale Entwicklungsrisikenstudie). The PIER study is a school-based study that was conducted in Brandenburg, Germany and includes a large community sample of male and female children and adolescents aged between 6 and 15 years at the first data wave. At the time of completion of this PhD thesis, the PIER study included three data waves across a period of approximately 5 years. However, as some measurement instruments were not included before the second data wave, the second and third study of this doctoral dissertation are based on only two measurement points.

5.1 Overview of Study 1

The aim of the first study of this PhD thesis was to investigate the longitudinal relationships between social rejection, academic failure, and affiliation with deviant peers in the etiological process of antisocial behavior. Although this study did not specifically focus on the development of aggression, a plethora of studies showed that aggression often appears in the context of other antisocial behaviors, such as delinquency, vandalism, or substance abuse (Stoff et al., 1997). Due to this high comorbidity with other deviant behaviors, Coie and Dodge (1998) argued “that an understanding of the etiology and developmental course of aggression might be enhanced by including aggression into the broader class of antisocial behavior” (p. 781). Thus, Study 1 aimed to examine the development of aggression in the larger context of antisocial behavior.

The theoretical framework was provided by the social interactional model of antisocial behavior by Patterson et al. (1989) which assumes that, as outlined above, the etiology of antisocial and aggressive behavior unfolds via two distinct but interrelated pathways. More specifically, it is proposed that antisocial behavior causes both social rejection by normative peers and academic failure. Both mechanisms are argued to promote the selective affiliation with deviant peers which has been shown to be a proximal predictor for the persistence and chronification of deviancy in childhood and adolescence. Although, the literature provides a large body of evidence on the validity of the separate developmental pathways between social rejection, academic failure, affiliation with deviant peers, and antisocial and aggressive behavior (Dodge et al., 2003; Fite et al., 2012; Mathys et al., 2013), a longitudinal analysis of the overall model is still missing. The first aim of this study was to provide a comprehensive analysis of the validity of the social interactional model based on a large community sample of male and female children and adolescents aged between 6 and 15 years. Using three measurement points across a period of approximately five years, it was hypothesized that antisocial behavior at T1 would predict both social rejection and academic failure at T2. Furthermore, it was predicted that the more individuals are socially rejected and the more they experience failure in school

at T2, the more they affiliate with similar deviant peers at the same measurement point. Finally, affiliation with deviant peers at T2 was expected to be associated with antisocial behavior at T3.

A second aim of the study was to analyze whether the predicted pathways differ as a function of individuals' gender or age. However, as it was not differentiated between specific forms or functions of antisocial behavior, the predicted pathways to hold for both males and females and to be unaffected by age.

5.2 Overview of Study 2

Most theorists highlight the relevance of social reinforcement processes in the link between affiliation with deviant peers and aggressive behavior. The aim of the second study of this doctoral dissertation was to examine the role of an external locus of control as an additional mechanism that may mediate the association between affiliation with deviant peers and aggression. More specifically, it was argued that deviant peers' interactions are often chaotic, disorganized, and lack stable contingencies between behaviors and social responses. Accordingly, individuals who are situated within a deviant peer group may find it difficult to predict the consequences of their own and their peers' behaviors. It was hypothesized that this non-contingency and disorganization of deviant peers' interactions may promote an external locus of control which further supports the development of aggressive behavior. Furthermore, and as outlined above, evidence on the potential moderating influence of individuals' gender or age in the link between locus of control and aggression is inconclusive. Accordingly, a second aim was to analyze gender and age differences in the proposed pathways. Using a half-longitudinal design, the following hypotheses were examined: First, the more individuals affiliate with deviant peers at T1, the more likely are participants to show an external locus of control at T2. Second, the more participants perceive events as uncontrollable at T1, the more they show aggressive behavior at T2. Third, external locus of control was expected to mediate the pathway between affiliation with deviant peers and aggression.

5.3 Overview of Study 3

The focus of the third study was to analyze the differential predictivity of clusters of developmental risks for the development of reactive and proactive aggression, using a combination of person- and variable centered analysis. Whereas there is evidence that social rejection, academic failure, and affiliation with deviant peers show distinct correlative patterns with both functions of aggression (Card & Little, 2006), evidence on how those developmental problems combine within individuals and whether specific combinations of risk factors are differentially related to the development of reactive and proactive aggression is still missing. Accordingly, the first aim of this study was to analyze which constellations of social rejection, academic failure, and affiliation with deviant peers existed in a

community sample of 9- to 19-year old children and adolescents, using latent profile analysis. As there was no prior evidence on the distribution of those developmental risks within a community sample, no prediction about the specific number or mean-level profiles of the latent classes were made. However, considering that an unselected community sample of children and adolescents was studied, it was expected to find a large non-risk group, characterized by low levels on all three risk factors, and other classes, characterized by combinations of risk factors. The second and third aims of this study were to analyze whether the observed risk groups were temporally stable or just transient phenomena and whether risk-group membership at T1 would differentially predict reactive and proactive aggression 17 months later, using latent path analysis. Based on previous research, a risk group characterized by high levels of social rejection was expected to be related to the development of reactive aggression and a risk group characterized by high levels of affiliation with deviant peers to be associated with proactive aggression. However, as no prior study analyzed the combined effects of social rejection, academic failure, and affiliation with deviant peers on the development of reactive and proactive aggression, it was acknowledged that the effect of combinations of risk factors may be different from what would be expected when analyzing risk factors in isolation. The fourth aim of this study was to examine whether reactive and proactive aggression would differentially predict risk-group membership at T2, indicating reciprocal relationships between risk groups and reactive and proactive aggression.

6 Study 1

Dynamic Progression of Antisocial Behavior in Childhood and Adolescence: A Three-Wave Longitudinal Study from Germany

Dynamic Progression of Antisocial Behavior in Childhood and Adolescence: A Three-Wave Longitudinal Study from Germany¹

Janis Jung, Barbara Krahe, Rebecca Bondü, Günter Esser, and Anne Wyszkon
University of Potsdam, Potsdam, Germany

Total word count: 11.064 (total)

Correspondence address:

Janis Jung

University of Potsdam

Department of Psychology

Karl-Liebknecht-Str. 24-25

D-14476 Potsdam, Germany

Tel: ++49-331-977-2636; Fax: ++49-331-977-2795

Email: janis.jung@uni-potsdam.de

¹ This research was conducted as part of the Graduate College “Intrapersonal developmental risk factors in childhood and adolescence: A longitudinal perspective” funded by the German Research Foundation (GRK 1668). Correspondence concerning this article should be addressed to: Janis Jung, University of Potsdam, Karl-Liebknecht-Str. 24-25, D-14476 Potsdam, Germany. Email: janis.jung@uni-potsdam.de.

Abstract

This longitudinal study from Germany examined the dynamic progression of antisocial behavior in childhood and adolescence based on the social interactional model by Patterson, DeBaryshe, and Ramsey. It examined the link between antisocial behavior, social rejection, academic failure, and affiliation with deviant peers in a sample of 1,657 children and youths aged between 6 and 15 years who were studied at three measurement waves (T1 to T3) over a time period of about five years. Teachers rated the children on all variables, parents additionally provided ratings of antisocial behavior and social rejection. Latent structural equation modeling yielded the predicted positive paths from antisocial behavior at T1 to social rejection and academic failure at T2. As predicted, affiliation with deviant peers at T2 was positively associated with social rejection and academic failure at the same measurement point. Finally, affiliation with deviant peers at T2 significantly predicted antisocial behavior at T3.

Keywords: antisocial behavior, Germany, social rejection, deviant peers, longitudinal study

**The Dynamic Progression of Antisocial Behavior in Childhood and Adolescence:
A Three-Wave Longitudinal Study from Germany**

Of all possible forms of childhood psychopathology, antisocial behavior has been shown to be particularly stable and persistent over the course of development, tending to evolve early in life and to continue into adolescence and adulthood (Huesmann, Dubow, & Boxer, 2009; Moffitt, 1993a; Olweus, 1979; Temcheff et al., 2008). From a social interactional perspective, the persistence of psychopathological behavior is the result of a continuous synergistic interplay between individuals and their social and physical environment (Bronfenbrenner, 1979; Cox, Mills-Koonce, Propper, & Gariépy, 2010; Dodge & Pettit, 2003; Masten & Cicchetti, 2010; Masten et al., 2005; Rutter & Sroufe, 2000; Sameroff, 2000). Accordingly, pathways to antisocial behavior in childhood and adolescence are marked by reciprocally noxious interactions between the child and significant others, such as parents, teachers, or peers. These interactive patterns have the propensity not only to perpetuate themselves over time but also to spread, that is, to negatively affect other functions and functioning levels of the individual, thereby causing a gradual accumulation of negative life experiences. This contagious quality of antisocial behavior, often referred to as cascade-, snowball-, or spill-over-effect (Masten & Cicchetti, 2010), suggests that even minor deviations from normative developmental patterns in childhood and adolescence may cause persistent and serious impairments later in life. The dynamic nature of the development of antisocial behavior calls for longitudinal research designs that can capture the reciprocal processes between individuals and their environment on multiple levels of functioning over time (Masten & Cicchetti, 2010). The present longitudinal study sought to analyze pathways in the development of antisocial behavior in a large sample of female and male school children in Germany who took part in three data waves covering an average period of five years.

The theoretical foundation for the study was provided by the social interactional approach proposed by Patterson et al. (1989). These authors suggest that the etiology and progression of antisocial behavior unfolds in sequential, reciprocal steps, whereby children's behavior at one stage causes predictable reactions of their social environment at the following stage. The altered ecological conditions cause an increased likelihood of selected behavioral reactions that, again, may change the environmental setting. It is hypothesized that each step puts the child at a higher risk of maladjusted behavior in adolescence and adulthood. Patterson et al. (1989) assert that these cascade-like effects may unfold via two discrete pathways, namely social rejection and academic failure. They argue that both mechanisms result in a social marginalization within the normative peer context and promote the affiliation with deviant peers, which is a proximal predictor of antisocial behavior at later developmental stages.

Psychological research has provided compelling evidence for the impact of social rejection, academic failure, and affiliation with deviant peers in the etiology and persistence of antisocial behavior (Arsenio, Adams, & Gold, 2009; Coie & Kupersmidt, 1983; Dishion, Spracklen, Andrews, & Patterson, 1996; Laird, Jordan, Dodge, Pettit, & Bates, 2001; Masten et al., 2005; Patterson & Dishion, 1985). However, the operating mechanisms between and within these risk factors are less well understood. Therefore, one aim of the current research is to analyze potential mechanisms that may underlie the developmental pattern of antisocial behavior as proposed by Patterson et al. (1989). Drawing on well-supported developmental theories of deviancy, such as control theory (Hirschi, 1971), social learning theory (Akers, 1977; Bandura, 1973, 1977), differential association theory (Matsueda, 1982, 1988; Sutherland & Cressey, 1955), and social development theory (Catalano & Hawkins, 1996), we argue that the social learning of antisocial behavior varies as a function of an individual's social bonding with a specific group or institution. Social bonding refers to an attachment, an emotional connection, or commitment to a socializing unit (e.g., family, peers, and school). It mainly develops when the social context provides commensurate opportunities for involvement and participation in social interactions, an optimal fit between required and existing skills, and a high degree of positive social reinforcement (Catalano & Hawkins, 1996). When performance is rewarded and skills and opportunities match, a stable social bond between the individual and the socializing unit is established that becomes the foundation for the learning, adoption, and internalization of group-specific norms, values, and behaviors. Thus, we argue that the learning of antisocial behavior heavily depends on an individual's social bonding or identification with a group or institution that is either favorable or unfavorable to deviancy and, therefore, differentially reinforces and punishes antisocial acts. Against this background, evidence for the critical pathways proposed in the social interactional model will be examined in turn.

Antisocial behavior and social rejection

A successful navigation through the social environment depends on a high sensitivity to the context- and group-specific social norms that regulate and coordinate interpersonal actions through prescribing which behaviors are appropriate and typical and which are inappropriate within a given situation (Miller & Prentice, 1996). Social groups tend to reward norm-congruent behavior and impose sanctions on individuals who violate those behavioral expectations (Schachter, 1951). These punishments may take interpersonal forms, such as derogation (Abrams, Marques, Bown, & Henson, 2000), negative feedback, assignment to unpleasant tasks, lower sociometric ratings, or social exclusion (Bierman, 2004; Dodge, Coie, Pettit, & Price, 1990; Eidelman, Silvia, & Biernat, 2006; Fite, Wimsatt, Vitulano, Rathert, & Schwartz, 2012; Laird et al., 2001). Most societies and social groups hold norms that prescribe prosocial behavior and apply sanctions against those individuals who behave in

an antisocial or aggressive way (Catalano & Hawkins, 1996). Accordingly, it has repeatedly been shown that most children tend to withdraw from peers who lie, cheat, take others' things without permission, or behave antisocially (Laird et al., 2001). In experimental studies, Coie and Kupersmidt (1983) and Dodge (1983) observed that physical and verbal aggression was a proximal predictor of social rejection in newly-formed playgroups. Other studies have shown that externalizing problem behavior, especially antisocial behavior and a lack of prosocial behavior, was a major determinant of stable patterns of social rejection (Parke et al., 1997; Vitaro, Tremblay, Gagnon, & Boivin, 1992) and chronically low peer acceptance (Brendgen, Vitaro, Bukowski, Doyle, & Markiewicz, 2001). Besides the pain and frustration associated with social rejection (Baumeister & Leary, 1995; Maslow, 1962), one of the major negative effects is that socially rejected children lack opportunities to learn and internalize normative standards as well as socially accepted behaviors and problem-solving skills through interactions with their non-deviant peers (Bierman, 2004; Coie, Dodge, & Kupersmidt, 1990; Dodge & Pettit, 2003).

Antisocial behavior and academic failure

Antisocial behavior in childhood and adolescence is associated with a number of cognitive problems, such as deficits in executive functioning, attention, and verbal intelligence (Arsenio et al., 2009; Connor, Steingard, Anderson, & Melloni, 2003; Fite, Hendrickson, Rubens, Gabrielli, & Evans, 2013; Huesmann, Eron, & Yarmel, 1987; Moffitt, 1993b), that are significant predictors of academic failure (Fergusson & Horwood, 1995; Spinath, Spinath, Harlaar, & Plomin, 2006). In addition, the positive relationship between academic failure and antisocial behavior remains, even when controlling for third variables, such as intelligence, socioeconomic status, and parenting style (Masten et al., 2005). Thus, antisocial behavior tends to clash with the clear and strictly formulated rules and norms imposed in a school setting. A certain degree of conformity and compliance is a prerequisite for high school achievement, and students who have chronic problems adjusting their behavior to the school rules will not normally obtain positive reinforcement, especially in the form of good grades (Wentzel, 1991). Moreover, teachers' disciplinary responses in dealing with rule-breaking behavior may further alienate antisocial individuals from academic institutions and impair the internalization and learning of socially approved values and behaviors (Catalano & Hawkins, 1996; Oelsner, Lippold, & Greenberg, 2011).

Antisocial behavior and affiliation with deviant peers

Unlike mainstream social institutions that demand and reward norm-conforming behavior, there are groups and institutions that have a greater tolerance for deviancy or even reward antisocial or aggressive behavior through social affirmation, higher social status, or facilitated access to desired resources (Anderson, 2002). This implies that the positive associations between antisocial behavior and social rejection and between antisocial behavior and academic failure may not be found in groups in which antisocial behavior is to some extent normatively accepted (Boivin, Dodge, & Coie, 1995;

Wright, Giammarino, & Parad, 1986). Such groups may even impose sanctions on individuals showing prosocial behavior or refusing to engage in deviant behavior (Patterson et al., 1989). Thus, whereas antisocial behavior is dysfunctional in mainstream social groups, it may be highly adaptive and successful in groups with deviant norm systems.

Individuals tend to select those social contexts that provide a high degree of social reinforcement, ideally for a minimum of social energy (Domjan, 1998). That means, they prefer groups that do not demand skills that are non-existent or underdeveloped, leading individuals with antisocial behavior patterns to affiliate with peers that approve of and reinforce antisocial behavior. The deviant peer context provides social acceptance and reputation for those children and adolescents who have general problems with attaining social reinforcement or prestige through conventional means (Anderson, 2002), for example, because of low school achievement (Dishion, Patterson, Stoolmiller, & Skinner, 1991), social rejection (Cairns, Cairns, Neckerman, Gest, & Gariépy, 1988; Dishion et al., 1991), and antisocial behavior (Gottfredson & Hirschi, 1990; Tremblay, Mâsse, Vitaro, & Dobkin, 1995). It has been argued that the positive reinforcement of antisocial behavior, sometimes referred to as *deviancy training* (Patterson et al., 1989), makes the deviant peer context a significant proximal and micro-systemic predictor of the promotion of antisocial behavior and the persistence of antisocial behavior patterns into adulthood (Dishion et al., 1996; Patterson & Dishion, 1985; Tremblay et al., 1995; West & Farrington, 1977).

The current study

The cross-sectional and longitudinal studies reviewed so far provide compelling evidence for the validity of the proposed links of antisocial behavior with social rejection, academic failure, and the affiliation with deviant peers. However, to our knowledge, only one study by Dishion, Véronneau, and Myers (2010) has incorporated all risk factors in a single model. Testing the mediating role of deviancy training in the association between membership in a deviant peer group and violence in adolescence, these authors obtained a good model fit for the social interactional model, with antisocial behavior, social rejection, and low school achievement at age 11 to 12 predicting membership in a deviant peer group two years later. Affiliation with deviant peers, in turn, predicted deviancy training at ages 16 to 17, which predicted multiple measures of violent behavior at ages 18 to 19.

In the current study, we aimed to extend these findings by conducting a comprehensive analysis of the social interactional model as proposed by Patterson et al. (1989). Adopting the same variable-centered methodological approach as used by these authors allowed us to analyze the developmental pathways proposed by the social interactional model. Including repeated measurements of antisocial behavior, social rejection, and academic failure over time allowed us to control for the temporal stability of each construct and thereby provide a stringent test of

developmental pathways of antisocial behavior. Additionally, whereas gender and age differences in specific facets of antisocial behavior are well-documented (Archer, 2004; Archer & Côté, 2005), evidence is limited regarding gender- and age-specific characteristics in the continuity of antisocial behavior over the life course (Loeber & Stouthamer-Loeber, 1998). Therefore, a second objective was to analyze the moderating influences of gender and age on the hypothesized developmental pathways of antisocial behavior.

The current study presents data on the link between antisocial behavior, social rejection, academic failure, and affiliation with deviant peers from a sample of 6- to 15-year old participants who were studied at three measurement waves (T1 to T3) over a time period of about five years. Teacher ratings were used as indicators of participants' antisocial behavior, academic failure, social rejection, and affiliation with deviant peers. In addition, parents provided ratings of antisocial behavior and social rejection.

The following predictions were examined in our study:

Hypothesis 1. The more antisocial behavior participants show at T1, the more likely they are to be socially rejected and show low academic achievement at T2.

Hypothesis 2. The more socially rejected participants are at T2, the more likely they are to affiliate with deviant peers at the same point of measurement.

Hypothesis 3. The lower participants' academic achievement is at T2, the more likely they are to affiliate with deviant peers at the same point of measurement.

Hypothesis 4. The more closely participants affiliate with deviant peers at T2, the more antisocial behavior they show at T3.

Hypothesis 5. Social rejection, academic failure, and affiliation with deviant peers at T2 mediate the path from antisocial behavior at T1 to antisocial behavior at T3.

We expected the proposed associations to hold for both boys and girls and to be unaffected by age.

Method

Participants

Participants were part of a community sample that was assessed in a school-based survey in different districts of the state of Brandenburg, Germany. Originally, the study was conceptualized as a cross-sectional survey aimed to recruit a German norming sample for investigating prevalence rates of developmental disorders in childhood. Accordingly, a large, representative sample was selected, including an equal representation of boys and girls as well as different age groups, social backgrounds, school tracks, and regional properties (urban, semi-urban, and rural). It was only after the first assessment (T1) that funding could be secured for extending the study into a longitudinal survey. All T1 participants were contacted again and invited to participate in further data waves. Of the $N = 2,463$ participants at T1, $N = 1,496$ agreed to participate at T2, and $N = 1,369$ took part at T3. The high dropout from T1 to T2 may be explained by the fact that T1 participants did not initially consent to being part of a longitudinal study. Once the longitudinal nature of the study was made clear, the dropout rate (from T2 to T3) was reduced to 8.5%. All participants who took part in the T1 measurement and at least in one of the two subsequent measurement waves were included, yielding a final sample size of $N = 1,657$ (48.6 % female).

The mean age of the sample was $M = 9.24$ years ($SD = 2.01$; range = 6.00 – 15.00) at T1, $M = 12.90$ years ($SD = 2.04$; range = 9.00 – 19.00) at T2, and $M = 14.39$ years ($SD = 1.93$; range = 11.00 – 20.00) at T3, with the three waves covering a mean time period of 5.14 years. At T1, participants were distributed across 146 schools, with the majority (86.8 %) attending primary school, 12.6 % attending secondary school, and 0.8 % attending other school types (e.g., schools for children with special needs). At T2, participants were distributed across 181 schools, and the majority (63.1 %) attended secondary school, 33.2 % participants were still in primary school, and 1.1 % attended other school types. At T3, participants were distributed across 141 schools, with the majority of participants attending secondary school (82.7 %), only 2.0 % still attending primary school, and 0.7 % attending other school types.

In terms of parents' educational background, 39.1 % of the mothers and 36.4 % of the fathers had vocational qualifications, 19.3 % of mothers and 13.5 % of fathers had a university entrance qualification, and 32.8 % of mothers and 35.6 % of fathers held a university degree. Only a small subset of parents (0.7 % of mothers, 1.0 % of fathers) had no or low levels of qualification. To determine whether the study variables were systematically associated with dropout, we computed a logistic regression model with dropout after T1 as criterion and all study variables as predictors. Participants who dropped out after T1 were significantly older ($p < .001$), came from a lower socioeconomic

background ($p < .001$), scored higher on teacher-rated antisocial behavior ($p < .05$), and lower on mathematical achievement ($p < .001$).

Measures

Antisocial behavior. Antisocial behavior was measured at T1 and T3 with the five-item “Conduct Problems” scale of the Strength and Difficulties Questionnaire (SDQ; Goodman, 1997) completed by parents and teachers. Respondents indicated on a three-point scale whether the respective behavior (for example, “Often fights with other children or bullies them”) was (0) *not true*, (1) *somewhat true*, or (2) *certainly true* of the child in question. Separate sum scores were computed for parents and teachers. Conventional measures of scale reliability (e.g., Cronbach’s alpha) have been shown to be biased when items provide only few response options or show a skewed distribution. In this case, measures based on the polychoric correlation matrix (e.g., ordinal alpha) provide more accurate estimates of reliability (Gaderman, Guhn, & Zumbo, 2012; Zumbo, Gaderman, & Zeisser, 2007). The ordinal alphas for the antisocial behavior measures and all other measures are satisfactory, as presented in Table 1.

Social rejection. Social rejection was assessed at T1 and T2 by the “Peer Relationship Problems” scale of the SDQ. Again, both parents and teachers rated the child on five items (for example, “Picked on or bullied by other children”), and separate sum scores were calculated for parents and teachers at both measurement points.

Academic failure. Teacher ratings of academic failure were obtained with the Potsdam Teacher Questionnaire (Potsdamer Lehrerfragebogen, PLF; Esser, Kohn, & Wyszkon, 2005). Teachers were asked to rate the child’s abilities in grammar, reading, arithmetic, and logical thinking on a six-point scale corresponding the German grading system, where 1 is “very good”, and 6 is “insufficient”. Thus, academic failure is indicated by higher sum scores. Two parcels were created by computing two separate sum scores at both T1 and T2. The first parcel contained grammar and reading and was labeled *verbal skills*. The second parcel contained arithmetic and logical thinking and was labeled *mathematical skills*.

Affiliation with deviant peers. Teacher ratings of affiliation with deviant peers were obtained at T2 by three self-generated items: (a) “Affiliates particularly with deviant peers”, (b) “Is impressed by deviant behavior of her/ his peers”, and (c) “Is not very popular among non-deviant peers”. Response options were equivalent to the SDQ, and teachers rated on a three-point scale whether the statement was (0) *not true*, (1) *somewhat true*, and (2) *certainly true* of the child in question.

Procedure

The assessment procedure was the same at all three measurement waves. All measures were obtained through either paper-pencil or online questionnaires and matched on the basis of an anonymous code. Active consent was obtained from all students and, additionally, from parents of participants under the age of 18. Instruments and procedures were approved by the Ethics Committee of the University of Potsdam as well as the Ministry for Education in the Federal State of Brandenburg, Germany where the study was conducted.

Plan of analysis

The hypotheses were examined by structural equation modeling using the *Mplus* Software, version 7.11 (Muthén & Muthén, 2013). Sum scores of parents' and teachers' ratings were used for the latent modelling of antisocial behavior at T1 and T3, social rejection at T1 and T2, and teacher ratings of participants' mathematical and verbal skills were used for the modeling of academic failure at T1 and T2. Because only teachers provided ratings of affiliation with deviant peers at T2, the three single items were used as indicators. To account for the variance that an indicator shared with itself over time, we added indicator-specific factors for each indicator variable that was measured repeatedly.

Clustering of observations. Because participants were nested within schools, the hierarchical structure of the data had to be accounted for, as ignoring the nested structure would have led to biased standard errors and test statistics of conventional covariance analyses (Julian, 2001). We dealt with the non-independence of observations by using the robust MLR estimator together with a "type complex" modeling approach (using school membership at T1 as cluster variable). This procedure provides adjusted standard errors and test statistics that are robust to clustering and non-normality of the data (Geiser, Eid, Nussbeck, Courvoisier, & Cole, 2010).

Missing data. Missing data were handled by full information maximum likelihood estimation (FIML; Enders, 2010). The FIML procedure is a model-based statistical approach for handling missing data and leads to unbiased parameter estimates and standard errors if data are missing at random. Different studies have shown that FIML outperforms traditional approaches for handling missing data, such as listwise deletion, pairwise deletion, or mean substitution and performs as well as multiple imputation (Enders & Bandalos, 2001; Olinsky, Chen, & Harlow, 2003; Schlomer, Bauman, & Card, 2010).

Indirect pathways. Indirect paths were tested through a bootstrapping approach, using the R software. This procedure allows the estimation of confidence intervals for indirect paths, which can be used to determine the statistical significance of indirect pathways. The bootstrapping approach offers

a good Type-I error protection and has been shown to be superior to more conventional procedures for the statistical testing of indirect paths (Hayes & Scharkow, 2013).

Model fit. Evaluation of model fit was based on the χ^2 -test, the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA), and the standardized root mean residual (SRMR). A good model fit is indicated by a non-significant χ^2 -value, a CFI above .95, a RMSEA coefficient of less than .06, and a SRMR of less than .08 (Hu & Bentler, 1998, 1999). As the χ^2 -value is highly inflated by a large sample size, many degrees of freedom, and violations of multivariate normality, different authors suggest that a non-significant χ^2 -value is too rigorous for evaluating model fit. Instead, more emphasis should be placed on the χ^2 -value relative to its degrees of freedom, where a ratio between 2 and 3 is indicative of a good model fit (Jöreskog & Sörbom, 1993). The MLR estimator does not allow for conventional χ^2 -difference testing. Therefore, to statistically compare nested models, an adjusted procedure was employed as described in Asparouhov and Muthén (2006).

Results

Descriptive statistics and correlations

The means and standard deviations for all study variables, along with gender differences, are presented in Table 1. To analyze gender differences, we conducted separate ANOVAs with gender as independent variable and the T1, T2, and T3 measures as dependent variables. This univariate approach was favored because a multivariate ANOVA would have considerably reduced the overall sample size due to attrition and missing values on teacher ratings. A corrected significance level of $.05/13 = .004$ was used for these analyses. As displayed in Table 1, all gender differences except for T1 social rejection as rated by parents and T2 mathematical skills were significant. Male participants scored higher on the measures of antisocial behavior, social rejection, and affiliation with deviant peers, and showed lower verbal skills. Furthermore, boys showed higher mathematical skills than girls at T1.

Table 2 presents the zero-order correlations among all variables as well as their links with age at T1, separately for boys and girls. Due to skewness of most study variables, Spearman rank-order correlations were computed, which have been shown to be less sensitive to violations of normality of the data (Bishara & Hittner, 2014). As expected, the more antisocial behavior participants showed at T1, the more socially rejected and the less academically successful they were at T2. These relationships were similar for males and females. Furthermore, at T2 social rejection and academic failure were positively associated with affiliation with deviant peers, and affiliation with deviant peers at T2 was significantly linked to both parent- and teacher-rated antisocial behavior at T3. Again, these correlation coefficients were comparable for male and female participants. Age played only a marginal role: For

girls, it showed small positive correlations with T1 teacher-rated antisocial behavior, T1 social rejection rated by parents and teachers, T2 parent-rated social rejection, and T2 affiliation with deviant peers; for boys, age showed small positive correlations with T1 parent- and teacher-rated social rejection.

Hypotheses-testing analyses

We began by running confirmatory factor analyses to test (a) the validity of the relations between the latent constructs and their manifest indicators and (b) the measurement invariance of the latent constructs across the data waves. First, an unrestricted model was specified as a baseline model that assumed configural measurement invariance, in which the factor loadings, intercepts, and residual variances of the indicators were allowed to differ across time. The baseline model showed an unsatisfactory fit with the data ($\chi^2(48) = 262.38, p < .001$; RMSEA = .05, 95% CI [.046, .058]; CFI = .93; SRMR = .04). Modification indices suggested including residual correlations between two manifest indicators: teachers' ratings of the child's social rejection at T2 and one item of teachers' ratings of the child's affiliation with deviant peers at T2. After these modifications, the baseline model showed an acceptable fit with the data ($\chi^2(47) = 139.05, p < .001$; RMSEA = .03, 95% CI [.028, .041]; CFI = .97; SRMR = .03).

We compared this baseline model to a model that constrained the factor loadings of the indicators to be equal across time. The restricted model showed a good fit ($\chi^2(50) = 133.97, p < .001$; RMSEA = .03, 95% CI [.025, .039]; CFI = .97; SRMR = .03). To examine whether the fit of the restricted model differed significantly from the baseline model, we computed an adjusted χ^2 -difference test. Results indicated that the restricted model did not fit significantly worse than the baseline model ($\Delta\chi^2(3) = .17, n.s.$), suggesting that the assumption of weak measurement invariance was tenable and that the factor loadings were comparable across measurement points. All following analyses are based on the restricted model.

To examine the proposed associations between antisocial behavior, social rejection, academic failure, and affiliation with deviant peers, we specified the path model displayed in Figure 1. As a modification of the original model proposed by Patterson et al. (1989), we added three direct paths to the model: the path from T1 antisocial behavior to T2 affiliation with deviant peers, and the paths from T2 social rejection and academic failure to T3 antisocial behavior. This was done to account for the possibility of direct effects of T1 antisocial behavior on affiliation with deviant peers and of social rejection and academic failure on antisocial behavior, over and above the hypothesized indirect links. We also controlled for the temporal stability of each construct as well as for the effects of plausible "third" variables by including the participants' gender, age, and socioeconomic status (operationalized through parents' highest educational degree) as covariates in the main model.

The hypothesized model showed an acceptable fit with the data ($\chi^2(85) = 215.26, p < .001$; RMSEA = .03, 95% CI [.027, .037]; CFI = .96; SRMR = .04), with all predicted paths being significant and in the expected direction. The standardized coefficients are presented in Figure 1. In line with Hypothesis 1, antisocial behavior at T1 significantly predicted both social rejection at T2 ($\beta = .19, p < .05$) and academic failure at T2 ($\beta = .19, p < .001$), controlling for the temporal stability of both constructs. In accordance with Hypothesis 2 and Hypothesis 3, higher social rejection and academic failure at T2 predicted higher affiliation with deviant peers at T2 ($\beta = .20, p < .01$; $\beta = .24, p < .001$). Finally, affiliation with deviant peers at T2 predicted antisocial behavior at T3 ($\beta = .46, p < .001$), consistent with Hypothesis 4. Regarding the additional paths added to the original model by Patterson et al. (1989), we found that antisocial behavior at T1 directly predicted affiliation with deviant peers at T2 ($\beta = .27, p < .01$). Neither social rejection nor academic failure at T2 showed a direct path to antisocial behavior at T3.²

Indirect paths. Two indirect pathways were hypothesized to contribute to the development of antisocial behavior: (a) the path from antisocial behavior at T1 via *social rejection* and affiliation with deviant peers at T2 to antisocial behavior at T3 and (b) the path from antisocial behavior at T1 via *academic failure* and affiliation with deviant peers at T2 to antisocial behavior at T3. The bootstrapping analysis showed that both the indirect path via social rejection ($\beta = .02, 95\% \text{ CI } [.001, .044]$) and the indirect path via academic failure ($\beta = .02, 95\% \text{ CI } [.007, .040]$) were statistically significant, as indicated by confidence intervals that did not include zero. These findings are in line with Hypothesis 5. Additionally, we found a significant indirect pathway from antisocial behavior at T1 via affiliation with deviant peers at T2 to antisocial behavior at T3 ($\beta = .13, 95\% \text{ CI } [.049, .221]$). T2 social rejection indirectly predicted T3 antisocial behavior through a stronger affiliation with deviant peers ($\beta = .09, 95\% \text{ CI } [.023, .174]$). Similarly, academic failure at T2 indirectly predicted T3 antisocial behavior via T2 affiliation with deviant peers ($\beta = .11, 95\% \text{ CI } [.049, .180]$).

² Due to the systematic differences between dropouts after T1 and participants included in the longitudinal sample reported above, we additionally estimated the main model with the total sample at T1 ($N = 2,463$). In this model, missing values at T2 and T3 were estimated using the FIML procedure for the participants who were present only at T1. This analysis fully replicated the paths obtained for the reduced sample ($\chi^2(85) = 221.99, p < .001$; RMSEA = .03, 95% CI [.023, .031]; CFI = .97; SRMR = .04).

Moderating variables. In the preceding analyses, gender and age were included as covariates, showing that the proposed pathways were significant taking gender and age differences into account. To further address the potential moderating role of these two variables for the proposed pathways of antisocial behavior, we conducted two multigroup analyses with gender (dummy coded; 1 = boys, 2 = girls) and age (dummy coded; 1 = “early and middle childhood”, 6 to 8 years; 2 = “late childhood”, 9 to 11, 3 = “adolescence”, 12 to 15 years at T1), respectively, as the grouping variable. In each case, we began by specifying a constrained model that restricted all paths to be equal across groups. This model was compared to an unconstrained model that allowed all paths to be freely estimated, using adjusted χ^2 -difference tests.

For gender as a moderating variable, the restricted model fitted significantly worse than the unconstrained model, as indicated by a significant adjusted χ^2 -value ($\Delta\chi^2 (14) = 35.52, p < .001$). Post-hoc analysis revealed that three coefficients differed significantly between boys and girls: the correlation between antisocial behavior and social rejection at T1, the correlation between antisocial behavior and academic failure at T1, and the path from academic failure at T2 to affiliation with deviant peers at T2. When these paths were allowed to be freely estimated in each group, the model showed an adequate fit with the data ($\chi^2 (153) = 193.84, p < .001$; RMSEA = .03, 95% CI [.028, .039]; CFI = .96; SRMR = .05). The standardized coefficients are presented in Table 4. The multigroup model did not differ from the model for the total sample controlling for gender in the predicted pathways.

In the multigroup analysis by age, the restricted model also fitted significantly worse than the unconstrained model ($\Delta\chi^2 (28) = 45.73, p < .05$). Post-hoc analyses showed that only the correlation between social rejection and academic failure at T1 differed significantly between the age groups. After removing the equality constraint, the model showed an acceptable fit with the data ($\chi^2 (244) = 437.03, p < .001$; RMSEA = .04, 95% CI [.032, .044]; CFI = .95; SRMR = .06). The standardized path coefficients are also presented in Table 4. In combination, the multigroup analyses provide little indication that the proposed pathways in the development of antisocial behavior differed for boys and girls or as a function of age.

Discussion

Understanding the developmental pathways that promote and consolidate antisocial behavior is a key task for developmental psychological research, both from a conceptual and an applied perspective. The present study aimed to provide empirical evidence for Patterson et al.'s (1989) model of the development of antisocial behavior. This model assigns a key role to social rejection and academic failure in leading children and adolescents to affiliate with peer groups that endorse antisocial behavior which, in turn, promotes further antisocial behavior. Studying these processes in a large sample of children and adolescents in Germany, we conducted a longitudinal analysis of the

complete model that relied on parent and teacher ratings to assess antisocial behavior in different social contexts over three data waves covering a total period of five years. State-of-the-art structural equation modeling, accounting for the nesting of students in schools, was used to analyze the data. Supporting the assumptions of the model, our findings contribute to understanding the mechanisms through which early conduct problems may be maintained and promoted throughout childhood and adolescence and lead to further antisocial behavior.

The social rejection path

Consistent with our predictions and in line with previous research (Laird et al., 2001; Ostrov, Murray-Close, Godleski, & Hart, 2013), higher antisocial behavior at T1 predicted higher peer rejection at T2, controlling for the stability of social rejection between T1 and T2. There are several reasons why non-deviant peers may reject those who show deviant behavior: For example, they may do so to punish these children and to illustrate the importance of the violated norm or to avoid becoming a target of their antisocial behavior. Patterson et al.'s (1989) model suggests that peer rejection further strengthens antisocial behavior patterns by driving the antisocial child or adolescent to affiliate with similarly antisocial peers. This affiliation provides further justifications, opportunities, and positive reinforcement that promote antisocial behavior. It has been argued that children and adolescents who are rejected by their peers not only experience negative emotions that may trigger aggressive responses (Baumeister & Leary, 1995) or use this kind of behavior to defend themselves or retaliate (reactive aggression; Vitaro, Brendgen, & Barker, 2006), but also lack important opportunities to acquire socially competent behavior in social interactions with non-deviant peers (Moffitt, 1993a; Patterson et al., 1989). Furthermore, research has indicated that negative social interactions may also occur within a circle of deviant peers, normalizing aggressive behavior (Dishion, Andrews, & Crosby, 1995; Grotzger & Crick, 1996). In line with these assumptions and consistent with our hypotheses, T2 social rejection was a positive predictor of affiliation with deviant peers at T2, and T2 social rejection indirectly predicted T3 antisocial behavior through a stronger affiliation with deviant peers. The direct effect from T2 social rejection to T3 antisocial behavior was non-significant, indicating that affiliation with deviant peers is, indeed, a crucial process underlying the pathway from social rejection to antisocial behavior.

The academic failure path

In line with our hypothesis, antisocial behavior at T1 significantly predicted academic failure at T2, over and above the temporal stability of academic failure from T1 to T2. One possible explanation for the link between antisocial behavior and academic failure is that antisocial children provoke dislike and rejection by teachers, impeding a positive student-teacher relationship (Blankemeyer, Flannery, & Vazsonyi, 2002). A supportive and functional student-teacher relationship is crucial for school-related

outcomes, like the students' satisfaction with school or their engagement in academic activities which, in turn, predict academic success (Baker, 1999; Connell & Wellborn, 1991). Antisocial children's undercontrolled and noncompliant behavior is also likely to undermine effective learning directly through having detrimental effects on academic meta-skills, such as regular attendance, spending time on teacher-assigned tasks, or the willingness to answer questions (Patterson et al., 1989). We argued that the lack of positive feedback from the normative academic institution is critical in promoting affiliation with deviant peers, who provide acceptance and recognition while not asking for underdeveloped skills, such as prosocial behavior. Consistent with our predictions, T2 academic failure significantly predicted affiliation with deviant peers at T2, which predicted antisocial behavior at T3. Again, the direct path from academic failure at T2 to antisocial behavior at T3 was non-significant, providing further evidence for the significance of the social reinforcement of deviant acts through similar antisocial peers for the persistence of antisocial behavior. Finally, the additional indirect path from T1 antisocial behavior via affiliation with T2 deviant peers, not going through T2 social rejection and academic failure, that we could test in our modified version of the Patterson et al. model was significant. In combination, these findings suggest that it is pivotal to prevent the affiliation with deviant peers in order to prevent a chronification of antisocial behavior in this age range.

Gender and age differences

Despite gender differences on most of the variables, the multigroup analysis revealed only few moderating effects of gender. Only three of the coefficients in our model differed between boys and girls, suggesting that most of the processes proposed by Patterson et al. (1989) operate in a similar way across genders. Additionally, when comparing the multigroup model to the model for the total sample controlling for gender, no substantive differences emerged. However, the stronger relationship between academic failure and affiliation with deviant peers at T2 in boys suggests a higher relevance of experiences of failure at school in the affiliation process with antisocial peers for males. Future research is needed to explain this gender difference.

The multigroup analysis comparing participants in early-middle childhood, late childhood, and adolescence revealed only one significant difference in the cross-sectional correlation between academic failure and social rejection at T1. None of the postulated direct pathways differed significantly across groups, indicating that the present data do not provide evidence for a critical time window in which social rejection, academic failure, or affiliation with deviant peers may be particularly conducive to the consolidation of antisocial behavior patterns. Instead, our findings suggest that these mediating variables affect antisocial behavior in different periods of development in a similar way, which is compatible with the social interactional model of antisocial behavior as proposed by Patterson et al. (1989). Rather than postulating a critical time window from which antisocial behavior develops

in a linear progression, the social interactional perspective assumes continuous stimulus-reaction mechanisms by which individuals and their environment are in a dynamic and permanent interplay of mutual influence over time. Such developmental cascades imply that, as long as there is a sufficient stability of environmental and individual attributes, the actor's behavior stimulates predictable environmental reactions that feed back into the individual's behavior, which then may again change the environmental setting. Accordingly, age effects in a cascade model should be observed only when there is a significant change in individual capabilities or a shift in the structure of the social environment. However, considering the age range of our sample, neither of these conditions appears likely. All our participants attended school and were thus within a system with a low tolerance of antisocial behavior that tends to instantly sanction deviant acts, regardless of whether the student is 6 or 15 years old. Additionally, by the time they start school, children should have developed a basic normative understanding and be aware of which behaviors are socially acceptable and which constitute a violation of prevailing social norms. Accordingly, the social punishment of deviancy, either by social rejection or academic failure, is not, at least in the present sample, a mechanism that should have an age-specific variability. Thus, it is an interesting question for future research whether the same developmental processes may apply to younger or older samples, including participants that are either not yet or not anymore situated within a school context or are more limited in their possibilities to actively select their peer groups.

Strengths and limitations

We believe our study has several strengths. It presents an examination of all the components of an influential model of the development and persistence of antisocial behavior in childhood and adolescence that have rarely been analyzed comprehensively in a single study. Additional paths were included in our modified version of the model that enabled us to further clarify the indirect pathways. We included a large sample of children and adolescents from Germany who were tested three times over a period of five years, complementing and supporting longitudinal evidence from North America. Finally, we relied on reports by teachers to operationalize the key variables of antisocial behavior, social rejection, academic failure, and affiliation with deviant peers and were able to additionally collect parent reports for measuring antisocial behavior and social rejection. Relying on both parent and teacher information enabled us to assess participants' antisocial behavior and experience of rejection in different social contexts. State-of-the-art latent path modeling was used to test the proposed developmental pathways, including indirect paths.

At the same time, some limitations of our study have to be noted. First, affiliation with deviant peers was measured at T2, concurrently with social rejection and academic failure that are proposed to precede this variable in the theoretical model. This limitation precludes firm conclusions about the

temporal sequence of their association, which would have required a fourth data wave. Thus, we cannot determine the direction of the relationship between affiliation with deviant peers on the one hand and academic failure and rejection by non-deviant peers on the other. Second, we were unable to collect a measure of affiliation with deviant peers at T1, which did not allow us to control for the construct's temporal stability. Without accounting for continuity across time, however, the paths from social rejection and academic failure to affiliation with deviant peers might have been affected by correlations that were already present at T1 and, hence, the temporal consistency of deviant peer affiliation might offer an alternative explanation for our findings (Masten et al., 2005; Masten & Cicchetti, 2010). Third, it is worth noting that some constructs were only measured by teacher reports (academic failure; affiliation with deviant peers), whereas others were assessed by both teacher and parent reports (antisocial behavior; social rejection). Measurement overlap for some constructs but not others may weaken the validity of SEM modeling. Fourth, future studies may want to consider peer- and self-ratings of social rejection, affiliation with deviant peers, as well as antisocial behavior in addition to parent and teacher reports, because these behaviors often occur within the peer context and may not always become known to parents and teachers. In the present study, we decided against including self-reports because at T1, a substantial proportion of participants (72.1 %) were too young for the SDQ's self-report version, which requires participants to be at least 11 years of age. Finally, our study yielded empirical evidence to support the assumed mechanisms for the maintenance and promotion of antisocial behavior throughout childhood and adolescence, but was unable to address the initial development of this pattern of behavior. Patterson et al. (1989) suggested that antisocial behavior patterns emerge as a result of poor parental discipline and monitoring. Indeed, there is abundant research supporting this assumption. Future research designed to provide a test of the full model should start when children are at a younger age and assess variables of the family context, such as parenting style.

Despite these limitations, our study adds to the understanding of how antisocial behavior is maintained and promoted in childhood and adolescence and provides a test of the sequential pathways from social rejection and academic failure via affiliation with deviant peers to the promotion of antisocial behavior in children and adolescents, based on longitudinal data from a community sample in Germany. The findings also suggest starting points for the development of effective prevention and intervention measures aimed at reducing antisocial behavior in children and adolescents. Although numerous successful and empirically validated programs for the reduction of antisocial behavior in childhood and adolescence have been developed (e.g. Dishion & Piehler, 2009; Sanders, 1999; Patterson, 2002; Van Ryzin & Dishion, 2012; Wright, John, Livingstone, Shepherd, & Duku, 2007), their effectiveness has been shown to be low when antisocial individuals are clustered within deviant groups (Klein, 2006). The present findings indicate that both social rejection and

academic failure may promote the affiliation with deviant peers and, therefore, any intervention aimed to improve social skills or academic achievement might counteract the chronification of antisocial behavior. Schools provide a particularly suitable setting for the implementation of intervention measures as they already have the necessary didactic structures in place. Additionally, as schools provide numerous opportunities to interact with peers in a natural environment, more application-oriented social skills trainings may be developed, focusing on specific interpersonal conflicts and their solution in a real-life setting. We believe that school-based programs aiming at both the improvement of academic performance and peer relationships have the potential to significantly reduce the prevalence of antisocial behavior and its associated costs for individual well-being and society as a whole.

References

- Abrams, D., Marques, J. M., Bown, N., & Henson, M. (2000). Pro-norm and anti-norm deviance within and between groups. *Journal of Personality and Social Psychology, 78*, 906–912. doi:10.1037/0022-3514.78.5.906
- Akers, R. L. (1977). *Deviant behavior: A social learning approach* (2nd ed.). Belmont, CA: Wadsworth Publishing Company.
- Anderson, E. (2002). The code of the streets. In S. L. Gabbidon, H. T. Greene, & V. D. Young (Eds.), *African American classics in criminology & criminal justice* (pp. 293–305). Thousand Oaks, CA: Sage.
- Archer, J. (2004). Sex differences in aggression in real-world settings: A meta-analytic review. *Review of General Psychology, 8*, 291–322. doi:10.1037/1089-2680.8.4.291
- Archer, J., & Côté, S. (2005). Sex differences in aggressive behavior: A developmental and evolutionary perspective. In R. E. Tremblay, W. W. Hartup, & J. Archer (Eds.), *Developmental origins of aggression* (pp. 425–443). New York: Guilford Press.
- Arsenio, W. F., Adams, E., & Gold, J. (2009). Social information processing, moral reasoning, and emotion attributions: Relations with adolescents reactive and proactive aggression. *Child Development, 80*, 1739–1755. doi:10.1111/j.1467-8624.2009.01365.x
- Asparouhov, T. & Muthén, B. (2006). *Robust chi square difference testing with mean and variance adjusted test statistics. Mplus Web Notes: No. 10*. Retrieved from <http://www.statmodel.com/download/webnotes/webnote10.pdf>
- Baker, J. A. (1999). Teacher-student interaction in urban at-risk classrooms: Differential behavior, relationship quality, and student satisfaction with school. *The Elementary School Journal, 100*, 57–70. doi:10.1086/461943
- Bandura, A. (1973). *Aggression: A social learning analysis*. Oxford, England: Prentice-Hall.
- Bandura, A. (1977). *Social learning theory*. Oxford, England: Prentice-Hall.
- Baumeister, R. F., & 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
- Bierman, K. L. (2004). *Peer rejection: Developmental processes and intervention strategies*. New York: Guilford Press.

- Bishara, A. J., & Hittner, J. B. (2014). Reducing bias and error in the correlation coefficient due to nonnormality. *Educational and Psychological Measurement*. doi:10.1177/0013164414557639
- Blankemeyer, M., Flannery, D. J., & Vazsonyi, A. T. (2002). The role of aggression and social competence in children's perceptions of the child–teacher relationship. *Psychology in the Schools, 39*, 293–304. doi:10.1002/pits.10008
- Boivin, M., Dodge, K. A., & Coie, J. D. (1995). Individual-group behavioral similarity and peer status in experimental play groups of boys: The social misfit revisited. *Journal of Personality and Social Psychology, 69*, 269–279. doi:10.1037/0022-3514.69.2.269
- Brendgen, M., Vitaro, F., Bukowski, W. M., Doyle, A. B., & Markiewicz, D. (2001). Developmental profiles of peer social preference over the course of elementary school: Associations with trajectories of externalizing and internalizing behavior. *Developmental Psychology, 37*, 308–320. doi:10.1037/0012-1649.37.3.308
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Cairns, R. B., Cairns, B. D., Neckerman, H. J., Gest, S. D., & Gariépy, J.-L. (1988). Social networks and aggressive behavior: Peer support or peer rejection? *Developmental Psychology, 24*, 815–823. doi:10.1037/0012-1649.24.6.815
- Catalano, R. F., & Hawkins, J. D. (1996). The social development model: A theory of antisocial behavior. In J. D. Hawkins (Ed.), *Cambridge criminology series. Delinquency and crime: Current theories* (pp. 149–197). New York: Cambridge University Press.
- Coie, J. D., Dodge, K. A., & Kupersmidt, J. B. (1990). Peer group behavior and social status. In S. R. Asher & J. D. Coie (Eds.), *Cambridge studies in social and emotional development. Peer rejection in childhood* (pp. 17–59). New York: Cambridge University Press.
- Coie, J. D., & Kupersmidt, J. B. (1983). A behavioral analysis of emerging social status in boys' groups. *Child Development, 54*, 1400–1416. doi:10.2307/1129803
- Connell, J.P., & Wellborn, J.G. (1991). Competence, autonomy and relatedness: A motivational analysis of self-system processes. In M. Gunnar & L.A. Sroufe (Eds.), *Minnesota Symposium on Child Psychology* (Vol. 22, pp. 43–77). Hillsdale, NJ: Lawrence Erlbaum.
- Connor, D. F., Steingard, R. J., Anderson, J. J., & Melloni, R. H. (2003). Gender differences in reactive and proactive aggression. *Child Psychiatry and Human Development, 33*, 279–294. doi:10.1023/A:1023084112561

- Cox, M. J., Mills-Koonce, R., Propper, C., & Gariépy, J.-L. (2010). Systems theory and cascades in developmental psychopathology. *Development and Psychopathology, 22*, 497–506. doi:10.1017/S0954579410000234
- Dishion, T. J., Andrews, D. W., & Crosby, L. (1995). Antisocial boys and their friends in early adolescence: Relationship characteristics, quality, and interactional process. *Child Development, 66*, 139–151. doi:10.2307/1131196
- Dishion, T. J., Patterson, G. R., Stoolmiller, M., & Skinner, M. L. (1991). Family, school, and behavioral antecedents to early adolescent involvement with antisocial peers. *Developmental Psychology, 27*, 172–180. doi:10.1037/0012-1649.27.1.172
- Dishion, T. J., & Piehler, T. F. (2009). Deviant by design: Peer contagion in development, interventions, and schools. In K. H. Rubin, W. M. Bukowski, & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups* (pp. 589–602). New York, US: Guilford Press.
- Dishion, T. J., Spracklen, K. M., Andrews, D. W., & Patterson, G. R. (1996). Deviancy training in male adolescents friendships. *Behavior Therapy, 27*, 373–390. doi:10.1016/S0005-7894(96)80023-2
- Dishion, T. J., Véronneau, M.-H., & Myers, M. W. (2010). Cascading peer dynamics underlying the progression from problem behavior to violence in early to late adolescence. *Development and Psychopathology, 22*, 603–619. doi:10.1017/S0954579410000313
- Dodge, K. A. (1983). Behavioral antecedents of peer social status. *Child Development, 54*, 1386–1399. doi:10.2307/1129802
- Dodge, K. A., Coie, J. D., Pettit, G. S., & Price, J. M. (1990). Peer status and aggression in boys' groups: Developmental and contextual analyses. *Child Development, 61*, 1289–1309. doi:10.2307/1130743
- Dodge, K. A., & Pettit, G. S. (2003). A biopsychosocial model of the development of chronic conduct problems in adolescence. *Developmental Psychology, 39*, 349–371. doi:10.1037/0012-1649.39.2.349
- Domjan, M. (1998). *The principles of learning and behavior* (4th ed.). Belmont, CA: Thomson Brooks/Cole Publishing Co.
- Eidelman, S., Silvia, P. J., & Biernat, M. (2006). Responding to deviance: Target exclusion and differential devaluation. *Personality and Social Psychology Bulletin, 32*, 1153–1164. doi:10.1177/0146167206288720
- Enders, C. K. (2010). *Applied missing data analysis*. New York: Guilford Press.

- Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling, 8*, 430–457. doi:10.1207/S15328007SEM0803_5
- Esser, G., Kohn, J., & Wyszkon, A. (2005). *Potsdamer Lehrerfragebogen (PLF)*, Potsdam, Germany.
- Fergusson, D. M., & Horwood, L. J. (1995). Early disruptive behavior, IQ, and later school achievement and delinquent behavior. *Journal of Abnormal Child Psychology, 23*, 183–199. doi:10.1007/BF01447088
- Fite, P. J., Hendrickson, M., Rubens, S. L., Gabrielli, J., & Evans, S. (2013). The role of peer rejection in the link between reactive aggression and academic performance. *Child & Youth Care Forum, 42*, 193–205. doi:10.1007/s10566-013-9199-9
- Fite, P. J., Wimsatt, A. R., Vitulano, M. L., Rathert, J. L., & Schwartz, S. (2012). Examination of peer rejection and depressive symptoms as mediators of the link between rule-breaking behavior and poor academic performance. *Journal of Psychopathology and Behavioral Assessment, 34*, 164–171. doi:10.1007/s10862-011-9269-y
- Gadermann, A. M., Guhn, M., & Zumbo, B. D. (2012). Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide. *Practical Assessment, Research & Evaluation, 17*, 1-13.
- Geiser, C., Eid, M., Nussbeck, F. W., Courvoisier, D. S., & Cole, D. A. (2010). Analyzing true change in longitudinal multitrait-multimethod studies: Application of a multimethod change model to depression and anxiety in children. *Developmental Psychology, 46*, 29–45. doi:10.1037/a0017888
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Child Psychology & Psychiatry & Allied Disciplines, 38*, 581–586. doi:10.1111/j.1469-7610.1997.tb01545.x
- Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.
- Grotzinger, J. K., & Crick, N. R. (1996). Relational aggression, overt aggression, and friendship. *Child Development, 67*, 2328–2338. doi:10.2307/1131626
- Hayes, A. F., & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: Does method really matter? *Psychological Science, 24*, 1918–1927. doi:10.1177/0956797613480187
- Hirschi, T. (1971). *Causes of delinquency*. Berkeley, CA: University of California Press.

- Hu, L.-T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3, 424–453. doi:10.1037/1082-989X.3.4.424
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6, 1–55. doi:10.1080/10705519909540118
- Huesmann, L. R., Dubow, E. F., & Boxer, P. (2009). Continuity of aggression from childhood to early adulthood as a predictor of life outcomes: Implications for the adolescent-limited and life-course-persistent models. *Aggressive Behavior*, 35, 136–149. doi:10.1002/ab.20300
- Huesmann, L. R., Eron, L. D., & Yarmel, P. W. (1987). Intellectual functioning and aggression. *Journal of Personality and Social Psychology*, 52, 232–240. doi:10.1037/0022-3514.52.1.232
- Jöreskog, K. G., & Sörbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language*. Hillsdale, NJ: Lawrence Erlbaum.
- Julian, M. W. (2001). The consequences of ignoring multilevel data structures in nonhierarchical covariance modeling. *Structural Equation Modeling*, 8, 325–352. doi:10.1207/S15328007SEM0803_1
- Klein, M. W. (2006). Peer Effects in Naturally Occurring Groups: The Case of Street Gangs. In K. A. Dodge, T. J. Dishion, & J. E. Lansford (Eds.), *Deviant peer influences in programs for youth: Problems and solutions* (pp. 234-250). New York, US: Guilford Press.
- Laird, R. D., Jordan, K. Y., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2001). Peer rejection in childhood, involvement with antisocial peers in early adolescence, and the development of externalizing behavior problems. *Development and Psychopathology*, 13, 337–354. doi:10.1017/S0954579401002085
- Loeber, R., & Stouthamer-Loeber, M. (1998). Development of juvenile aggression and violence: Some common misconceptions and controversies. *American Psychologist*, 53, 242–259. doi:10.1037/0003-066X.53.2.242
- Maslow, A. (1962). *Toward a psychology of being*. Princeton, NJ: D Van Nostrand.
- Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology*, 22, 491–495. doi:10.1017/S0954579410000222
- Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradović, J., Riley, J. R., Tellegen, A. (2005). Developmental cascades: Linking academic achievement and externalizing and internalizing

- symptoms over 20 years. *Developmental Psychology*, 41, 733–746. doi:10.1037/0012-1649.41.5.733
- Matsueda, R. L. (1982). Testing control theory and differential association: A causal modeling approach. *American Sociological Review*, 47, 489–504. doi:10.2307/2095194
- Matsueda, R. L. (1988). The current state of differential association theory. *Crime & Delinquency*, 34, 277–306. doi:10.1177/0011128788034003005
- Miller, D. T., & Prentice, D. A. (1996). The construction of social norms and standards. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 799–829). New York: Guilford Press.
- Moffitt, T. E. (1993a). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, 100, 674–701. doi:10.1037/0033-295X.100.4.674
- Moffitt, T. E. (1993b). The neuropsychology of conduct disorder. *Development and Psychopathology*, 5, 135–151. doi:10.1017/S0954579400004302
- Muthén, L. K., & Muthén, B. O. (2013). *Mplus user guide. Statistical analysis with latent variables*. Los Angeles: Muthén & Muthén.
- Oelsner, J., Lippold, M. A., & Greenberg, M. T. (2011). Factors influencing the development of school bonding among middle school students. *The Journal of Early Adolescence*, 31, 463–487. doi:10.1177/0272431610366244
- Olinsky, A., Chen, S., & Harlow, L. (2003). The comparative efficacy of imputation methods for missing data in structural equation modeling. *European Journal of Operational Research*, 151, 53–79. doi:10.1016/S0377-2217(02)00578-7
- Olweus, D. (1979). Stability of aggressive reaction patterns in males: A review. *Psychological Bulletin*, 86, 852–875. doi:10.1037/0033-2909.86.4.852
- Ostrov, J. M., Murray-Close, D., Godleski, S. A., & Hart, E. J. (2013). Prospective associations between forms and functions of aggression and social and affective processes during early childhood. *Journal of Experimental Child Psychology*, 116, 19–36. doi:10.1016/j.jecp.2012.12.009
- Parke, R. D., O'Neil, R., Spitzer, S., Isley, S., Welsh, M., Wang, S., . . . Cupp, R. (1997). A longitudinal assessment of sociometric stability and the behavioral correlates of children's social acceptance. *Merrill-Palmer Quarterly*, 43, 635–662.

- Patterson, G. R. (2002). Etiology and treatment of child and adolescent antisocial behavior. *The Behavior Analyst Today, 3*, 133-144. doi:10.1037/h0099971
- Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (1989). A developmental perspective on antisocial behavior. *American Psychologist, 44*, 329-335. doi:10.1037/0003-066X.44.2.329
- Patterson, G. R., & Dishion, T. J. (1985). Contributions of families and peers to delinquency. *Criminology, 23*, 63-79. doi:10.1111/j.1745-9125.1985.tb00326.x
- Rutter, M., & Sroufe, L. A. (2000). Developmental psychopathology: Concepts and challenges. *Development and Psychopathology, 12*, 265-296. doi:10.1017/S0954579400003023
- Sameroff, A. J. (2000). Developmental systems and psychopathology. *Development and Psychopathology, 12*, 297-312. doi:10.1017/S0954579400003035
- Sanders, M. R. (1999). Triple P-Positive Parenting Program: Towards an empirically validated multilevel parenting and family support strategy for the prevention of behavior and emotional problems in children. *Clinical Child and Family Psychology Review, 2*, 71-90. doi:10.1023/A:1021843613840
- Schachter, S. (1951). Deviation, rejection, and communication. *The Journal of Abnormal and Social Psychology, 46*, 190-207. doi:10.1037/h0062326
- Schlomer, G. L., Bauman, S., & Card, N. A. (2010). Best practices for missing data management in counseling psychology. *Journal of Counseling Psychology, 57*, 1-10. doi:10.1037/a0018082
- Spinath, B., Spinath, F. M., Harlaar, N., & Plomin, R. (2006). Predicting school achievement from general cognitive ability, self-perceived ability, and intrinsic value. *Intelligence, 34*, 363-374. doi:10.1016/j.intell.2005.11.004
- Sutherland, E. H., & Cressey, D. R. (1955). *Principles of criminology* (5th ed.). Oxford, England: J. B. Lippincott.
- Temcheff, C. E., Serbin, L. A., Martin-Storey, A., Stack, D. M., Hodgins, S., Ledingham, J., & Schwartzman, A. E. (2008). Continuity and pathways from aggression in childhood to family violence in adulthood: A 30-year longitudinal study. *Journal of Family Violence, 23*, 231-242. doi:10.1007/s10896-007-9147-2
- Tremblay, R. E., Mâsse, L. C., Vitaro, F., & Dobkin, P. L. (1995). The impact of friends' deviant behavior on early onset of delinquency: Longitudinal data from 6 to 13 years of age. *Development and Psychopathology, 7*, 649-667. doi:10.1017/S0954579400006763
- Van Ryzin, M. J., & Dishion, T. J. (2012). The impact of a family-centered intervention on the ecology of adolescent antisocial behavior: Modeling developmental sequelae and trajectories during

- adolescence. *Development and Psychopathology*, *24*, 1139-1155.
doi:10.1017/S0954579412000582
- Vitaro, F., Brendgen, M., & Barker, E. D. (2006). Subtypes of aggressive behaviors: A developmental perspective. *International Journal of Behavioral Development*, *30*, 12–19.
doi:10.1177/0165025406059968
- Vitaro, F., Tremblay, R. E., Gagnon, C., & Boivin, M. (1992). Peer rejection from kindergarten to Grade 2: Outcomes, correlates, and prediction. *Merrill-Palmer Quarterly*, *38*, 382–400.
- Wentzel, K. R. (1991). Relations between social competence and academic achievement in early adolescence. *Child Development*, *62*, 1066–1078. doi:10.2307/1131152
- West, D. J., & Farrington, D. P. (1977). *The delinquent way of life: Third report of the Cambridge Study in Delinquent Development*. Oxford, England: Heinemann Educational Books.
- Wright, J. C., Giammarino, M., & Parad, H. W. (1986). Social status in small groups: Individual–group similarity and the social 'misfit'. *Journal of Personality and Social Psychology*, *50*, 523–536.
doi:10.1037/0022-3514.50.3.523
- Wright, R., John, L., Livingstone, A., Shepherd, N., & Duku, E. (2007). Effects of school-based interventions on secondary school students with high and low risks for antisocial behaviour. *Canadian Journal of School Psychology*, *22*, 32-49. doi:10.1177/0829573507301249
- Zumbo, B. D., Gadermann, A. M., & Zeisser, C. (2007). Ordinal versions of coefficients alpha and theta for Likert rating scales. *Journal of Modern Applied Statistical Methods*, *6*, 21-29.

Table 1. Scale reliabilities, means and standard deviations.

Variable	N items	α	Min.-Max.	M (SD)			Gender differences	η^2
				total	girls	boys		
Antisocial behavior (AS)								
T1 Parents	5	.78	0-9	1.29 (1.46)	1.06 (1.28)	1.52 (1.58)	$F(1, 1571) = 39.38^*$	.02
T1 Teachers	5	.87	0-9	0.87 (1.38)	0.50 (0.95)	1.22 (1.62)	$F(1, 1058) = 76.15^*$	.07
T3 Parents	5	.81	0-8	1.22 (1.35)	1.04 (1.26)	1.39 (1.41)	$F(1, 1254) = 20.67^*$	.02
T3 Teachers	5	.87	0-8	0.88 (1.36)	0.56 (1.03)	1.17 (1.55)	$F(1, 802) = 42.30^*$	.05
Social rejection (SR)								
T1 Parents	5	.80	0-9	1.09 (1.53)	0.99 (1.47)	1.20 (1.59)	$F(1, 1571) = 7.32$	.00
T1 Teachers	5	.88	0-9	1.23 (1.74)	1.00 (1.49)	1.45 (1.91)	$F(1, 1058) = 18.07^*$	.02
T2 Parents	5	.84	0-10	1.08 (1.56)	0.86 (1.31)	1.30 (1.75)	$F(1, 1357) = 27.52^*$	.02
T2 Teachers	5	.88	0-10	1.34 (1.85)	1.08 (1.56)	1.59 (2.06)	$F(1, 1030) = 20.28^*$	.02
Teacher-rated academic failure (AF)^a								
T1 Verbal	2	.82	1-11	3.94 (1.62)	3.70 (1.52)	4.16 (1.69)	$F(1, 1047) = 21.19^*$	.02
T1 Math	2	.93	1-12	4.09 (1.74)	4.31 (1.73)	3.89 (1.73)	$F(1, 1029) = 15.07^*$	.01
T2 Verbal	2	.88	1-11	4.06 (1.64)	3.75 (1.50)	4.35 (1.72)	$F(1, 1023) = 35.30^*$	.03
T2 Math	2	.94	1-12	4.48 (1.81)	4.55 (1.81)	4.40 (1.82)	$F(1, 1003) = 1.63$	.00
Affiliation with deviant peers (DP)								
T2 Teacher rating	3	.78	0-6	0.87 (1.22)	0.64 (1.06)	1.10 (1.33)	$F(1, 1005) = 37.71^*$	.04

Note. T1 = Time 1; T2 = Time 2, T3 = Time 3. * $p < .004$. ^a Higher scores indicate lower achievement.

Table 2. Bivariate correlations among the model variables for girls (above the diagonal) and boys (below the diagonal).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 T1 Antisocial behavior (parents)	-	.34***	.32***	.22**	.17**	.12***	.27***	.16***	.18***	.17***	.16***	.45***	.22***	-.04
2 T1 Antisocial behavior (teachers)	.38***	-	.20***	.38***	.19***	.10*	.23***	.21*	.23*	.15**	.21***	.25***	.33**	.04*
3 T1 Social rejection (parents)	.36***	.23***	-	.33***	.16***	.12***	.42***	.25***	.11*	.12***	.16***	.15*	.07	.10**
4 T1 Social rejection (teachers)	.26***	.45***	.37***	-	.19***	.13**	.26***	.21***	.15*	.14**	.12*	.11	.14	.14**
5 T1 Academic failure verbal (teachers) ^a	.17***	.20***	.16***	.18***	-	.60***	.11**	.09*	.52***	.38***	.11	.09	.08	.00
6 T1 Academic failure math (teachers) ^a	.12**	.19***	.14*	.16***	.60***	-	.09***	.02	.41***	.49***	.08*	.06	.01	.06
7 T2 Social rejection (parents)	.26***	.17**	.48***	.30***	.04	.03	-	.37***	.15***	.07**	.14**	.19**	.06	.08*
8 T2 Social rejection (teachers)	.21***	.22***	.26***	.26***	.07	-.02	.41***	-	.24***	.16***	.36***	.08	.16**	.03
9 T2 Academic failure verbal (teachers) ^a	.14**	.25***	.11**	.15**	.47***	.38***	.07	.21***	-	.59***	.26***	.10	.21*	-.06
10 T2 Academic failure math (teachers) ^a	.14*	.18***	.12*	.13*	.39***	.51***	.03	.13**	.57***	-	.23***	.13**	.19	.01
11 T2 Affiliation with deviant peers	.15***	.18***	.13**	.12*	.11**	.13**	.13**	.34***	.27***	.28***	-	.23**	.28***	.04*
12 T3 Antisocial behavior (parents)	.46***	.26***	.19***	.13**	.07	.08	.21***	.12**	.11*	.16**	.29***	-	.30***	-.02
13 T3 Antisocial behavior (teachers)	.21***	.34***	.16***	.16***	.10	.05	.08	.18**	.22***	.27***	.31***	.34***	-	-.03
14 T1 Age	-.02	.02	.10**	.16***	.01	.05	.08	.03	-.03	-.02	-.01	.03	.01	-

Note. T1 = Time 1; T2 = Time 2; T3 = Time 3. * $p < .05$, ** $p < .01$, *** $p < .001$.^a Higher scores indicate lower achievement.

Table 3. Standardized path coefficients for multigroup models by gender and age.

<i>Path</i>	Multigroup model by gender		Multigroup model by age		
	Girls (N = 803)	Boys (N = 845)	6-8 years (N = 697)	9-11 years (N = 684)	12-15 years (N = 267)
T1 Antisocial behavior → T2 Social rejection	.22**	.30**	.31**	.36**	.37*
T1 Antisocial behavior → T2 Academic failure	.13***	.21***	.22***	.25***	.16***
T1 Antisocial behavior → T2 Deviant peers	.16*	.21*	.28***	.28**	.22**
T1 Antisocial behavior → T3 Antisocial behavior	.52**	.59***	.56***	.47***	.50**
T1 Social rejection → T2 Social rejection	.43***	.43***	.30***	.35**	.61**
T1 Academic failure → T2 Academic failure	.65***	.62***	.61***	.65***	.50***
T2 Social rejection → T2 Deviant peers	.27**	.25**	.21*	.18*	.14*
T2 Academic failure → T2 Deviant peers	.17**	.25***	.21***	.19***	.24***
T2 Social rejection → T3 Antisocial behavior	-.20	-.16	-.01	-.01	-.01
T2 Academic failure → T3 Antisocial behavior	-.01	-.01	-.10	-.07	-.08
T2 Deviant peers → T3 Antisocial behavior	.53***	.47***	.52***	.43***	.57***
T1 Antisocial behavior ←→ T1 Social rejection	.55***	.73***	.68***	.63***	.74***
T1 Antisocial behavior ←→ T1 Academic failure	.23**	.30***	.30***	.29***	.49***
T1 Social rejection ←→ T1 Academic failure	.31***	.25***	.32***	.16*	.51***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. The coefficients highlighted in italics differ significantly between groups.

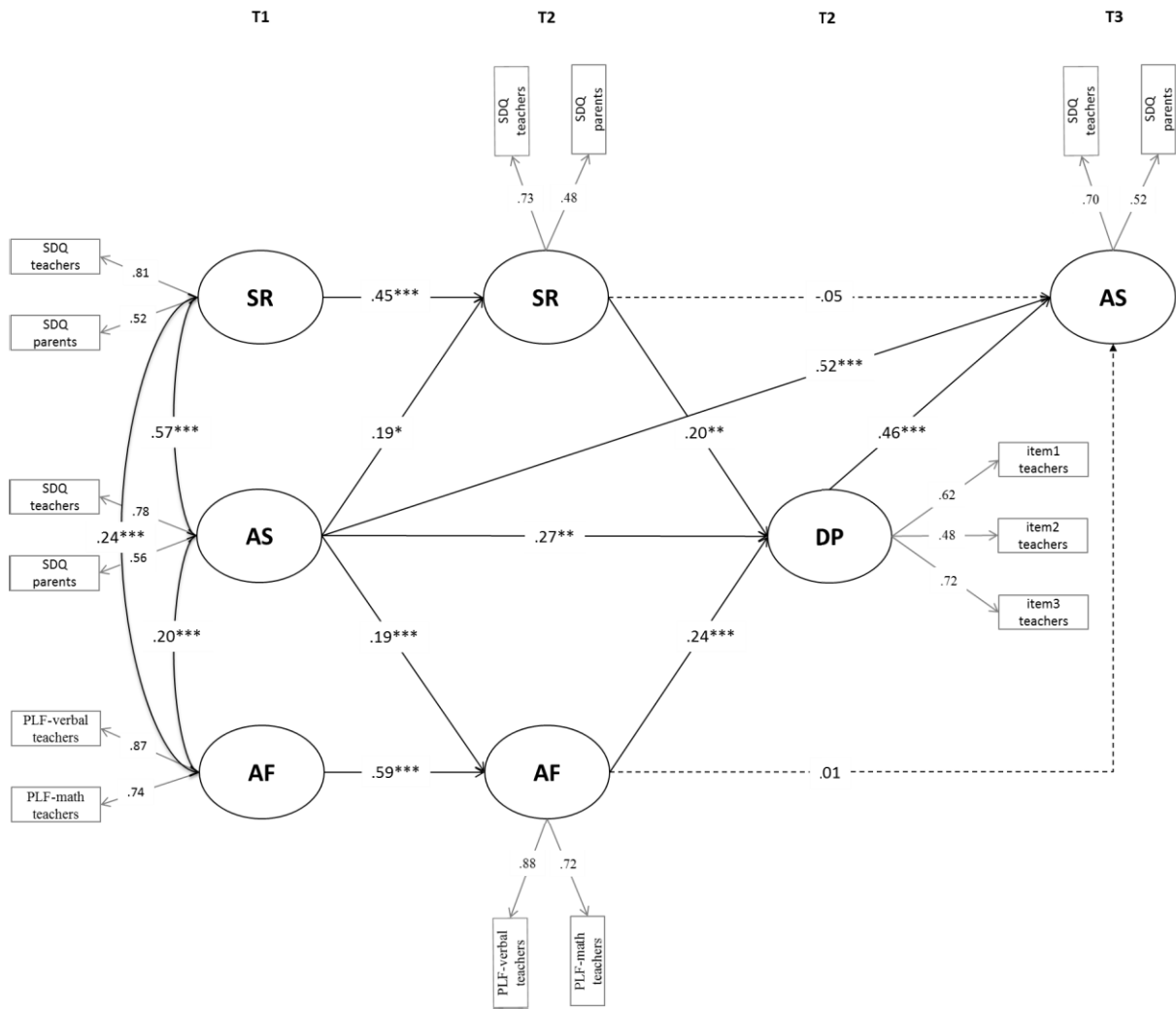


Figure 1. Standardized path coefficients from T1 antisocial behavior to T3 antisocial behavior via T2 social rejection, T2 academic failure, and T2 affiliation with deviant peers.

Model-Fit: χ^2 (85) = 215.26, $p < .001$; RMSEA = .03, 95% CI [.027, .037]; CFI = .96; SRMR = .03.

Note. T1 = Time 1; T2 = Time 2; T3 = Time 3. AS = Antisocial behavior; SR = Social rejection; AF = Academic failure; DP = Affiliation with deviant peers. Dotted lines are non-significant ($p > .05$). * $p < .05$, ** $p < .01$, *** $p < .001$.

7 Study 2

Beyond the Positive Reinforcement of Aggression: Peers' Acceptance of Aggression Promotes Aggression via External Control Beliefs

**Beyond the Positive Reinforcement of Aggression:
Peers' Acceptance of Aggression Promotes Aggression via External Control
Beliefs³**

Janis Jung, Barbara Krahé, and Robert Busching
University of Potsdam, Germany

Total word count: 8.629 (total)

Correspondence Address:

Janis Jung

University of Potsdam

Department of Psychology

Karl-Liebknecht-Str. 24-25

D-14476 Potsdam, Germany

Tel: ++49-331-977-2636

Fax: ++49-331-977-2795

Email: janis.jung@uni-potsdam.de

³ This research was conducted as part of the Graduate College "Intrapersonal developmental risk factors in childhood and adolescence: A longitudinal perspective" funded by the German Research Foundation (GRK 1668). Correspondence concerning this article should be addressed to: Janis Jung, University of Potsdam, Karl-Liebknecht-Str. 24-25, D-14476 Potsdam, Germany. Email: janis.jung@uni-potsdam.de.

Abstract

Being surrounded by peers who are accepting of aggression is a significant predictor of the development and persistence of aggression in childhood and adolescence. Whereas past research has focused on social reinforcement mechanisms as the underlying processes, the present longitudinal study analyzed the role of external control beliefs as an additional mediator explaining the link between peers' acceptance of aggression and the development of aggressive behavior. Drawing on a large community sample of $N = 1,466$ male and female children and adolescents from Germany aged between 10 and 18 years, results of latent structural equation modeling were consistent with the hypotheses that peer acceptance of aggression would predict external control beliefs in the social domain, which in turn, should predict aggressive behavior over time. Additional multigroup analyses showed that the predicted pathways were consistent across gender and age groups.

Keywords: aggression, aggressive peers, control beliefs, childhood, adolescence, longitudinal, Germany

Beyond the Positive Reinforcement of Aggression: Peers' Acceptance of Aggression Promotes Aggression via External Control Beliefs

Affiliation with peers who show a high acceptance of aggression has been shown to be crucial for both the development and the persistence of aggressive behavior in childhood and adolescence (Allen, Porter, McFarland, Marsh, & McElhaney, 2005; Lacourse, Nagin, Tremblay, Vitaro, & Claes, 2003; Nesdale, Durkin, Maass, Kiesner, & Griffith, 2008; Werner & Crick, 2004). Mediating mechanisms have been mostly explained from a social learning perspective, arguing that the aggressive peers' reinforcement of aggressive and delinquent acts accounts for the high stability of aggressive behavior throughout the lifetime (Buehler, Patterson, & Furniss, 1966; Dishion, Spracklen, Andrews, & Patterson, 1996; Mathys, Hyde, Shaw, & Born, 2013; Snyder et al., 2005). Although social reinforcement mechanisms provide a versatile approach for understanding the link between aggressive peers norms and the maintenance of aggressive behavior, they imply that social interactions between peers with a high acceptance of aggression are regulated by clearly formulated and commonly shared behavioral guidelines. However, unless they take place in highly organized deviant social groups (e.g. street gangs), many dyadic exchanges between aggressive peers are unstructured, unorganized, and lacking stable stimulus-response contingencies (Dishion, Nelson, Winter, & Bullock, 2004). In the present research, we argue that this social disorganization and lack of consistency may provide a further explanatory approach for the association between a peer group environment that condones aggression and the development of aggression in childhood and adolescence. Specifically, social disorganization and lacking consistencies in social interactions between aggressive peers might promote the development of external control beliefs. External control beliefs reflect individuals' perceptions that social outcomes are beyond their control and have been shown to be positively related to antisocial and aggressive behavior (Anderson, 1977; Duke & Fenhagen, 1975; Han, Weisz, & Weiss, 2001; Romi & Itskowitz, 1990). In our longitudinal study, we examine the proposition that membership of a peer group in which the acceptance of aggression is high, facilitates the development of external control beliefs that, in turn, contribute to the development of aggression over time.

External locus of control and aggression

Locus of control refers to an individual's tendency to locate the sufficient causes for events within or outside the self (Connell, 1985; Rotter, 1966, 1990; Skinner, 1996; Skinner, Zimmer-Gembeck, & Connell, 1998). Accordingly, locus of control describes a set of subjective and persistent perceptions of the contingency between one's own behavior and the occurrence of desired and undesired outcomes. Whereas individuals with an internal locus of control tend to perceive outcomes as contingent on their behavior, individuals with an external locus of control consider outcomes to be the

result of external influences that are beyond their control. Past research has highlighted the domain specificity of locus of control and its potential to vary across different contexts. Control perceptions in the cognitive, physical, and social domain are differentiated, based on the assumption that each dimension has characteristic associative patterns with other psychological constructs as well as distinct developmental pathways (Connell, 1985; Han et al., 2001; Harter, 1982).

The perception of the self as efficient and capable of manipulating and controlling social and physical events is a significant predictor of psychological functioning and mental and physical well-being (Seligman, 1975; Skinner et al., 1998). By contrast, a lack of control is associated with both internalizing psychopathology, like depressive or anxious symptoms (McCauley, Mitchell, Burke, & Moss, 1988), and externalizing problems, such as antisocial, delinquent, or aggressive behavior (Duke & Fenhagen, 1975; Halloran, Dumas, John, & Margolin, 1999; Han et al., 2001; Österman et al., 1999). Various variables have been found to moderate the link between control beliefs and aggression. For example, examining the domain specificity of control beliefs, Han et al. (2001) found negative associations of internal control beliefs in the physical and social, but not in the academic, domain with internalizing and externalizing psychopathology in children and adolescents aged between 7 and 17 years. Analyzing the moderating role of gender, Österman et al. (1999) reported that physical, indirect, and verbal forms of aggression were significantly related to a global measure of external locus of control in male, but not in female adolescents. By contrast, a study of children aged between 8 and 11 years found significant associations between an overall score of external control beliefs and aggression for girls but not for boys (Halloran et al., 1999). For boys, the relationship even tended to be reversed, indicating that males who perceived themselves as unable to control environmental outcomes showed less aggression. Taken together, these studies not only provide evidence for significant associations between external control beliefs and externalizing psychopathology, they also suggest that this link may vary as a function of both individual attributes and domain. Accordingly, further research is needed to consider plausible moderating variables, such as gender or age, and the domain specificity of control beliefs when examining its relationship with aggressive behavior. As aggression takes place in a social context, we argue that beliefs about the control of outcomes in the social domain are particularly relevant.

From a developmental perspective, it is argued that individuals have an innate motivation to feel competent and effective in interactions with their environment (Connell & Wellborn, 1991; Harter, 1978; Skinner, 1996; White, 1959). The subjective experience of internal, personal control, however, depends on both the individuals' skills and capabilities as well as the structure, organization, and responsivity of their social and physical environment (Skinner et al., 1998). Research on contextual influences has shown that one significant determinant of an individual's locus of control is the

contingency of the environment (Skinner et al., 1998). Environmental contingency refers to the degree to which actions are followed consistently and discriminately by the same outcomes. Generally, the existence of contingency in the environment is a prerequisite for learning, planning, and effective problem solving. Without a minimum of contingency, organization, and structure, individuals would not be able to anticipate future outcomes and to adequately prepare for upcoming events. Non-contingent environments are experienced as unreliable, and outcomes are likely to be perceived as arbitrary and the result of influences beyond internal control, such as fate, chance, or powerful others (Skinner, et al. 1998). Accordingly, it has been shown that in warm, benevolent, and highly contingent family environments, children and adolescents tend to grow up with a greater sense of agency and internal control (Grolnick, Ryan, & Deci, 1991; Krampen, 1989; Watson, 1966; Yates, Kennelly, & Cox, 1975). In these environments, parents tend to be more sensitive to their children's wishes and needs and to respond more consistently to their behaviors. By contrast, critical, punitive, and non-contingent family environments, in which parents are responding inconsistently and unpredictably to their children's actions, support the development of external control beliefs as well as feelings of helplessness and ineffectiveness (Grolnick et al., 1991; Grolnick & Ryan, 1992).

Peers' acceptance of aggression and the development of external control beliefs

The majority of studies examining contextual effects on control beliefs have focused on the family environment. However, while the socializing impact of the family is most important in early and middle childhood, its influence is gradually decreasing as the child moves into adolescence (Bierman, 2004). At the same time, the significance of social interactions with same-aged peers increases (Pardini, Loeber, & Stouthamer-Loeber, 2005). Peer interactions are especially relevant for the development of aggressive behavior. Explanatory approaches postulate that the normative system of aggressive peer groups substantially differs from mainstream social groups in that it does not impose sanctions on aggressive behaviors. Moreover, aggressive peers even tend to reward aggressive behaviors through applause, reputation, or access to desired resources while at the same time tending to ignore, discourage, or even punish prosocial acts (Anderson, 2002; Buehler et al., 1966; Dishion et al., 1996; Mathys et al., 2013).

Despite the importance of selective reinforcement mechanisms, there is some evidence that dyadic interactions between deviant individuals are not as coordinated as commonly suggested within a contingency framework. Deviant peer interactions may be chaotic, disorganized, and lack stable contingencies between behaviors and social reactions. For example, applying a dynamic system framework, Dishion et al. (2004) observed that interactions between deviant boys and their best friends not only contained more deviant behaviors than those of well-adjusted peers, they were also less structured and organized. Dishion et al. (2004) argued that aggressive individuals' deficits in social

information processing as well as a lack of problem solving skills may account for the observed weak structure and contingency of deviant peer interactions. Aggressive individuals often show a biased attentional focus to provoking stimuli and a tendency to misread and misattribute social cues. They tend to overreact to ambiguous social stimuli and to use inappropriate interpersonal problem solving strategies (Crick & Dodge, 1994; Dodge, Bates, & Pettit, 1990). Accordingly, it is likely that in aggressive peer interactions, social cues are frequently misinterpreted, followed by inappropriate social reactions in the absence of clear behavior guidelines. As a consequence, children and adolescents with an aggressive peer network may find it difficult to gauge and predict the social consequences of their own and their peers' behaviors. Accordingly, being situated within such a disorganized peer context is proposed to constitute a risk factor for the development of external control beliefs in the social domain, thereby supporting the development of aggressive behavior.

The current study

In the present longitudinal study, we examined external locus of control beliefs as mediators in the link between affiliation with peers who show a high acceptance of aggressive behavior and the development of aggression. Acknowledging the domain specificity of locus of control (Han et al., 2001) and considering the interpersonal nature of aggressive behavior, we expected an external locus of control in the social domain to be predicted by peers' acceptance of aggression and, in turn, to predict individual aggression. Additionally, we examined whether the hypothesized pathways might be moderated by gender and age. Given the inconclusive findings on gender differences and the lack of evidence on age differences in the relationship between locus of control and aggressive behavior, we refrained from formulating specific hypotheses.

The current study presents data on the link between peers' acceptance of aggression, external locus of control, and aggressive behavior in a sample of 10- to 18-year old participants, who were studied at two measurement waves over a period of about 1.5 years. Although conventional tests of mediation depend on at least three data waves, Cole and Maxwell (2003) noted that two waves of data collection may be sufficient for assessing partial mediation if the causal effect between the mediator and the outcome variable may be assumed to be temporally stable (assumption of stationarity). In our case, this means that the strength of the path from external locus of control to aggression is not assumed to change over time. Although the present study does not allow us to test this assumption directly, theoretical considerations suggest that a change in causal effects is unlikely, as the socializing impact of peers is especially salient in adolescence. Accordingly, the following predictions were examined in our study:

Hypothesis 1. The higher the perceived approval of aggression in their peer network at T1, the more likely participants are to show an external locus of control in the social domain at T2.

Hypothesis 2. The more participants perceive outcomes in the social domain as non-controllable at T1, the more aggressive behavior they show at T2.

Hypothesis 3. The path from peer approval of aggression to aggressive behavior is mediated by an external locus of control in the social domain.

In testing Hypothesis 3, mediation is indicated by a significant product of the path coefficient from peers' acceptance of aggression at T1 to external locus of control at T2 and the path coefficient from external locus of control at T1 to aggression at T2.

Method

Participants

The study used data from a community sample of male and female children and adolescents involved in a school-based longitudinal study conducted in different districts of the state of Brandenburg, Germany. Of the 1,466 (50% female) participants assessed at T1, 1,107 took part at T2, resulting in an attrition rate of approximately 24.5%. The mean age of the sample was 12.9 years at T1 ($SD = 2.01$) and 14.3 years ($SD = 1.90$) at T2, covering a mean time period of about 17 months between the measurement waves. At T1, participants were distributed across 181 schools, 31.8% attended primary school, 67.1% attended secondary school, and 1.1% attended other schools. In terms of parents' educational background, 42.1% of the fathers and 42.4% of the mothers had vocational qualifications, 15.2% of fathers and 20.8% of mothers had a university entrance qualification, and 41.6% of fathers and 36.0% of mothers held a university degree. Only a small subset (1.1% fathers; 0.8% mothers,) had no or low levels of qualification.

Measures

Aggressive behavior. Aggressive behavior was assessed at T1 and T2 by a self-report measure developed by Krahe and Möller (2010) comprising ten items. Participants were asked to indicate how often in the past six months they had shown a particular behavior, using a five-point scale from 1 (*never*) to 5 (*very often*). Five items measured physical aggression (e.g. "I have kicked another person"), and five items measured relational aggression (e.g. "I have excluded someone from our group"). Due to the skewness of the scale distribution, we computed ordinal alpha as a measure of scale reliability (Gaderman, Guhn, & Zumbo, 2012; Zumbo, Gaderman, & Zeisser, 2007). The ordinal alphas for the total scale of aggression was high, as shown in Table 1.

Peers' acceptance of aggression. Peers' acceptance of aggression was measured at T1 and T2 by participants' appraisal of how accepted aggressive behavior was within their peer group. Participants were asked to read a vignette describing a provocation scenario based on Möller and

Krahé (2009).

Imagine one of your friends is extremely angry with one of your classmates because he/she treated your friend in a mean and unfair way in front of others in the school break. After school, your friend coincidentally meets the person again, and this time the two are alone. Immediately he/she starts quarreling with your friend again, saying nasty things.

Participants were presented with a version referring to a same-sex peer and asked to rate how acceptable most of their peers would find each of six possible reactions on a four-point scale from 1 (*not at all okay*) to 4 (*totally okay*). Three items described physical forms of aggressive behavior (“to kick him/ her”, “to punch him/ her”, “to push him/ her”), and three items referred to relational forms of aggression (“to spread rumors about him/ her”, “to mock him/ her”, “to speak badly about him/ her”). Internal consistency was high at each data wave, as shown in Table 1.

Control beliefs. Participants’ locus of control was measured by the Multidimensional Measure of Children’s Perception of Control (MMPC; Connell, 1985) at T1 and T2. The MMCP is a 48-item self-report instrument, including one dimension of internal and two dimensions of external control perceptions (powerful others, unknown), each assessed in three specific behavioral domains (cognitive, social, physical) and one general domain. However, due to time restrictions, only a subset of the original items could be administered in our study, resulting in a four-item scale for external locus of control (two items from the subscale “powerful others control” in the social domain: “If I want my classmates to think I am an important person, I have to be friends with the really popular kids”, “If I want to be an important member of my class, I have to get the popular kids to like me”; two items from the subscale “unknown control” in the social domain: “When another kid doesn’t like me, I usually don’t know why”, “If somebody doesn’t like me, I usually can’t work out why”). Participants indicated the degree to which they did not know why certain outcomes occur (unknown control) and the degree to which other people brought about the respective outcomes (powerful others control), using a five-point scale from 1 (*not at all true*) to 5 (*totally true*). As measures of internal consistency are sensitive to the number of scale items (Cortina, 1993), the reliability of the control beliefs scale was acceptable, given that it only consisted of four items (see Table 1).

Procedure

All participants were tested individually by trained experimenters using paper-pencil questionnaires. Active consent was obtained from all students and, additionally, from parents of participants under the age of 18. Instruments and procedure were approved by the Ethics Committee

of the University of Potsdam as well as the Ministry for Education in the Federal State of Brandenburg, Germany where the study was conducted.

Plan of analysis

All hypotheses were examined by structural equation modeling using the Mplus Software, version 7.30 (Muthén & Muthén, 1998-2015). Mean scores of the two facets of physical and relational aggression and peer acceptance of aggression were used as indicators for the latent factors of the participant's aggressive behavior and the acceptance of aggressive behavior in the peer group, respectively. The two facets of external locus of control were used to model the latent factor of locus of control. To account for the variance that an indicator shared with itself over time, we specified indicator-specific factors for each construct.

Missing data. Missing data analysis yielded missing data rates of 10.2% for peers' acceptance of aggression, 4.3% for external control beliefs, and below 1% for aggression at T1. The higher proportion of missing data on the measures of peers' acceptance of aggression and external control beliefs was due to an error in the compilation of the questionnaire which was only noticed and corrected after the data collection had started. This means that the likelihood of missing observations does not depend on any observed or unobserved values, justifying the treatment of missings as "missing completely at random" (MCAR). This assumption is further supported by the low correlations between testing date and T1 measures (all $r_s < .08$). At T2, the rate of missing data was below 1% on all variables.

Missing data were handled by a multiple imputation approach, using the *mice* software package (van Buuren & Groothuis-Oudshoorn, 2011) in **R**. Multiple imputation is a regression-based procedure for dealing with missing data that is considered as a "state-of-the-art" missing data technique (Schafer & Graham, 2002) and has been shown to be superior to traditional techniques for dealing with missing data, such as listwise deletion, pairwise deletion, or mean substitution (Enders, 2010). Twenty-five imputed data sets were generated. Trace plot analyses showed a good convergence after 50 iterations of the imputation algorithm.⁴

⁴ We additionally estimated the main model using the FIML procedure in Mplus. This model fully replicated the critical pathways obtained with the multiple imputation procedure ($\chi^2(36) = 89.76, p < .001$; RMSEA = .03; CFI = .98; SRMR = .02).

Clustering of observations. As participants were nested within schools, we had to deal with the non-independence of observations from participants in the same schools (Geiser, Eid, Nussbeck, Courvoisier, & Cole, 2010; Julian, 2001). Standard errors and test statistics of covariance analysis were corrected using the robust maximum likelihood estimator (MLR) together with a “type complex” modeling approach, using school membership at T1 as cluster variable.

Model fit. As the chi-value is sensitive to sample size, degrees of freedom, and violations of multivariate normality, even minor differences between the model’s implied and observed covariance matrix may lead to model rejection (Bollen, 1989; Tucker & Lewis, 1973). Accordingly, evaluation of model fit was based on the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA), and the standardized root mean residual (SRMR). A good model fit is indicated by a CFI higher than .95, a RMSEA coefficient of less than .05, and a SRMR smaller than .08 (Hu & Bentler, 1998; Schermelleh-Engel, Moosbrugger, & Müller, 2003). As the same drawbacks of the absolute chi-square test apply to the chi-square difference test (Brannick, 1995), the CFI index was used to compare nested models by gender and age, for which a value smaller or equal to .01 indicates a non-significant difference (Chen, 2007; Cheung & Rensvold, 2002).

Results

Descriptive statistics and correlations

The means, standard deviations, and gender differences for all manifest constructs are presented in Table 1. To analyze gender differences, we conducted separate ANOVAs, with gender as the independent variable and each of the T1 and T2 measures as dependent variables. Inflation of alpha error caused by multiple testing was accounted for by adopting a corrected significance level of $p = .05/6 = .008$.

Significant effects of gender were found for peers’ acceptance of aggression at both time points, T1: $F(1,1315) = 88.25, p < .001, \eta^2 = .06$; T2: $F(1,1105) = 100.20, p < .001, \eta^2 = .08$. Males were more likely than females to report that their friends would accept aggression as an appropriate interpersonal behavior in response to the provocation scenario. Additionally, males scored higher on aggression at T1 and T2, $F(1,1460) = 29.76, p < .001, \eta^2 = .02$; $F(1,1104) = 32.98, p < .001, \eta^2 = .03$. Only one gender difference was found on the measures of external control beliefs. Females scored higher than males on external control beliefs at T2, $F(1,1102) = 14.60, p < .001, \eta^2 = .01$.

Table 2 presents the zero-order correlations among all manifest constructs as well as their links with age at T1, separately for males and females. As expected, peers’ acceptance of aggression at T1 was significantly associated with external locus of control at T2 for both males and females. Additionally, external locus of control at T1 was significantly related to aggression at T2 for males and

for females. Age was significantly related to most study variables: For both males and females, age was positively correlated with peers' acceptance of aggression, indicating that older individuals were more likely to have peers accepting of aggression. External locus of control showed consistent positive relationships with age, again, for both males and females, indicating that feelings of non-control were more pronounced in the older age cohorts. Finally, age was positively related to aggression at T1, but not at T2 for both males and females.

Hypotheses-testing analyses

As a first step, confirmatory factor analyses were conducted to analyze the proposed relations between the latent constructs and their manifest indicators and to test the constructs' measurement invariance across the data waves. We specified a restricted model that constrained the factor loadings of the indicators to be equal across time and compared this model to a baseline model in which the factor loadings were allowed to differ. The restricted model showed a good fit with the data ($\chi^2(24) = 105.84, p < .001$; RMSEA = .05, CFI = .98; SRMR = .03) and did not fit significantly worse than the baseline model ($\Delta\text{CFI} = .004$), indicating that the assumption of weak measurement invariance was tenable and the factor loadings were comparable across time. All further analyses are based on the restricted model.

To examine the mediational role of external locus of control in the link between peers' acceptance of aggression and the development of aggression, we specified a model as displayed in Figure 1. Additionally, to control for the influence of plausible third variables on the proposed pathways, we included gender and age as covariates in the model at this stage, before following up gender and age comparisons in the multigroup analyses reported below.

The hypothesized model showed a good fit with the data ($\chi^2(36) = 130.72, p < .001$; RMSEA = .04; CFI = .98; SRMR = .03). In support of Hypothesis 1, peers' acceptance of aggression at T1 significantly predicted external locus of control in the social domain at T2 ($\beta = .15, p < .05$). This path was significant even after controlling for the temporal stability of control beliefs. Additionally, external locus of control at T1 predicted peers' acceptance of aggression at T2 ($\beta = .14, p < .05$), suggesting a reciprocal relationship between both constructs. The more participants saw events in the social domain as controlled by external forces, the more likely they were to be surrounded by peers with a high acceptance of aggression 17 months later, controlling for the stability of both control beliefs and peers' acceptance of aggression. In line with Hypothesis 2, aggression at T2 was significantly predicted by external locus of control at T1 ($\beta = .16, p < .05$), again even after controlling for the construct's temporal stability. Finally and consistent with earlier research, peers' acceptance of aggression at T1 was significantly associated with aggressive behavior at T2 ($\beta = .11, p < .05$).

Indirect effects. To examine the indirect pathways from the T1 constructs to aggressive behavior at T2, we employed a parametric bootstrapping approach, suggested by Hayes and Scharkow (2013). The analyses showed that only the indirect path from peers' acceptance of aggression via locus of control in the social domain to aggressive behavior was statistically significant ($\beta = .02$, 95% CI [.001, .058]), as indicated by a confidence interval that did not include zero. This finding supported Hypothesis 3. No other indirect effects were significant.

Moderating variables. In the preceding analysis, age and gender were included as covariates in the model. To further examine gender- and age-specific variations in the proposed developmental pathways, we specified separate multigroup models with gender (dummy coded; 1=male, 2=female) and age (dummy coded; 1 = "late childhood", 10 to 11 years; 2 = "early adolescence", 12 to 14 years; 3 = "adolescence" 15 to 18 years at T1) as the grouping variables. For both gender and age, we first specified a model that allowed all paths to differ between groups and compared this unconstrained model with a model that restricted all paths to be equal across groups, using the Δ CFI criteria outlined by Chen (2007) and Cheung and Rensvold (2002). For both gender and age as moderating variables, the constrained models did not fit significantly worse than the unconstrained models (gender: Δ CFI = .008; age: Δ CFI = .009), indicating that all path coefficients were comparable for boys and girls and across the three age groups. In combination, these results do not provide evidence for gender- or age-specific differences in the proposed developmental pathways from peers' acceptance of aggression via external control beliefs to aggressive behavior.

Discussion

Most theoretical explanations of peer influences on the development of aggression in adolescence have emphasized the reinforcement of aggressive behavior by peers who accept aggression as normative as the driving mechanism (e.g. Dishion et al., 1996; Snyder et al., 2005). The aim of the present longitudinal study was to demonstrate a further mechanism by which peers may contribute to the development and persistence of aggressive behavior. We argued that the lack of structured interactions in aggressive peer groups may promote feelings of non-control and helplessness, which have been shown to be proximal predictors of externalizing psychopathology, such as aggressive behavior (e.g. Halloran et al., 1999; Han et al., 2001). Studying a large community sample of male and female children and adolescents, latent structural equation modeling was used to test our hypotheses. Additional multigroup analyses allowed us to examine gender- and age-specific variations in the proposed developmental pathways.

The path from peers' acceptance of aggression to control beliefs

In line with our hypotheses, peers' acceptance of aggression at T1 predicted external control

beliefs at T2 in the social domain, controlling for the construct's temporal stability and the influence of plausible third variables, such as gender and age. Accordingly, affiliation with peers who endorse aggressive behaviors may give rise to generalized and persistent feelings of non-control in social interactions. Children and adolescents who are surrounded by peers with a high acceptance of aggressive behavior may feel less able to influence the course and outcome of social interactions in accordance with their personal wishes and needs. We argued that interactions between aggressive individuals tend to be less regulated and organized, offering only weak contingencies between the behaviors shown and the subsequent social reactions. Accordingly, individuals in aggressive peer groups cannot reliably expect their actions to be followed by the same reactions across time and situations, leading them to see social outcomes as arbitrary. Additionally, being in an aggressive peer network may increase the likelihood of becoming a target of the peers' aggressive behavior. Peers' aggression has been identified not only as a significant risk-factor for the development of individual aggression but also as a risk factor for victimization, suggesting that having friends with a high acceptance of aggressive behavior may be a source of risk rather than of protection (Huizinga, Weiher, Espiritu, & Esbensen, 2003; Sampsons & Lauritsen, 1990, Schreck, Fisher, & Miller, 2004). Repeated experiences of victimization may in themselves stimulate the development of external control beliefs (Radliff, Wang, & Swearer, 2015). Interestingly, the association between peers' acceptance of aggression and locus of control was reciprocal, indicating that individuals holding external control beliefs were attracted, over time, to peers with a higher acceptance of aggression. Thus, individuals with a strong external locus of control tend to actively select milieus that are characterized by a high acceptance of aggressive behavior. This reciprocity demonstrates that the synergistic interplay of selective and socializing processes may gradually contribute to the persistence and amplification of external control beliefs as well as aggressive behavior over the course of development.

The path from control beliefs to aggressive behavior

As expected, external locus of control in the social domain was significantly related to aggression. Again, this path remained significant after controlling for age, gender, and the temporal stability of the constructs, indicating that children and adolescents who perceive themselves as less effective and competent in controlling the outcomes of their social interactions tend to show more aggressive behavior. The link between external locus of control and aggression may be explained by negative affect that is associated with experiences of non-control (Han et al., 2001). Being repeatedly confronted with interpersonal situations that are outside one's volitional control is frustrating and aversive, making aggressive behavior more likely (Berkowitz, 1989; Dollard, Miller, Doob, Mowrer, & Sears, 1939). Finally, the analysis of the indirect pathways revealed that the effect of peers' acceptance of aggression on individual aggression was partially mediated by an external locus of control in the

social domain. Together, these findings suggest that being situated within a peer group in which aggression is considered as an appropriate interpersonal behavior contributes to the development of subjective beliefs of non-control that promote future aggressive behavior.

Gender and age differences

Although males and females differed significantly on all measures of peers' acceptance of aggression and self-reported aggressive behavior, the multigroup analysis yielded no evidence for gender-specific variations of the postulated developmental pathways of aggressive behavior. Whereas some researchers (Halloran et al., 1999; Österman et al., 1999) found significant associations between external locus of control and aggression only for one gender group, the present study suggests that external control beliefs contribute to the development of aggressive behavior similarly for males and females. From a conceptual perspective, there is no reason to assume that experiences of non-control should have different psychological outcomes for males and females. Additionally, our findings are consistent with other studies that showed that external control beliefs are related to indicators of psychosocial adjustment, such as social acceptance or measures of depression, equally for boys and girls (e.g., Connell, 1985; Weisz, Weiss, Wasserman, & Rintoul, 1987). Nevertheless, evidence on gender differences remains inconclusive, and future research is needed to clarify the moderating role of gender in the association between external control beliefs in the social domain and the development of aggressive behavior.

Regarding age effects, the multigroup analysis comparing participants in late childhood, early adolescence, and adolescence did not reveal significant differences in the postulated pathways. Accordingly, the present study does not provide evidence that the developmental pathways from peers' acceptance of aggression via external locus of control to aggression are moderated by age.

Strengths, limitations and perspectives for future research

The present longitudinal study aimed to analyze the mediating role of external locus of control in the link between peers' acceptance of aggression and the development of individual aggressive behavior. Strengths of our study are the inclusion of two data waves covering a mean interval of 17 months and the large sample size that comprised a wide age range from late childhood into adolescence.

At the same time, some limitations of our study have to be acknowledged. The first is the reliance on a half-longitudinal design with two measurement points. As noted, two waves of data collection may be sufficient to assess partial mediation if the effect between the mediator and the outcome variable is temporally stable (stationarity assumption; Cole & Maxwell, 2003). Although we argued that in the present sample a change of causal effects is unlikely because of the stable impact

of peers in the covered age group, this assumption cannot be directly tested without having at least three measurement waves. A second limitation is that the measures of all constructs were based on self-reports. Although self-reports provide rich information about an individual's beliefs and behavior in a variety of different contexts and time periods, they are potentially subject to various sources of inaccuracy, especially when assessing behaviors that are prone to biases due to social desirability, such as aggression. Self-presentation mechanisms, such as impression management or self-deception, may have led to an underreporting of aggressive behavior as well as acceptance of aggression in the peer group (Paulhus, 1984, 2002). Additionally, our measure of peers' acceptance of aggression required the participants to have valid insights into the dynamics of their peer group, an assumption that might not always hold, especially for younger participants. Multi-informant measures, including self- and peer-ratings, would have provided a more stringent test of our hypotheses. Third, due to the study's time restrictions, we could only include a limited number of items of the scale for external locus of control, which reduced the internal consistency of this measure at both time points and did not allow us to differentiate between control beliefs in relation to success and failure outcomes. Although external locus of control has generally been shown to be associated with lower psychosocial functioning and a number of disruptive behaviors, some studies suggest that an external locus of control might be of advantage in certain situations. For example, Burish et al. (1984) found that in medical settings with only little possibilities for personal control, external control beliefs were associated with less distress and negative arousal. Similarly, attributing negative outcomes of social interactions to external causes might be less frustrating and aversive, thereby decreasing the likelihood for aggressive behavior. Future research may provide insights into such interactions between control beliefs and situational characteristics. Fourth, although we argued that the less structured organization of aggressive peers' interactions stimulates the development of external control beliefs, we did not actually measure the degree of organization in interactions between individuals with a high acceptance of aggression.

Despite these limitations, the present findings may help to improve the understanding of the psychological processes underlying the link between peers' acceptance of aggressive behavior and the development of aggression in childhood and adolescence. Consistent with the view that multiple pathways may lead to the same psychopathological behavior (Cicchetti & Rogosch, 1996), our research indicates that external control beliefs may help to explain how peers' acceptance of aggression contributes to the consolidation of aggression over and above the role of social reinforcement. These findings suggest that intervention programs would benefit from incorporating measures to reduce an external locus of control in the social domain. Although not explicitly focusing on aggression, several studies have shown that it is possible to experimentally modify perceptions of personal control using different procedures, such as providing contingent versus random feedback

(Whitson & Galinsky, 2008), reminding participants of personal events over which they did or did not have control (Kay, Gaucher, Napier, Callan, & Laurin, 2008), or the cognitive restructuring of beliefs about controllability (Lachman, Weaver, Bandura, Elliott, & Lewkowicz, 1992). Similarly, we believe that teaching children and adolescents that they are able to influence and modify social events may enhance their sense of control and thereby reduce aggression both directly and indirectly via its link to affiliation with peers who show a high normative acceptance of aggression. The latter aim is crucial as intervention programs are less successful with individuals in peer groups that are highly accepting of aggression (Dodge, Dishion, & Lansford, 2006).

Considering the important socializing role of peer relations, more research is needed to investigate the multiple pathways through which characteristics of the peer group may contribute to the development of both functional and dysfunctional behavior in childhood and youth. Our findings suggest a closer analysis of how external control beliefs interact with other psychological mechanisms in explaining peer influences on aggressive behavior.

References

- Allen, J. P., Porter, M. R., McFarland, F. C., Marsh, P., and McElhaney, K. B. (2005). The two faces of adolescents' success with peers: Adolescent popularity, social adaptation, and deviant behavior. *Child Development, 76*, 747–760. doi:10.1111/j.1467-8624.2005.00875.x
- Anderson, C. R. (1977). Locus of control, coping behaviors, and performance in a stress setting: A longitudinal study. *Journal of Applied Psychology, 62*, 446–451. doi:10.1037/0021-9010.62.4.446
- Anderson, E. (2002). The code of the streets. In S. L. Gabbidon, H. T. Greene, & V. D. Young (Eds.), *African American classics in criminology & criminal justice*. (pp. 293–305). Thousand Oaks, CA: Sage Publications, Inc.
- Berkowitz, L. (1989). Frustration-aggression hypothesis: Examination and reformulation. *Psychological Bulletin, 106*, 59–73. doi:10.1037/0033-2909.106.1.59
- Bierman, K. L. (2004). *Peer rejection: Developmental processes and intervention strategies*. New York: Guilford Press.
- Bollen, K. A. (1989). *Structural equations with latent variables*. Oxford, England: John Wiley & Sons.
- Brannick, M. T. (1995). Critical comment on applying covariance structure modeling. *Journal of Organizational Behavior, 16*, 201–213. doi:10.1002/job.4030160303
- Buehler, R. E., Patterson, G. R., & Furniss, J. M. (1966). The reinforcement of behavior in institutional settings. *Behaviour Research and Therapy, 4*, 157–167. doi:10.1016/0005-7967(66)90002-7
- Burish, T. G., Carey, M. P., Wallston, K. A., Stein, M. J., Jamison, R. N., & Lyles, J. N. (1984). Health locus of control and chronic disease: An external orientation may be advantageous. *Journal of Social and Clinical Psychology, 2*, 326–332. doi:10.1521/jscp.1984.2.4.326
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*, 464–504. doi:10.1080/10705510701301834
- Cheung, G. W. & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*, 233–255. doi:10.1207/S15328007SEM0902{_}5
- Cicchetti, D. & Rogosch, F. A. (1996). Equifinality and multifinality in developmental psychopathology. *Development and Psychopathology, 8*, 597–600. doi:10.1017/S0954579400007318
- Cole, D. A. & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology, 112*, 558–577. doi:10.1037/0021-843X.112.4.558
- Connell, J. P. (1985). A new multidimensional measure of children's perceptions of control. *Child*

- Development*, 56, 1018–1041. doi:10.2307/1130113
- Connell, J. P. & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar, & L. A. Sroufe (Eds.), *Self processes and development*. (pp. 43–77). Hillsdale, NJ: Lawrence Erlbaum Associates
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, 78, 98-104. doi:10.1037/0021-9010.78.1.98
- Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, 115, 74-101. doi:10.1037/0033-2909.115.1.74
- Dishion, T. J., Nelson, S. E., Winter, C. E., & Bullock, B. M. (2004). Adolescent friendship as a dynamic system: Entropy and deviance in the etiology and course of male antisocial behavior. *Journal of Abnormal Child Psychology*, 32, 651–663. doi:10.1023/B:JACP.0000047213.31812.21
- Dishion, T. J., Spracklen, K. M., Andrews, D. W., & Patterson, G. R. (1996). Deviancy training in male adolescent friendships. *Behavior Therapy*, 27, 373–390. doi:10.1016/S0005-7894(96)80023-2
- Dodge, K. A., Bates, J. E., & Pettit, G. S. (1990). Mechanisms in the cycle of violence. *Science*, 250, 1678-1683. doi:10.1126/science.2270481
- Dodge, K. A., Dishion, T. J., & Lansford, J. E. (2006). *Deviant peer influences in programs for youth: Problems and solutions*. New York: Guilford Press.
- Dollard, J., Miller, N. E., Doob, L. W., Mowrer, O. H., & Sears, R. R. (1939). *Frustration and aggression*. New Haven, CT: Yale University Press.
- Duke, M. P. & Fenhagen, E. (1975). Self-parental alienation and locus of control in delinquent girls. *The Journal of Genetic Psychology: Research and Theory on Human Development*, 127, 103–107. doi:10.1080/00221325.1975.10532360
- Enders, C. K. (2010). *Applied missing data analysis*. New York: Guilford Press.
- Gadermann, A. M., Guhn, M., & Zumbo, B. D. (2012). Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide. *Practical Assessment, Research & Evaluation*, 17, 1-13.
- Geiser, C., Eid, M., Nussbeck, F. W., Courvoisier, D. S., & Cole, D. A. (2010). Analyzing true change in longitudinal multitrait-multimethod studies: Application of a multimethod change model to depression and anxiety in children. *Developmental Psychology*, 46, 29–45. doi:10.1037/a0017888

- Grolnick, W. S. & Ryan, R. M. (1992). Parental resources and the developing child in school. In M. E. Procidano, & C. B. Fisher (Eds.), *Contemporary families: A handbook for school professionals*. (pp. 275–291). New York: Teachers College Press.
- Grolnick, W. S., Ryan, R. M., & Deci, E. L. (1991). Inner resources for school achievement: Motivational mediators of children's perceptions of their parents. *Journal of Educational Psychology*, *83*, 508–517. doi:10.1037/0022-0663.83.4.508
- Halloran, E. C., Dumas, D. M., John, R. S., & Margolin, G. (1999). The relationship between aggression in children and locus of control beliefs. *The Journal of Genetic Psychology: Research and Theory on Human Development*, *160*, 5–21. doi:10.1080/00221329909595376
- Han, S. S., Weisz, J. R., & Weiss, B. (2001). Specificity of relations between children's control-related beliefs and internalizing and externalizing psychopathology. *Journal of Consulting and Clinical Psychology*, *69*, 240–251. doi:10.1037/0022-006X.69.2.240
- Harter, S. (1978). Effectance motivation reconsidered: Toward a developmental model. *Human Development*, *21*, 34–64. doi:10.1159/000271574
- Harter, S. (1982). The perceived competence scale for children. *Child Development*, *53*, 87–97. doi:10.2307/1129640
- Hayes, A. F. & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: Does method really matter? *Psychological Science*, *24*, 1918–1927. doi:10.1177/0956797613480187
- Hu, L.-t. & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, *3*, 424–453. doi:10.1037/1082-989X.3.4.424
- Huizinga, D., Weiher, A., Espiritu, R., & Esbensen, F. (2003). Longitudinal research in the social and behavioral sciences: an interdisciplinary series. In T. P. Thornberry, & M. D. Krohn (Eds.), *Taking stock of delinquency: An overview of findings from contemporary longitudinal studies*. (pp. 47–91). New York: Springer.
- Julian, M. W. (2001). The consequences of ignoring multilevel data structures in nonhierarchical covariance modeling. *Structural Equation Modeling*, *8*, 325–352. doi:10.1207/S15328007SEM0803{_}1
- Kay, A. C., Gaucher, D., Napier, J. L., Callan, M. J., & Laurin, K. (2008). God and the government: Testing a compensatory control mechanism for the support of external systems. *Journal of Personality and Social Psychology*, *95*, 18–35. doi:10.1037/0022-3514.95.1.18

- Krahé, B. & Möller, I. (2010). Longitudinal effects of media violence on aggression and empathy among German adolescents. *Journal of Applied Developmental Psychology, 31*, 401–409. doi:10.1016/j.appdev.2010.07.003
- Krampen, G. (1989). Perceived childrearing practices and the development of locus of control in early adolescence. *International Journal of Behavioral Development, 12*, 177–193. doi:10.1177/016502548901200203
- Lacourse, E., Nagin, D., Tremblay, R. E., Vitaro, F., & Claes, M. (2003). Developmental trajectories of boys' delinquent group membership and facilitation of violent behaviors during adolescence. *Development and Psychopathology, 15*, 183–197. doi:10.1017/S0954579403000105
- Lachman, M. E., Weaver, S. L., Bandura, M., Elliott, E., & Lewkowicz, C. J. (1992). Improving memory and control beliefs through cognitive restructuring and self-generated strategies. *Journal of Gerontology, 47*, 293–299. doi:10.1093/geronj/47.5.P293
- Mathys, C., Hyde, L. W., Shaw, D. S., & Born, M. (2013). Deviancy and normative training processes in experimental groups of delinquent and nondelinquent male adolescents. *Aggressive Behavior, 39*, 30–44. doi:10.1002/ab.21456
- McCauley, E., Mitchell, J. R., Burke, P. M., & Moss, S. J. (1988). Cognitive attributes of depression in children and adolescents. *Journal of Consulting and Clinical Psychology, 56*, 903–908. doi:10.1037/0022-006X.56.6.903
- Möller, I. & Krahé, B. (2009). Exposure to violent video games and aggression in German adolescents: A longitudinal analysis. *Aggressive Behavior, 35*, 75–89. doi:10.1002/ab.20290
- Muthén, L. K. & Muthén, B. O. (1998-2015). *Mplus user's guide. Seventh edition*. Los Angeles, CA: Muthén & Muthén.
- Nesdale, D., Durkin, K., Maass, A., Kiesner, J., & Griffiths, J. A. (2008). Effects of group norms on children's intentions to bully. *Social Development, 17*, 889–907. doi:10.1111/j.1467-9507.2008.00475.x
- Österman, K., Björkqvist, K., Lagerspetz, K. M. J., Charpentier, S., Caprara, G. V., & Pastorelli, C. (1999). Locus of control and three types of aggression. *Aggressive Behavior, 25*, 61–65. doi:10.1002/(SICI)1098-2337(1999)25:1<61::AID-AB6>3.0.CO;2-G
- Paulhus, D. L. (1984). Two-component models of socially desirable responding. *Journal of Personality and Social Psychology, 46*, 598–609. doi:10.1037/0022-3514.46.3.598
- Paulhus, D. L. (2002). Socially desirable responding: The evolution of a construct. In H. I. Braun, D. N. Jackson, D. E. Wiley (Eds.), *The role of constructs in psychological and educational measurement*

- (pp. 49-69). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Pardini, D. A., Loeber, R., & Stouthamer-Loeber, M. (2005). Developmental shifts in parent and peer influences on boys' beliefs about delinquent behavior. *Journal of Research on Adolescence, 15*, 299–323. doi:10.1111/j.1532-7795.2005.00098.x
- Radliff, K. M., Wang, C., & Swearer, S. M. (2016). Bullying and peer victimization: An examination of cognitive and psychosocial constructs. *Journal of Interpersonal Violence, 31*, 1983-2005. doi:10.1177/0886260515572476
- Romi, S. & Itskowitz, R. (1990). The relationship between locus of control and type of aggression in middle-class and culturally deprived children. *Personality and Individual Differences, 11*, 327–333. doi:10.1016/0191-8869(90)90214-C
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied, 80*, 1–28. doi:10.1037/h0092976
- Rotter, J. B. (1990). Internal versus external control of reinforcement: A case history of a variable. *American Psychologist, 45*, 489–493. doi:10.1037/0003-066X.45.4.489
- Sampsons, R. J. & Lauritsen, J. L. (1990). Deviant lifestyles, proximity to crime, and the offender-victim link in personal violence. *Journal of Research in Crime and Delinquency, 27*, 110–139. doi:10.1177/0022427890027002002
- Schafer, J. L. & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods, 7*, 147–177. doi:10.1037/1082-989X.7.2.147
- Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research, 8*, 23–74.
- Schreck, C. J., Fisher, B. S., & Miller, J. M. (2004). The social context of violent victimization: A study of the delinquent peer effect. *Justice Quarterly, 21*, 23–47. doi:10.1080/07418820400095731
- Seligman, M. E. P. (1975). *Helplessness: On depression, development, and death*. New York: W H Freeman/Times Books/ Henry Holt & Co.
- Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology, 71*, 549–570. doi:10.1037/0022-3514.71.3.549
- Skinner, E. A., Zimmer-Gembeck, M. J., & Connell, J. P. (1998). Individual differences and the development of perceived control. *Monographs of the Society for Research in Child Development, 63*. doi:10.2307/1166220

- Snyder, J., Schrepferman, L., Oeser, J., Patterson, G., Stoolmiller, M., Johnson, K., & Snyder, A. (2005). Deviancy training and association with deviant peers in young children: Occurrence and contribution to early-onset conduct problems. *Development and Psychopathology, 17*, 397–413. doi:10.1017/S0954579405050194
- Tucker, L. R. & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika, 38*, 1–10. doi:10.1007/BF02291170
- van Buuren, S. & Groothuis-Oudshoorn, K. (2011). Mice: Multivariate imputation by chained equations in R. *Journal of Statistical Software, 45*, 1–67.
- Watson, J. S. (1966). The development and generalization of 'contingency awareness' in early infancy: Some hypotheses. *Merrill-Palmer Quarterly, 12*, 123–135.
- Weisz, J. R., Weiss, B., Wasserman, A. A., & Rintoul, B. (1987). Control-related beliefs and depression among clinic-referred children and adolescents. *Journal of Abnormal Psychology, 96*, 58-63. doi:10.1037/0021-843X.96.1.58
- Werner, N. E. & Crick, N. R. (2004). Maladaptive peer relationships and the development of relational and physical aggression during middle childhood. *Social Development, 13*, 495–514. doi:10.1111/j.1467-9507.2004.00280.x
- White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66*, 297–333. doi:10.1037/h0040934
- Whitson, J. A., & Galinsky, A. D. (2008). Lacking control increases illusory pattern perception. *Science, 322*, 115-117. doi:10.1126/science.1159845
- Yates, R., Kennelly, K., & Cox, S. H. (1975). Perceived contingency of parental reinforcements, parent-child relations, and locus of control. *Psychological Reports, 36*, 139–146. doi:10.2466/pr0.1975.36.1.139
- Zumbo, B. D., Gadermann, A. M., & Zeisser, C. (2007). Ordinal versions of coefficients alpha and theta for Likert rating scales. *Journal of Modern Applied Statistical Methods, 6*, 21-29.

Table 1. Scale reliabilities, means, standard deviations and gender differences.

<i>Variable</i>	<i>N items</i>	α	<i>Range</i>	<i>M (SD) total</i>	<i>M (SD) males</i>	<i>M (SD) females</i>	η^2
Time 1 Peers' acceptance of aggression	6	.88	1.00-4.00	1.65 (0.54)	1.77 (0.60) ^a	1.50 (0.40) ^b	.06
Time 1 External locus of control	4	.67	1.00-5.00	2.13 (0.73)	2.12 (0.74)	2.14 (0.72)	.00
Time 1 Aggressive behavior	10	.87	1.00-3.20	1.39 (0.34)	1.43 (0.37) ^a	1.34 (0.29) ^b	.02
Time 2 Peers' acceptance of aggression	6	.86	1.00-4.00	1.63 (0.48)	1.76 (0.54) ^a	1.49 (0.36) ^b	.08
Time 2 External locus of control	4	.67	1.00-4.50	1.98 (0.67)	1.90 (0.67) ^a	2.05 (0.67) ^b	.01
Time 2 Aggressive behavior	10	.86	1.00-3.10	1.34 (0.30)	1.40 (0.33) ^a	1.29 (0.26) ^b	.03

Note. $N = 1,466$. ^{a,b} Pairwise means differ at $p < .008$.

Table 2. Bivariate correlations between the model variables for males (above the diagonal) and females (below the diagonal).

	1	2	3	4	5	6	7
1 Time 1 Peers' acceptance of aggression	-	0.15***	0.34***	0.44***	0.18***	0.27***	0.23***
2 Time 1 External locus of control	0.19***	-	0.28***	0.17***	0.33***	0.28***	0.12**
3 Time 1 Aggressive behavior	0.34***	0.33***	-	0.28***	0.14**	0.50***	0.11**
4 Time 2 Peers' acceptance of aggression	0.37***	0.20***	0.19***	-	0.21***	0.46***	0.10*
5 Time 2 External locus of control	0.19***	0.35***	0.20***	0.18***	-	0.29***	0.17***
6 Time 2 Aggressive behavior	0.19***	0.20***	0.39***	0.40***	0.22***	-	0.03
7 Age	0.13**	0.19***	0.16***	0.01	0.07	-0.02	-

Note. $N = 1,466$. * $p < .05$, ** $p < .01$, *** $p < .001$.

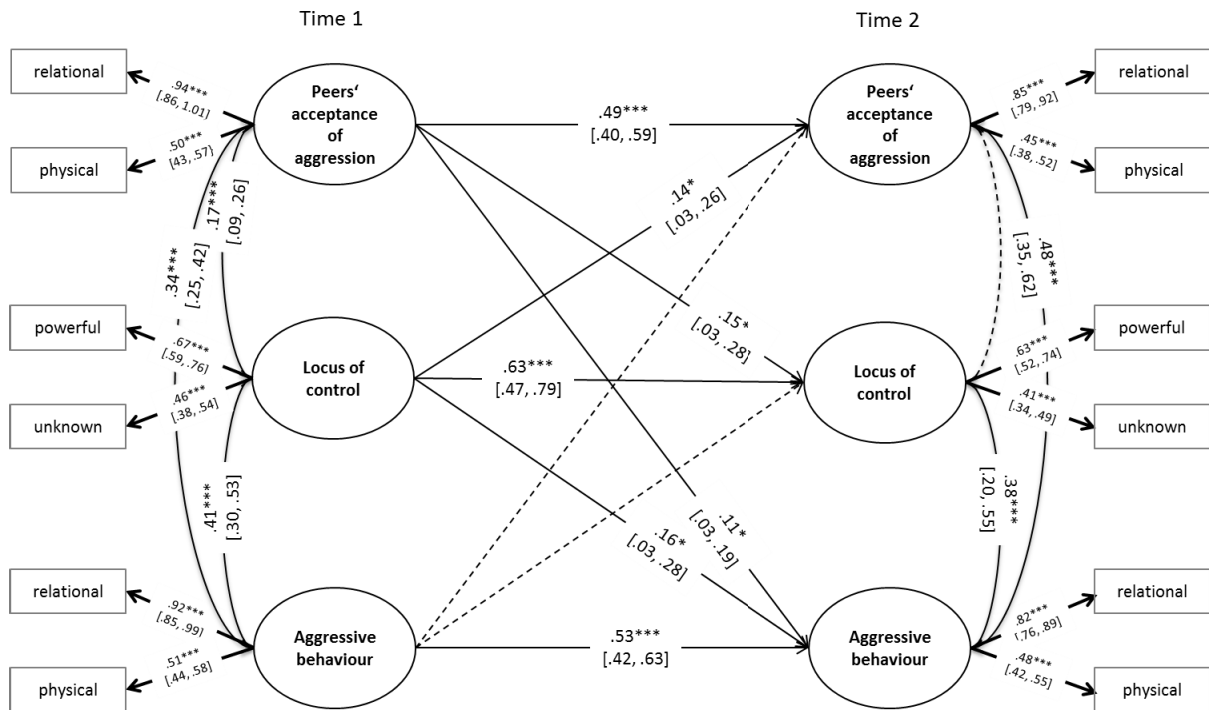


Figure 1. Standardized path coefficients for the relationships between peers' acceptance of aggression, external locus of control, and aggressive behavior.

Model fit: $\chi^2(36) = 130.72, p < .001$; RMSEA = .04; CFI = .98; SRMR = .03.

Note: $N = 1,466$. Dotted lines are non-significant ($p > .05$). * $p < .05$, ** $p < .01$, *** $p < .001$.

8 Study 3

Differential Risk Profiles for Reactive and Proactive Aggression: A Longitudinal Latent-Profile Analysis

Differential Risk Profiles for Reactive and Proactive Aggression: A Longitudinal Latent-Profile Analysis ⁵

Janis Jung, Barbara Krahé, and Robert Busching
University of Potsdam, Germany

Total word count: 8.016 (excluding references, tables, and figures)

Correspondence Address:

Janis Jung

University of Potsdam

Department of Psychology

Karl-Liebknecht-Str. 24-25

D-14476 Potsdam, Germany

Tel: ++49-331-977-2636

Fax: ++49-331-977-2795

Email: janis.jung@uni-potsdam.de

⁵ This research was conducted as part of the Graduate College “Intrapersonal developmental risk factors in childhood and adolescence” funded by the German Research Foundation (GRK 1668-1). Correspondence concerning this article should be addressed to: Janis Jung, University of Potsdam, Karl-Liebkecht-Str. 24-25, D-14476 Potsdam, Germany. Email: janis.jung@uni-potsdam.de.

Abstract

This two-wave longitudinal study identified configurations of social rejection, affiliation with aggressive peers, and academic failure and examined their predictivity for reactive and proactive aggression in a sample of 1,479 children and adolescents aged between 9 and 19 years. Latent profile analysis yielded three configurations of risk factors, made up of a non-risk group, a risk group scoring high on measures of social rejection (SR), and a risk group scoring high on measures of affiliation with aggressive peers and academic failure (APAF). Latent path analysis revealed that, as predicted, only membership in the SR group at T1 predicted reactive aggression at T2 17 months later. By contrast, only membership in the APAF group at T1 predicted proactive aggression at T2.

Keywords: reactive aggression, proactive aggression, social rejection, aggressive peers, academic failure, longitudinal, childhood, adolescence, Germany

Differential Risk Profiles for Reactive and Proactive Aggression: A Longitudinal Latent-Profile Analysis

Identifying psychosocial risk factors for the development and persistence of childhood and adolescent aggression has become a major field in aggression research. Today, a plethora of studies indicates not only that multiple risks are involved in the etiology of aggression but also that risk factors of different domains often co-occur within individuals, implying a high comorbidity of developmental problems (Angold, Costello, & Erkanli, 1999; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998; Masten et al., 2005). However, considering the multifaceted structure of aggression, more recent studies suggest that different aspects of aggressive behavior are differentially related to psychosocial risks (Raine et al., 2006). For reactive and proactive aggression in particular, a growing body of cross-sectional and longitudinal evidence suggests that both subtypes are differentially associated with developmental problems, implying that they might have distinct etiological pathways (Card & Little, 2006). However, compared to the growing evidence on differential associations between reactive and proactive aggression and psychosocial risks, less is known about how those risk factors interrelate, how they combine within individuals, and, most importantly, whether different configurations of risk factors differentially predict the development of reactive and proactive aggression. The aim of the present longitudinal study was to identify configurations of developmental problems across the social and academic domain and to analyze their specific effects on reactive and proactive aggression, using a combination of person- and variable-centered analyses. In particular, we examined the role of social rejection, affiliation with aggressive peers, and academic failure which have been shown to be especially relevant in the etiology of aggressive behavior (Laird, Jordan, Dodge, Pettit, & Bates, 2001; Masten et al., 2005; Patterson et al., 1989; Tremblay, Mâsse, Vitaro, & Dobkin, 1995).

The selection of those three developmental risks was based on a theoretical model of the development of antisocial and aggressive behavior proposed by Patterson, DeBaryshe, and Ramsey (1989). The model suggests that aggressive behavior causes both social rejection by non-aggressive peers and failure in school. Both mechanisms are argued to increase the likelihood that the socially marginalized and academically unsuccessful child selectively affiliates with aggressive peers who socially reinforce deviant behavior and thereby promote aggression at later developmental stages. Although the model suggests that social rejection, academic failure, and affiliation with aggressive peers are likely to co-occur within individuals, an analysis of the differential predictivity of combinations of those risk factors for the development of the different functions of aggression is still missing.

The variable-centered approach adopted in previous studies does not lend itself easily to the examination of constellations of multiple risk factors because the inclusion of higher-order interaction terms into regression models may lead to problems in the estimation and interpretation of effects when considering several risk factors in combination. In the present study, we therefore adopt a person-centered approach, namely latent-profile analysis (LPA), which permits grouping individuals into categories on the basis of their shared characteristics (here: risk factors). In contrast to variable-centered approaches that provide information about the mean levels of single risk factors and their respective variations, latent-profile analysis identifies groups of individuals that meaningfully differ in their configurations of several risk factors. Different structural organizations of risk factors may unfold a dynamic that goes beyond the effect of the single risks and may be associated with distinct facets of aggression. For example, whereas subgroups of individuals who affiliate with aggressive peers, who perform poor at school, and who are socially rejected might be prone to develop reactive aggression, subgroups of individuals who affiliate with aggressive peers, who perform poor at school, but who are relatively popular might be more likely to develop proactive aggressive behavior. Due to a more holistic perspective, latent-profile analysis is especially suitable for analyzing the possibility of such non-additive effects.

Multidimensionality of aggression

Aggression is a multidimensional construct that may be classified along various topographical features, such as response modality (physical vs. relational vs. verbal), visibility (overt vs. covert), immediacy (direct vs. indirect), or response quality (active vs. passive) (Krahé, 2013; Parrott & Giancola, 2007). In addition, aggressive behavior may be differentiated in terms of its underlying psychological functions or motives, which is reflected in the distinction between *reactive* and *proactive* aggression (Dodge, 1991; Dodge & Coie, 1987; Parrott & Giancola, 2007). The dichotomous conceptualization of the functionality of aggression has its roots in two different theoretical perspectives, referring to distinct social-cognitive processes involved in aggressive behavior. The concept of reactive aggression (also referred to as hostile or “hot-blooded” aggression) is related to frustration-aggression theory and its extension into a more general affect-based model of aggression (Berkowitz, 1989, 2012; Dollard, Miller, Doob, Mowrer, & Sears, 1939), which assumes that frustration or other aversive events lead to aggression. In this line of theorizing, aggressive behavior is conceptualized as a defensive and emotionally-laden response to a perceived threat, stressor, or provocation, associated with intense affective states of anger or hostility. By contrast, proactive aggression (also referred to as instrumental or “cold-blooded” aggression) is a more deliberate and goal-directed behavior, enacted to obtain a desired outcome. Proactive aggression is theoretically rooted in social learning theory (Bandura, 1973, 1986), which argues that aggressive behavior is a learned habit, stimulated by the reinforcement

contingency of the social environment. Accordingly, the anticipation of social or material reward is the driving mechanism underlying proactively aggressive behavior.

Differential correlates of reactive and proactive aggression

Although both functions are related and frequently co-occur within the same individual (Bushman & Anderson, 2001; Card & Little, 2006), their discriminant dimensionality has been shown by both exploratory and confirmatory factor analyses (Brown, Atkins, Osborne, & Milnamow, 1996; Day, Bream, & Pal, 1992; Poulin & Boivin, 2000a). Additionally, reactive and proactive aggression have been shown to be associated with distinct correlates and patterns of social maladjustment. For example, although problems with peers have long been associated with the development of general measures of aggression (Dishion, Véronneau, & Myers, 2010), a more specific analysis of the underlying functionality reveals that reactive aggression is related more closely than proactive aggression to social rejection and victimization (Card & Little, 2006). For example, Price and Dodge (1989) not only observed that reactively aggressive boys were more socially rejected than proactive boys, directing proactive aggressive behaviors towards peers was even positively associated with peer status. Problems with peers and lacking social skills may be attributed to more general deficits in verbal intelligence and social-cognitive information processing. Reactively aggressive individuals are prone to biases in the encoding and interpretation of social stimuli, with a hypervigilance to potentially threatening cues and a tendency to misinterpret ambiguous situations as malicious (Day et al., 1992; Dodge & Coie, 1987). As a consequence, reactively aggressive children and adolescents tend to misjudge others' intentions as provoking and hostile, increasing their risk for over-reactive, aggressive responses.

Proactively aggressive individuals, by contrast, do not seem to differ from nonaggressive individuals in the perception and interpretation of social situations. Instead, proactive aggression is associated with biases in the search, selection, and evaluation of appropriate interpersonal behaviors (Dodge & Coie, 1987). Proactively aggressive individuals are more ready to use aggression as a problem-solving strategy and tend to expect the outcome of an aggressive act to be particularly favorable and rewarding, probably due to the exposure to aggressive role models in their proximal social environment. In line with this reasoning, proactively aggressive children and adolescents are often found to have proactively aggressive friends (Poulin & Boivin, 2000b; Sijtsema et al., 2009). Thus, they experience a social context that not only shows a high acceptance of aggressive behavior but also tends to actively reward aggression through access to desired resources, such as reputation, status, or other privileges (Anderson, 2002). Various cross-sectional and longitudinal studies showed that the peers' positive reinforcement of aggression, also referred to as *deviancy training*, is crucial for the development and persistence of aggressive behavior, even into adulthood (Dishion, Spracklen,

Andrews, & Patterson, 1996; Patterson et al., 1989).

Whereas the literature provides compelling evidence for significant differences between reactively and proactively aggressive individuals in the social domain, evidence on whether reactive and proactive aggression are differentially associated with academic problems, such as poor school performance, is less conclusive (Day et al., 1992; Little, Brauner, Jones, Nock, & Hawley, 2003; Raine et al., 2006). From a theoretical standpoint, both reactive and proactive aggression might be related to impaired academic performance, but for different reasons. For example, reactively aggressive individuals' deficits in verbal intelligence and social-cognitive information processing might interfere with mastering school requirements. In this vein, Little et al. (2003) found that, in contrast to exclusively proactively aggressive individuals, participants who scored high on reactive or on both reactive and proactive aggression showed consistent maladaptive patterns across different outcomes, including low school performance. However, the negative relationship between academic performance and aggression has been shown to remain even when controlling for an individual's cognitive functioning (Masten et al., 2005), indicating that multiple mechanisms contribute to the link between aggression and academic failure. One candidate is low school motivation, which was found to be a significant determinant of academic success (Covington, 2000). Low school motivation has also been linked differentially to proactive and reactive aggression. For example, Raine et al. (2006) found that boys with low school motivation at age 7 had higher scores on measures of proactive, but not reactive, aggression at age 16.

The present study

The evidence reviewed so far suggests that reactive and proactive aggression follow both distinct and overlapping etiological pathways, involving specific patterns of risk factors (Dodge, 1991). Reactive aggression has been shown to be particularly associated with social rejection, whereas proactive aggression seems particularly linked to affiliation with aggressive peers. At the same time, both functions may be related to academic problems in school. Despite the importance of social rejection, affiliation with aggressive peers, and academic failure for the development of aggressive behavior (Patterson et al., 1989), an analysis of how those risk factors combine to differentially predict reactive and proactive aggression is still missing. Accordingly, the first aim of this study was to identify constellations of social rejection, affiliation with aggressive peers, and academic failure in a community sample of 9 to 19 year-old children and adolescents, using latent-profile analysis. Understanding how different risk factors combine and whether different constellations predict distinct facets of aggression is relevant not only from a theoretical perspective but also for the development of intervention programs tailored to specific risk factor constellations. For example, if it was established that academic failure is likely to go hand in hand with the association with aggressive peers and the two factors in

combination are more likely than, for instance, social rejection, to promote proactive aggression, interventions to prevent proactive aggression could be tailored to this pattern of risk factors.

Because of the lack of prior studies examining constellations of social rejection, affiliation with aggressive peers, and academic failure, we made no a priori hypotheses regarding the exact number and the mean-level profiles of groups that would emerge. However, because we studied an unselected community sample, we expected the majority of participants to be classified in a non-risk group characterized by low scores on measures of social rejection, affiliation with aggressive peers, and academic failure. Additionally, considering the comorbidity of psychosocial risks and their tendency to co-occur, we expected to find groups characterized by combinations of developmental problems.

In addition to identifying specific constellations of social rejection, affiliation with aggressive peers, and academic failure, we sought to establish whether they are stable over time or just transient phenomena. Accordingly, a second issue of our study is to determine the temporal stability of the observed risk-profiles over a period of approximately 17 months.

The third aim of our study was to analyze the differential predictivity of the distinct risk profiles for the development of reactive and proactive aggression, using latent path analysis. Latent path analysis allows to simultaneously analyze relationships between multiple dependent and independent latent variables. One major advantage of latent path analysis is that the measurement error of the observed variables is explicitly taken into account in the model. Hence, latent path analysis provides more accurate estimates of statistic relationships between variables than more traditional methodological approaches, such as correlation or regression analysis, which are based on manifest variables (Geiser, 2013). Although the combined effect of social rejection, affiliation with aggressive peers, and academic failure has not been studied yet, considering the literature reviewed so far, we expected a risk profile particularly characterized by high social rejection to be more closely related to reactive than to proactive aggression. By contrast, we hypothesized that a risk profile characterized by particularly high scores on measures of affiliation with aggressive peers to be more closely associated with proactive than with reactive aggression. As academic failure may be equally related to both functions of aggression, we refrained from proposing specific hypothesis about associations between subsets of individuals performing particularly poorly in school and the development of reactive and proactive aggressive behavior. However, we argue that for individuals who are not only socially rejected (or affiliate with aggressive peers) but also fail in school, the risk of developing reactive or proactive aggression might be different compared to individuals who are socially rejected (or affiliate with aggressive peers) but do not perform poorly in school.

Finally, by taking a dynamic perspective on the development of psychopathological behavior

(Hinshaw, 2008; Masten & Cicchetti, 2010), we expected not only that the different risk profiles would be unique predictors of one function of aggression but not the other, but also that reactive and proactive aggressive behavior would have an impact of risk-group membership over time. This reciprocal relationship between risk factors and outcomes has been shown to be especially crucial in the etiological process of antisocial and aggressive behavior and to contribute to the high stability of aggression over the lifetime (Dishion et al., 2010; Patterson et al., 1989). By adopting a cross-lagged panel design that includes both the risk factor constellations and the two functions of aggression at two data waves, we were able to examine these reciprocal associations.

Using a combination of latent profile and latent path analysis has the particular advantage of identifying potential heterogeneities in the etiology of reactive and proactive aggression. More specifically, a synergistic person- and variable-centered approach acknowledges that a population may be composed of different subgroups of individuals that differ in their level of social rejection, affiliation with aggressive peers, and academic failure, and that subgroup membership may be differentially related to the development of reactive and proactive aggression.

To summarize, the following research questions were addressed in our study:

(1) What are the configurations of three established risk factors of aggression in childhood and adolescence, namely social rejection, affiliation with aggressive peers, and academic failure in a large community sample of children and adolescents in Germany and how stable are the patterns of risk factors over a 17-months period? (2) Are the patterns of risk factors differentially predictive of reactive and proactive aggression over time, and, conversely, (3) Do reactive and proactive aggression predict patterns of risk factors over time, in line with a transactional model of the development of aggressive behavior? These questions were addressed using data from the participants as well as from their parents and teachers.

Method

Participants and procedure

A total of 1,479 (50.0% female) children and adolescents participated in this two-wave study, which was part of a larger school-based survey on risk factors for developmental problems. Their mean age at T1 was 12.89 years ($SD = 2.03$; range = 9 – 19). Participants were distributed across 174 schools, with the majority attending secondary school (67.3%), 31.7% attending primary school, and only a small subset attending other school types, such as schools for children with special needs (1.1%). A total of 1,182 (49.6% female) participants took part in the second data wave (T2). The T2 sample had a mean age of 14.33 years ($SD = 1.90$; range = 11 – 20) and was distributed across 121 schools. The

majority attended secondary school (95.9%), 2.4% were still in primary school, and 1.7% attended other school types. Only 1.1% of children came from homes in which a language other than German was spoken. Analyses of parents' educational background revealed that the majority of parents had vocational qualifications (42.1% of fathers; 42.5% of mothers), 15.3% of the fathers and 20.7% of the mothers held a university entrance qualification, and 41.5% of fathers and 36.0% of mothers held a university degree. Only 1.2% of the fathers and 0.8% of the mothers had low or no educational qualifications.

An attrition analysis revealed that the 297 participants who dropped out after T1 showed significantly lower academic achievement at T1 than those participants who remained in the study but did not differ on the remaining T1 variables ($p < .001$). Within each data wave, participants for whom parent- or teacher-reports were missing did not differ on self-report data of aggression, social rejection, affiliation with aggressive peers, or academic failure from participants for whom data from parents and teachers were available (all $p > .05$). All T1 participants were included in the analyses, the handling of missing data is explained below.

At both data waves, all self-report measures were collected by trained project staff in individual sessions. Parent- and teacher-reports were collected through either paper-pencil or online questionnaires. Instruments and procedure were approved by the Ethics Committee of the [authors'] University as well as the Ministry for Education in the Federal State of [XXX], where the study was conducted.

Measures

Functions of aggression. To measure reactive and proactive aggression, a two-step procedure was adopted. In the first step, participants were asked to rate how often they had shown different aggressive behaviors in the past six months, with five items measuring physical aggression (e.g. "I have kicked another person") and five items referring to relational aggression (e.g. "I have excluded someone from our group"). These items were taken from Krahé and Möller (2010). The response scale ranged from 1 (*never*) to 5 (*very often*), and total scores were obtained by computing the mean across all items, separately for each measurement point.

The frequency ratings were required as the reference for rating the reactive or proactive function underlying these behaviors, which were the outcome variables in the main analysis. As Cronbach's alpha has been shown to be biased when data are skewed, we report ordinal alpha as a measure of scale reliability, which has been shown to be a more accurate estimate of reliability when assumptions of normality are violated (Gaderman, Guhn, & Zumbo, 2012; Zumbo, Gaderman, & Zeisser, 2007). The ordinal alphas for the aggression measures and all other measures are presented in Table 1.

In the second step, reactive and proactive aggression were measured with an adapted version of the Instrument of Reactive and Proactive Aggression (IRPA; Polman, de Castro, Thomaes, & van Aken, 2009). Following each form of aggressive behavior for which they reported a frequency greater than zero, participants were presented with six items referring to proactive and reactive motivations for engaging in the respective behavior. The items were prefaced with “When I showed these behaviors, it was because...”, and three items referred to reactive aggression (e.g. “because someone teased me and I got upset”) and three items described proactive aggressive motives (e.g. “to hurt or to be mean”). The response scale ranged from 1 (*never*) to 5 (*very often*).

Participants completed the second part of the questionnaire only if they responded with a frequency rating greater than zero to at least one of the physical or relational aggression items. Thus, children who reported no relational or physical aggressive behavior at all had logical missings on the items of reactive and proactive aggression. To be able to include all participants in the sample and use the Full Information Maximum Likelihood (FIML) approach, this nonrandom pattern of missing data had to be converted into a random pattern by including the mechanism which caused the missing data. This was done by adding the frequency reports of physical and relational aggression as correlates of the proactive and reactive aggression scores at T1 and T2. Because the frequency of aggression was a perfect predictor of the presence or missingness of values on the functions items, missing data on the pro- and reactive aggression measures could be treated as missing at random (MAR; Enders, 2010), which allowed us to employ the FIML approach in Mplus.

Social rejection. Social rejection was measured by parent-, teacher-, and self-reports using three items of the “Peer Relationship Problems” scale of the Strength and Difficulties Questionnaire (SDQ; Goodman, 1997) and two self-generated items (“is often excluded by others”, “is sometimes an outsider in class”)⁶. Using a three-point scale, respondents rated whether a statement was (0) *not true*, (1) *somewhat true*, or (2) *definitely true*. Separate mean scores were computed for self-reports, parent-reports, and teacher-reports. These scores were standardized and then aggregated into an overall mean score as an indicator of the participants’ social rejection at T1 and T2, respectively. The results from principal component analysis supported the formation of a single score, yielding only one

⁶ At T2, the item “is sometimes an outsider in class” was accidentally left out in the Teacher Questionnaire. Accordingly, teacher-rated social rejection was measured by four items at T2.

component with an eigenvalue above Kaiser's criterion of 1 at T1 and T2, respectively ($R^2_{T1} = .63$; $R^2_{T2} = .60$).

Affiliation with aggressive peers. Affiliation with aggressive peers was assessed by self- and teacher-ratings. Self-reports referred to participants' appraisal of the acceptance of aggression within their peer group, using a vignette that described a provocation scenario (Möller & Krahe, 2009; same-sex gender reference, as appropriate).

Imagine one of your (male/female) friends is extremely angry with one of his/her classmates who treated your friend in a mean and unfair way in front of others in the school break. After school, your friend bumps into the classmate again, and this time the two are alone. Immediately, the classmate starts quarreling with your friend again, saying nasty things.

Participants were asked to rate how acceptable most of their peers would find each of six possible reactions the friend might show in the situation, using a four-point scale from 1 (*not at all okay*) to 4 (*totally okay*), with three items describing physical aggression (e.g. "to kick/ punch him/ her"), and three items referring to relational aggression (e.g. "to spread rumors about him/ her").

Teacher-ratings of affiliation with aggressive peers were measured by three self-generated items: (a) "Affiliates particularly with deviant peers", (b) "Is impressed by deviant behavior of her/ his peers", and (c) "Is not very popular among non-deviant peers". Response options were equivalent to the SDQ, and teachers rated on a three-point scale whether a statement was (0) *not true* (1) *somewhat true*, or (2) *definitely true*. Separate mean scores were created by averaging responses across the items for each respondent and measurement point, standardized and averaged to a single overall score. Again, principal component analysis supported the computation of a single score for an individual's affiliation with aggressive peers at T1 and T2, respectively ($R^2_{T1} = .55$; $R^2_{T2} = .55$).

Academic failure. Academic failure was assessed by asking participants for their grades in Math, German, and English on their latest report cards. In German schools, grading is made on a six-point scale, where 1 is "very good", and 6 is "insufficient", so that higher scores indicate lower performance. Standardized mean scores were computed for each data wave by aggregating across the three subjects.

As this study was part of a larger survey, the data of the teacher- and parent-report of social rejection, the self-report on the frequency of physical and relation aggression, and the measures of affiliation with deviant peers have been used in previous studies (Jung, Krahe, Bondü, Esser, & Wyschkon, in press; Jung, Krahe, & Busching, in press).

Statistical analyses

To examine the structure and consistency of different configurations of risk factors and their differential predictive value for the development of reactive and proactive aggression, a two-step analysis was conducted, using the software *Mplus* 7.4 (Muthén & Muthén, 2015). First, we used latent profile analysis to identify distinct patterns of risk factors and investigated whether comparable risk patterns could be found at both data waves. Although our individual constructs were measured as ordinal variables with the number of response categories ranging from three to five, the latent scores were composed of multiple indicators yielding a wider range of response categories. Therefore, latent profile analysis was chosen rather than latent class analysis, which is the method of choice for modeling categorical data (Muthén, 2001). Second, cross-lagged panel analysis was used to analyze (a) the temporal stability of distinct risk patterns and (b) the developmental pathways from patterns of risk factors to reactive and proactive aggression and vice versa.

All participants who participated in the T1 data wave were included in the analyses, and missing data was handled by a full information maximum likelihood estimator (FIML). Since participants were nested within school, we accounted for possible dependencies in our data by employing the type “complex” option in *Mplus* (with school membership at T1 as cluster variable) in combination with a robust ML estimator (*MLR*). This approach provides standard errors and test statistics that are robust against clustering and non-normality of the data.

Results

Descriptive statistics and intercorrelations

The overall means and standard deviations of all variables are presented in Table 1, and their intercorrelations and intra-class correlations are presented in Table 2. Most variables were positively associated. At both T1 and T2, reactive aggression was significantly related to self-, parent-, and teacher-reports of social rejection and to self-rated affiliation with aggressive peers. In addition, positive correlations between reactive aggression and teacher-rated affiliation with aggressive peers and between reactive aggression and academic failure were found at T1. Proactive aggression showed significant positive correlations with parent- and teacher-rated social rejection, self-rated and teacher-rated affiliation with aggressive peers, and academic failure at both T1 and T2. Table 2 also shows the associations between measures of social rejection and affiliation with aggressive peers across different informants. Moderate correlations were found between self-, parent- and teacher-ratings of social rejection at T1 and T2 ($r = .32$ to $.49$). The agreement of self- and teacher-reports on measures of affiliation with aggressive peers was lower ($r = .10$ at T1 and T2), but still significant and similar to previous studies (e.g. Aschenbach, McConaughy, & Howell, 1987; Hawley, 2003; Laidra, Allik, Harro, Merenäkk, & Harro, 2006; Miller, Martinez, Shumka, & Baker, 2014).

Latent profile analysis

Model evaluation, and hence the selection of the appropriate number of empirical clusters, was based on the Lo-Mendell-Rubin Test (Tofighi & Enders, 2008), considering the interpretability and parsimony of the class solutions (exclusion of solutions with classes comprising fewer than 5% of all participants).

In the first step, overall scores of T1 social rejection, affiliation with aggressive peers, and academic failure were included in a series of analyses, estimating models with two to five classes. Comparison of fit statistics suggested that a 3-class solution fitted our data best, with a significant Lo-Mendell-Rubin Test ($LRT = 229.88, p < .01$), an entropy of .90, and all classes containing a sufficient number of participants. Additionally, the inspection of the mean-level profiles showed that the 3-class solution resulted in distinct profile shapes (see Figure 1), with all group-mean scores being significantly different across groups (all $ps < .05$). Thus, the 3-class pattern was adopted as the final solution. Based on the mean-level profiles, we identified a *non-risk* group and two risk groups that we labeled as the *social rejection group* (SR) and the *affiliation with aggressive peers/ academic failure group* (APAF). As expected, the non-risk group comprised the majority of our sample (82.9%) and was characterized by the lowest mean scores on the measures of social rejection, affiliation with aggressive peers, and academic failure. Participants in the SR group (10.1% of the sample) had significantly higher scores of social rejection, however, affiliated significantly less with other aggressive peers and performed significantly better in school than participants in the APAF group. Finally, participants in the APAF group (7.0% of the sample) were significantly less socially rejected than participants in the SR group, but had significantly higher scores on the measures of affiliation with aggressive peers and significantly lower grades.

In the second step, we investigated whether the 3-class solution was consistent across time, testing for temporal measurement invariance. We included the T2 measures of social rejection, affiliation with aggressive peers, and academic failure in the model and estimated a 3-class latent profile analysis simultaneously for both measurement points. We first specified a baseline model that allowed all mean-level profiles to differ between T1 and T2 and then compared it to a model that constrained all mean-level profiles to be equal across time. Inspection of the model fit indices indicated that the constrained model did fit better than the baseline model ($BIC_{baseline} = 18692.75, BIC_{constrained} = 18662.79$), which supported the assumption of measurement invariance and allowed us to interpret temporal transitions in group memberships.

As displayed in Table 3, the majority of participants who were in the non-risk group at T1 remained in that group at T2 (93.6%), and only a small percentage of participants from the non-risk

group at T1 changed to either the SR (2.9%) or the APAF (3.5%) group at T2. Similarly, most individuals in either risk group at T1 remained in their group at T2 (SR: 60.0%; APAF: 79.6%). However, 38.0% of participants in the SR group and 18.4% of participants in the APAF group at T1 changed to the non-risk group at T2. Only few temporal transitions of group membership were evident between the two risk groups: only 2.0% of the SR group at T1 changed to the APAF group at T2, and 1.9% of participants in the APAF group at T1 were in the SR group at T2. It is important to note that all percentages of temporal transitions between T1 and T2 are conditional probabilities, based on the total number of participants in latent class, not on the total number of participants in the sample as a whole. Therefore, Table 3 also presents the absolute numbers of participants with stable or changing group memberships. These numbers show that the group sizes were comparable across the two data waves, although proportionately more participants changed from either of the two risk groups to the non-risk group than vice versa.

In summary, these findings suggest that although a high percentage of participants remained in, or moved into, the non-risk group at T2, membership in one of the two risk groups showed a moderate stability over time and a substantial proportion of participants consistently showed risk factors for the development of aggressive behavior across the two data waves.

To analyze the role of participants' sex (1 = male; 2 = female), age, and fathers' and mothers' educational status (as indicators of socio-economic background) for risk-group membership at T1 and T2, we conducted multinomial logistic regression analyses, separately for T1 and T2. Compared to the non-risk group, the odds of membership in the APAF group at T1 were higher for male than for female participants ($OR = 0.17, p < .001$) and for older participants ($OR = 1.15, p < .05$). Only participants' sex predicted membership in the SR group at T1, with male children and adolescents being more likely to be in the SR group than in the non-risk group ($OR = 0.54, p < .01$). At T2, male participants were more likely to be in the APAF group than in the non-risk group ($OR = 0.17, p < .001$). Finally, in comparison to the non-risk group, the odds of membership in the SR group at T2 were higher for older participants ($OR = 0.90, p < .05$).

Latent path analysis

In latent path analysis, a measurement model and a structural model are differentiated. The measurement model specifies and tests the relationships between the latent variables and their observed indicators. The structural model specifies and tests the proposed relationships between the latent constructs. Hence, as reactive and proactive aggression were modeled as latent factors, we first had to analyze the validity of the measurement model. This was done by running confirmatory factor analyses which allowed us to test (a) the relations between reactive and proactive aggression and their

manifest indicators, and (b) the measurement invariance of the latent constructs across the two data waves. To reduce the complexity of the model, we computed three parcels per latent factor, each consisting of the mean of two items, one referring to physical and one referring to relational aggression. Additionally, we specified indicator-specific factors for each indicator variable measured at T1 and T2 to account for the variance that an indicator shared with itself across time. The resulting baseline measurement model provided a satisfactory fit with the data ($\chi^2(30) = 67.29, p < .001$; RMSEA = .03, 95% CI [.02, .04]; CFI = .98, TLI = .95; SRMR = .02).

In the next step, we specified a constrained model that restricted all factor loadings, intercepts, and residual variances to be equal across time, testing for strict measurement invariance. The constrained model showed a good fit with the data ($\chi^2(46) = 73.87, p < .01$; RMSEA = .02, 95% CI [.01, .03]; CFI = .98; TLI = .98; SRMR = .03) and did not fit significantly worse than the baseline model as indicated by a non-significant adjusted Satorra-Bentler χ^2 -test ($\Delta\chi^2(16) = 13.11, n.s.$). Accordingly, all factor loadings, intercepts, and residual variances were comparable across time. All subsequent analyses are based on the constrained model.

To examine the proposed developmental pathways from the distinct risk profiles to reactive and proactive aggression and vice versa, we specified the structural model displayed in Figure 2.⁷ We included participants' risk-group membership at T1 as a dummy-variable (Dummy_1: 0=non-risk group, 1=SR group, 0=APAF group; Dummy_2: 0=non-risk group, 0=SR group, 1=APAF group) and specified group membership at T2 as a nominal variable. To control for the logical dependency of the function of aggression on the reported frequencies and the resulting missing data pattern in the functions of aggression, we included a participant's frequency score of aggression at both T1 and T2 in the model. Additionally, due to the high overlap of reactive and proactive aggression, we controlled each pathway for the influence of the other functional subtype of aggression. Finally, we controlled for influences of relevant third variables by including a participants' sex, age, and educational status of fathers and mothers as covariates in the model.

Consistent with earlier studies (Bushman & Anderson, 2001; Card & Little, 2006; McAuliffe, Hubbard, Rubin, Morrow, & Dearing, 2006), reactive and proactive aggression were correlated at both

⁷ In Mplus 7.4, fit indices for models with nominal dependent variables are not provided. Accordingly, we are not able to report common indices of model fit.

T1 and T2 (T1: $r = .56, p < .001$; T2: $r = .49, p < .001$) and showed a moderate stability over time (RA: $\beta = .41, p < .001$; PA: $\beta = .55, p < .001$). Despite the high correlation between reactive and proactive aggression, reactive aggression at T1 did not predict proactive aggression at T2 ($\beta = -.13, p = .13$) nor did proactive aggression at T1 predict reactive aggression at T2 ($\beta = .05, p = .54$). Inspection of the temporal relationships of risk-group membership complemented the descriptive analyses of risk-group transitions described above. In terms of the temporal stability of group membership, compared to the non-risk group, the odds of remaining in the SR group at T2 were high with an OR of 63.81, which corresponds to a standardized path coefficient of $\beta = .95 (p < .001)$. Similarly, the temporal stability for remaining in the APAF group was also high, with an OR of 115.83, corresponding to $\beta = .80 (p < .001)$. As expected, membership in the socially rejected group at T1 was significantly associated with reactive ($\beta = .11, p < .01$), but not proactive aggression ($\beta = -.01, p = .90$) at T2. Conversely, in line with our hypothesis, membership in the APAF group at T1 predicted proactive ($\beta = .17, p < .05$), but not reactive aggression ($\beta = .06, p = .20$) at T2. Investigating the pathways from the functions of aggression at T1 to risk-group membership at T2 revealed that, as expected, higher proactive aggression at T1 increased the odds for membership in the APAF group at T2 ($OR = 3.03, p < .05$). By contrast and unexpectedly, higher reactive aggression at T1 did not significantly predict the odds for membership in the SR group at T2 ($OR = 1.08, p = .84$).

Discussion

The aim of this two-wave longitudinal study was twofold: first, we sought to identify groups of children and adolescents characterized by specific constellations of developmental problems and assess the stability and change of group membership over time. Second, we examined the prospective associations of membership in risk and non-risk groups with reactive and proactive aggression in childhood and adolescence over a period of 17 months. Our aim was to demonstrate that reactive and proactive aggression, once controlled for influences of the other functional subtype of aggression, are distinct constructs and differentially predicted by specific constellations of risk factors related to their proposed motivational foundations. We expected that subgroups of children and adolescents whose risk profile was characterized by a high degree of social rejection would be more at risk for developing reactive than proactive aggression. We also expected that participants in a group characterized by especially high affiliation with aggressive peers would be more prone to the development of proactive compared to reactive aggression. Additionally, as academic failure has been shown to be related to both functions of aggression, we investigated whether academic failure would show distinct associations with either social rejection or affiliation with aggressive peers. To analyze the proposed pathways in a sample of participants aged between 9 and 19 years, a combination of person- and variable-centered analyses was conducted. We first determined the number of empirical

configurations of the risk factors for proactive and reactive aggression, using latent profile analysis. Subsequently, latent path analysis was used to examine the etiological pathways from the distinct risk patterns to reactive and proactive aggression, spanning a period of approximately one and a half years.

Results from latent profile analysis lead to the identification of three groups: a non-risk group that contained the majority of our participants, a social rejection group (SR) characterized by particularly high scores on measures of social rejection, and a risk group characterized by high scores on measures of affiliation with aggressive peers and academic failure (APAF). Unsurprisingly, the majority of participants in this unselected sample were included in the non-risk group, characterized by the lowest scores on all three developmental risk factors. However, a substantial proportion of children and adolescents were classified into one of the two risk groups. These risk groups not only showed significantly more developmental problems than the non-risk group but also significantly differed from each other in their mean-level profiles. Compared to the non-risk group, participants in the SR group showed the highest scores on measures of social rejection and, additionally, affiliated more with aggressive peers and performed worse in school. Similarly, participants in the APAF group not only experienced significantly more social rejection than did the non-risk group, they also had significantly lower school grades and affiliated more with aggressive peers than the SR group. These findings not only demonstrate the tendency of developmental risks to co-occur within individuals, they also suggest which risk factors are more or less likely to appear in combination. Specifically, we found an incompatibility between affiliating with aggressive peers and success in school. Different mechanisms may underlie the link between a deviant peer culture and academic performance. For example, research has indicated the strong socializing influence of the peer group on school motivation and academic outcomes (Wentzel, 1998). The social values and norms of the peer group not only affect the willingness to learn and to participate in lessons (Kindermann, 1993; Ryan, 2000, 2001), but also an individual's readiness to abide by the school rules. In particular, aggressive peer groups may promote behaviors, such as disruptive or aggressive behavior in class, that interfere with the rules and demands of the school setting and result in sanctioning measures, for example in the form of poor grades. However, there is also evidence that aggressive individuals who have problems to conform to school rules actively select social groups that show a high tolerance for aggressive behavior (Patterson et al., 1989), which suggests that the relationship between affiliation with aggressive peers and academic failure is most likely to be reciprocal.

Analyses of temporal transitions in group membership showed that more than 90% of participants who were in the non-risk group at T1 remained in this group at T2. Of the participants in the APAF group at T1, about 80% remained in the same group at T2, and of the participants in the SR group at T1, about 60% remained in their group at T2. This relative stability of risk-group membership

is comparable to other studies analyzing transitions between latent classes (e.g. Choi & Temple, 2016; Kretschmer, Barker, Dijkstra, Oldehinkel, & Veenstra, 2015; Lanza & Bray, 2010; Rodgers et al., 2014).

Consistent with our theoretical reasoning, membership in the SR group at T1 significantly predicted reactive, but not proactive aggression at T2, after controlling for the construct's temporal stability, the influence of proactive aggression, and for participants' age, sex, and parents' educational status. There is a plethora of research showing that peer problems and social rejection are highly aversive experiences, especially in childhood and adolescence, where the need for close and intimate relationships with peers increases significantly (Baumeister & Leary, 1995; Bierman, 2004; Pardini, Loeber, & Stouthamer-Loeber, 2005). In line with this evidence, being chronically frustrated by social rejection in interpersonal situations has the potential to make individuals especially anger-prone (Vitaro, Brendgen, & Barker, 2006), lowering the threshold for anger-based, reactive aggression. By contrast, and in line with our expectations, we observed that group membership in the APAF group at T1 was positively associated with proactive but not reactive aggression at T2, again even after controlling for the construct's temporal stability, the effect of reactive aggression, and the influence of relevant "third" variables. We argue that aggressive peer groups, unlike mainstream social groups, not only show a higher acceptance of aggression but tend to positively reinforce and normatively endorse aggressive behavior (Sijtsema et al., 2009). Thereby, we propose that the configuration of academic failure and affiliation with aggressive peers is especially relevant in the etiological process of proactive aggression. The objective of school education is not only the effective transfer of knowledge and skills but also the teaching of normative values and behaviors. Accordingly, the incompatibility of the norms of the aggressive peer group and the norms of the school sanctioning aggressive behavior may not only impede academic success but also the internalization of the rejection of aggression. Affiliating with aggressive peers, therefore, not only supports beliefs that aggressive behavior is an appropriate and legitimate interpersonal behavior but also undermines the learning of socially approved values and behaviors.

In line with our predictions, the association between membership in the APAF group and proactive aggression was reciprocal, indicating that individuals who behaved proactively aggressive at T1 were more at risk of showing a combination of academic problems and affiliation with aggressive peers at T2. This dynamic interplay between distinct patterns of risk factors and negative outcomes has been shown to be a crucial aspect in the chronification process of aggression (Masten et al., 2005; Patterson et al., 1989). Contrary to our hypotheses, however, reactive aggression at T1 did not predict group membership in the SR group at T2. This finding is surprising, especially in the light of the large body of research indicating that social groups tend to reject individuals who behave in a reactively aggressive way (Card & Little, 2006; Fite, Hendrickson, Rubens, Gabrielli, & Evans, 2013; Ostrov,

Murray-Close, Godleski, & Hart, 2013). One possible explanation for the absence of a path from reactive aggression to membership in the SR group might be that the interval between T1 and T2 was too short for the effect to be manifested (Masten & Cicchetti, 2010). Future studies aiming to analyze the link between aggression and profiles of risk factors should therefore study a longer interval between the data waves.

Strength and limitations

We believe our study has several strengths. First, it included two data waves covering a time span of one and a half years and was based on a large sample of almost 1,500 male and female children and adolescents of different ages, attending a wide range of mainstream schools. Second, considering multiple informants for the measures of social rejection and affiliation with aggressive peers enabled us to assess both risk factors in different social contexts. Third, with the combination of latent profile analysis and latent path analysis, we were able to identify empirical configurations of social rejection, affiliation with aggressive peers, and academic failure and relate these risk patterns to the development of reactive and proactive aggression over time. This combination of person- and variable-centered analyses facilitated the analysis of pathways in the etiology of reactive and proactive aggression for different subgroups of individuals, which would not have been possible with an exclusively variable-centered approach.

At the same time, the study should be evaluated in the context of some limitations: Measures of the form and functions of aggression were based on self-reports, an approach consistent with other work in this area, such as studies based on the Little et al. (2003) measure of proactive and reactive aggression. Although we argue that the intrinsic motivation underlying an aggressive response is often only accessible to the actor, we acknowledge that multi-informant measures including self-, peer-, and parent- or teacher-reports may provide additional tests of our theoretical assumptions. Another limitation is that, due to the lack of prior studies, we based our decision to adopt a 3-class solution on common fit statistics, while considering the interpretability and parsimony of the class solutions. Considering this data-driven approach to model selection, future research is needed to replicate our class solution in comparable community samples. Third, the interval of 17 months between the two data waves may have been too short to capture the dynamics of peer responses to aggressive behavior, for instance in the form of rejecting peers with a propensity for reactive aggression. Finally, due to the limited number of individuals in both risk-groups, multigroup analyses for investigating moderating influences on the predicted pathways were not feasible. Hence, future research is needed to clarify whether the developmental pathways identified in our study vary as a function of participants' sex or age.

Despite these limitations, we believe that our study significantly contributes to the understanding of the differential etiology and effects of reactive and proactive aggression in childhood and adolescence, presenting further support for the conceptual distinction between the two constructs. By providing insights into the co-occurrence of psychosocial risk factors in a community sample of children and adolescents, the study suggests starting points for the conceptualization and development of intervention programs tailored to specific constellations of risk factors and their likely outcomes.

References

- Anderson, E. (2002). The code of the streets. In S. L. Gabbidon, H. T. Greene, & V. D. Young (Eds.), *African American classics in criminology & criminal justice*. (pp. 293–305). Thousand Oaks, CA: Sage Publications, Inc.
- Angold, A., Costello, E. J., & Erkanli, A. (1999). Comorbidity. *Journal of Child Psychology and Psychiatry*, *40*, 57–87. doi:10.1111/1469-7610.00424
- Achenbach, T. M., McConaughy, S. H., & Howell, C. T. (1987). Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin*, *101*, 213-232. doi:10.1037/0033-2909.101.2.213
- Bandura, A. (1973). *Aggression: A social learning analysis*. Oxford, England: Prentice-Hall.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Baumeister, R. F., & 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
- Berkowitz, L. (1989). Frustration-aggression hypothesis: Examination and reformulation. *Psychological Bulletin*, *106*, 59–73. doi:10.1037/0033-2909.106.1.59
- Berkowitz, L. (2012). A cognitive-neoassociation theory of aggression. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (Vol , pp. 99–117). Thousand Oaks, CA: Sage Publications Ltd. doi:10.4135/9781446249222.n31
- Bierman, K. L. (2004). *Peer rejection: Developmental processes and intervention strategies*. New York, NY: Guilford Press.
- Brown, K., Atkins, M. S., Osborne, M. L., & Milnamow, M. (1996). A revised teacher rating scale for reactive and proactive aggression. *Journal of Abnormal Child Psychology*, *24*, 473–480. doi:10.1007/BF01441569
- Bushman, B. J., & Anderson, C. A. (2001). Is it time to pull the plug on hostile versus instrumental aggression dichotomy? *Psychological Review*, *108*, 273–279. doi:10.1037/0033-295X.108.1.273
- Card, N. A., & Little, T. D. (2006). Proactive and reactive aggression in childhood and adolescence: A meta-analysis of differential relations with psychosocial adjustment. *International Journal of Behavioral Development*, *30*, 466–480. doi:10.1177/0165025406071904

- Choi, H. J., & Temple, J. R. (2016). Do gender and exposure to interparental violence moderate the stability of teen dating violence?: Latent transition analysis. *Prevention Science, 17*, 367–376. doi:10.1007/s11121-015-0621-4
- Covington, M. V. (2000). Goal theory, motivation, and school achievement: An integrative review. *Annual Review of Psychology, 51*, 171–200. doi:10.1146/annurev.psych.51.1.171
- Day, D. M., Bream, L. A., & Pal, A. (1992). Proactive and reactive aggression: An analysis of subtypes based on teacher perceptions. *Journal of Clinical Child Psychology, 21*, 210–217. doi:10.1207/s15374424jccp2103_2
- Dishion, T. J., Spracklen, K. M., Andrews, D. W., & Patterson, G. R. (1996). Deviancy training in male adolescent friendships. *Behavior Therapy, 27*, 373–390. doi:10.1016/S0005-7894(96)80023-2
- Dishion, T. J., Véronneau, M.-H., & Myers, M. W. (2010). Cascading peer dynamics underlying the progression from problem behavior to violence in early to late adolescence. *Development and Psychopathology, 22*, 603–619. doi:10.1017/S0954579410000313
- Dodge, K. A. (1991). The structure and function of reactive and proactive aggression. In D. J. Pepler & K. H. Rubin (Eds.), *The development and treatment of childhood aggression*. (pp. 201–218). Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.
- Dodge, K. A., & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology, 53*, 1146–1158. doi:10.1037/0022-3514.53.6.1146
- Dollard, J., Miller, N. E., Doob, L. W., Mowrer, O. H., & Sears, R. R. (1939). *Frustration and aggression*. New Haven, CT: Yale University Press. doi:10.1037/10022-000
- Enders, C. K. (2010). *Applied missing data analysis*. New York, NY: Guilford Press.
- Fite, P. J., Hendrickson, M., Rubens, S. L., Gabrielli, J., & Evans, S. (2013). The role of peer rejection in the link between reactive aggression and academic performance. *Child & Youth Care Forum, 42*, 193–205. doi:10.1007/s10566-013-9199-9
- Gadermann, A. M., Guhn, M., & Zumbo, B. D. (2012). Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide. *Practical Assessment, Research & Evaluation, 17*, 1-13.
- Geiser, C. (2013). *Data analysis with Mplus*. New York: Guilford Press.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Child Psychology*

& *Psychiatry & Allied Disciplines*, 38, 581–586. doi:10.1111/j.1469-7610.1997.tb01545.x

Hawley, P. H. (2003). Prosocial and coercive configurations of resource control in early adolescence: A case for the well-adapted machiavellian. *Merrill-Palmer Quarterly*, 49, 279-309. doi:10.1353/mpq.2003.0013

Hinshaw, S. P. (2008). Developmental psychopathology as a scientific discipline: Relevance to behavioral and emotional disorders of childhood and adolescence. In T. P. Beauchaine, & S. P. Hinshaw (Eds.), *Child and adolescent psychopathology*. (pp. 3–26). Hoboken, NJ: John Wiley & Sons Inc.

Jung, J., Krahé, B., Bondü, R., Esser, G., & Wyschkon, A. (in press). The dynamic progression of antisocial behavior in childhood and adolescence: A three-wave longitudinal study from Germany. *Applied Developmental Science*. doi: 10.1080/10888691.2016.1219228

Jung, J., Krahé, B., & Busching, R. (in press). Beyond the positive reinforcement of aggression: Peers' acceptance of aggression promotes aggression via external control beliefs. *International Journal of Behavioral Development*. doi: 10.1177/0165025416671613

Kindermann, T. A. (1993). Natural peer groups as contexts for individual development: The case of children's motivation in school. *Developmental Psychology*, 29, 970–977. doi:10.1037/0012-1649.29.6.970

Krahé, B. (2013). *The social psychology of aggression (2nd ed.)*. New York, NY: Psychology Press.

Krahé, B., & Möller, I. (2010). Longitudinal effects of media violence on aggression and empathy among German adolescents. *Journal of Applied Developmental Psychology*, 31, 401–409. doi:10.1016/j.appdev.2010.07.003

Kretschmer, T., Barker, E. D., Dijkstra, J. K., Oldehinkel, A. J., & Veenstra, R. (2015). Multifinality of peer victimization: Maladjustment patterns and transitions from early to mid-adolescence. *European Child & Adolescent Psychiatry*, 24, 1169–1179. doi:10.1007/s00787-014-0667-z

Laidra, K., Allik, J., Harro, M., Merenäkk, L., & Harro, J. (2006). Agreement among adolescents, parents, and teachers on adolescent personality. *Assessment*, 13, 187-196. doi:10.1177/1073191106287125

Laird, R. D., Jordan, K. Y., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2001). Peer rejection in childhood, involvement with antisocial peers in early adolescence, and the development of externalizing behavior problems. *Development and Psychopathology*, 13, 337–354. doi:10.1017/S0954579401002085

- Lanza, S. T., & Bray, B. C. (2010). Transitions in drug use among high-risk women: An application of latent class and latent transition analysis. *Advances and Applications in Statistical Sciences*, *3*, 203–235.
- Little, T. D., Brauner, J., Jones, S. M., Nock, M. K., & Hawley, P. H. (2003). Rethinking aggression: A typological examination of the functions of aggression. *Merrill-Palmer Quarterly*, *49*, 343–369. doi:10.1353/mpq.2003.0014
- Loeber, R., Farrington, D. P., Stouthamer-Loeber, M., & Van Kammen, W. B. (1998). Multiple risk factors for multiproblem boys: Co-occurrence of delinquency, substance use, attention deficit, conduct problems, physical aggression, covert behavior, depressed mood, and shy/withdrawn behavior. In R. Jessor (Ed.), *New perspectives on adolescent risk behavior*. (pp. 90–149). New York, NY: Cambridge University Press. doi:10.1017/CBO9780511571138.005
- Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology*, *22*, 491–495. doi:10.1017/S0954579410000222
- Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradović, J., Riley, J. R., ... Tellegen, A. (2005). Developmental cascades: Linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology*, *41*, 733–746. doi:10.1037/0012-1649.41.5.733
- McAuliffe, M. D., Hubbard, J. A., Rubin, R. M., Morrow, M. T., & Dearing, K. F. (2006). Reactive and proactive aggression: Stability of constructs and relations to correlates. *The Journal of Genetic Psychology: Research and Theory on Human Development*, *167*, 365–382. doi:10.3200/GNTP.167.4.365-382
- Miller, L. D., Martinez, Y. J., Shumka, E., & Baker, H. (2014). Multiple informant agreement of child, parent, and teacher ratings within community samples. *The Canadian Journal of Psychiatry / La Revue Canadienne De Psychiatrie*, *59*, 34-39.
- Möller, I., & Krahé, B. (2009). Exposure to violent video games and aggression in German adolescents: A longitudinal analysis. *Aggressive Behavior*, *35*, 75–89. doi:10.1002/ab.20290
- Muthén, B. (2001). Latent variable mixture modeling. In G. A. Marcoulides, & R. E. Schumacker (Eds.), *New developments and techniques in structural equation modeling* (pp. 1–33). Mahwah, NJ: Lawrence Erlbaum Associates.
- Muthén, L. K., & Muthén, B. O. (2015). *Mplus user's guide. Seventh edition*. Los Angeles, CA: Muthén & Muthén.

- Ostrov, J. M., Murray-Close, D., Godleski, S. A., & Hart, E. J. (2013). Prospective associations between forms and functions of aggression and social and affective processes during early childhood. *Journal of Experimental Child Psychology, 116*, 19–36. doi:10.1016/j.jecp.2012.12.009
- Pardini, D. A., Loeber, R., & Stouthamer-Loeber, M. (2005). Developmental shifts in parent and peer influences on boys' beliefs about delinquent behavior. *Journal of Research on Adolescence, 15*, 299–323. doi:10.1111/j.1532-7795.2005.00098.x
- Parrott, D. J., & Giancola, P. R. (2007). Addressing “The criterion problem” in the assessment of aggressive behavior: Development of a new taxonomic system. *Aggression and Violent Behavior, 12*, 280–299. doi:10.1016/j.avb.2006.08.002
- Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (1989). A developmental perspective on antisocial behavior. *American Psychologist, 44*, 329–335. doi:10.1037/0003-066X.44.2.329
- Polman, H., de Castro, B. O., Thomaes, S., & van Aken, M. (2009). New directions in measuring reactive and proactive aggression: Validation of a teacher questionnaire. *Journal of Abnormal Child Psychology, 37*, 183–193. doi:10.1007/s10802-008-9266-0
- Poulin, F., & Boivin, M. (2000a). Reactive and proactive aggression: Evidence of a two-factor model. *Psychological Assessment, 12*, 115–122. doi:10.1037/1040-3590.12.2.115
- Poulin, F., & Boivin, M. (2000b). The role of proactive and reactive aggression in the formation and development of boys' friendships. *Developmental Psychology, 36*, 233–240. doi:10.1037/0012-1649.36.2.233
- Price, J. M., & Dodge, K. A. (1989). Reactive and proactive aggression in childhood: Relations to peer status and social context dimensions. *Journal of Abnormal Child Psychology, 17*, 455–471. doi:10.1007/BF00915038
- Raine, A., Dodge, K., Loeber, R., Gatzke-Kopp, L., Lynam, D., Reynolds, C., ... Liu, J. (2006). The reactive-proactive aggression questionnaire: Differential correlates of reactive and proactive aggression in adolescent boys. *Aggressive Behavior, 32*, 159–171. doi:10.1002/ab.20115
- Rodgers, S., Ajdacic-Gross, V., Müller, M., Hengartner, M. P., Holtforth, M. G., Angst, J., & Rössler, W. (2014). The role of sex on stability and change of depression symptom subtypes over 20 years: A latent transition analysis. *European Archives of Psychiatry and Clinical Neuroscience, 264*, 577–588. doi:10.1007/s00406-013-0475-3
- Ryan, A. M. (2000). Peer groups as a context for the socialization of adolescents' motivation, engagement, and achievement in school. *Educational Psychologist, 35*, 101–111.

doi:10.1207/S15326985EP3502_4

- Ryan, A. M. (2001). The peer group as a context for the development of young adolescent motivation and achievement. *Child Development, 72*, 1135–1150. doi:10.1111/1467-8624.00338
- Sijtsema, J. J., Ojanen, T., Veenstra, R., Lindenberg, S., Hawley, P. H., & Little, T. D. (2009). Forms and Functions of Aggression in Adolescent Friendship Selection and Influence: A Longitudinal Social Network Analysis. *Social Development, 19*, 515–534. doi:10.1111/j.1467-9507.2009.00566.x
- Tofighi, D., & Enders, C. K. (2008). Identifying the correct number of classes in growth mixture models. In G. R. Hancock & K. M. Samuelsen (Eds.), *Advances in latent variable mixture models* (pp. 317–341). Charlotte, NC: Information Age Publishing.
- Tremblay, R. E., Mâsse, L. C., Vitaro, F., & Dobkin, P. L. (1995). The impact of friends' deviant behavior on early onset of delinquency: Longitudinal data from 6 to 13 years of age. *Development and Psychopathology, 7*, 649–667. doi:10.1017/S0954579400006763
- Vitaro, F., Brendgen, M., & Barker, E. D. (2006). Subtypes of aggressive behaviors: A developmental perspective. *International Journal of Behavioral Development, 30*, 12–19. doi:10.1177/0165025406059968
- Wentzel, K. R. (1998). Social relationships and motivation in middle school: The role of parents, teachers, and peers. *Journal of Educational Psychology, 90*, 202–209. doi:10.1037/0022-0663.90.2.202
- Zumbo, B. D., Gadermann, A. M., & Zeisser, C. (2007). Ordinal versions of coefficients alpha and theta for Likert rating scales. *Journal of Modern Applied Statistical Methods, 6*, 21–29.

Table 1. Scale reliabilities, ranges, means, and standard deviations at Time 1 and Time 2

Variable	N Items	α_{T1}	Range T1	M (SD) T1	α_{T2}	Range T2	M (SD) T2
Reactive aggression	6	.86	1.00 – 4.83	1.86 (0.72)	.85	1.00 – 5.00	1.83 (0.73)
Proactive aggression	6	.85	1.00 – 4.17	1.24 (0.40)	.84	1.00 – 3.67	1.21 (0.36)
Social rejection - self	5	.82	0.00 – 2.00	0.28 (0.30)	.85	0.00 – 1.80	0.22 (0.28)
Social rejection – parents	5	.89	0.00 – 2.00	0.20 (0.33)	.88	0.00 – 2.00	0.17 (0.30)
Social rejection – teachers	5	.93	0.00 – 2.00	0.27 (0.39)	.87	0.00 – 1.75	0.23 (0.35)
Affil. aggressive peers - self	6	.86	1.00 – 4.00	1.65 (0.54)	.86	1.00 – 4.00	1.62 (0.48)
Affil. aggressive peers - teachers	3	.78	0.00 – 2.00	0.30 (0.42)	.70	0.00 – 2.00	0.26 (0.38)
Academic failure	3	.85	1.00 – 6.00	2.29 (0.76)	.80	1.00 – 6.00	2.41 (0.71)

Note. T1 = Time1; T2 = Time2; * $p < .05$, ** $p < .01$, *** $p < .001$. Affil. aggressive peers = affiliation with aggressive peers.

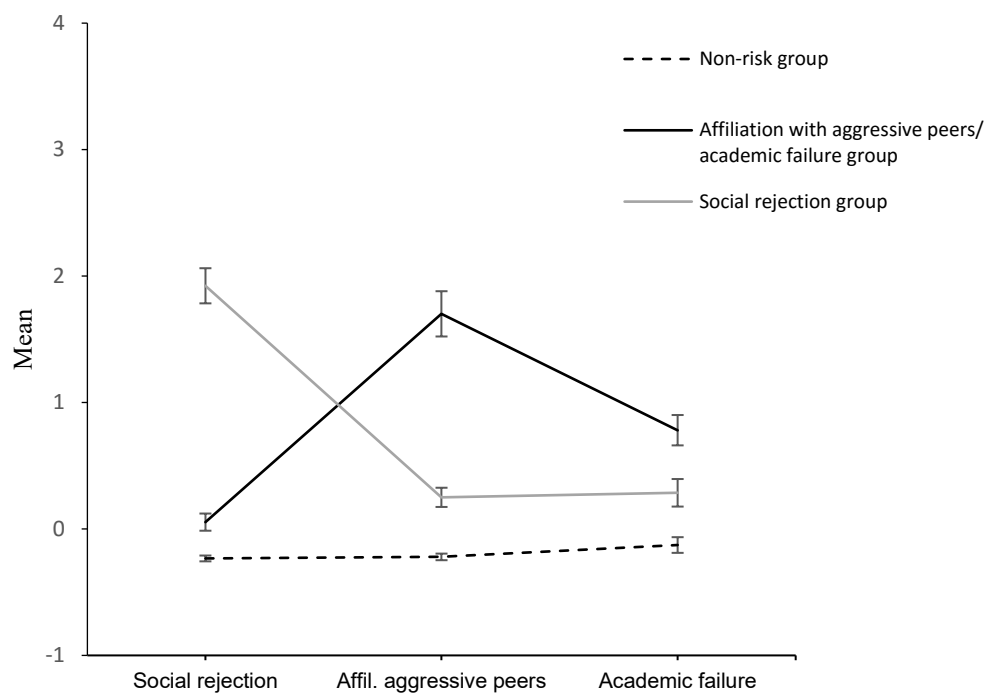
Table 2. Manifest intercorrelations and ICCs at Time 1 and Time 2

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 T1 Reactive aggression	-															
2 T1 Proactive aggression	.34***	-														
3 T1 Social rejection - self	.16***	.03	-													
4 T1 Social rejection – parents	.12***	.09**	.49***	-												
5 T1 Social rejection – teachers	.07*	.07*	.35***	.47***	-											
6 T1 Affil. aggressive peers - self	.21***	.28***	.10***	.09**	0.06	-										
7 T1 Affil. aggressive peers - teachers	.10**	.12***	.09**	.18***	.41***	.10**	-									
8 T1 Academic failure	.06*	.14***	.08**	.11***	.24***	.11***	.30***	-								
9 T2 Reactive aggression	.35***	.12***	.13***	.13***	.06	.19***	.09*	0.04	-							
10 T2 Proactive aggression	.13***	.30***	0.05	.04	.09*	.20***	.17***	.17***	.24***	-						
11 T2 Social rejection - self	.08*	.03	.40***	.31***	.29***	.02	.09**	.07*	.13***	0.03	-					
12 T2 Social rejection – parents	.14***	.10**	.33***	.52***	.35***	.04	.15***	0.05	.10**	.00	.45***	-				
13 T2 Social rejection – teachers	.09*	.08	.25***	.35***	.53***	-.02	.30***	.13***	.12**	.05	.32***	.42***	-			
14 T2 Affil. aggressive peers - self	.16***	.17***	.07*	.03	.12***	.46***	.14***	.07*	.22***	.34***	.03	.04	.08*	-		
15 T2 Affil. aggressive peers - teachers	0.07	.14***	.06	.14***	.23***	.06	.36***	.16***	.14***	.15***	.11**	.15***	.35***	.10**	-	
16 T2 Academic failure	0.05	.12***	.11***	.13***	.22***	.05	.27***	.62***	.01	.14***	.11***	.08**	.20***	.08**	.21***	-
ICC	.01	.03	.03	.01	.02	.05	.04	.29	.00	.00	.01	.01	.01	.00	.02	.16

Note. T1 = Time1; T2 = Time2; * $p < .05$, ** $p < .01$, *** $p < .001$. Affil. aggressive peers = affiliation with aggressive peers.

Table 3. Proportions and absolute numbers (in parentheses) of participants' risk-group membership at T1 and T2

	<i>T2 Non-risk group</i>	<i>T2 Social rejection group</i>	<i>T2 Affiliation with aggressive peers/academic failure group</i>	<i>T1 Total</i>
T1 Non-risk group	93.6% (1147)	2.9% (36)	3.5% (43)	100% (1226)
T1 Social rejection group	38.0% (57)	60.0% (90)	2.0% (3)	100% (150)
T1 Affiliation with aggressive peers/academic failure group	18.4% (19)	1.9% (2)	79.6% (82)	100% (103)
T2 Total	100% (1223)	100% (128)	100% (128)	



Note. Affil. aggressive peers = affiliation with aggressive peers.

Figure 1. Mean-level profiles for the 3-class solution.

9 General discussion

The major aim of this doctoral dissertation was to provide a deeper understanding of the development and progression of aggressive behavior in middle childhood and adolescence. As particularly the peer group and schools are important socializing units in children's and adolescent's life, this PhD thesis focused on the interrelations between dysfunctional peer relationships and academic failure in the etiological process of aggression. The main research goal was addressed within the scope of three separate studies which aimed to a) provide a comprehensive analysis of developmental pathways of antisocial and aggressive behavior by examining the dynamic interplay between social rejection, academic failure, and affiliation with deviant peers over time (Study 1), b) to gain more knowledge about the role of deviant peers in the etiology of aggression by investigating the mediating role of external control beliefs in the link between affiliation with deviant peers and aggressive behavior (Study 2), and c) to provide more insights into the etiology of reactive and proactive aggression by analyzing the differential predictivity of distinct constellations of dysfunctional peer relationships and failure in the academic domain for the development of reactive and proactive aggression (Study 3).

9.1 A deeper understanding of developmental pathways of antisocial and aggressive behavior

The **first study** of this PhD thesis aimed to investigate the development of aggression in the broader class of antisocial behavior. Based on the premises of the social interactional model proposed by Patterson et al. (1989), it was argued that the development of antisocial behavior unfolds via two distinct pathways, whereby the child's disruptive behavior triggers both social rejection and academic failure. Both mechanisms were hypothesized to promote the selective affiliation with deviant peers which contributes to the persistence and chronification of antisocial behavior across the life-time.

The findings of Study 1 indicated that antisocial behavior has the potential to interfere with success in normative domains and thereby negatively affect children's and adolescents' social and academic development. The results of latent path analysis showed that antisocial behavior predicted both social rejection and academic failure in the following measurement point, even after controlling for the constructs' temporal stability and the influence of relevant third variables, such as participants' age, gender, or socioeconomic status. These findings are in line with a large body of evidence showing that particularly antisocial and aggressive behavior has the potential to evoke negative reactions from the social environment (Dodge et al., 2003; Fite et al., 2012; Mathys et al., 2013). Antisocial behavior tends to interfere with schools' low tolerance for norm-violating behaviors and, additionally, negatively affects student's academic meta-skills, such as spending time on teacher-assigned tasks, regular attendance, or their willingness to participate in class activities (Patterson et al., 1989).

Similarly, due to their disruptiveness, antisocial and aggressive children are frequently disliked by normative peers and, hence, excluded from peer activities (Laird et al., 2001). However, rejection by normative peers not necessarily implies that antisocial individuals are completely isolated and excluded from peer interactions. The findings of Study 1 suggest that antisocially or aggressively behaving individuals tend to affiliate with peers who show similar levels of deviancy. Accordingly, antisocial individuals actively seek social groups that match their own behavioral repertoire and that do not ask for skills that are low or nonexistent.

Importantly, antisocial behavior not only predicted affiliation with deviant peers directly but also indirectly via its links with social rejection and academic failure. Thus, antisocial behavior triggers both problems with conventional peers and difficulties in school, which further promote that the socially marginalized and academically unsuccessful child selectively affiliates with peers who show similar behavioral problems. These findings corroborate the assumption that deviant peer groups are gathering places for individuals who have problems to succeed in normative domains (Patterson et al., 1989). Furthermore, the lack of positive reinforcement by conventional means pushes antisocial individuals into social environments that show a higher acceptance and approval of antisocial behavior.

Congruent with a large body of evidence, the findings of Study 1 assigned a key role to affiliation with deviant peers in the etiology of antisocial behavior (Allen et al., 2005; Berger & Rodkin, 2012; Espelage et al., 2003; Lacourse et al., 2003). In the model, only affiliation with deviant peers predicted future antisocial behavior over and above the construct's temporal stability and although both social rejection and academic failure indirectly predicted antisocial behavior via affiliation with deviant peers, both constructs' direct effect was nonsignificant. These findings were remarkable given that the pain and frustration associated with social exclusion and academic failure may be sufficient to promote antisocial and aggressive behavior via the frustration-aggression link (Baumeister & Leary, 1995; Berkowitz, 1989). However, the present findings suggest that failure in school and problems with peers substantially unfold their developmental harm by motivating individuals to affiliate with deviant peer groups. Within such groups, antisocial behavior holds a certain degree of normativity and is socially approved and reinforced by other group members. Hence, whereas antisocial behavior is dysfunctional within normative social groups and institutions, it is highly adaptive within a deviant peer environment. Moreover, deviant peers tend to ignore, to discourage, or even to punish prosocial or other forms of conventional behaviors. This differential reward of deviant behavior and punishment of normative behavior is the crucial mechanism underlying the consolidation of antisocial behavior throughout life-time (Dishion et al., 1996).

In summary, the first study of this dissertation illustrated the spreading and contagious quality of antisocial and aggressive behavior and suggested that aggression is capable to stimulate a cascade

of negative events, which feedback and thereby intensify the initial maladjusted behavior (Masten & Cicchetti, 2010; Sameroff, 2000). Particularly affiliation with deviant peers was shown to play a key role by being the critical junction between failure in normative domains and the progression of deviancy. These findings indicated the necessity for a deeper understanding of the processes and mechanisms that mediate the link between affiliation with deviant peers and aggression. This research aim was addressed in Study 2.

9.2 The role of affiliation with deviant peers in the development of aggression

Mediating processes in the link between affiliation with deviant peers and aggression have been most commonly explained from a social learning perspective (Dishion et al., 1996; Mathys et al., 2013; Snyder et al., 2005). However, given the complexity of human development it is unlikely that deviant peers' reinforcement of aggressive behavior alone may account for the important link between affiliation with deviant peers and aggression. The aim of the **second study** was to provide insights into how interactions between deviant peers may contribute to the development of aggressive behavior by investigating the mediating role of external control beliefs. The central idea was based on findings of the first study which showed that deviant peer groups are often composed of individuals who have problems to conform to behavioral rules. This non-compliance towards prevailing social norms provides a significant explanation for aggressive individuals' social rejection by normative peers or failure at school. However, aggressive children's and adolescents' unwillingness, or inability, to follow social rules has also important implications for the dynamics within deviant peer groups. It was argued that one essential consequence of the lack of conformity to social norms and behavioral standards is that deviant peers' interactions are frequently disorganized and chaotic, thereby showing only a weak contingency between a behavior and its evoked social reaction. These assumptions are in line with studies showing that verbal dialogues between deviant peers frequently include unpredictable patterns of interactions (Dishion et al., 2004). It was proposed that this environmental non-contingency promotes feelings of helplessness and non-control in social interactions, which would further predict future aggression.

The assumptions about a potential mediating role of external control beliefs in the link between affiliation with deviant peers and aggression were investigated by using latent path analysis. In line with the hypotheses, affiliation with deviant peers significantly predicted external control beliefs in the social domain. These findings were, at least to our knowledge, the first that showed that not only the family environment or experiences at school are capable to affect children's and adolescent's control beliefs but also the peer group. In fact, there are many reasons why aggressive peers may promote external control beliefs. As outlined above, interactions between aggressive individuals often lack clear behavioral routines. Hence, for individuals who are situated within a deviant peer group, it

might be difficult to predict the social consequences of their own and their peers' behaviors, leading them to perceive social outcomes as arbitrary or as the result of other external sources that are beyond their volitional control. Additionally, there is evidence that deviant peers not only aggress on outgroup members but also on each other (Sampsons & Lauritsen, 1990; Schreck, Fisher, & Miller, 2004). Thus, friends of deviant individuals are highly at risk to become a victims of their friends' aggressive outbursts themselves. Experiences of victimization, thereby, may promote the development of external control beliefs (Radliff, Wang, & Swearer, 2015).

As expected, external control beliefs predicted aggressive behavior at the following measurement point. These findings are in line with studies showing that primarily external control beliefs in the social domain are related to the development of aggression (Han et al., 2001). Furthermore, being repeatedly confronted with interpersonal situations that are outside one's control may be highly aversive and frustrating, making aggressive behavior more likely via the frustration-aggression link (Berkowitz, 1989, 2012b). Most importantly, however, the indirect pathway from affiliation with deviant peers via external control beliefs to aggression was significant, indicating that external control beliefs, indeed, significantly mediated the link between deviant peers and aggression.

Interestingly, affiliation with deviant peers not only increased feeling of non-control but also did external control beliefs promote the affiliation with deviant peers, indicating a reciprocal link between both constructs. In combination with Study 1, these findings suggest that not only individuals who are socially rejected by conventional peers and who fail at school are likely to affiliate with deviant peer groups but also individuals who feel less competent and effective in interpersonal situations. Although it was not subject of the investigation, one possible explanation for this link might be that individuals who frequently experience non-control in the social domain attempt to bond with bullies or otherwise aggressively behaving individuals in the hope to gain more influence, power, or control in social interactions. Ironically, by showing that children who affiliate with aggressive peers feel less effective in the social domain, the second study indicates the exact opposite.

It is important to note that social reinforcement mechanisms and external control beliefs are not mutually exclusive in explaining the link between affiliation with deviant peers and aggressive behavior. In fact, deviant peers may be highly contingent in the reward of aggression but, at the same time, be unpredictable in their reactions to other forms of social behaviors. Furthermore, the findings that multiple mechanisms and pathways may lead to the same problem behavior is congruent with a contemporary perspective of developmental psychopathology (Cicchetti & Rogosch, 1996).

9.3 The development of reactive and proactive aggression

The first two studies of this dissertation provided significant insights into the etiology of aggression by investigating the interplay between aggression, problems at school, and dysfunctional peer relationships. The aim of the **third study** was to expand the understanding of the development of aggressive behavior by examining the interrelations between those developmental problems while taking account of the underlying motive or function of aggression. This seemed important as a large body of evidence indicates that reactive and proactive aggression are differentially related to patterns of maladjustment (Card & Little, 2006). Furthermore, the third study aimed to go beyond the results of the first studies by examining how social rejection, academic failure, and affiliation with deviant peers combine *within* individuals and whether specific combinations are differentially predictive for the development of reactive and proactive aggression. The investigation of combinations of developmental risks is important as the effect of a single risk may substantially change in the presence or absence of other risks. Hence, the third study not only aimed to corroborate the existing literature on the differential relationships between social rejection, academic failure, and affiliation with deviant peers and reactive and proactive aggression but also to expand previous findings by taking account of the clustering of developmental risks. In order to shed light on this research question, a two-step analysis was applied. First, using latent profile analysis, distinct combinations of social rejection, academic failure, and affiliation with deviant peers were identified. Second, the predictive quality of combinations of risk factors for reactive and proactive aggression was investigated, using latent path analysis.

The findings of Study 3 demonstrated a high co-occurrence of social rejection, academic failure, and affiliation with deviant peers within individuals. These findings are congruent with evidence from large epidemiological studies from Europe and the US, which indicate a high comorbidity of developmental problems in childhood and adolescence (Angold, Costello, & Erkanli, 1999; Fergusson et al., 1993; Ihle & Esser, 2002). Results from latent profile analysis yielded three distinct risk groups, made up of a non-risk group, with low scores on all risk measures, a group characterized by particularly high scores on social rejection (SR group), and a group with the highest scores on measures of affiliation with deviant peers and academic failure (APAF group). Given that the analyses were based on a non-clinical sample, it was not surprising that most children and adolescents were included in the non-risk group. But still, almost every fifth participant was included in one of the two risk groups, which not only showed significantly higher scores on all risk measures than the non-risk group but also significantly differed from each other in their mean-level profiles. On the one hand these findings imply that social rejection, academic failure, and affiliation with deviant peers are likely to co-occur within individuals, indicating a high comorbidity of developmental problems. These results

are also congruent with Study 1 which indicated a high interdependency of social rejection, academic failure, and affiliation with deviant peers. On the other hand, these results demonstrate that some risk factors are more likely to appear in combinations than others. Study 3 indicated that particularly affiliation with deviant peers tends to co-occur with failure in the academic domain. Although the study design did not allow to analyze the underlying processes, a reciprocal relationship between affiliation with deviant peers and academic failure was hypothesized. There is evidence that the peer group is a strong predictor for individuals' school motivation, their willingness to learn, and their readiness to participate in class activities (Kindermann, 1993; Ryan, 2000; Wentzel, 1998). Thereby, deviant peers might adversely affect such academic meta-skills and thereby undermine academic success. Additionally, it was assumed that due to their disruptiveness, aggressive children and adolescents obtain only limited positive reinforcement in school and, hence, actively seek social contexts that provide a higher acceptance and reward of aggression. Particularly the latter is in line with the findings of Study 1.

Most importantly, the third study not only demonstrated that risk factors are likely to co-occur within individuals but also that distinct constellations of risk factors are predictive for different functions of aggressive behavior. More specifically, results from latent path analysis yielded that only membership in the SR group predicted reactive aggression 17 months later. These findings are in line with the large body of evidence indicating that social rejection is more strongly related to reactive than to proactive aggression (Card & Little, 2006; Vitaro et al., 2006). Additionally, the present results complement previous research by showing that the link remains even when social rejection occurs in combination with other developmental risks. As outlined above, social rejection is a fundamental threat to humans need to belong and, hence, is experienced as highly aversive and distressing (Baumeister & Leary, 1995). Accordingly, being chronically excluded from peer interactions may particularly increase the likelihood for frustration-based, reactive aggression (Berkowitz, 1989, 2012a). It is important to note that these results are not necessarily contradictory to the findings of Study 1, where the direct pathway from social rejection to antisocial behavior was found to be nonsignificant. Instead, the present findings indicate the importance to differentiate between motives of aggression and, additionally, demonstrate that the effect of a combination of risks might be different from what would be expected when analyzing risk factors in isolation.

As expected, only membership in the APAF group predicted proactive aggression at a later developmental stage. Thus, individuals who were situated within a deviant peer context *and* who failed at school were at risk to behave proactively aggressive in the future. This configuration of affiliation with deviant peers and academic failure might be particularly critical in the development of proactive aggression. The deviant peer group not only provides incentives to deliberately use aggression for the

attainment of personally valued and desired outcomes but also undermines the learning of more socially valued behaviors within the school context. As outlined above, schools are important socializing instances for the transfer of normative values and beliefs. Hence, the incompatibility of the norms of the deviant peer group and the norms of the school may impede the learning and internalization of socially approved skills and behaviors that are necessary for being successful in more normative domains. This relationship is crucial as the deviant peer group's reward of aggressive intrusions remains the only source of positive reinforcement.

Importantly, proactive aggression also predicted membership in the APAF group at the following measurement point. This finding was congruent with the results of Study 1 and, more generally, in line with this doctoral dissertation's basic assumption about aggressive behavior's potential to cause developmental problems in multiple domains. Unexpectedly, however, the complementary path from reactive aggression to membership in the SR group was nonsignificant. These findings seem to contradict the evidence that particularly reactive aggressive individuals are prone to be excluded from peer activities (Ostrov, Murray-Close, Godleski, & Hart, 2013; Price & Dodge, 1989; Prinstein & Cillessen, 2003). Nonetheless, it is important to consider that combinations of risk factors may unfold a dynamic that goes beyond the effect of the single risks. Hence, the prospective pathway from reactive aggression to social rejection may be different, when social rejection co-occurs with other developmental risks. Future studies are needed to clarify this issue.

In summary, the results of the three studies included in this dissertation provide new insights into the mechanisms that are involved in the development of aggression in middle childhood and adolescence. Whereas Study 1 demonstrated the temporal sequence and gradual accumulation of developmental problems in the peer and academic domain, Study 2 provided further insights into the processes by which dysfunctional peer relationships may shape the etiology of aggression. Finally, Study 3 provided evidence on the comorbidity of developmental risks within persons and, additionally, showed that distinct combinations of risk factors may differentially predict reactive and proactive aggression.

9.4 The role of moderating factors in the development of aggression

The large age range of the sample and the inclusion of both male and female children and adolescents in the analyses, enabled the investigation of age and gender specific variations in the proposed developmental pathways and processes of aggression.

Generally, the findings of this doctoral dissertation provided only little evidence for gender differences in the predicted pathways. In Study 1, only one path differed between boys and girls and, still, was significant in both genders. Similarly, in Study 2 none of the proposed pathways showed

significant variations as a function of participants' gender. These findings, however, were not necessarily surprising as both studies did not differentiate between distinct forms or functions of antisocial and aggressive behavior. For example, it is argued that foremost the type of aggression that does not fit the prevailing gender stereotype should cause social rejection by peers (Crick, 1997; Salmivalli et al., 2000). Additionally, although males and females have been shown to frequently differ in their mean levels on measures of social rejection, academic failure, or affiliation with deviant peers, the literature provides only little evidence for gender specific variations in their links with aggression (Chen et al., 2010; Dodge et al., 2003; Laird et al., 2001; Masten et al., 2005). In regard to control beliefs, the present findings indicate that an external locus of control may promote future aggressive behavior similarly for both boys and girls. These results supplement the scarce and inconsistent findings on gender differences in the link between external control beliefs and aggression (Halloran et al., 1999; Österman et al., 1999). However, the empirical evidence is still inconclusive and future research is needed to clarify the role of gender in the relationship between external locus of control and aggressive behavior.

In summary, the findings of this dissertation are congruent with a large body of evidence showing that similar processes and mechanisms are involved in males' and females' development of aggression in middle childhood and adolescence. Nonetheless, it remains an interesting research question whether the developmental pathways are equally valid for boys and girls when taking account of different types of aggressive behavior.

Despite the sample's wide age range, the analyses in Study 1 and Study 2 yielded that none of the proposed pathways differed between participants of different age cohorts. These findings were partially contradictory to other studies indicating that the etiological relevance of dysfunctional peer relationships or aversive experiences at school varies as a function of individuals' age (Boivin et al., 2001; Chen et al., 2010; Steinberg & Monahan, 2007). However, the present findings should be evaluated in the context of the sample's specific characteristics: All participants attended school and were thus situated within a social context that tends to instantly sanction deviant acts, regardless of the student's age. Similarly, in this period most peer groups agree that antisocial and aggressive behavior is a severe violation against prevailing social norms and rules. Thus, the social punishment of deviancy, by either social exclusion or poor grades, is not a process that should have an age-specific variability. Additionally, individuals in middle childhood and adolescence have the necessary degrees of freedom as well as interpersonal skills to actively select their peer groups. This allows socially marginalized and academically unsuccessful children to affiliate with deviant peers who provide a higher degree of social reinforcement. Finally, Study 2 was the first study to investigate age differences in the interrelations between affiliation with deviant peers, external locus of control, and aggression.

The findings indicate that deviant peers' interactions may promote feelings of helplessness and non-control independently of the child's or adolescent's age. Additionally, it was found that experiences of non-control are similarly aversive for individuals in late childhood, early adolescence, and adolescence and, hence, have the propensity to promote future aggression via the frustration-aggression link.

The findings of Study 1 and Study 2 provided only little evidence for a moderating influence of individual attributes, such as participants' gender or age. In sum, these results suggest that the proposed developmental pathways of aggression generalize across different subgroups of individuals and hold equally for males and females as well as different age cohorts.

9.5 Practical implications

This doctoral dissertation suggests that, due to the high comorbidity and interrelation of developmental problems, intervention strategies are most effective when targeting multiple risks simultaneously rather than exclusively focusing on a single cause. Particularly interventions aimed to improve both social and academic skills have the potential to reduce children's and adolescents' aggression and, thereby, positively affect their developmental course. By teaching prosocial skills and age-appropriate interpersonal problem solving strategies, individuals are less likely to be rejected and excluded by normative peers. Similarly, improving children's and adolescents' academic performance may support school-bonding and thereby the internalization of normative values and beliefs. Most importantly, however, the findings of this doctoral dissertation suggest that such interventions may increase the amount of positive experiences in normative domains and thereby counteract the selective affiliation with deviant peers. The latter is crucial as it has been shown that intervention strategies are less effective when individuals are embedded within a deviant peer context (Dodge et al., 2006).

The analyses of Study 3 yielded that different functions of aggression are associated with distinct patterns of developmental problems. Particularly reactive aggressive individuals were shown to be at risk to be excluded from normative peer interactions, whereas proactive aggressive individuals showed the highest levels of academic failure and affiliation with deviant peers. These findings suggest that intervention programs may benefit from taking account of individuals' underlying motives of aggression. Thus, knowing why individuals behave aggressively allows the implementation of more compressed and more effective intervention strategies that are tailored to the individuals' specific problems and deficits.

Although the findings indicate that it is pivotal to keep children and adolescents from affiliating with deviant peers, sometimes this might not be feasible. Particular within high-risk neighborhoods, characterized by high levels of poverty, unemployment, or delinquency it is hardly possible to prevent

individuals from having contact with deviant or delinquent peers. Additionally, for individuals who show deficits in various normative domains, the deviant peer group is often the only source of positive reinforcement. In such cases, knowing about potential mediators in the link between deviant peers and aggression may help to develop intervention programs that aim on the modification of those mediating mechanisms. The results of the second study suggest that strategies that reduce individuals' external control beliefs may buffer deviant peers' adverse influences. Teaching children that they are able to shape and modify environmental events may boost their sense of internal control and thereby reduce aggressive behavior. Importantly, a reduction of external control beliefs may affect aggression even indirectly by reducing children's and adolescent's tendency to affiliate with deviant peers.

Particularly schools are a promising location for the implementation of intervention programs. Children and adolescents spend a substantial proportion of their waking hours within school. Additionally, most of children's and adolescents' social interactions take place within class or the larger school environment. Hence, school-based intervention are a powerful tool to reach a large amount of individuals in a variety of different situations without running the risk of stigmatization or discrimination and without putting additional strains on families. Additionally, due to their proximity to a real-life setting, school-based interventions have the propensity to focus on triggers and consequences of authentic interpersonal problems and to develop possible solutions in cooperation with the conflict parties. Finally, schools already have the necessary didactic structures in place, which enables a fast and cost- efficient application of intervention strategies.

9.6 Strengths and limitations

The research presented in this doctoral dissertation has several strengths. First, all analyses were based on a large community sample of male and female children and adolescents, which allowed the investigation of gender specific variations in developmental pathways of aggressive behavior. Additionally, due to the sample's wide age range, it was possible to analyze whether pathways of aggression differed between distinct age groups. Second, by taking account of dysfunctional peer relationships and problems at school, this dissertation allowed the investigation of the temporal interrelations between aggression and two significant socializing domains in children's and adolescents' development. Third, including multiple informants allowed to assess problem behavior in different social contexts.

At the same time, the study results have to be evaluated in the context of some limitations: First, although the sample covered a wide age range that allowed to analyze the progression of aggressive behavior through childhood and adolescence, it was not possible to assess the initial development of aggression. There is a large body of evidence that a substantial proportion of aggression already manifests in early childhood. For example, Patterson et al. (1989) argued that

certain characteristics of the family environment promote early forms of antisocial behavior and later delinquency. Antisocial children often grow up in a harsh and punitive family environment, characterized by limited parental support and supervision. Furthermore, it is suggested that antisocial or aggressive behavior is directly trained by family members. More specifically, within some families aggressive behavior is an effective mean to escape from coercive intrusions from other family members and, hence, is negatively reinforced by the removal of aversive events. Future studies may want to include younger participants to assess both the early beginnings of antisocial behavior and its progression.

Second, although multiple informants were included for some measures, others were exclusively assessed by either self-, parent-, or teacher-reports. Relying on a single data source, however, is associated with some drawbacks. On the one hand, observers' ability to evaluate the child's behavior across various contexts is limited. This is particularly true for teachers who experience the child almost exclusively in the class environment. However, even parent-ratings are not capable to assess the real extent of problem behavior, especially when children grow older and spend less time within their families. On the other hand, although self-reports provide rich information of different kinds of behaviors across different domains and contexts, they are susceptible to various sources of inaccuracy - particularly when the behavior in question is socially undesirable (Paulhus, 1984, 2002). Self-presentation mechanisms, such as impression formation or self-deception, may have led to an underestimation of the true extent of problem behavior, such as aggression, social rejection, academic failure, or affiliation with deviant peers. Hence, consistently using multiple informants would have provided a more stringent test of the hypotheses. Related to that, it was not possible to assess social rejection by sociometric methods, which would have required that all students of a class participated in the study. As peer nominations are a valid method to assess children's social rejection inside and outside the class environment, future studies may consider to include peer ratings as an additional data source.

Third, due to the limited number of data waves, it was not feasible to investigate the prospective relationships between some constructs. This is particularly so in the first study where social rejection and academic failure were measured concurrently with affiliation with deviant peers. The lacking temporal gap between those measurements precludes firm interpretation about the temporal sequence of the relevant constructs. Similarly, as only two data waves were available in the second study, it was relied on a half-longitudinal design to measure the mediating role of external control beliefs in the link between affiliation with deviant peers and aggression. However, assessing partial mediation with only two data waves is based on certain premises (e.g. assumption of stationarity) that were not directly testable in the study (Cole & Maxwell, 2003).

9.7 Conclusion

This doctoral dissertation contributes to a deeper understanding of the pathways and processes involved in the development and progression of aggressive behavior in middle childhood and adolescence. The findings demonstrate that aggression interferes with both the establishment of functional relationships with conventional peers and success in school and thereby prevents individuals from making important social and academic learning experiences that are fundamental for a healthy transition into adulthood. Furthermore, the resulting behavioral deficits were shown to feedback and to promote future aggression, indicating that aggression triggers a negative cycle in which behavioral shortcomings and aggressive behavior are mutually reinforcing and thereby are contributing to a gradual accumulation of negative life events across time. Additionally, by highlighting the significance of affiliation with deviant peers in the etiological process of aggression and by investigating the mediating role of external control beliefs, this dissertation provides insights into the multiple processes by which interactions between deviant peers may promote the progression of aggressive behavior in middle childhood and adolescence, which is congruent with a contemporary understanding of developmental psychopathology. Finally, by the implementation of a synergistic person- and variable-centered analysis, the findings of this PhD thesis indicate a high co-occurrence of developmental problems in the social and academic domain and, even more important, demonstrate the differential predictivity of combinations of social rejection, academic failure, and affiliation with deviant peers for the development of reactive and proactive aggression.

The findings of this dissertation may contribute to the conceptualization of intervention and prevention programs aimed to reduce aggressive behavior in middle childhood and adolescence and its associated costs for the individual and society as a whole.

10 References

- Abrams, D., Marques, J. M., Bown, N., & Henson, M. (2000). Pro-norm and anti-norm deviance within and between groups. *Journal of Personality and Social Psychology, 78*, 906–912. doi:10.1037/0022-3514.78.5.906
- Allen, J. P., Porter, M. R., McFarland, F. C., Marsh, P., & McElhaney, K. B. (2005). The two faces of adolescents' success with peers: Adolescent popularity, social adaptation, and deviant behavior. *Child Development, 76*, 747–760. doi:10.1111/j.1467-8624.2005.00875.x
- Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology, 53*, 27–51. doi:10.1146/annurev.psych.53.100901.135231
- Anderson, E. (2002). The code of the streets. In S. L. Gabbidon, H. T. Greene, & V. D. Young (Eds.), *African American classics in criminology & criminal justice*. (pp. 293–305). Thousand Oaks, CA, US: Sage Publications, Inc.
- Angold, A., Costello, E. J., & Erkanli, A. (1999). Comorbidity. *Journal of Child Psychology and Psychiatry, 40*, 57–87. doi:10.1111/1469-7610.00424
- Arsenio, W. F., Adams, E., & Gold, J. (2009). Social information processing, moral reasoning, and emotion attributions: Relations with adolescents reactive and proactive aggression. *Child Development, 80*, 1739–1755. doi:10.1111/j.1467-8624.2009.01365.x
- Asher, S. R., & McDonald, K. L. (2009). The behavioral basis of acceptance, rejection, and perceived popularity. In K. H. Rubin, W. M. Bukowski, & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups*. (pp. 232–248). New York: Guilford Press.
- Asher, S. R., Rose, A. J., & Gabriel, S. W. (2001). Peer rejection in everyday life. In M. R. Leary (Ed.), *Interpersonal rejection*. (pp. 105–142). New York: Oxford University Press.
- Baker, J. A. (1999). Teacher–student interaction in urban at-risk classrooms: Differential behavior, relationship quality, and student satisfaction with school. *The Elementary School Journal, 100*, 57–70. doi:10.1086/461943
- Bandura, A. (1973). *Aggression: A social learning analysis*. Oxford, England: Prentice-Hall.
- Bandura, A. (1983). Psychological mechanisms of aggression. In R. G. Geen & E. I. Donnerstein (Eds.), *Aggression: Theoretical and empirical reviews. Volume 1* (pp. 1–40). New York: Academic Press.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ, US: Prentice-Hall, Inc.
- Bandura, A., Ross, D., & Ross, S. A. (1963). Vicarious reinforcement and imitative learning. *The Journal*

- of Abnormal and Social Psychology*, 67, 601–607. doi:10.1037/h0045550
- Barker, E. D., Tremblay, R. E., Nagin, D. S., Vitaro, F., & Lacourse, E. (2006). Development of male proactive and reactive physical aggression during adolescence. *Journal of Child Psychology and Psychiatry*, 47, 783–790. doi:10.1111/j.1469-7610.2005.01585.x
- Baron, R. A., & Richardson, D. R. (1994). *Human aggression* (2nd ed.). New York: Plenum Press.
- Baumeister, R. F., & 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
- Berger, C., & Rodkin, P. C. (2012). Group influences on individual aggression and prosociality: Early adolescents who change peer affiliations. *Social Development*, 21, 396–413. doi:10.1111/j.1467-9507.2011.00628.x
- Berkowitz, L. (1964). Aggressive cues in aggressive behavior and hostility catharsis. *Psychological Review*, 71, 104–122. doi:10.1037/h0043520
- Berkowitz, L. (1989). Frustration-aggression hypothesis: Examination and reformulation. *Psychological Bulletin*, 106, 59–73. doi:10.1037/0033-2909.106.1.59
- Berkowitz, L. (1990). On the formation and regulation of anger and aggression: A cognitive-neoassociationistic analysis. *American Psychologist*, 45, 494–503. doi:10.1037/0003-066X.45.4.494
- Berkowitz, L. (1993). *Aggression: Its causes, consequences, and control*. Philadelphia, PA: Temple University Press.
- Berkowitz, L. (2012a). A cognitive-neoassociation theory of aggression. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology (Vol 2)*. (pp. 99–117). Thousand Oaks, CA: Sage Publications Ltd. doi:10.4135/9781446249222.n31
- Berkowitz, L. (2012b). A different view of anger: The cognitive-neoassociation conception of the relation of anger to aggression. *Aggressive Behavior*, 38, 322–333. doi:10.1002/ab.21432
- Berndt, T. J., & Hanna, N. A. (1995). Intimacy and self-disclosure in friendships. In K. J. Rotenberg (Ed.), *Disclosure processes in children and adolescents*. (pp. 57–77). New York: Cambridge University Press. doi:10.1017/CBO9780511527746.003
- Bierman, K. L. (2004). *Peer rejection: Developmental processes and intervention strategies*. New York: Guilford Press.
- Björkqvist, K., Lagerspetz, K. M., & Kaukiainen, A. (1992). Do girls manipulate and boys fight?

- Developmental trends in regard to direct and indirect aggression. *Aggressive Behavior*, *18*, 117–127. doi:10.1002/1098-2337(1992)18:2<117::AID-AB2480180205>3.0.CO;2-3
- Blankemeyer, M., Flannery, D. J., & Vazsonyi, A. T. (2002). The role of aggression and social competence in children's perceptions of the child-teacher relationship. *Psychology in the Schools*, *39*, 293–304. doi:10.1002/pits.10008
- Boivin, M., Hymel, S., & Hodges, E. V. E. (2001). Toward a process view of peer rejection and harassment. In J. Juvonen & S. Graham (Eds.), *Peer harassment in school: The plight of the vulnerable and victimized*. (pp. 265–289). New York: Guilford Press.
- Boivin, M., & Vitaro, F. (1995). The impact of peer relationships on aggression in childhood: Inhibition through coercion or promotion through peer support. In J. McCord (Ed.), *Coercion and punishment in long-term perspectives*. (pp. 183–197). New York: Cambridge University Press. doi:10.1017/CBO9780511527906.011
- Bondü, R., & Krahé, B. (2015). Links of justice and rejection sensitivity with aggression in childhood and adolescence. *Aggressive Behavior*, *41*, 353–368. doi:10.1002/ab.21556
- Brendgen, M., Vitaro, F., Bukowski, W. M., Doyle, A. B., & Markiewicz, D. (2001). Developmental profiles of peer social preference over the course of elementary school: Associations with trajectories of externalizing and internalizing behavior. *Developmental Psychology*, *37*, 308–320. doi:10.1037/0012-1649.37.3.308
- Brendgen, M., Vitaro, F., Tremblay, R. E., & Wanner, B. (2002). Parent and peer effects on delinquency-related violence and dating violence: A test of two mediational models. *Social Development*, *11*, 225–244. doi:10.1111/1467-9507.00196
- Broidy, L. M., Nagin, D. S., Tremblay, R. E., Bates, J. E., Brame, B., Dodge, K. A., ... Vitaro, F. (2003). Developmental trajectories of childhood disruptive behaviors and adolescent delinquency: A six-site, cross-national study. *Developmental Psychology*, *39*, 222–245. doi:10.1037/0012-1649.39.2.222
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard university press.
- Brown, B. B. (1990). Peer groups and peer cultures. In S. S. Feldman & G. R. Elliott (Eds.), *At the threshold: The developing adolescent*. (pp. 171–196). Cambridge, MA: Harvard University Press.
- Brown, B. B., & Klute, C. (2003). Friendships, cliques, and crowds. In G. R. Adams & M. D. Berzonsky (Eds.), *Blackwell handbook of adolescence*. (pp. 330–348). Malden, MA: Blackwell Publishing.
- Brown, K., Atkins, M. S., Osborne, M. L., & Milnamow, M. (1996). A revised teacher rating scale for

- reactive and proactive aggression. *Journal of Abnormal Child Psychology*, *24*, 473–480. doi:10.1007/BF01441569
- Buss, A. H. (1961). *The psychology of aggression*. Hoboken, NJ: John Wiley & Sons Inc. doi:10.1037/11160-000
- Cairns, E., McWhirter, L., Duffy, U., & Barry, R. (1990). The stability of self-concept in late adolescence: Gender and situational effects. *Personality and Individual Differences*, *11*, 937–944. doi:10.1016/0191-8869(90)90275-V
- Cairns, R. B., & Cairns, B. D. (1984). Predicting aggressive patterns in girls and boys: A developmental study. *Aggressive Behavior*, *10*, 227–242.
- Cairns, R. B., & Cairns, B. D. (1994). *Lifelines and risks: Pathways of youth in our time*. New York: Cambridge University Press.
- Card, N. A., & Little, T. D. (2006). Proactive and reactive aggression in childhood and adolescence: A meta-analysis of differential relations with psychosocial adjustment. *International Journal of Behavioral Development*, *30*, 466–480. doi:10.1177/0165025406071904
- Card, N. A., Stucky, B. D., Sawalani, G. M., & Little, T. D. (2008). Direct and indirect aggression during childhood and adolescence: A meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Development*, *79*, 1185–1229. doi:10.1111/j.1467-8624.2008.01184.x
- Catalano, R. F., & Hawkins, D. J. (1996). The social development model: A theory of antisocial behavior. In J. D. Hawkins (Ed.), *Delinquency and crime: Current theories*. (pp. 149–197). New York: Cambridge University Press.
- Chen, X., Huang, X., Chang, L., Wang, L., & Li, D. (2010). Aggression, social competence, and academic achievement in Chinese children: A 5-year longitudinal study. *Development and Psychopathology*, *22*, 583–592. doi:10.1017/S0954579410000295
- Chubb, N. H., Fertman, C. I., & Ross, J. L. (1997). Adolescent self-esteem and locus of control: A longitudinal study of gender and age differences. *Adolescence*, *32*, 113–129.
- Cicchetti, D., & Rogosch, F. A. (1996). Equifinality and multifinality in developmental psychopathology. *Development and Psychopathology*, *8*, 597–600. doi:10.1017/S0954579400007318
- Cillessen, A. H. N., Bukowski, W. M., & Haselager, G. J. T. (2000). Stability of sociometric categories. In A. H. N. Cillessen & W. M. Bukowski (Eds.), *Recent advances in the measurement of acceptance and rejection in the peer system*. (pp. 75–93). San Francisco, CA: Jossey-Bass.

- Cillessen, A. H. N., & Mayeux, L. (2004). From censure to reinforcement: Developmental changes in the association between aggression and social status. *Child Development, 75*, 147–163. doi:10.1111/j.1467-8624.2004.00660.x
- Coie, J. D., & Dodge, K. A. (1983). Continuities and changes in children's social status: A five-year longitudinal study. *Merrill-Palmer Quarterly, 29*, 261–282.
- Coie, J. D., & Dodge, K. A. (1998). Aggression and antisocial behavior. In N. Eisenberg (Ed.), *Handbook of child psychology, 5th ed.: Vol 3. Social, emotional, and personality development*. (pp. 779–862). Hoboken, NJ: John Wiley & Sons Inc.
- Cole, D. A., & Maxwell, S. E. (2003). Testing Mediation Models With Longitudinal Data: Questions and Tips in the Use of Structural Equation Modeling. *Journal of Abnormal Psychology, 112*, 558–577. doi:10.1037/0021-843X.112.4.558
- Collins, A. M., & Loftus, E. F. (1975). A spreading-activation theory of semantic processing. *Psychological Review, 82*, 407–428. doi:10.1037/0033-295X.82.6.407
- Connell, J. P. (1985). A new multidimensional measure of children's perceptions of control. *Child Development, 56*, 1018–1041. doi:10.2307/1130113
- Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar & L. A. Sroufe (Eds.), *Self processes and development*. (pp. 43–77). Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.
- Connor, D. F., Steingard, R. J., Anderson, J. J., & Melloni Jr, R. H. (2003). Gender differences in reactive and proactive aggression. *Child Psychiatry and Human Development, 33*, 279–294.
- Covington, M. V. (2000). Goal theory, motivation, and school achievement: An integrative review. *Annual Review of Psychology, 51*, 171–200. doi:10.1146/annurev.psych.51.1.171
- Crick, N. R. (1996). The role of overt aggression, relational aggression, and prosocial behavior in the prediction of children's future social adjustment. *Child Development, 67*, 2317–2327. doi:10.2307/1131625
- Crick, N. R. (1997). Engagement in gender normative versus nonnormative forms of aggression: Links to social–psychological adjustment. *Developmental Psychology, 33*, 610–617. doi:10.1037/0012-1649.33.4.610
- Crick, N. R., Casas, J. F., & Mosher, M. (1997). Relational and overt aggression in preschool. *Developmental Psychology, 33*, 579–588. doi:10.1037/0012-1649.33.4.579
- Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing

- mechanisms in children's social adjustment. *Psychological Bulletin*, *115*, 74–101. doi:10.1037/0033-2909.115.1.74
- Csikszentmihalyi, M., & Larson, R. (1984). *Being adolescent: Conflict and growth in the teenage years*. New York: Basic Books.
- Day, D. M., Bream, L. A., & Pal, A. (1992). Proactive and reactive aggression: An analysis of subtypes based on teacher perceptions. *Journal of Clinical Child Psychology*, *21*, 210–217. doi:10.1207/s15374424jccp2103_2
- Dishion, T. J. (2000). Cross-setting consistency in early adolescent psychopathology: Deviant friendships and problem behavior sequelae. *Journal of Personality*, *68*, 1109–1126. doi:10.1111/1467-6494.00128
- Dishion, T. J., Andrews, D. W., & Crosby, L. (1995). Antisocial boys and their friends in early adolescence: Relationship characteristics, quality, and interactional process. *Child Development*, *66*, 139–151. doi:10.2307/1131196
- Dishion, T. J., Nelson, S. E., Winter, C. E., & Bullock, B. M. (2004). Adolescent friendship as a dynamic system: Entropy and deviance in the etiology and course of male antisocial behavior. *Journal of Abnormal Child Psychology*, *32*, 651–663. doi:10.1023/B:JACP.0000047213.31812.21
- Dishion, T. J., & Owen, L. D. (2002). A longitudinal analysis of friendships and substance use: Bidirectional influence from adolescence to adulthood. *Developmental Psychology*, *38*, 480–491. doi:10.1037/0012-1649.38.4.480
- Dishion, T. J., Patterson, G. R., Stoolmiller, M., & Skinner, M. L. (1991). Family, school, and behavioral antecedents to early adolescent involvement with antisocial peers. *Developmental Psychology*, *27*, 172–180. doi:10.1037/0012-1649.27.1.172
- Dishion, T. J., Piehler, T. F., & Myers, M. W. (2008). Dynamics and ecology of adolescent peer influence. In M. J. Prinstein & K. A. Dodge (Eds.), *Understanding peer influence in children and adolescents*. (pp. 72–93). New York: Guilford Press.
- Dishion, T. J., Poulin, F., & Burraston, B. (2001). Peer group dynamics associated with iatrogenic effects in group interventions with high-risk young adolescents. In D. W. Nangle & C. A. Erdley (Eds.), *The role of friendship in psychological adjustment*. (pp. 79–92). San Francisco, CA: Jossey-Bass.
- Dishion, T. J., Reid, J. B., & Patterson, G. R. (1988). Empirical guidelines for a family intervention for adolescent drug use. *Journal of Chemical Dependency Treatment*, *1*, 189–224.
- Dishion, T. J., Spracklen, K. M., Andrews, D. W., & Patterson, G. R. (1996). Deviancy training in male adolescent friendships. *Behavior Therapy*, *27*, 373–390. doi:10.1016/S0005-7894(96)80023-2

- Dishion, T. J., & Tipsord, J. M. (2011). Peer contagion in child and adolescent social and emotional development. *Annual Review of Psychology, 62*, 189–214. doi:10.1146/annurev.psych.093008.100412
- Dishion, T. J., Véronneau, M.-H., & Myers, M. W. (2010). Cascading peer dynamics underlying the progression from problem behavior to violence in early to late adolescence. *Development and Psychopathology, 22*, 603–619. doi:10.1017/S0954579410000313
- Dodge, K. A. (2006). Translational science in action: Hostile attributional style and the development of aggressive behavior problems. *Development and Psychopathology, 18*, 791–814. doi:10.1017/S0954579406060391
- Dodge, K. A., & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology, 53*, 1146–1158. doi:10.1037/0022-3514.53.6.1146
- Dodge, K. A., Dishion, T. J., & Lansford, J. E. (2006). *Deviant peer influences in programs for youth: Problems and solutions*. New York: Guilford Press.
- Dodge, K. A., Lansford, J. E., Burks, V. S., Bates, J. E., Pettit, G. S., Fontaine, R., & Price, J. M. (2003). Peer rejection and social information-processing factors in the development of aggressive behavior problems in children. *Child Development, 74*, 374–393. doi:10.1111/1467-8624.7402004
- Dodge, K. A., Lochman, J. E., Harnish, J. D., Bates, J. E., & Pettit, G. S. (1997). Reactive and proactive aggression in school children and psychiatrically impaired chronically assaultive youth. *Journal of Abnormal Psychology, 106*, 37–51. doi:10.1037/0021-843X.106.1.37
- Dollard, J., Miller, N. E., Doob, L. W., Mowrer, O. H., & Sears, R. R. (1939). *Frustration and aggression*. New Haven, CT: Yale University Press.
- Domjan, M. (1998). *The principles of learning and behavior* (4th ed.). Belmont, CA: Thomson Brooks/Cole Publishing Co.
- Eidelman, S., Silvia, P. J., & Biernat, M. (2006). Responding to deviance: Target exclusion and differential devaluation. *Personality and Social Psychology Bulletin, 32*, 1153–1164. doi:10.1177/0146167206288720
- Elliott, D. S., Huizinga, D., & Ageton, S. S. (1985). *Explaining delinquency and drug use*. Beverly Hills, CA: SAGE.
- Eron, L. D. (1997). The development of antisocial behavior from a learning perspective. In D. M. Stoff, J. Breiling, & J. D. Maser (Eds.), *Handbook of antisocial behavior*. (pp. 140–147). Hoboken, NJ:

John Wiley & Sons Inc.

- 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
- Feingold, A. (1994). Gender differences in personality: A meta-analysis. *Psychological Bulletin, 116*, 429–456. doi:10.1037/0033-2909.116.3.429
- Fergusson, D. M., & Horwood, L. J. (1999). Prospective childhood predictors of deviant peer affiliations in adolescence. *Journal of Child Psychology and Psychiatry, 40*, 581–592. doi:10.1111/1469-7610.00475
- Fergusson, D. M., Horwood, L. J., & Lynskey, M. T. (1993). Prevalence and comorbidity of DSM-III-R diagnoses in a birth cohort of 15 year olds. *Journal of the American Academy of Child & Adolescent Psychiatry, 32*, 1127–1134.
- Fite, P. J., & Colder, C. R. (2007). Proactive and reactive aggression and peer delinquency: Implications for prevention and intervention. *The Journal of Early Adolescence, 27*, 223–240. doi:10.1177/0272431606294838
- Fite, P. J., Hendrickson, M., Rubens, S. L., Gabrielli, J., & Evans, S. (2013). The role of peer rejection in the link between reactive aggression and academic performance. *Child & Youth Care Forum, 42*, 193–205. doi:10.1007/s10566-013-9199-9
- Fite, P. J., Raine, A., Stouthamer-Loeber, M., Loeber, R., & Pardini, D. A. (2009). Reactive and proactive aggression in adolescent males: Examining differential outcomes 10 years later in early adulthood. *Criminal Justice and Behavior, 37*, 141–157. doi:10.1177/0093854809353051
- Fite, P. J., Wimsatt, A. R., Vitulano, M. L., Rathert, J. L., & Schwartz, S. (2012). Examination of peer rejection and depressive symptoms as mediators of the link between rule-breaking behavior and poor academic performance. *Journal of Psychopathology and Behavioral Assessment, 34*, 164–171. doi:10.1007/s10862-011-9269-y
- Frude, N. (1993). Hatred between children. In V. P. Varma (Ed.), *How and why children hate*. (pp. 73–93). London, England: Jessica Kingsley Publishers.
- Grolnick, W. S., & Ryan, R. M. (1992). Parental resources and the developing child in school. In M. E. Procidano & C. B. Fisher (Eds.), *Contemporary families: A handbook for school professionals*. (pp. 275–291). New York: Teachers College Press.
- Grolnick, W. S., Ryan, R. M., & Deci, E. L. (1991). Inner resources for school achievement: Motivational mediators of children's perceptions of their parents. *Journal of Educational Psychology, 83*, 508–

517. doi:10.1037/0022-0663.83.4.508
- Han, S. S., Weisz, J. R., & Weiss, B. (2001). Specificity of relations between children's control-related beliefs and internalizing and externalizing psychopathology. *Journal of Consulting and Clinical Psychology, 69*, 240–251. doi:10.1037/0022-006X.69.2.240
- Hardy, C. L., Bukowski, W. M., & Sippola, L. K. (2002). Stability and change in peer relationships during the transition to middle-level school. *The Journal of Early Adolescence, 22*, 117–142. doi:10.1177/0272431602022002001
- Harré, R., & Lamb, R. (1986). *The dictionary of personality and social psychology*. Cambridge, MA: The MIT Press.
- Hartup, W. W., & Stevens, N. (1997). Friendships and adaptation in the life course. *Psychological Bulletin, 121*, 355–370. doi:10.1037/0033-2909.121.3.355
- Hartup, W. W., & Stevens, N. (1999). Friendships and adaptation across the life span. *Current Directions in Psychological Science, 8*, 76–79. doi:10.1111/1467-8721.00018
- Hawkins, D. J., Catalano, R. F., Kosterman, R., Abbott, R., & Hill, K. G. (1999). Preventing adolescent health-risk behaviors by strengthening protection during childhood. *Archives of Pediatrics & Adolescent Medicine, 153*, 226–234.
- Hawley, P. H., Little, T. D., & Card, N. A. (2007). The allure of a mean friend: Relationship quality and processes of aggressive adolescents with prosocial skills. *International Journal of Behavioral Development, 31*, 170–180. doi:10.1177/0165025407074630
- Hawley, P. H., & Vaughn, B. E. (2003). Aggression and adaptive functioning: The bright side to bad behavior. *Merrill-Palmer Quarterly, 49*, 239–242. doi:10.1353/mpq.2003.0012
- Hinshaw, S. P. (2008). Developmental psychopathology as a scientific discipline: Relevance to behavioral and emotional disorders of childhood and adolescence. In T. P. Beauchaine & S. P. Hinshaw (Eds.), *Child and adolescent psychopathology*. (pp. 3–26). Hoboken, NJ: John Wiley & Sons Inc.
- Hubbard, J. A., Dodge, K. A., Cillessen, A. H. N., Coie, J. D., & Schwartz, D. (2001). The dyadic nature of social information processing in boys' reactive and proactive aggression. *Journal of Personality and Social Psychology, 80*, 268–280. doi:10.1037/0022-3514.80.2.268
- Huesmann, L. R. (1988). An information processing model for the development of aggression. *Aggressive Behavior, 14*, 13–24. doi:10.1002/1098-2337(1988)14:1<13::AID-AB2480140104>3.0.CO;2-J

- Huesmann, L. R. (1998). The role of social information processing and cognitive schema in the acquisition and maintenance of habitual aggressive behavior. In R. G. Geen & E. Donnerstein (Eds.), *Human aggression: Theories, research, and implications for social policy*. (pp. 73–109). San Diego, CA: Academic Press.
- Huesmann, L. R., Dubow, E. F., & Boxer, P. (2009). Continuity of aggression from childhood to early adulthood as a predictor of life outcomes: Implications for the adolescent-limited and life-course-persistent models. *Aggressive Behavior, 35*, 136–149. doi:10.1002/ab.20300
- Ihle, W., & Esser, G. (2002). Epidemiologie psychischer Störungen im Kindes- und Jugendalter: Prävalenz, Verlauf, Komorbidität und Geschlechtsunterschiede [Epidemiology of mental disorders in childhood and adolescence: Prevalence, course, comorbidity and gender differences]. *Psychologische Rundschau, 53*, 159–169. doi:10.1026//0033-3042.53.4.159
- Izard, C. E., Fantauzzo, C. A., Castle, J. M., Haynes, O. M., Rayias, M. F., & Putnam, P. H. (1995). The ontogeny and significance of infants' facial expressions in the first 9 months of life. *Developmental Psychology, 31*, 997–1013. doi:10.1037/0012-1649.31.6.997
- Jackson, Y., Frick, P., & Dravage-Bush, J. (2000). Perceptions of control in children with externalizing and mixed behavior disorders. *Child Psychiatry and Human Development, 31*, 43–58. doi:10.1023/A:1001974021298
- Joireman, J., Anderson, J., & Strathman, A. (2003). The aggression paradox: Understanding links among aggression, sensation seeking, and the consideration of future consequences. *Journal of Personality and Social Psychology, 84*, 1287–1302. doi:10.1037/0022-3514.84.6.1287
- Kandel, D. B. (1978). Homophily, selection, and socialization in adolescent friendships. *American Journal of Sociology, 84*, 427–436. doi:10.1086/226792
- Killen, M., Lee-Kim, J., McGlothlin, H., & Stangor, C. (2002). How children and adolescents evaluate gender and racial exclusion. *Monographs of the Society for Research in Child Development, 67*. doi:10.1111/1540-5834.00218
- Killen, M., Rutland, A., & Jampol, N. S. (2009). Social exclusion in childhood and adolescence. In K. H. Rubin, W. M. Bukowski, & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups*. (pp. 249–266). New York: Guilford Press.
- Kindermann, T. A. (1993). Natural peer groups as contexts for individual development: The case of children's motivation in school. *Developmental Psychology, 29*, 970–977. doi:10.1037/0012-1649.29.6.970
- Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: Continuity and

- change, antecedents, and implications for social development. *Developmental Psychology*, *36*, 220–232. doi:10.1037/0012-1649.36.2.220
- Kokko, K., Pulkkinen, L., Huesmann, L. R., Dubow, E. F., & Boxer, P. (2009). Intensity of aggression in childhood as a predictor of different forms of adult aggression: A two-country (Finland and the United States) analysis. *Journal of Research on Adolescence*, *19*, 9–34. doi:10.1111/j.1532-7795.2009.00579.x
- Krahé, B. (2013). *The social psychology of aggression* (2nd ed.). New York: Psychology Press.
- Krampen, G. (1989). Perceived childrearing practices and the development of locus of control in early adolescence. *International Journal of Behavioral Development*, *12*, 177–193. doi:10.1177/016502548901200203
- Kulas, H. (1996). Locus of control in adolescence: A longitudinal study. *Adolescence*, *31*, 721–729.
- Kupersmidt, J. B., Burchinal, M., & Patterson, C. J. (1995). Developmental patterns of childhood peer relations as predictors of externalizing behavior problems. *Development and Psychopathology*, *7*, 825–843. doi:10.1017/S0954579400006866
- Kupersmidt, J. B., & DeRosier, M. E. (2004). How peer problems lead to negative outcomes: An integrative mediational model. In J. B. Kupersmidt & K. A. Dodge (Eds.), *Children's peer relations: From development to intervention*. (pp. 119–138). Washington, DC: American Psychological Association. doi:10.1037/10653-007
- Kupersmidt, J. B., DeRosier, M. E., & Patterson, C. P. (1995). Similarity as the basis for children's friendships: The roles of sociometric status, aggressive and withdrawn behavior, academic achievement, and demographic characteristics. *Journal of Social and Personal Relationships*, *12*, 439–452. doi:10.1177/0265407595123007
- Lacourse, E., Nagin, D., Tremblay, R. E., Vitaro, F., & Claes, M. (2003). Developmental trajectories of boys' delinquent group membership and facilitation of violent behaviors during adolescence. *Development and Psychopathology*, *15*, 183–197. doi:10.1017/S0954579403000105
- Ladd, G. W., & Troop-Gordon, W. (2003). The role of chronic peer difficulties in the development of children's psychological adjustment problems. *Child Development*, *74*, 1344–1367. doi:10.1111/1467-8624.00611
- Laird, R. D., Jordan, K. Y., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2001). Peer rejection in childhood, involvement with antisocial peers in early adolescence, and the development of externalizing behavior problems. *Development and Psychopathology*, *13*, 337–354. doi:10.1017/S0954579401002085

- Lansford, J. E., Malone, P. S., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2010). Developmental cascades of peer rejection, social information processing biases, and aggression during middle childhood. *Development and Psychopathology, 22*, 593–602. doi:10.1017/S0954579410000301
- Leary, M. R., Twenge, J. M., & Quinlivan, E. (2006). Interpersonal rejection as a determinant of anger and aggression. *Personality and Social Psychology Review, 10*, 111–132. doi:10.1207/s15327957pspr1002_2
- Lev-Wiesel, R., Nuttman-Shwartz, O., & Sternberg, R. (2006). Peer rejection during adolescence: Psychological long-term effects - A brief report. *Journal of Loss and Trauma, 11*, 131–142. doi:10.1080/15325020500409200
- Lev-Wiesel, R., Sarid, M., & Sternberg, R. (2013). Measuring social peer rejection during childhood: Development and validation. *Journal of Aggression, Maltreatment & Trauma, 22*, 482–492. doi:10.1080/10926771.2013.785456
- Little, T. D., Brauner, J., Jones, S. M., Nock, M. K., & Hawley, P. H. (2003). Rethinking aggression: A typological examination of the functions of aggression. *Merrill-Palmer Quarterly, 49*, 343–369. doi:10.1353/mpq.2003.0014
- Loeber, R., & Hay, D. (1997). Key issues in the development of aggression and violence from childhood to early adulthood. *Annual Review of Psychology, 48*, 371–410. doi:10.1146/annurev.psych.48.1.371
- Maguin, E., & Loeber, R. (1996). Academic performance and delinquency. *Crime and Justice, 20*, 145–264.
- Manger, T., & Eikeland, O.-J. (2000). On the relationship between locus of control, level of ability and gender. *Scandinavian Journal of Psychology, 41*, 225–229. doi:10.1111/1467-9450.00191
- Marsee, M. A., Frick, P. J., Barry, C. T., Kimonis, E. R., Centifanti, L. C. M., & Aucoin, K. J. (2014). Profiles of the forms and functions of self-reported aggression in three adolescent samples. *Development and Psychopathology, 26*, 705–720. doi:10.1017/S0954579414000339
- Martino, S. C., Ellickson, P. L., Klein, D. J., McCaffrey, D., & Edelen, M. O. (2008). Multiple trajectories of physical aggression among adolescent boys and girls. *Aggressive Behavior, 34*, 61–75. doi:10.1002/ab.20215
- Masten, A. S. (2006). Developmental psychopathology: Pathways to the future. *International Journal of Behavioral Development, 30*, 47–54. doi:10.1177/0165025406059974
- Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology, 22*, 491–495. doi:10.1017/S0954579410000222

- Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradović, J., Riley, J. R., ... Tellegen, A. (2005). Developmental cascades: Linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology, 41*, 733–746. doi:10.1037/0012-1649.41.5.733
- Mathys, C., Hyde, L. W., Shaw, D. S., & Born, M. (2013). Deviancy and normative training processes in experimental groups of delinquent and nondelinquent male adolescents. *Aggressive Behavior, 39*, 30–44. doi:10.1002/ab.21456
- McCauley, E., Mitchell, J. R., Burke, P. M., & Moss, S. J. (1988). Cognitive attributes of depression in children and adolescents. *Journal of Consulting and Clinical Psychology, 56*, 903–908. doi:10.1037/0022-006X.56.6.903
- McHale, S. M., Dariotis, J. K., & Kauh, T. J. (2003). Social development and social relationships in middle childhood. In R. M. Lerner, M. A. Easterbrooks, & J. Mistry (Eds.), *Handbook of psychology: Developmental psychology, Vol. 6*. (pp. 241–265). Hoboken, NJ: John Wiley & Sons Inc.
- Merk, W., de Castro, B. O., Koops, W., & Matthys, W. (2005). The distinction between reactive and proactive aggression: Utility for theory, diagnosis and treatment? *European Journal of Developmental Psychology, 2*, 197–220. doi:10.1080/17405620444000300
- Miller, N. E. (1941). The frustration-aggression hypothesis. *Psychological Review, 48*, 337–342. doi:10.1037/h0055861
- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 100*, 674–701. doi:10.1037/0033-295X.100.4.674
- Moffitt, T. E. (2007). A review of research on the taxonomy of life-course persistent versus adolescence-limited antisocial behavior. In D. J. Flannery, A. T. Vazsonyi, & I. D. Waldman (Eds.), *The Cambridge handbook of violent behavior and aggression*. (pp. 49–74). New York: Cambridge University Press. doi:10.1017/CBO9780511816840.004
- Nesdale, D. (2004). Social identity processes and children's ethnic prejudice. In M. Bennett & F. Sani (Eds.), *The development of the social self*. (pp. 219–245). New York: Psychology Press.
- Newcomb, A. F., & Bagwell, C. L. (1995). Children's friendship relations: A meta-analytic review. *Psychological Bulletin, 117*, 306–347. doi:10.1037/0033-2909.117.2.306
- OECD. (2016). Low-performing students: Why they fall behind and how to help them succeed. Paris, France: OECD Publishing. doi:http://dx.doi.org/10.1787/9789264250246-en
- Olweus, D. (1979). Stability of aggressive reaction patterns in males: A review. *Psychological Bulletin, 86*, 85–105. doi:10.1037/0033-2909.86.1.85

- 86, 852–875. doi:10.1037/0033-2909.86.4.852
- Österman, K., Björkqvist, K., Lagerspetz, K. M. J., Charpentier, S., Caprara, G. V., & Pastorelli, C. (1999). Locus of control and three types of aggression. *Aggressive Behavior, 25*, 61–65. doi:10.1002/(SICI)1098-2337(1999)25:1<61::AID-AB6>3.0.CO;2-G
- Ostrov, J. M., Murray-Close, D., Godleski, S. A., & Hart, E. J. (2013). Prospective associations between forms and functions of aggression and social and affective processes during early childhood. *Journal of Experimental Child Psychology, 116*, 19–36. doi:10.1016/j.jecp.2012.12.009
- Pardini, D. A., Loeber, R., & Stouthamer-Loeber, M. (2005). Developmental shifts in parent and peer influences on boys' beliefs about delinquent behavior. *Journal of Research on Adolescence, 15*, 299–323. doi:10.1111/j.1532-7795.2005.00098.x
- Parker, J. G., & Asher, S. R. (1993). Friendship and friendship quality in middle childhood: Links with peer group acceptance and feelings of loneliness and social dissatisfaction. *Developmental Psychology, 29*, 611–621. doi:10.1037/0012-1649.29.4.611
- Parker, J. G., Rubin, K. H., Erath, S. A., Wojslawowicz, J. C., & Buskirk, A. A. (2006). Peer relationships, child development, and adjustment: A developmental psychopathology perspective. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology, Vol 1: Theory and method* (2nd ed.). (pp. 419–493). Hoboken, NJ: John Wiley & Sons Inc.
- Parrott, D. J., & Giancola, P. R. (2007). Addressing “The criterion problem” in the assessment of aggressive behavior: Development of a new taxonomic system. *Aggression and Violent Behavior, 12*, 280–299. doi:10.1016/j.avb.2006.08.002
- Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (1989). A developmental perspective on antisocial behavior. *American Psychologist, 44*, 329–335. doi:10.1037/0003-066X.44.2.329
- Patterson, G. R., & Dishion, T. J. (1985). Contributions of families and peers to delinquency. *Criminology, 23*, 63–79. doi:10.1111/j.1745-9125.1985.tb00326.x
- Paulhus, D. L. (1984). Two-component models of socially desirable responding. *Journal of Personality and Social Psychology, 46*, 598–609. doi:10.1037/0022-3514.46.3.598
- Paulhus, D. L. (2002). Socially desirable responding: The evolution of a construct. In H. I. Braun, D. N. Jackson, & D. E. Wiley (Eds.), *The role of constructs in psychological and educational measurement*. (pp. 49–69). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Pellegrini, A. D., Bartini, M., & Brooks, F. (1999). School bullies, victims, and aggressive victims: Factors relating to group affiliation and victimization in early adolescence. *Journal of Educational Psychology, 91*, 216–224. doi:10.1037/0022-0663.91.2.216

- Pellegrini, A. D., & Long, J. D. (2002). A longitudinal study of bullying, dominance, and victimization during the transition from primary school through secondary school. *British Journal of Developmental Psychology, 20*, 259–280. doi:10.1348/026151002166442
- Poulin, F., & Boivin, M. (1999). Proactive and reactive aggression and boys' friendship quality in mainstream classrooms. *Journal of Emotional and Behavioral Disorders, 7*, 168–177. doi:10.1177/106342669900700305
- Poulin, F., & Boivin, M. (2000a). Reactive and proactive aggression: Evidence of a two-factor model. *Psychological Assessment, 12*, 115–122. doi:10.1037/1040-3590.12.2.115
- Poulin, F., & Boivin, M. (2000b). The role of proactive and reactive aggression in the formation and development of boys' friendships. *Developmental Psychology, 36*, 233–240. doi:10.1037/0012-1649.36.2.233
- Price, J. M., & Dodge, K. A. (1989). Reactive and proactive aggression in childhood: Relations to peer status and social context dimensions. *Journal of Abnormal Child Psychology, 17*, 455–471. doi:10.1007/BF00915038
- Prinstein, M. J., & Cillessen, A. H. N. (2003). Forms and functions of adolescent peer aggression associated with high levels of peer status. *Merrill-Palmer Quarterly, 49*, 310–342. doi:10.1353/mpq.2003.0015
- Pulkkinen, L. (1996). Proactive and reactive aggression in early adolescence as precursors to anti- and prosocial behavior in young adults. *Aggressive Behavior, 22*, 241–257. doi:10.1002/(SICI)1098-2337(1996)22:4<241::AID-AB1>3.0.CO;2-O
- Radliff, K. M., Wang, C., & Swearer, S. M. (2015). Bullying and peer victimization: An examination of cognitive and psychosocial constructs. *Journal of Interpersonal Violence*, advance online publication. doi:10.1177/0886260515572476
- Raine, A., Dodge, K., Loeber, R., Gatzke-Kopp, L., Lynam, D., Reynolds, C., ... Liu, J. (2006). The reactive-proactive aggression questionnaire: Differential correlates of reactive and proactive aggression in adolescent boys. *Aggressive Behavior, 32*, 159–171. doi:10.1002/ab.20115
- Rodkin, P. C., Farmer, T. W., Pearl, R., & Van Acker, R. (2000). Heterogeneity of popular boys: Antisocial and prosocial configurations. *Developmental Psychology, 36*, 14–24. doi:10.1037/0012-1649.36.1.14
- Rodkin, P. C., & Wilson, T. (2007). Aggression and adaptation: Psychological record, educational promise. In P. H. Hawley, T. D. Little, & P. C. Rodkin (Eds.), *Aggression and adaptation: The bright side to bad behavior*. (pp. 235–267). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

- Romi, S., & Itskowitz, R. (1990). The relationship between locus of control and type of aggression in middle-class and culturally deprived children. *Personality and Individual Differences, 11*, 327–333. doi:10.1016/0191-8869(90)90214-C
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied, 80*, 1–28. doi:10.1037/h0092976
- Rotter, J. B. (1990). Internal versus external control of reinforcement: A case history of a variable. *American Psychologist, 45*, 489–493. doi:10.1037/0003-066X.45.4.489
- Rubin, K. H., Bukowski, W., & Parker, J. G. (1998). Peer interactions, relationships, and groups. In N. Eisenberg (Ed.), *Handbook of child psychology, 5th ed.: Vol 3. Social, emotional, and personality development*. (pp. 619–700). Hoboken, NJ: John Wiley & Sons Inc.
- Ryan, A. M. (2000). Peer groups as a context for the socialization of adolescents' motivation, engagement, and achievement in school. *Educational Psychologist, 35*, 101–111. doi:10.1207/S15326985EP3502_4
- Ryan, A. M. (2001). The peer group as a context for the development of young adolescent motivation and achievement. *Child Development, 72*, 1135–1150. doi:10.1111/1467-8624.00338
- Salmivalli, C., Kaukiainen, A., & Lagerspetz, K. (2000). Aggression and sociometric status among peers: Do gender and type of aggression matter? *Scandinavian Journal of Psychology, 41*, 17–24. doi:10.1111/1467-9450.00166
- Sameroff, A. J. (2000). Developmental systems and psychopathology. *Development and Psychopathology, 12*, 297–312. doi:10.1017/S0954579400003035
- Sameroff, A. J. (2012). Discontinuity: The hallmark of developmental science. *International Journal of Developmental Science, 6*, 37–39. doi:10.3233/DEV-2012-11100
- Sampsons, R. J. & Lauritsen, J. L. (1990). Deviant lifestyles, proximity to crime, and the offender-victim link in personal violence. *Journal of Research in Crime and Delinquency, 27*, 110–139. doi:10.1177/0022427890027002002
- Schank, R. C., & Abelson, R. P. (1977). *Scripts, plans, goals and understanding: An inquiry into human knowledge structures*. Oxford, England: Lawrence Erlbaum.
- Schreck, C. J., Fisher, B. S., & Miller, J. M. (2004). The social context of violent victimization: A study of the delinquent peer effect. *Justice Quarterly, 21*, 23–47. doi:10.1080/07418820400095731
- Seligman, M. E. P. (1975). *Helplessness: On depression, development, and death*. New York: W H Freeman/Times Books/ Henry Holt & Co.

- Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology, 71*, 549–570. doi:10.1037/0022-3514.71.3.549
- Skinner, E. A., Chapman, M., & Baltes, P. B. (1988). Children's beliefs about control, means-ends, and agency: Developmental differences during middle childhood. *International Journal of Behavioral Development, 11*, 369–388.
- Skinner, E. A., Zimmer-Gembeck, M. J., & Connell, J. P. (1998). Individual differences and the development of perceived control. *Monographs of the Society for Research in Child Development, 63*, v–220. doi:10.2307/1166220
- Snyder, J. (2002). Reinforcement and coercion mechanisms in the development of antisocial behavior: Peer relationships. In J. B. Reid, G. R. Patterson, & J. Snyder (Eds.), *Antisocial behavior in children and adolescents: A developmental analysis and model for intervention*. (pp. 101–122). Washington, DC: American Psychological Association.
- Snyder, J., Schrepferman, L., Oeser, J., Patterson, G., Stoolmiller, M., Johnson, K., & Snyder, A. (2005). Deviancy training and association with deviant peers in young children: Occurrence and contribution to early-onset conduct problems. *Development and Psychopathology, 17*, 397–413. doi:10.1017/S0954579405050194
- Sroufe, L. A., Bennett, C., Englund, M., Urban, J., & Shulman, S. (1993). The significance of gender boundaries in preadolescence: Contemporary correlates and antecedents of boundary violation and maintenance. *Child Development, 64*, 455–466. doi:10.2307/1131262
- Steinberg, L., & Monahan, K. C. (2007). Age differences in resistance to peer influence. *Developmental Psychology, 43*, 1531–1543. doi:10.1037/0012-1649.43.6.1531
- Stipek, D., & Miles, S. (2008). Effects of aggression on achievement: Does conflict with the teacher make it worse? *Child Development, 79*, 1721–1735. doi:10.1111/j.1467-8624.2008.01221.x
- Stoff, D. M., Breiling, J., & Maser, J. D. (1997). *Handbook of antisocial behavior*. (D. M. Stoff, J. Breiling, & J. D. Maser, Eds.). Hoboken, NJ: John Wiley & Sons Inc.
- Tedeschi, J. T., & Felson, R. B. (1994). *Violence, aggression, and coercive actions*. Washington, DC: American Psychological Association.
- Temcheff, C. E., Serbin, L. A., Martin-Storey, A., Stack, D. M., Hodgins, S., Ledingham, J., & Schwartzman, A. E. (2008). Continuity and pathways from aggression in childhood to family violence in adulthood: A 30-year longitudinal study. *Journal of Family Violence, 23*, 231–242. doi:10.1007/s10896-007-9147-2
- Thompson, E. A., Connelly, C. D., Thomas-Jones, D., & Eggert, L. L. (2013). School difficulties and co-

- occurring health risk factors: Substance use, aggression, depression, and suicidal behaviors. *Journal of Child and Adolescent Psychiatric Nursing*, 26, 74–84. doi:10.1111/jcap.12026
- Tremblay, R. E. (1999). When children's social development fails. In D. P. Keating & C. Hertzman (Eds.), *Developmental health and the wealth of nations: Social, biological, and educational dynamics*. (pp. 55–71). New York: Guilford Press.
- Tremblay, R. E., Mâsse, L. C., Vitaro, F., & Dobkin, P. L. (1995). The impact of friends' deviant behavior on early onset of delinquency: Longitudinal data from 6 to 13 years of age. *Development and Psychopathology*, 7, 649–667. doi:10.1017/S0954579400006763
- Tremblay, R. E., Nagin, D. S., Séguin, J. R., Zoccolillo, M., Zelazo, P. D., Boivin, M., ... Japel, C. (2005). Physical aggression during early childhood: Trajectories and predictors. *Canadian Child and Adolescent Psychiatry Review*, 14, 3–9.
- Underwood, M. K. (2004). Gender and peer relations: Are the two gender cultures really all that different? In J. B. Kupersmidt & K. A. Dodge (Eds.), *Children's peer relations: From development to intervention*. (pp. 21–36). Washington, DC: American Psychological Association.
- Vaillancourt, T. (2005). Indirect aggression among humans: Social construct or evolutionary adaptation? In R. E. Tremblay, W. W. Hartup, & J. Archer (Eds.), *Developmental origins of aggression*. (pp. 158–177). New York: Guilford Press.
- Vaillancourt, T., Brendgen, M., Boivin, M., & Tremblay, R. E. (2003). A longitudinal confirmatory factor analysis of indirect and physical aggression: Evidence of two factors over time? *Child Development*, 74, 1628–1638. doi:10.1046/j.1467-8624.2003.00628.x
- Vitaro, F., Brendgen, M., & Barker, E. D. (2006). Subtypes of aggressive behaviors: A developmental perspective. *International Journal of Behavioral Development*, 30, 12–19. doi:10.1177/0165025406059968
- Vitaro, F., Brendgen, M., & Tremblay, R. E. (2000). Influence of deviant friends on delinquency: Searching for moderator variables. *Journal of Abnormal Child Psychology*, 28, 313–325. doi:10.1023/A:1005188108461
- Vitaro, F., Brendgen, M., & Tremblay, R. E. (2002). Reactively and proactively aggressive children: Antecedent and subsequent characteristics. *Journal of Child Psychology and Psychiatry*, 43, 495–505. doi:10.1111/1469-7610.00040
- Vitaro, F., Brendgen, M., & Wanner, B. (2005). Patterns of affiliation with delinquent friends during late childhood and early adolescence: Correlates and consequences. *Social Development*, 14, 82–108. doi:10.1111/j.1467-9507.2005.00292.x

- Wang, J., Iannotti, R. J., & Nansel, T. R. (2009). School bullying among adolescents in the United States: Physical, verbal, relational, and cyber. *Journal of Adolescent Health, 45*, 368–375. doi:10.1016/j.jadohealth.2009.03.021
- Watson, J. S. (1966). The development and generalization of “contingency awareness” in early infancy: Some hypotheses. *Merrill-Palmer Quarterly, 12*, 123–135.
- Weiss, B., Caron, A., Ball, S., Tapp, J., Johnson, M., & Weisz, J. R. (2005). Iatrogenic effects of group treatment for antisocial youths. *Journal of Consulting and Clinical Psychology, 73*, 1036–1044. doi:10.1037/0022-006X.73.6.1036
- Wentzel, K. R. (1998). Social relationships and motivation in middle school: The role of parents, teachers, and peers. *Journal of Educational Psychology, 90*, 202–209. doi:10.1037/0022-0663.90.2.202
- Werner, N. E., & Crick, N. R. (2004). Maladaptive peer relationships and the development of relational and physical aggression during middle childhood. *Social Development, 13*, 495–514. doi:10.1111/j.1467-9507.2004.00280.x
- West, D. J., & Farrington, D. P. (1977). *The delinquent way of life: Third report of the Cambridge Study in Delinquent Development*. Oxford, England: Heinemann Educational Books.
- Williams, K. D. (2007). Ostracism. *Annual Review of Psychology, 58*, 425–452. doi:10.1146/annurev.psych.58.110405.085641
- Yates, R., Kennelly, K., & Cox, S. H. (1975). Perceived contingency of parental reinforcements, parent-child relations, and locus of control. *Psychological Reports, 36*, 139–146. doi:10.2466/pr0.1975.36.1.139
- Zimmer-Gembeck, M. J., Geiger, T. C., & Crick, N. R. (2005). Relational and physical aggression, prosocial behavior, and peer relations: Gender moderation and bidirectional associations. *The Journal of Early Adolescence, 25*, 421–452. doi:10.1177/0272431605279841

Eidesstattliche Erklärung

Hiermit versichere ich, die Dissertation „The Role of Dysfunctional Peer Relationships and Academic Failure in the Development and Progression of Aggression: A Longitudinal Perspective“ selbstständig angefertigt zu haben. Die Arbeit wird zur Promotion im Fach Psychologie eingereicht und ist ohne unzulässige Hilfe Dritter verfasst worden. Bei der Abfassung wurden nur die in der Dissertation angegebenen Hilfsmittel benutzt sowie alle wörtlich oder inhaltlich übernommenen Stellen als solche gekennzeichnet. Die Dissertation ist in der gegenwärtigen oder einer anderen Fassung in keinem früheren Promotionsverfahren angenommen oder abgelehnt worden. Ich habe an keiner anderen Hochschule ein Promotionsverfahren eröffnet.

Potsdam, Oktober 2016

Unterschrift