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In the name of status
Adolescent harmful social behavior as strategic self-regulation

Hensums, M.

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IN THE NAME OF STATUS

ADOLESCENT HARMFUL SOCIAL BEHAVIOR AS STRATEGIC SELF-REGULATION

MAUD HENSUMS

In the Name of Status:

Adolescent Harmful Social Behavior as Strategic Self-Regulation

Maud Hensums

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Adolescent Harmful Social Behavior as Strategic Self-Regulation

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Faculteit der Maatschappij- en Gedragswetenschappen

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CHAPTER 1

General Introduction and Outline of the Dissertation

GENERAL INTRODUCTION AND OUTLINE OF THE DISSERTATION

Two teenage boys have a face-off prior to a boxing game, in which they stand close to each other and stare each other in the eyes. Suddenly, one of the boys pushes the other, the intensity increases, and the face-off ends abruptly.

It is the year 2020 and a pandemic severely restricts everybody's movement. Instead of following regulations and staying home to prevent the disease from spreading, a group of youngsters secretly gathers and posts about it on social media. After getting caught, they get punished and monitored more strictly by their parents.

A clique of high-school girls is talking about the new girl who just moved to town. Most girls think the new girl is cool. Quickly, one of the girls in the clique makes up a horrific rumor about the new girl, damaging the new girl's reputation.

At first glance, these examples might be interpreted as maladaptive, classic acts of low self-control or impulsivity. Yet, these examples might also be interpreted as goal-directed, skilled, and well-regulated behaviors that can be classified as adaptive. The boy involved in the face-off can exert social dominance and power by provoking his opponent. The group of youngsters might have lost some personal freedom, but their post was liked by more than a hundred of their friends. The girl from the clique might have ruined someone else's reputation but increased her own chances of social success.

In the current dissertation, I argue that behaviors that promote the self at the expense of others (bullying, aggression, selfishness, rule-breaking) do not always stem from weakness and cognitive deficits. On the contrary: some of these behaviors are carried out by socially skilled adolescents who can reach important goals by using these harmful strategies. Skillfully, they attune their behaviors to peer norms—also when these norms reward behaviors that harm others or go against societal norms. When we know more about the self-regulatory processes underlying adolescent harmful social behavior such as aggression, selfishness, and rule-breaking, we can more effectively target and decrease such behaviors. The current dissertation aims to uncover further whether (1) adolescent harmful social behavior can be seen as strategic attempts to obtain social status, and (2) how we can incorporate this status-pursuit perspective more into current interventions that aim to reduce harmful social behavior.

Harmful Social Behavior in Adolescence: Inadequate or Strategic Self-Regulation?

This dissertation focuses on behavior that benefits the self at the expense of another person. Such behavior can be aggressive (e.g., bullying, aggression), risky (e.g., rule-breaking), or selfish (e.g., giving more resources to oneself than to others) in nature. There is no overarching term in the social sciences that adequately captures all these behaviors. The term 'antisocial behavior' captures a range of behaviors such as aggression, violence, deceitfulness, impulsivity, rule-breaking, and a lack of empathy or remorse, but is also used in the social sciences to refer to delinquency or juvenile offending in the forensic setting (e.g., Moffitt, 1993; Monahan et al., 2009). The term 'misbehavior' refers to behavior

that is considered inappropriate, disruptive, or problematic within a given social context (e.g., Daddis & Meadows, 2021). Yet the prefix 'mis' in this context may denote a sense of wrongdoing or inappropriateness, by which the term 'misbehavior' carries a moral or evaluative connotation that I wanted to avoid in this dissertation. Another potential overarching term could be 'socially deviant behavior' (Dodge et al., 2006), which refers to behaviors that are deemed inappropriate by authority figures or caretakers. However, in the context of this dissertation which largely revolves around the influence of peer norms, it would be overly complex to include a definition that requires norm violations. Therefore, I use the overarching term 'harmful social behavior'. Aggression and bullying can harm victims, selfishness can harm the interest of peers involved in the selfish interaction, and risk-taking in the context of COVID-19 can put the risk-taker and others (peers, parents, teachers) in the environment of the risk-taker at risk of for example, being infected with COVID-19.

Adolescent harmful social behavior occurs on a large scale. To illustrate, 100–600 million adolescents engage in bullying globally each year (Volk et al., 2012). At the age of 11, 22.9% of adolescents bully, 27.5% of those aged 13 years, and 26.1% of 15-year-old adolescents, resulting in 1 out of 3 children being bullied at least once per month worldwide (UNESCO, 2018). This comes at a high cost: perpetrators and victims of adolescent harmful social behavior, such as bullying and aggression, are at risk for developing psychosomatic problems in various social and health domains, which can even result in suicidal ideation and suicide attempts (e.g., Card & Little, 2006; Gini & Pozzoli, 2009; Katsaras et al., 2018). The high prevalence and far-reaching consequences of adolescent harmful social behavior underscore the need to decrease such behaviors in high school settings.

When trying to pinpoint the origin of harmful social behavior, scholars often look at the role of self-regulation and conclude that impaired self-regulation leads to problematic outcomes (e.g., aggression, criminal behavior, substance abuse) later in development (for a meta-analysis see Robson et al., 2020). Such a deficit perspective holds that adolescent harmful social behavior stems, for example, from deficits in executive functioning, such as planning, execution, and evaluation (Zelazo et al., 1997), deficits in frontal lobe function impairing inhibition of harmful social behavior (Grigsby & Stevens, 2000) or underdeveloped social skills such as problem-solving abilities (Glick, 2003). Adolescent harmful social behavior is thus considered maladaptive, serving as a manifestation of compromised adolescent development. In other words, when the typical developmental processes of adolescence are hindered or disrupted, it may lead to the display of problematic harmful social behavior (Smokowski & Kopasz, 2005; Walden & Beran, 2010).

As a consequence, many interventionists developed social skills trainings to teach adolescents to regulate their behaviors better. This does effectively reduce harmful social behavior for the universal, non-clinical population, but effect sizes are small (e.g., Beelmann & Lösel, 2021; Lösel & Beelmann, 2003). There is a similar picture when zooming in on specific forms of harmful social behavior, such as bullying. Anti-bullying programs do reduce bullying behaviors in high schools, but effect sizes are small and less pronounced

than in primary school settings (Yeager et al., 2015). There is a need to more effectively reduce adolescent harmful social behavior on a larger scale in the general population.

Relatedly, scholars recently began to question whether the deficit perspective could explain all adolescent harmful social behavior. In their work, Volk and colleagues (2012, p. 222) argue that *"Bullying is believed to be what happens when something goes wrong with the developmental process (Smokowski & Kopasz, 2005; Walden and Beran, 2010). However, using the above global prevalence rates, this means that something has gone 'wrong' with the development of 100–600 million adolescents each year."* Although a deficit perspective of self-regulation does seem to explain adolescent harmful social behavior, it does so only partly, emphasizing the need of going beyond the deficit perspective by examining alternative explanations.

One alternative explanation might be uncovered by reassessing the role of self-regulation in adolescent harmful social behavior. In this dissertation, I define self-regulation as "the ability to flexibly activate, monitor, inhibit, persevere and/or adapt one's behavior, attention, emotions, and cognitive strategies in response to direction from internal cues, environmental stimuli and feedback from others, in an attempt to attain personally relevant goals" (Moilanen, 2007, p. 835). As such, it is important to not only consider the skills that adolescents have to regulate their behavior, but also their motivation to do so. This opens up the possibility that harmful social behavior could also be skillful when it is used as an instrument to achieve personally relevant goals in their environments. Indeed, some argue that harmful behavior can actually be an expression of successful and rational self-regulation when it is used as a means to an end (Kopetz & Orehek, 2015).

The Central Role of Resource Control

Experimental tasks that are employed to measure self-regulation often overlook the motivational and contextual aspects that contribute to the process of self-regulation. For example, in one of the classical experimental paradigms to measure self-regulation, a child is presented with a marshmallow and told that if it does not eat it directly, it will later receive a second marshmallow and it can eat both (Mischel, 1972). The experimenter leaves and the child is left with the choice between an immediate, small reward or a delayed but larger reward. According to theorists, a good self-regulated choice is to delay gratification and wait for the larger reward (Mischel, 2014; Mischel et al., 1989; Shoda et al., 1990). However, for children who live in harsher and more unreliable environments such as poverty or violence, choosing the immediate reward might be an adaptive strategy (Fenneman & Frankenhuis, 2020; Kidd et al., 2013). According to the life history perspective, whether behaviors are adaptive or beneficial for adolescents' functioning depends to a large extent on their context (Belsky et al., 1991; Dishion & Véronneau, 2012; Fenneman & Frankenhuis, 2020). Experiences in childhood and conditions under which children grow up affect processes and psychological and physiological mechanisms that determine decision-making processes in life (e.g., Belsky et al., 1991). Examples of varying conditions and experiences are socio-economic welfare, family dynamics, and exposure to stress and adversity (Belsky et al., 1991). What constitutes an adaptive self-regulatory

choice is context-dependent. And relatedly, scholars began to question the replicability of 'adequate' self-regulatory responses and developmental cascades as predicted by the marshmallow paradigm (Falk et al., 2020; Watts et al., 2018; Watts & Duncan, 2020).

Whether behavior is functional and an expression of adequate self-regulation depends on whether such behavior contributes to acquiring specific evolutionary relevant goals that adolescents pursue. At the ultimate level, evolutionary psychologists regard behavior as functional when it contributes to the two overarching goals that humans face over the course of their lives: survival and reproduction (Darwin, 1859; Hawley, 2014b). Humans compete over limited resources that enhance their chances of attaining to the ultimate goals of survival and reproduction (Darwin, 1859). Adolescents are routinely exposed to challenging environments that require them to adapt behaviors and strategies to what will provide them with the attainment of resources (Hawley, 1999). Which strategies individuals choose to obtain beloved resources, also depends on proximal causes, such as hormonal or motivational underpinnings (Hawley, 2014b). One of these, proximal, psychological motivations that can guide individual behavior in resource acquisition, is the motivation to obtain reputational benefits (Hawley, 2014b). Such reputational benefits can serve as a means of controlling resources or can function as a valuable resource in and of itself, contributing to the ultimate goals of survival and reproductive success.

There are two dominant ways in which adolescents can acquire reputational benefits: by being cooperative and by being coercive (Hawley, 1999). Cooperative behavior can for example be sharing resources, assisting others, and forming alliances. Such cooperative strategies can be very powerful when resources are abundant, or when working together is highly valued within a specific group. Coercive behavior can for example be exerting aggression, being dominant, and prioritizing one's own needs at the expense of others. Such coercive strategies can be very powerful when resources are scarce or when there is much competition (Hawley, 1999). Which strategy—being cooperative or coercive—yields more favorable outcomes, depends on the context, availability of resources, and the perceived costs of engaging in the strategies. Being able to employ both strategies and to shift between them flexibly based on contextual demands, may therefore be an effective way to increase hierarchy and to acquire resources (Farrell & Dane, 2020; Hawley, 1999). The interpersonal flexibility theory, later complemented by the functional flexibility theory, mentions that well-functioning individuals are those with high flexibility who have a large behavioral repertoire and can attune the behaviors they employ to contextual demands (Leary, 1957; Paulhus & Martin, 1987; 1988).

Of course, the social situations that adolescents find themselves in are nowadays oftentimes less threatening and urgent than they were many centuries ago. However, our evolutionary instinct to survive and reproduce as a response to resource pressures in the past may still contribute to behavioral strategies to date, albeit more nuanced (Bjorklund & Pellegrini, 2000). Resource control theory generally implies that we should see a great portion of adolescent harmful social behavior as socially skilled, functional behavior. This can explain why adolescent harmful social behavior occurs on such a large scale, in every school, situated in countries across the globe.

Adolescence as a Key Developmental Phase

Adolescence is a key developmental phase to investigate the underlying mechanisms of harmful social behavior, as harmful social behavior often occurs in this period, especially in high school climates (Arnett, 1999). Adolescence, which in Western cultures roughly translates into the period between ages 10 and 22 years, is characterized as a transitional period between childhood and adulthood that revolves around gaining independence (Arnett, 1999; Crone & Dahl, 2012).

Adolescent Status Pursuit

When children enter adolescence, often marked by the onset of puberty, they face changes in their social environment, a surge in hormones, and structural and functional 'social' brain development which improve their social cognition (Blakemore, 2012). Consequently, this impacts adolescents' social cognitive behavior, making adolescents more sociable than children (Steinberg, 2017; Steinberg & Morris, 2001). Adolescents become increasingly capable of and interested in forming complex, hierarchical peer relationships, and their actions become guided by an increased fear of being rejected and a heightened sensitivity to being accepted (Steinberg, 2017; Steinberg & Morris, 2001). Brain regions that are important for social cognition and self-awareness undergo massive development during adolescence, fueling adolescents' need to explore and form an identity, their ability to be self-conscious, and their tendency to gravitate toward peers (Blakemore, 2012; Steinberg, 2017; Steinberg & Morris, 2001).

The combination of gravitating toward peers, being self-conscious, pursuing acceptance, and avoiding rejection results in adolescents being highly invested in climbing the social hierarchy. This surge in hormones (Terburg & van Honk, 2013) and social brain development (Gunther Moor et al., 2010) makes adolescents, more so than children and adults (LaFontana & Cillessen, 2010), interested in gaining and maintaining status—over and above other normative goals that adolescents have, such as pursuing affiliation and academic achievement (LaFontana & Cillessen, 2010). Adolescents' motivation to become accepted or popular explains why adolescence is a period in which harmful social behavior peaks: they are driven by a need to get along or to get ahead of their peers (Hogan and Hogan, 1991). Using harmful social behavior can be an instrument to climb the social hierarchy, exert dominance, and control social resources that make others admire them.

Notably, even though the desire for status is normative and fits adolescent development, there are some adolescents who are even more sensitive to the prospect of gaining status. This heightened sensitivity for status is for example present in adolescents who strongly desire popularity and dominance, indicated by their higher agentic goal orientations (Abele Wojciszke, 2014) or in adolescents with higher levels of non-clinical narcissistic personality traits (Grapsas et al., 2020). Individual differences in the perceived importance of gaining status may also influence how far adolescents are willing to go to reach their desired status.

Peer Norms

One important source of information for adolescents on how they can gain status in the peer group is through peer norms. Peer norms are unwritten rules that provide information about which behaviors and attitudes are desired or encouraged in specific groups (Cialdini, 1988). Peer norms can be descriptive or injunctive. *Descriptive norms* refer to the perceptions or beliefs about what behaviors are typically exhibited by peers in a given situation. They describe the behavior that is commonly observed or perceived to be prevalent in a particular social context. Descriptive norms are based on the idea that people often look to others as a guide for how they should behave, and they influence individual behavior by shaping people's beliefs about what is considered normal within a specific group or community. *Injunctive norms* refer to the perceived social expectations or beliefs about what behaviors are approved or disapproved of within the peer group. In contrast to descriptive norms, injunctive norms describe what behavior is deemed appropriate or desirable by others (Cialdini, 1988). Adolescents are likely to adjust their behavior toward descriptive and injunctive norms of their peers. This applies, for example, to risky and distractive driving (Nicolls et al., 2022; Simons-Morton et al., 2014), substance use (Elek et al., 2006; Voogt et al., 2013), and sexual online behavior (Baumgartner et al., 2011). Although norm attunement can also arise from a desire to fit in (i.e., not deviating from what others in the group do), I propose that norms that signal not only how to fit in but also how to stand out (i.e., be popular), might be especially powerful in adolescence.

Nowadays, peer norms are also communicated online via social media. In Western communities, 95% of adolescents (aged 13 to 17) have access to smartphones, and 45% of these adolescents are frequently online (Anderson & Jiang, 2018). More specifically, 97% of these adolescents use social media when they are active on the internet (Anderson & Jiang, 2018), and at the age of 16, adolescents spent an average of three hours a day on these social media platforms (Bayindir & Kavanagh, 2018). What influential others do on social media platforms or how certain behavior is evaluated by unknown or known peers, can convey social norms about appropriate and approved of behavior in the online context. This information can provide guidelines for how adolescents can gain likes and online popularity. When adolescents see behaviors that are liked online, even when these behaviors are dangerous or illegal, this can lower adolescents' inhibition to engage in similar behaviors (Sherman et al., 2018). It remains to be disentangled further if, to what extent, and for whom these online social norms also drag over to real-life social behavior.

Adolescence is not only a key developmental period in terms of understanding the mechanisms behind harmful social behavior, it may also be a key developmental period in terms of changing adolescent harmful social behavior and stimulating more egalitarianism and cooperation. The social brain undergoes development throughout adolescence (Blakemore, 2012). Such changes in brain functions and structures may signal plasticity: the brain is able to change and reorganize itself by forming new neural connections in response to learning, experience, or injury. This may imply that adolescence is also a sensitive period in which social development can be stimulated by external factors.

Adolescents can possibly be educated and guided in their social cognitive development and in, for example, being mindful of other people and what they are thinking (Blakemore, 2012). When we know if and how adolescents attune their behaviors to what can gain them status in the peer group, this also provides us concrete guidelines for how to motivate them to behave otherwise and to steer social development in a more prosocial direction.

The Current Dissertation

As recognized by scholars recently, there is a need to go beyond the deficit perspective of self-regulation to explain adolescent harmful social behavior by exploring alternative explanations of why adolescents engage in harmful social behavior (e.g., Kopetz & Orehek, 2015; Volk et al., 2012). It is hypothesized that adolescents are likely to adjust their behaviors to what can gain them status in the peer group—even if that means that they have to engage in harmful social behavior (Hawley, 1999; Volk et al., 2012; Volk , Dane et al., 2022). To uncover this further, this dissertation aims to test the hypothesis that adolescent harmful social behavior can be a form of successful self-regulation, employed strategically to earn social status. More specifically, can adolescent harmful social behavior be seen as strategic attempts to obtain social status? And how can we incorporate this status-pursuit perspective more into current interventions that aim to reduce harmful social behavior? The latter can aid future intervention practices, as interventions are currently only to a small extent effectively reducing adolescent harmful social behavior (e.g., Yeager et al., 2015). To answer these questions, the current dissertation consists of three sections (see table 1).

To explore an alternative explanation, the first section is devoted to reassessing the role of self-regulation in adolescent (harmful) social behavior by assessing how the different aspects involved in self-regulatory processes (i.e., abilities, goals/ motivation, and social agents) explain harmful social behavior in adolescence. This section may provide insights into whether, given the operationalization and development of self-regulation, adolescent (harmful) social behavior can also be employed strategically. I conducted a meta-review (review of reviews) on the development and socialization of self-regulation from infancy to adolescence in **Chapter 2**. Many reviews have been conducted to date, but an overarching review of reviews that connects reviews on the different processes involved in self-regulation over time is missing. Social agents can influence abilities and goal setting over time (e.g., stimulating and modeling specific goal orientations). But also on a momentary, short-time scale, social agents can influence how important developmental goals can be reached within certain contexts, such as the peer context. This section also identified peer norms as guiding social evaluative cues in adolescence, and social status as an important goal that adolescents pursue.

Hereafter, to test the alternative hypothesis, the second section is devoted to empirically testing the status-pursuit mechanism of adolescent harmful social behavior by assessing to what extent adolescents adjust their behavior to descriptive and injunctive norms that provide information on how they can gain status in their peer group, and for whom this effect is more pronounced. In **Chapter 3**, I assessed the goals and gains of adolescent bullying and aggression by conducting a meta-analysis. In this chapter,

I investigated whether adolescent bullying and aggression can be a means to acquire popularity for adolescents who desire agency in daily life school settings. Previous meta-analyses focused on the goals that precede bullying and aggression *or* the gains of bullying and aggression, but a meta-analysis that connects goals, behavior, and gains in a meta-analytical structural equation modeling (MASEM) is lacking and could provide more insights into the instrumental value of bullying and aggression in adolescence. In **Chapter 4**, I assessed whether adolescents attune their selfish or egalitarian behavior to what will provide them with status, in a preregistered experimental study. I manipulated how selfish behavior is rewarded by students from the same school and grade as participating adolescents. I also assessed whether the prospect of status could motivate adolescents with heightened status needs, higher narcissism and agentic goals, even more. In **Chapter 5**, I assessed whether adolescents adjust their COVID-19-related attitudes, behavioral intentions, and behavior to what influential others (vloggers) do online, and by how vloggers' behavior is evaluated online by anonymous viewers, in a preregistered experimental study. I exploratory assessed whether this applies even more to adolescents who identify more strongly with vloggers. Prior to this experimental study, I conducted a content-analysis on Dutch YouTube vlogs that were recorded in times of the pandemic to assess the occurrence of vloggers' (non)compliance and to collect materials to use in the experimental study. In section 2, I embrace the goal-directedness of adolescent harmful social behavior and view peer norms as an important source for how adolescents can reach their goals, which we can manipulate. This perspective has not often been tested experimentally yet, though it could provide valuable insights for how to intervene.

To explore whether the status pursuit perspective can be incorporated more in practice, the <u>third section</u> is devoted to gaining more insights into what we are currently doing in interventions that aim to decrease harmful social behavior and whether that works and for whom. This section assesses <u>whether current intervention practices effectively reduce (subgroups of) youths' harmful social behavior, and whether there are interventions that consist of certain components that are more or less effective</u>. I zoomed in on how we are currently reducing a specific form of adolescent harmful social behavior (bullying) in **Chapter 6**. I conducted an individual participant meta-analysis (IPDMA) on what works for whom in school-based anti-bullying interventions, including 39,793 children and adolescents. Findings of this chapter will provide insights into whether and how the findings of this dissertation could be integrated (more) to potentially maximize intervention efforts.

In the final chapter of this dissertation, I summarize the main findings and provide a general discussion of this dissertation (**Chapter 7**). I discuss limitations as well as future research directions, and end with my final conclusion.

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Table 1. *Outline of the Dissertation*

Section 1. How can the different aspects involved in self-regulatory processes (i.e., abilities, goals/ motivation, and social agents) explain harmful social behavior in adolescence?

Chapter	Behavior	Status	Context	Aim(s)	Research Design
2			Parents, Teachers, Peers	Summarize existing review literature on the development of self-regulatory abilities, goals, and motivation from infancy to adolescence; Synthesize current knowledge on how the development of self-regulatory abilities, goals, and motivation is influenced by parents, teachers, and peers.	A Meta-Review: Review of Reviews

Section 2. To what extent do adolescents adjust their behavior to descriptive and injunctive norms that provide information on how they can gain status in their peer group, and for whom is this effect more pronounced?

Chapter	Behavior	Status	Context	Aim(s)	Research Design
3	Bullying, Relational and Pro-active Aggression	Peer-reported Likeability and Popularity	Real-life class or school peers	Synthesize both correlational and longitudinal empirical studies that focus on the association between adolescents' social goals, socially coercive behavior, and social outcomes	Meta-Analytic Structural Equation Model (MASEM)
4	Selfishness (vs. egalitarianism)	(Manipulated) Private peer (dis) approval leading to a public reputation of popularity	Real-life peers from the same school and grade	Experimentally investigate whether the normative desire to achieve status contributes to whether adolescents choose to behave selfishly or egalitarian, by manipulating whether selfish behavior leads to status gain or status loss; Investigate whether manipulating prospective status influences adolescents with narcissism and agentic goals even more, due to their heightened status sensitivity.	Experimental Paradigm

Table 1. Continued.

Chapter	Behavior	Status	Context	Aim(s)	Research Design
5	Noncompliance with regulations (vs. compliance)	(Manipulated) peer (dis)approval not tied to own gains/losses	Online popular peers (vloggers) and unknown peers	Study 1: Assess whether vloggers showed noncompliance or compliance to COVID-19 enacted regulations, whether verbal comments of vloggers about COVID-19 supported or dismissed COVID-19 and enacted regulations, and how viewers reacted to these different types of content; Study 2: Test the effects of vlogger (non)compliance and viewer evaluations on adolescents' COVID-19-related attitudes, intentions, and behaviors.	Content Analysis Experimental Paradigm

Section 3. Are current intervention practices effectively reducing (subgroups of) youths' harmful social behavior, and are there interventions that consist of certain components that are more or less effective?

Chapter	Behavior	Status	Context	Aim(s)	Research Design
6	Bullying		Primary and Secondary Schools (real-life setting)	Assess the overall effect of school-based anti-bullying interventions; Assess which youth benefited more from school-based anti-bullying interventions as a whole ("for whom"); Assess which youth benefited most from specific intervention components ("what works for whom").	An Individual Participant Data Meta-analysis (IPDMA)

SECTION 1

CHAPTER 2

Development and Socialization of Self-Regulation from Infancy to Adolescence:
A Meta-Review Differentiating between Self-Regulatory Abilities, Goals, and Motivation

ABSTRACT

Self-regulation has been intensely studied across developmental science disciplines in virtue of its significance to understanding and fostering adaptive functioning throughout life. Whereas research has predominantly focused on self-regulatory abilities, age-related changes in goals and motivation that underlie self-regulation have been largely neglected. In a systematic meta-review, we disentangle the development of self-regulatory abilities from age-related goals and motivation between infancy and adolescence. We further investigate the roles of parents, teachers, and peers in the socialization of self-regulatory abilities separately from the socialization of goals and motivation. We searched reviews and meta-analyses on self-regulation in typical development (0-18 years), identifying 1,935 records, from which 136 articles were included. Results show that self-regulation develops from being largely co-regulated in infancy to an independent yet socially-calibrated process in adolescence. We further demonstrate continuity as well as age-related transitions in the abilities, goals, and motivation employed for self-regulation, and pinpoint the exact role of various social agents involved in these processes. Our meta-review yields a detailed description of self-regulation development between infancy and adolescence, providing a starting point for future developmental and intervention work regarding key processes and social agents to be considered when targeting self-regulation in a particular age group.

Keywords: Self-regulation, goals, motivation, development, socialization, meta-review

INTRODUCTION

In primary school, Meryem was known as a smart kid who obtained high grades—she was considered to be good at self-regulation. In middle school, however, her grades dropped. What caused this change? It is not likely that her self-regulatory abilities decreased. In fact, these abilities may have even increased because her parents and teachers taught her strategies to self-regulate more effectively by planning ahead and counting to ten when she feels agitated. However, her goals changed, from performing well in school to performing well in skateboarding, a goal she adopted from her peers. While skateboarding, she was persistent in practicing new tricks and she managed to overcome the frustration from initial failures. For particularly difficult tricks, she sought out tips from friends. Her motivation to pursue her goal to become a great skateboarder was continuously reinforced by excelling at new tricks and receiving positive feedback from peers. Thus, her self-regulatory abilities were used in skateboarding instead of schoolwork, and her grades dropped.

Traditionally, developmental research has focused on the abilities that underlie self-regulation, such as executive functions and reappraisal (e.g., Diamond, 2013; Garon et al., 2008, 2014; Gestsdottir & Lerner, 2008). In Meryem's case, her abilities are sufficient to obtain high grades. Yet—albeit rather simplistic—the example makes clear that more factors determine the extent to which these abilities are used in the service of self-regulation. Instead of learning for school, Meryem prioritizes skateboarding, demonstrating that her personal goals and motivation influence whether and how she will use her abilities to self-regulate in different contexts (e.g., Gestsdottir & Lerner, 2008; Murray et al., 2019). Meryem's goals, in turn, are geared towards gaining positive feedback from peers (rather than from parents and teachers), highlighting the important role of social agents in affecting self-regulation (e.g., S. M. Carlson, 2009; Kidd et al., 2013; King et al., 2018; Pino-Pasternak & Whitebread, 2010; Yu & Smith, 2016).

Whereas research has focused on the role of social agents in influencing self-regulation development in general, socialization processes involved in developing self-regulatory abilities have not been systematically differentiated from those on goals and motivation. The current meta-review integrates these perspectives into a framework in which two socialization pathways influence self-regulation: 1) the *ability pathway,* through which social agents influence improvements in the cognitive and emotional skills children employ to self-regulate, and 2) the *goals and motivation pathway,* through which social agents are involved in shaping the willingness to enact self-regulation (see Figure 1).
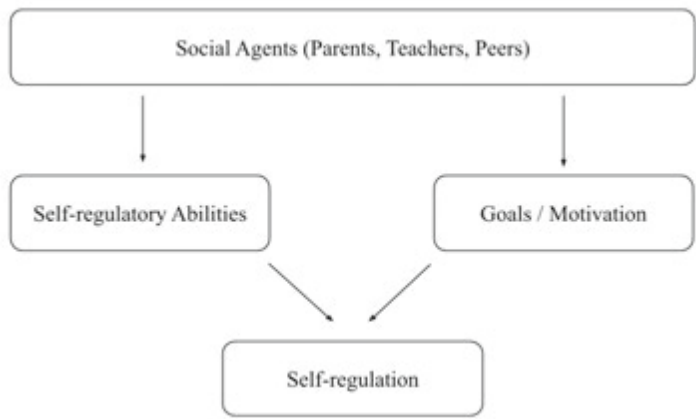
Figure 1. *Conceptual Framework of Socialization Pathways of Self-regulation Studied in This Meta-review*

Note. Proximal social agents influence self-regulation development via two socialization pathways: 1) via self-regulatory abilities, and 2) via goals and motivation.

Self-regulation is not only relevant for academic achievement (Dent & Koenka, 2016), as shown in the example of Meryem. A large body of research demonstrates that individual differences in self-regulation predict social skills, risky behaviors (e.g., substance use and criminal behavior), physical health, internalizing and externalizing problems, and unemployment (Allan et al., 2014; Blair & Raver, 2015; Eisenberg, Valiente, & Eggum, 2010; Hails et al., 2019; Moffitt et al., 2011; Robson et al., 2020). Given the large number of review work highlighting the relevance of self-regulation for well-being over the entire lifespan, a *meta-review* (also known as a *review of reviews*; Cooper & Koenka, 2012) appears necessary and timely to provide a broader but condensed picture of the factors involved in self-regulation development. Such a detailed description is essential to inform future research and intervention practices regarding key processes and social agents to be considered when targeting self-regulation in a particular age group. Therefore, the current meta-review summarizes existing knowledge on the development and socialization of self-regulatory abilities, goals, and motivation from infancy to adolescence (0–18 years). In the following, we provide the conceptual definitions of the studied constructs.

Constructs Studied in the Current Meta-Review

What is Self-Regulation?
Self-regulation can be defined as the process of "flexibly activating, monitoring, inhibiting, persevering and/or adapting one's behavior, attention, emotions and cognitive strategies in response to direction from internal cues, environmental stimuli and feedback from others, in an attempt to attain personally-relevant goals" (Moilanen, 2007, p. 835; for similar definitions, see e.g., Blair, 2016; Nigg, 2017; I. T. Petersen et al., 2016; Posner & Rothbart,

2000; Pintrich, 1999; Zhou et al., 2012). In this work, we argue that each individual has a certain ability for self-regulation that develops over time. Yet a person's goals and motivation influence whether and how this ability for self-regulation is translated into concrete actions (the process of self-regulation) and consequently what outcomes can be expected from this self-regulation process. For example, in the introductory example, Meryem is taught new self-regulation strategies (her ability for self-regulation improves), yet her motivation and goals make her pursue skateboarding instead of good grades (high ability for self-regulation does not necessarily translate into a self-regulation process with high adjustment outcomes). The distinction between self-regulatory abilities and self-regulation made in the present review draws upon prior developmental research highlighting that children's cognitive ability might not be evident in task performance, for instance in cases in which the testing situation confused them (Sophian, 1997).

What are Self-Regulatory Abilities?

We define self-regulatory abilities as the subset of cognitive and emotional-affective processes that individuals employ to exercise deliberate, effortful control over their behaviors, emotions, and cognitions (Hendry et al., 2016; Johansson et al., 2015). Self-regulatory abilities comprise: 1) reactive control processes that are used in response to unforeseen environmental triggers, and proactive control processes used in anticipation and preparation to resolve a foreseen regulatory problem with respect to personal goals and contextual demands (Aron et al., 2011; Braver, 2012; Braver et al., 2007), and 2) the metacognitive strategies for effective selection, use, and coordination of these proactive and reactive control processes (Chevalier et al., 2015; Shenhav et al., 2013). To illustrate, inhibition is used reactively when abruptly halting at the edge of the sidewalk when the streetlight turns red. When used proactively, inhibition would involve monitoring the stoplight status and incoming traffic as you approach the crossing point, and preparing to stop if required. Metacognitive strategies and the proactive use of executive functions require some learning experience (Chevalier et al., 2015). Although self-regulation involves the recursive interaction between top-down/deliberate and bottom-up/automatic processes (Blair & Raver, 2015; Botvinick & Cohen, 2014; Bridgett et al., 2015; Gross, 2015; Nigg, 2017; Wagner et al 2021), we specifically focus on the top-down/deliberate aspects of self-regulation because these are the primary processes that enable individuals to engage with the environment in adaptive ways (Nigg, 2017; Tomlin & Axelrod, 2005). Table 1 provides a glossary with an extensive overview of the abilities (marked by *) studied in relation to the construct of self-regulation.

Earlier research has shown that different sets of self-regulatory abilities may become activated depending on the affective value of the context (S. M. Carlson, 2005; Zelazo et al., 2010; Zelazo & Carlson, 2012; Zelazo & Müller, 2002). Thus, we describe the development of abilities employed for the regulation of behavior in affectively more neutral contexts (e.g., planning) separately from the development of abilities for the regulation of emotion (Bridgett et al., 2015; D. W. Murray et al., 2019; Nigg, 2017; Zelazo & Carlson, 2012). Assuming

that increases in the complexity of the cognitive control structures underlying self-regulatory abilities advance the complexity of problems that children can solve (e.g., Diamond, 2013; Zelazo et al., 2003), we further differentiate self-regulatory abilities on a continuum from simple to complex. More complex self-regulatory abilities involve the coordination among multiple simpler self-regulatory abilities and provide a longer-term solution to a wider range of self-regulatory problems (Garon et al., 2008). For instance, reorienting attention is a simple ability for regulating distress, whereas reappraisal is a more complex ability which requires working memory to simultaneously hold and evaluate multiple appraisals of what caused the distress, and attention shifting and inhibitory control to enable the transition from the original to the new appraisal (De France & Hollenstein, 2022). Age-related changes in self-regulatory abilities are further examined in relation to socialization processes.

What are Goals and Motivation?

Goals are defined as the 'outcome' someone is striving for (e.g., internal or external states and events; Elliot & Fryer, 2008). Self-regulation is aimed at pursuing personally relevant goals. When conflicting goals are encountered, self-regulation serves to select an appropriate course of action in order to prioritize and achieve the more personally relevant and rewarding outcome (Shenhav et al., 2013), based on the perceived importance of these goals (i.e., a hierarchy of goals; Rasmussen et al., 2006). In case of conflict of competing goals, individuals are most likely to pursue a higher-order goal (tied towards a sense of self-identity, to *being* something) than a lower-order goal (concrete, related to *doing* something). When individuals need to choose between lower-order goals, they most likely pursue a goal that contributes most to a higher order goal (Rasmussen et al., 2006). Because of changing priorities, different types of goals are pursued across different developmental stages (Hennecke & Freund, 2017). Hence, this meta-review focuses on how goals may influence self-regulation throughout different developmental stages, and how social agents influence goal-setting and goal-pursuit.

Motivation relates to someone's 'drive' to obtain a certain outcome (Eccles & Wigfield, 2002; Woolfolk, 2016), which can be defined as an internal state that arouses, directs, and maintains behavior toward a certain goal (Woolfolk, 2016). Self-determination theory (Deci & Ryan, 2000) proposes that different types of motivation can be distinguished based on the degree to which the individual's goals originate from extrinsic, social influences versus intrinsic sources. Extrinsic motivation can be driven by compliance, rewards, and punishment (external), by avoiding guilt or shame, or by enhancing one's self-worth (introjected), by the utility of that behavior for personally valued goals (identified), or by the perception that the behavior is consistent with endorsed values and aspects of the self (integrated). In contrast, intrinsic motivation refers to the engagement with an activity for the inherent satisfaction derived from the activity itself or the congruence with one's current needs for competence, relatedness, and autonomy (Deci & Ryan, 2000). Motivation is further influenced by self-efficacy beliefs—the individual's beliefs and knowledge about their competence and efficacy, expectancies for success or failure, and the sense of control

over outcomes (e.g., Bandura, 1997; Crandall et al., 1965; Eccles & Wigfield, 2002). In this meta-review, we discuss age-related changes in the motivation to self-regulate, and the influence of different social agents on motivation.

What is the Role of Proximal Social Agents in Influencing Self-Regulatory Abilities, Goals, and Motivation?

Early theories construed self-regulation as an inherently social phenomenon, which develops through the continuous transactions with various social agents (Bandura, 1991; Cairns, 1979; Piaget, 1950; Vygotsky, 1986). An extensive literature body has established that proximal social agents such as parents not only impact the development of self-regulatory abilities, but also create opportunities and encouragement to set specific goals and build motivation to self-regulate. Despite long-standing evidence that social agents can shape the development of self-regulation through these pathways, no systematic distinction has been made between the socialization processes involved in the development of self-regulatory abilities and those involved in the development of goals and motivation. In this meta-review, we focus on the role of proximal social agents who interact directly with the child—parents, teachers, and peers—to disentangle the socialization processes that influence the developmental course of self-regulatory abilities from those of goals and motivation. Although distal contextual factors such as poverty, neighborhood violence, household chaos, urbanization, and cultural background have also been acknowledged as important factors in shaping self-regulation (Andrews et al., 2021; Blair & Raver, 2015; Hails et al., 2019; Li-Grining et al., 2012; Marsh et al., 2020; Palacios-Barrios et al., 2019; Raver, 2004; Sylva, 2014; Weeland et al., 2019), these are beyond the scope of this review (see Box A for an overview).

The Current Meta-Review

The goals of the current work were to (1) summarize existing review literature on the development of self-regulatory abilities, goals, and motivation from infancy to adolescence; and to (2) synthesize current knowledge on how the development of self-regulatory abilities, goals, and motivation is influenced by parents, teachers, and peers. In order to highlight topics that were considered central enough to be reviewed in the current heterogeneous self-regulation literature, as well as to identify underrepresented topics that warrant further research, we used a meta-review approach. To this end, we performed a systematic search of peer-reviewed reviews and meta-analyses on self-regulation in typically developing youth between 0 to 18 years of age. We mapped out the review literature according to commonly used developmental periods to study self-regulation: infancy (< 1 year), toddlerhood and preschool period (1–5 years), childhood (6–11 years), and adolescence (12–18 years).

[BOX A] Distal Contextual Factors

Although this review focuses on influences from the proximal social environment, broader contextual factors have also been implied in the development of self-regulation following (bio)-ecological frameworks (e.g., Bronfenbrenner, 1986). Distal contextual factors likely influence the child's self-regulation development by affecting the behavior of proximal social agents. For instance, normative cultural and ethnic values shape parents' socializing processes, which in turn influence children's self-regulation (LeCuyer & Zhang, 2015; Li-Grining, 2012). A similar pathway has been suggested for the effects of environmental adversities on children's self-regulation. Poverty, for instance, can undermine the quality of parental caregiving practices, which may explain its association with lower self-regulation in children (Blair and Raver, 2015; Li-Grining, 2012). Another explanation for the effects of poverty may be that the frequent experiences of adversities cause chronic stress for a family. Studies on stress physiology have demonstrated that children from disadvantaged families show dysregulated functioning of the hypothalamic-pituitary-adrenal stress-response system (Wesarg et al., 2020). In early childhood, alterations in stress hormones may in turn affect the development of brain regions that support self-regulation functioning (Merz et al., 2019). Both hypotheses may also partly explain why adversities such as experiencing interparental and neighborhood violence are associated with lower levels of children's emotional self-regulation (Raver, 2004).

METHODS

Literature Search

Eligibility Criteria and Information Sources

We searched for peer-reviewed narrative, systematic and meta-analytic reviews on self-regulation and related constructs in typically developing children between 0 and 18 years of age. We used four major databases in Psychology and Educational Sciences: PsycINFO, ERIC, Web of Science, and Medline, searching all possibly eligible reviews published prior to September 2022.

Search Strategy

The search strategy and syntax (*https://osf.io/a9ery?view_only=1f78d81a1a424f67828096 b5f7eca62c)* used in this study are available on the project's Open Science Framework [OSF] Repository (*https://osf.io/bg9f4/?view_only=1f78d81a1a424f67828096b5f7eca62c).* The database searches yielded a total of 3,904 records, and 1,924 records following deduplication using the citation management tool Zotero (see Table S1 for an overview of the records per database, per developmental period; *https://osf.io/hzw82?view_only=414f6bbb7d254fe6bfe92fdba1e2c0d7).* We complemented our findings with specific non-systematic searches following Staaks (2022) (e.g., relevancy search in Google Scholar, from personal knowledge, bibliography of papers from our results, suggestions from peer-researchers). The number of records included per search method can be found in the PRISMA 2020 flowchart (Figure 2).
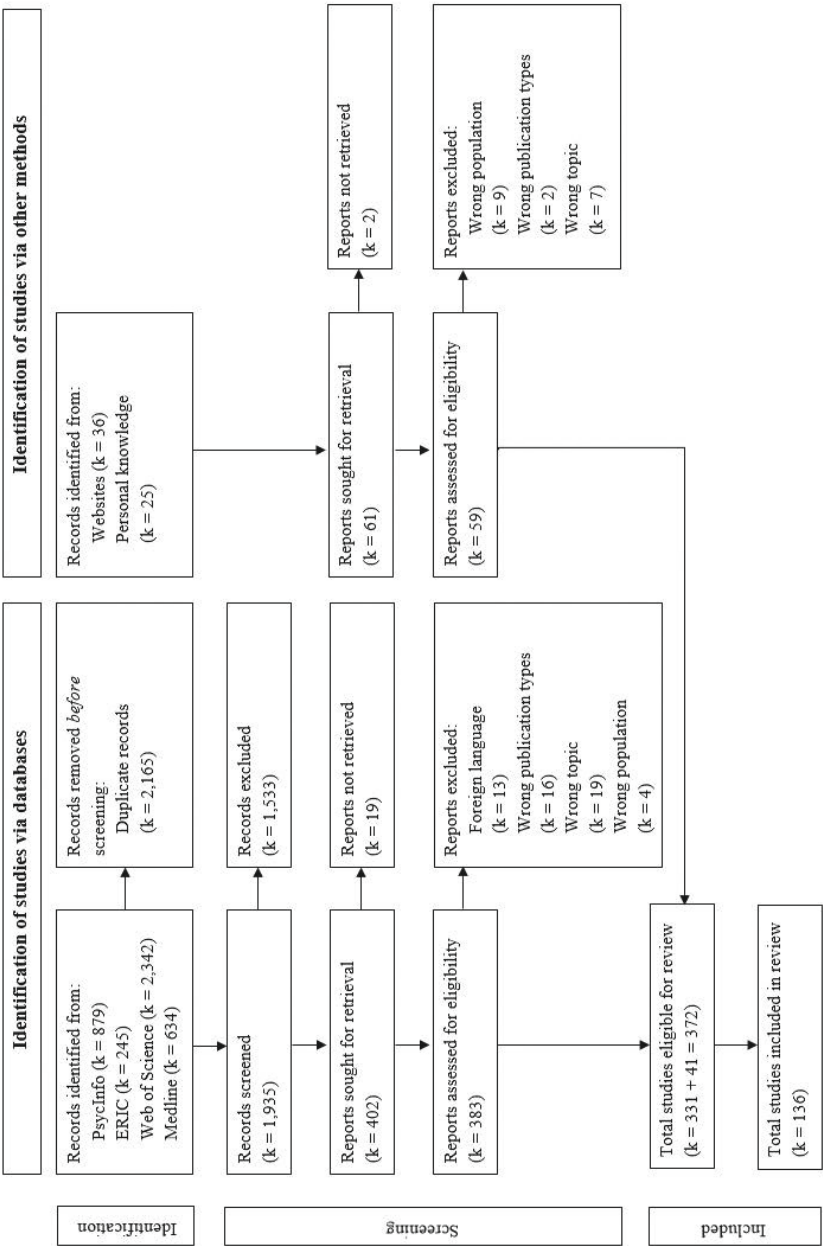
Figure 2. *Systematic search of the literature: PRISMA 2020 Flow-Chart*

Selection Process

After removing duplicates, titles and abstracts were screened by the five first authors using the systematic review web application Rayyan (Ouzzani et al., 2016). *Fleiss kappa*, a measure of agreement suitable for categorical outcomes that corrects for chance-level among more than two raters, was calculated on a randomly drawn subset of 65 records using the R-package "irr" (v.0.84.1, Gamer & Lemon, 2019). Decisions of inclusion and exclusion among the five raters showed near-perfect agreement ($k = .93$, $p < .001$). To maintain the reliability of our judgments during the screening process, a decision tree specifying the labeling system, key term synonyms, and criteria for labeling an article to be "included" or "excluded" was applied during the screening (https://osf.io/v6xe3?view_only=414f6bbb7d254fe6bfe92fdba1e2c0d7). Papers were excluded in a hierarchical manner, due to: 1) non-English language, 2) non-target population (i.e., > 18 years of age, animals, atypical populations, etc.), 3) non-target publication type (e.g., unpublished work, dissertations), 4) non-target topic. Following full-text screening, 372 papers were retained for data extraction (see Figure 2).

Data Extraction

Results were extracted according to a qualitative coding scheme available on OSF (https://osf.io/zmcth?view_only=309bd9845d354b88968c57c48e2d9e62). Book chapters that were eligible for inclusion were consulted in case there were no reviews or meta-analyses available on the same topic.

Data Items

The extracted data can be found on OSF (https://osf.io/zmcth?view_only=309bd9845 d354b88968c57c48e2d9e62). The main outcome variables were 1) a working definition of self-regulation (and whether it was provided in the first place), 2) the aspect of self-regulation that was discussed (e.g., self-regulatory abilities, social agents), 3) the main study goals, 4) a summary of the most relevant findings, and 5) the publication type (i.e., meta-analysis, systematic review, narrative review). The publication type[1] of the papers cited in our results section is indicated by superscript [N] for narrative reviews or book chapters, [S] for systematic reviews, and [M] for meta-analyses. Figure 3 and Table S2 (https://osf.io/ctz9y?view_only=414f6bbb7d254fe6bfe92fdba1e2c0d7) provide an overview of the number of reviews included in the results section per publication type and developmental period. Data were further extracted on the measurement methods of self-regulation, study limitations, future recommendations, and practical implications as mentioned in the review papers, as well as those identified by our team.

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1   In this meta-review, we focused on evaluating the type rather than strength of evidence. A systematic evaluation of evidence strength in a meta-review (i.e., based on effect sizes and study quality) would require review papers to perform quality assessments of the primary research papers. Quality assessment is not (yet) common practice in narrative reviews and is not always reported in systematic reviews and meta-analyses in developmental research. Therefore, we report on evidence type to inform the reader whether the evidence discussed stems from a qualitative (i.e., narrative review) or a quantitative (i.e., systematic review, meta-analysis) study design.
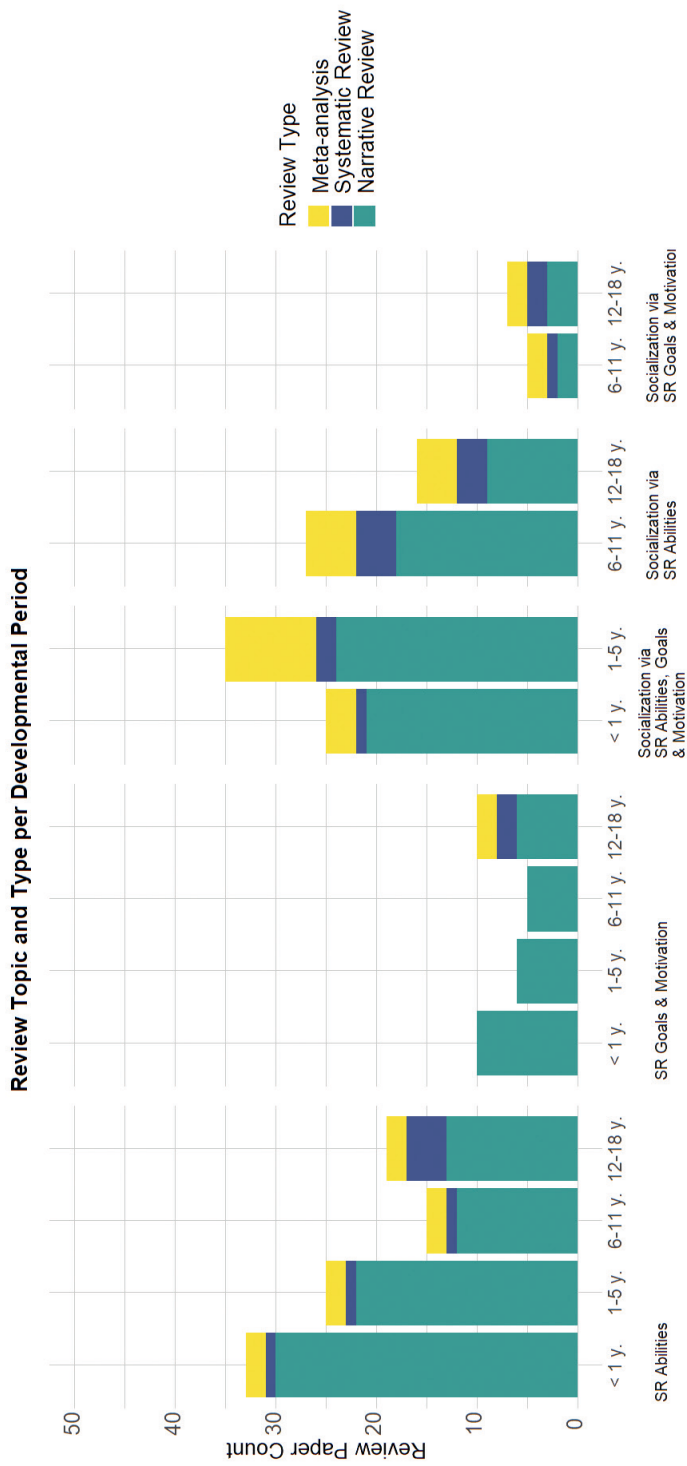
Figure 3. *Review Type and Review Topic per Developmental Period.*

Note. Our search yielded disproportionately few systematic reviews and meta-analyses relative to narrative reviews on the topic of self-regulation. Furthermore, much less review work was available on (the socialization of) goals and motivation.

2

Results Synthesis

The eligible papers were grouped per developmental period and ranked based on relevancy to the primary research questions. Papers were marked as relevant if they specifically addressed: 1) how abilities, or goals and motivation influence self-regulated responses, 2) how abilities, goals, or motivation are manifested in specific developmental periods, 3) the influences of social agents on ability, goals, or motivation. Findings from the set of 'relevant' papers ($N = 136$) are reported in the Results section. To assure that the findings in this meta-review can be traced back to review papers identified through our search, findings are referenced to the review paper(s) from which information was extracted rather than the original source.

RESULTS

The definitions for all <u>underlined</u> terms throughout our results section are provided in the glossary in Table 1. Definitions were derived from primary literature that was referenced in the review articles and cited accordingly. To maintain terminological consistency, we emphasized parallels between definitions of the same construct in the glossary, wherever possible.

Table 1. *Glossary of Terms and Definitions*

Alerting system	The brain's attention network for achievement and maintenance of an alert state to facilitate task performance (Zani & Proverbio, 2017). See also *Attention*.
Affective attunement	An extrinsic mode of emotion regulation typically observed during interactive contexts such as face-to-face play, in which caregivers provide an emotionally resonant response to the child's emotional expressions in order to enhance or dampen the child's emotional reaction (Thompson, 1991).
Appearance goals	Performance goals in which the predominant theme is to appear talented (VandeWalle & Cummings, 1997).
Approach goals	Goals that strive towards acquiring success (Dweck, 1986; Nicholls, 1984).
*Arousal regulation**	Within cognitive psychology, concept describing the production and maintenance of vigilance for task performance (Petersen & Posner, 2012). See *Alerting system* and *Attention*.
Attachment	Describes the lasting affectional bonds that develop between young children and their primary caregivers (Bowlby, 1982). The work of Ainsworth (1979) and Main & Solomon (1990) identified four types of mother-infant attachment: Secure (type B), insecure avoidant (type A), insecure ambivalent/resistant (type C), and disorganized (type D).

Table 1. Continued.

Attention*	The attention system encompasses a set of information gathering mechanisms that can be subsumed under the three neurologically-based functional systems of the alerting, orienting, and executive network, and the interactions among them (Petersen & Posner, 2012; Posner, 2012; Posner & Petersen, 1990). *Alerting attention* involves attaining and maintaining a state of high sensitivity to incoming stimuli; *orienting attention* pertains to the selection of information from sensory input; *executive attention* involves a set of mechanisms for monitoring and resolving conflict among cognitive, emotional, and behavioral responses (Rueda & Posner, 2013).
Authoritarian parenting	Parenting style characterized by low support, the demand of unquestioning obedience and rigid control without warm communication (Baumrind, 1971; Kiss et al., 2014).
Authoritative parenting	Parenting style in which parents involve the child in decision making while reserving the final judgement. Further characterized by high support and warmth of parents (Baumrind, 1971; Kiss et al., 2014).
Autonomy support	Behavior that encourages an individual to take personal initiative and that supports the individual's competence in a climate of relatedness (Deci et al., 2001; Gagné, 2003).
Avoidance goals	Goals that strive towards avoiding failure (Elliot, 1999).
Behavioral control	Parental control of children's behavior through provision of regulation, structure, or guidance (Bean et al., 2006).
Cognitive control*	A set of superordinate functions involved in resource allocation, information representation, and executive attention in the context of dynamically changing goals and task demands (Botvinick & Braver, 2015; Carter & Krug, 2012; Nigg, 2017). Closely related to, but narrower than executive functions. Basic top-down operations that enable complex executive functions (Nigg, 2017).
Cognitive flexibility*	Umbrella term used to describe the broad combination of updating, shifting, and conflict-resolving in tasks (Hendry et al., 2016). Although cognitive flexibility may be closely linked to working memory, working memory tasks more purely refer to updating tasks (e.g., Garon et al., 2014), while cognitive flexibility tasks require broader updating/shifting/conflict-resolving skills.
Compliance*	Term used in early childhood to describe children's ability to comply with external (mostly caregivers') requests. Can be differentiated in two motivationally distinct forms of compliance, situational and committed compliance. Situational compliance involves the acceptance and following of caregivers' rules under close monitoring, whereas committed compliance involves the full endorsement of caregivers' rules and the willingly adherence to these without supervision (Kochanska & Aksan, 1995).
Coping*	Cognitive and behavioral efforts employed by a person to manage stress (Lazarus & Folkman, 1984). Generally categorized as emotion-focused and problem-focused coping (Garcia, 2010).
Co-regulation	An interactive process of regulatory support and guidance that can occur within the context of caring relationships (e.g., between the child and parents/teachers/peers) across the lifespan (Kopp, 1982; Rosanbalm & Murray, 2017).

2

Table 1. Continued.

*Delay of Gratification**	The ability to postpone an immediate gain or to persist in an undesirable activity in favour of greater and later reward (Mischel & Ebbesen, 1970).
Demonstration goals	Goals that are aimed towards proving one's skills (Dweck & Leggett, 1988; Molden & Dweck, 2006). This terminology is mostly used in the social context.
*Effortful control**	The regulatory dimension of temperament that serves to modulate the two reactive dimensions of temperament—negative affectivity and extraversion/surgency (Rothbart et al., 2004). Further defined as "the efficiency of executive attention, including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors" (Rothbart & Bates, 2006, p. 129). Also used later in development to identify top-down self-regulatory processes related to executive functioning (Pallini et al., 2018).
Emotion dysregulation	Emotion dysregulation refers to the instance when strategies employed to manage emotions are unsuccessful in the long-term, or successful in the short-term but with consequences for long-term well-being (Cole et al. 2019).
*Emotion regulation**	"Processes used to manage and change if, when, and how (e.g., how intensely) one experiences emotions and emotion-related motivational and physiological states, as well as how emotions are expressed behaviorally." (Eisenberg et al., 2007, p. 288)
*Endogenous attention**	The voluntary, strategic allocation of attention resources (Hunnius, 2007).
*Executive attention (system)**	Top-down form of attention that involves overcoming attention to a certain stimulus in order to relocate attention to a goal-relevant stimulus (Nigg, 2017). See also *Attention*.
*Executive functions**	A set of higher-order top-down cognitive processes that are essential for the control of behavior, emotion, and cognition. Consists of working memory, inhibitory control, and shifting (Miyake et al., 2000), with on-going debates whether there is a unitary 'core' to all executive functions (Nigg, 2017).
Future time perspective	The present anticipation of future goals (Simons et al., 2004).
Goal setting	Retrieving information from memory about how strategies could help to achieve a goal and then develop a strategic plan based on this metacognitive knowledge and the understanding of the task (Pintrich, 2000; Winne, 2001). Often described as part of *planning*.
Growth mindset	The belief that one's current ability can be improved with enough effort (Dweck, 2007).
Higher-order goals	Abstract goals that are on top in the hierarchical goal structure and that are related to 'being something' (Powers, 1973).
Identified motivation	Amount of invested effort is based on the utility of that behavior for personally valued goals (Ryan & Deci, 2000).
Information processing	Selecting, encoding, and remembering incoming information (Bornstein, 1998).
*Inhibition**	See *Response inhibition*.
*Inhibitory control**	See *Response inhibition*.

Table 1. Continued.

Integrated motivation	Amount of invested effort is based on the perception that the behavior is consistent with other endorsed values and aspects of the self (Ryan & Deci, 2000).
Intentional pre-verbal communication*	The use of non-verbal communicative signals such as gestures and vocalizations to direct and maintain another person's attention to a particular object or referent (Bretherton & Bates, 1979).
Metacognition*	A thinking skill, also called 'thinking about thinking' or cognition about cognition to enable monitoring and controlling cognition (Muis, 2007; Lavi et al., 2019; Ohtani & Hisasaka, 2018). It can be divided into two broad categories, namely "metacognitive knowledge" and "metacognitive activities", which involve goal setting, planning, monitoring, evaluation, and strategy selection and use (Martini & Shore, 2008)
Mind-mindedness	Caregivers' capacity to understand and verbalize the internal state of their child during interaction (Meins, 2013).
Modeling	A learning process in which children take over similar patterns of behavior as observed from their parents (Rosenthal & Zimmerman, 2014; Tibbs et al., 2001).
Monitoring*	Monitoring one's thinking, a metacognitive activity (Lavi et al., 2019).
Normative goals	Performance goals in which the predominant theme is to outperform others (VandeWalle & Cummings, 1997).
Oculomotor control	The rapid, stable, and coordinated manner in which eye movements need to be controlled in order to accurately fixate targets in the visual field (Hung, 2006).
Ostensive gestures	Gestures in which an object is used to communicate something about that object itself, for instance when showing an object or demonstrating its use (Kuvalja et al., 2013).
Parental responsiveness	A component of parental sensitivity encompassing parents' prompt and contingent reactions to their child's exploratory and communicative actions (Bornstein et al., 2008).
Parental scaffolding	The provision of supporting strategies, including instruction and demonstration (Lewis & Carpendale, 2009).
Parental sensitivity	Parenting behaviors characterized by an accurate interpretation of a child's signals, and a prompt and appropriate response to these (DePasquale & Gunnar, 2020). Involves positive affect, warmth, and the absence of hostility and rejection (Fay-Stammbach et al., 2014). Closely related to the construct of *parental responsiveness*.
Parental stimulation	Parenting style that involves enriched interactions such as reading to the child with the aim of providing children with opportunities to develop cognitive skills (Bradley et al., 2011).
Planning*	Metacognitive activity involving the construction of mental representations of personal goals, as well as the organization and management of strategies for achieving them (Eilam & Aharon, 2003; Lavi et al., 2019).
Reappraisal*	Altering one's view of a given situation before the emotion occurs (Tyson et al., 2009). A cognitive form of emotion regulation (Ziv et al., 2017).

2

Table 1. Continued.

*Response inhibition**	Intentional or effortful suppression of behavior in order to sustain goal-directed behavior. Top-down ability involved in executive functions and effortful control (Logan & Cowan, 1984; Nigg, 2017). A differentiation can be made between *simple response inhibition* (i.e., delaying a proponent response with minimal demands on working memory), and *complex inhibitory control* (i.e., delaying the proponent response while responding to a salient, conflicting response option involving greater working memory demand; S. M. Carlson & Moses, 2001; Garon et al., 2008).
Selective reinforcement	Selectively rewarding/punishing an emotional reaction in order to encourage/devalue the frequency at which it occurs (Thompson, 1991).
*Self-control**	Umbrella construct that includes concepts from different disciplines such as delay of gratification, impulse control, willpower, and executive functions (Moffitt et al., 2011). In the developmental literature, self-control more specifically refers to the capacity to inhibit a dominant response and activate a subdominant response (Diamond, 2013).
Self-directed language.*	Language directed to the self that typically involves on-task commentary that aims to support the problem solving process (Kuvalja et al., 2013).
Self-efficacy (beliefs)	Beliefs about one's capabilities to complete actions (Bandura, 1977).
*Self-prohibition**	A form of egocentric symbol use in which the child approaches a previously forbidden object or initiates an activity which has been previously prohibited and then expresses negation, verbally or through gestures (Pea, 1980).
*Set-shifting**	A complex executive function involving the ability to alternate between different response sets (Miyake et al., 2000).
*Simple inhibition**	See *Response inhibition*.
Social referencing	When the child seeks information from the parent's social cues to interpret or respond to an ambiguous situation (Walden & Ogan, 1988).
*Strategy selection/use**	Selecting or using a cognitive strategy, a metacognitive activity (Muis, 2007).
*Spatial orienting**	Orienting attention resources toward and away from objects, people, or visual cues at a specific spatial location (Hendry et al., 2019; see *Attention*).
*Sustained attention**	Effortful attentional engagement with a stimulus for the purpose of active information processing (Hendry et al., 2019).
*Working memory**	Executive function representing the ability to hold multiple contents in mind at once while actively manipulating one or more of them (Baddeley, 2012).

Note. All terms are underlined in the results section. Terms that are marked with a star represent self-regulatory capacities.

Infancy (< 1 year)

Self-Regulatory Abilities

During the first year of life, the self-regulatory system is primarily concerned with the regulation of affective, arousal, and underline attention states (Foley, 2017[N]; Hendry et al., 2016[N]; D. W. Murray et al., 2019[N]; Samdan et al., 2020[S]). In infancy, the self-regulatory system transitions

from being largely involuntary and contingent on the parents' co-regulation to becoming more effortful and endogenous (Eisenberg & Sulik, 2012[N]). This developmental progression is supported by marked improvements in <u>attention control</u> (Hendry et al., 2016[N]; Posner & Rothbart, 2000[N]), rudimentary executive functions such as <u>information processing</u> speed, <u>simple inhibition</u>, and <u>working memory</u> ability (Hendry et al., 2016[N]), as well as the rising ability to articulate intentions to others using non-verbal communication (Foley, 2017[N]; Kuvalja et al., 2013[N], Prizant & Wetherby, 1990[N]; Santa-Cruz & Rosas, 2017[N]).

Abilities for the Regulation of Behavior. As <u>oculomotor control</u> and visual acuity improve rapidly over the first two to three months, young infants learn to detect and orient to novel stimuli that appear in their immediate environment, often triggered exogenously by certain physical characteristics of the stimulus such as color contrast or dynamic motion (Feldman, 2004[N]; Hunnius, 2007[N]; S. E. Petersen & Posner, 2012[N]). The first instances of <u>endogenous attention</u> manifest around 3 to 4 months of age when infants begin shifting their focus between competing spatial locations, a development that has been primarily attributed to maturation in the cortical and subcortical visual systems and the orienting <u>attention</u> network (Hendry et al., 2016[N], 2019[N]; Hunnius, 2007[N]; S. E. Petersen & Posner, 2012[N]; Posner & Rothbart, 2000[N]; Rothbart & Posner, 1985[N]; Rothbart et al., 2011[N]). This allows infants to exercise a degree of selectivity upon the inputs that get forwarded for further processing—a skill that remains key for thriving in an environment in which multiple locations are competing for attentional engagement. Improvements in the speed of <u>attention</u> shifts continue even into adulthood but the steepest improvements are observed in infancy between 1 and 6 months of age (Hendry et al., 2016[N]; S. E. Petersen & Posner, 2012[N]).

The development of <u>sustained attention</u> towards the end of the first year reflects the integration of multiple <u>cognitive control</u> systems, in particular the control that the early <u>executive system</u> begins to exert over the <u>alerting system</u> (Hendry et al., 2019[N]; Posner et al., 2016[N]). Although even young infants are able to achieve a steady state of alertness (Blair & Raver, 2015[N]), maintaining alertness through effort only becomes possible after the age of 8 to 9 months when infants begin to maintain voluntary visual engagement for the sake of <u>information processing</u> while suppressing input from distracting events (Eisenberg, Spinrad, & Eggum, 2010[N]; Eisenberg & Sulik, 2012[N]; Hendry et al., 2016[N]; Posner & Rothbart, 2000[N]; Santa-Cruz & Rosas, 2017[N]). Importantly, between-person variation in <u>sustained attention</u> towards the end of the first year has been found predictive of concurrent and toddlerhood impulse control and <u>cognitive flexibility</u> (Posner & Rothbart, 2000[N]; Santa-Cruz & Rosas, 2017[N]). However, results are mixed regarding the stability of individual differences in <u>sustained attention</u> and whether the predictive relationship holds across <u>cognitive flexibility</u> measures (Hendry et al., 2016[N]).

Substantial increments in <u>information processing</u> speed are reported between 2 and 6 months of age (Colombo & Mitchell, 2009[N]); moreover, <u>working memory</u> abilities emerge between 5 and 8 months of age (Hendry et al., 2016[N]; Levin & Hanten, 2005[N]; Santa-Cruz & Rosas, 2017[N]). Individual differences in <u>information processing</u> speed at 7 and 12 months of

age were found to predict working memory and set-shifting performance at the age of 11 years (Hendry et al., 2016[N]), which is consistent with the relation between encoding speed as the major rate-limiting factor of working memory ability observed across other age groups (Colombo & Mitchell, 2009[N]; Hendry et al., 2016[N]). Early forms of simple inhibition also begin to manifest as infants become capable of controlling their looking responses towards spatially competing stimuli (Posner & Rothbart, 2000[N]; Rothbart et al., 2007[N]).

Two aspects of the developing language and communication skills support developmental improvements in self-regulated behavior—the intentional pre-verbal communication with other social agents and the rise of self-directed language (Foley, 2017[N]; Kuvalja et al., 2013[N]; Prizant & Wetherby, 1990[N]; Santa-Cruz & Rosas, 2017[N]; Thompson, 1991[N]). Between 8 and 10 months, infants become able to articulate intentions to others using non-verbal communication such as gestures and vocalizations for giving, showing, and pointing to objects (Bates, 1987[N]). These skills occur during periods of joint attention with the parent that become more frequent around the same age (Carpenter et al., 1998[N]; Colonnesi et al., 2010[M]). In doing so, infants begin to deliberately regulate the behavior of others around them (e.g., by maintaining the parent's attention towards an object; Bretherton & Bates, 1979[N]; Colonnesi et al., 2010[M]) and soon after, infants start using ostensive gestures to regulate their own behavior. Self-directed pointing gestures observed among 11- to 15-month-olds' are specifically used for problem-solving in the absence of another communicative party (Kuvalja et al., 2013[N]). Furthermore, ostensive gestures between the ages of 8 and 24 months were found to aid attention maintenance and prospective planning towards object manipulation (Prizant & Wetherby, 1990[N]). Self-prohibition is another relevant phenomenon observed in preverbal infants who vocalize or gesture negation via head shakes upon engagement with a previously forbidden object or activity, which is thought of as a product of internalizing co-regulation (Prizant & Wetherby, 1990[N]). These observations are consistent with the idea of language as a precursor to the development of (rudimentary) executive functioning (Zelazo & Frye, 1998[N]; Zelazo et al., 2003[N]) in that (pre-)linguistic skills are thought to aid the formation of a mental goal representation of the problem or conflict to be solved (Kuvalja et al., 2013[N]).

Abilities for the Regulation of Emotion. Developing control over the orienting attention network is instrumental not only in enabling infants to steer their own learning processes but also for modulating levels of arousal and affect and for managing the natural flow of communication with the parent (Eisenberg & Sulik, 2012[N]; Foley, 2017[N]; Henderson & Wachs, 2007[N]; Strayhorn, 2002[N]). From around 4- to 5-months of age, spatial orienting begins to serve as a general behavioral strategy for multiple self-control goals, such as modulating distress levels, preventing overstimulation, and improving soothability (i.e., emotion and arousal regulation; Eisenberg, Spinrad, & Eggum, 2010[N]; Gennis et al., 2022[M]; Henderson & Wachs, 2007[N]; S. E. Petersen & Posner, 2012[N]; Raver, 2004[N]; Rothbart et al., 2011[N]; Samdan et al., 2020[S]; Strayhorn, 2002[N]). Tactile self-stimulation is another early-life strategy used to temper negative arousal (Foley, 2017[N]; Gennis et al., 2022[M]; Henderson & Wachs, 2007[N]; Samdan et al., 2020[S]; Thompson, 1991[N]). Similar to spatial orienting, tactile self-stimulation

only provides a temporary buffer to reduce negative affect rather than resolving it via the active manipulation of the environment (Henderson & Wachs, 2007[N]; Taipale, 2016[N]). At about 8 months of age, infants become able to perform simple <u>response inhibition</u> tasks with minimal <u>working memory</u> demands, such as withholding approach under conditions of heightened reward/punishment and per request of the parent (Hendry et al., 2016[N]). Early forms of <u>simple inhibition</u> also manifest via fear responses towards novel objects and persons that become more frequent in the second half of the first year and show considerable stability through childhood up to late adolescence (Posner & Rothbart, 2000[N]; Rothbart et al., 2007[N]).

Goals and Motivation

Infants' action goals can be defined with reference to the self as well as to other social agents (Trevarthen & Aitken, 2001[N]). In terms of goal contents, infants have been documented to systematically pursue physiological and emotional regulation—maintaining physiological homeostasis, establishing a feeling of security, experiencing positive emotions and controlling negative emotions (Tronick, 1989[N]). At the same time, infants seek engagement with the social and physical world – interacting with others, maintaining proximity to parents, engaging in positive reciprocal interactions, and exploring objects (Prizant & Wetherby, 1990[N]). In terms of what motivates infants to exert voluntary control during the first year of life, infants demonstrate that they are independent learners who, motivated by their own curiosity, are intrinsically drawn to explore novelty around them (Bazhydai & Westermann, 2020[N]; Marvin et al., 2020[N]; Oudeyer et al., 2016[N]; L. B. Smith et al., 2018[N]). Approach and avoidance tendencies are also strongly mediated by hedonic factors (i.e., avoiding punishment, approaching reward) and by the tendency to avoid sensory overstimulation (Henderson et al., 2015[N]; Lipsitt, 1990[N]; Trevarthen & Aitken, 2001[N]). In fact, the neural systems for pain perception and cognitive control are closely aligned, allowing the mediation of learning in response to aversive events by pain receptor mechanisms (Tucker et al., 2005[N]). Viscerally significant motives such as the experience of (emotional) pain and longing can also motivate early-life social behaviors. Specifically, opiate release during periods of affection and frustration can guide the development of <u>coping</u> strategies in response to unrewarding experiences that are part of adaptive social functioning (Tucker et al., 2005[N]). Noteworthy is that in our search results, there were no publications reviewing the developmental progression of goals and motivation during the first year of life.

Socialization of Self-Regulatory Abilities, Goals, and Motivation

The impact of socialization processes on the development of infants' self-regulatory abilities, goals, and motivation was not clearly differentiated in the review literature; hence, we report on these findings together.

Parents. The development of self-regulatory abilities such as executive functioning depends heavily on early social experiences, such as the parents' co-regulation and provision of sensitive, contingent care and stable routines (Blair & Raver, 2015[N]; Eisenberg,

Spinrad, & Eggum, 2010[N]; Foley, 2017[N]; Miller et al., 2020[N]; Raver & Blair, 2016[N]; Samdan et al., 2020[S]). Parents use various co-regulation strategies to assist infants with regulating their emotions, for instance, by directly modulating their exposure to stimulating events (Thompson, 1991[N]). Similarly, processes such as selective reinforcement of positive emotional experiences and the attenuation of negativity, modeling emotional behavior, and social referencing (i.e., when the infant seeks information from the parent's social cues to resolve ambiguity) all serve for managing the circumstances under which heightened emotional arousal states are likely to be experienced (Thompson, 1991[N]). Infants' distress, frustration, and fear are further co-regulated through soothing and distraction techniques (Eisenberg & Sulik, 2012[N]; Foley, 2017[N]; Henderson & Wachs, 2007[N]; Posner & Rothbart, 2000[N]; Thompson, 1991[N]). Through the parents' mirroring of facial expressions (i.e., affective attunement), on the other hand, infants gradually learn to track, identify, and articulate their own emotional states, which is an integral part of emotion regulation (D. W. Murray et al., 2019[N]; Taipale, 2016[N]; Thompson, 1991[N]). Practicing the synchronous timing with which infants and parents exchange reciprocal communicative signals during early social interactions is another important facilitator for developing communicative skills and emotion regulation (Masek et al., 2021[N]; MacPhee et al., 2015[N]), whereas dysregulated interactions contribute to adjustment problems and externalizing behaviors (MacPhee et al., 2015[N]).

Other behavioral mechanisms through which parents co-regulate the infant's behavioral and emotional responses are parental sensitivity and responsiveness, each found to be concurrently (Eisenberg, Spinrad, & Eggum, 2010[N]; Foley, 2017[N]; Samdan et al., 2020[S]) and longitudinally predictive of toddlerhood self-regulation skills, especially in infants with heightened reactivity to environmental inputs (Samdan et al., 2020[S]). The earliest positive effects of parental sensitivity on infant regulation of temperament and sleep were observed already from birth on, whereas after 4 months of age parental sensitivity was related to infant regulation of attention and mood (Samdan et al., 2020[S]). Through positive parenting techniques such as scaffolding (i.e., the provision of supporting strategies through instruction and demonstration; Vygotsky, 1962), including autonomy support, and mind-mindedness (i.e., the ability to treat the child as an agent with independent thoughts and feelings; Aldrich et al., 2021[M]; Meins, 2013[N]), and in the context of secure attachment (Van IJzendoorn et al., 1995[M]), parents provide infants with the vocabulary to verbally mediate their own behavior, thereby also fostering the development of executive functioning (Aldrich et al., 2021[M]; L. A. Carlson, 2003[N]; MacPhee et al., 2015[N]). Furthermore, an early-life linguistic focus on verbs rather than objects has been related to an earlier onset of inhibitory and self-control processes (LeCuyer & Zhang, 2015[N]).

Affective maternal touch and proximity have been shown to foster the development of emotional and behavioral regulation, reciprocity during social interaction, and the formation of a secure attachment bond (Farroni et al., 2022[N]; Feldman, 2004[N]; Weller & Feldman, 2003[N]). The development of stable cognitive representations of attachment relationships around 9 to 10 months enables infants to use social support for regulating distress (Chen et al., 2017[N]) and secure attachment provides a safe context for exploration

or dealing with frustration (Foley, 2017[N]). However, longitudinal relationships between attachment and self-regulatory abilities such as executive functioning do not manifest robustly until toddlerhood (Pallini et al., 2018[M]), though this result may be partially accounted for by the methods used to measure self-regulatory abilities and attachment before the age of 3 years.

Teachers. Interactions with other caretakers during the first year of life did not emerge as a theme in our search results, which was surprising given that infants begin attending daycare as early as 3 months of age in some countries.

Peers. Only one review focused on the socialization of self-regulatory abilities, goals, and motivation via peers, nevertheless demonstrating the importance of peers already in the first year of life. Infants between 3 and 6 months of age were shown to be sensitive to distress signals from peers, responding with behavioral strategies such as tactile self-stimulation and attentional spatial orienting to regulate their own emotional distress (Pahigiannis & Glos, 2020[N]). Additionally, the production of gestures and shared engagement with toys during peer interactions was shown to be influenced by peer responses from previous social interactions (Pahigiannis & Glos, 2020[N]).

Toddlerhood and Preschool (1-5 years)

Self-Regulatory Abilities
Abilities for the Regulation of Behavior. In the toddler and preschool years, a rapid development from simple to more complex self-regulatory abilities occurs, enabling improvements in behavior regulation (Calkins, 2007[N]; Eisenberg & Sulik, 2012[N]; Kopp, 1982[N]). For instance, toddlers become able to deploy their attention more voluntarily from the second year of life on, allowing the processing of additional sources of information (Eisenberg & Sulik, 2012[N]; D. W. Murray et al., 2019[N]; Rothbart et al., 2007[N]; Ziv et al., 2017[N]). Toddlers further begin to demonstrate compliance in response to external (e.g., parental) directives, a prototypic form of early self-regulated behavior (Kopp, 1982[N]).

Marked age-related improvements in inhibitory control occur from age 3 to 6, as reflected in preschoolers' increasing ability to withhold or suppress a prepotent but no longer relevant response or stopping a response in progress (Levin & Hanten, 2005[N]; Miller et al., 2020[N]; I. T. Petersen et al., 2016[M]; Roebers, 2017[N]; Rothbart, 2007[N]; Ziv et al., 2017[N]). For instance, whereas only half of the 3-year-olds in the "bear/dragon" test (Reed et al., 1984) manage to follow directions from the bear puppet while ignoring commands from the dragon puppet, 5-year-olds easily succeed in this task (Ziv et al., 2017[N]). Relatedly, toddlers and preschoolers become increasingly better at inhibitory control in motivationally salient situations (Kochanska & Aksan, 2006[N]; Posner & Rothbart, 2000[N]; Ziv et al., 2017[N]). For instance, the length of time children can wait for a treat increases between 2 and 4 years of age, reflecting improvements in the ability to delay gratification (Eisenberg & Sulik, 2012[N]).

From about age 4, preschoolers' working memory capacity – the maximum number of information units that can be simultaneously activated and processed in working memory – improves with the use of simple memory tactics such as verbally naming an item for rehearsal (Levin & Hanten, 2005[N]; Ziv et al., 2017[N]). Preschoolers also develop cognitive flexibility: they begin to use rules more flexibly by changing and shifting between rules based on their understanding of environmental demands (Ziv et al., 2017[N]). Preschoolers further manage simple planning tasks (De Corte, 2019[N]; Levin & Hanten, 2005[N]), whereby they make use of metacognitive abilities such as private speech or self-directed language to guide their behavior (Anastopoulos & Krehbiel, 1985[N]; Foley, 2017[N]; Gholami et al., 2016[N]; Kuvalja et al., 2013[N]; Levin & Hanten, 2005[N]; Roebers, 2017[N]; Ziv et al., 2017[N]).

Abilities for the Regulation of Emotion. Similar to infants, toddlers engage in simple strategies including reorienting attention in order to regulate distress (Eisenberg, Spinrad, & Eggum, 2010[N]; Gennis et al., 2022[M]). Their ability to use simple language enables them to talk themselves through emotionally challenging situations or request help for regulation from a close person (Garner, 2010[S]; Higgins, 2016[N]; Zeman et al., 2006[N]). From the age of 3 to 4, preschoolers start to understand their own basic emotions and those of others (Housman, 2017[N]; Rothbart et al., 2007[N]; Ziv et al., 2017[N]). They can rely on an increasingly broader repertoire of behavioral strategies to manage their emotions, for instance, by playing with a favorite toy as a self-calming strategy, or by covering their eyes to regulate sensory intake (Housman, 2017[N]; Thompson, 1991[N]; Zeman et al., 2006[N]). Preschoolers can further implement carefully planned strategies such as actively resisting negative ouvertures from a peer to prevent the occurrence of negative emotion (Garner, 2010[S]).

Goals and Motivation[2]

During toddlerhood, gaining autonomy arises as a higher-order goal that children pursue (Bronson, 2000[N]; Calkins, 2007[N]; Higgins, 2016[N]). In order to attain this goal, motivation to engage in self-regulation may increase in toddlers. Although they want to do things themselves, toddlers do not yet have accurate knowledge about their own level of ability, and therefore, they may often experience frustration in trying to reach goals (Bronson, 2000[N]). Nevertheless, these failures are likely to be overcome due to toddlers' strong striving for mastery and independence (Bronson, 2000[N]; Calkins, 2007[N]). Another important higher-order goal for toddlers is to understand their environment, which is reflected in a high motivation to explore and manipulate objects in the environment (Bronson, 2000[N]). In trying to achieve this goal, toddlers strive to cognitively organize their environment. This is supported by the acquisition of language, helping toddlers to place for example objects or animals in named categories (Bronson, 2000[N]).

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2   As our systematic search revealed only a few review-type papers on the development of motivation for self-regulation in toddlerhood and the preschool years, we mainly draw upon the book of Bronson (2000) on self-regulation in early childhood in this section.

In contrast to toddlers, preschoolers are better able to take their own level of skills into account while formulating goals and choosing tasks (Ziv et al., 2017[N]). Their motivation to reach specific short-term goals becomes more focused (Levin & Hanten, 2005[N]; Ziv et al., 2017[N]). Whereas toddlers are mostly interested in the *process* of an action (e.g., drawing), preschoolers become interested in the *product* as well, which they evaluate based on concrete standards (e.g., the quality of the cat they have drawn; Bronson, 2000[N]). By reaching their goals, preschoolers experience pleasure that is self-reinforcing and motivates them to set new goals (Bronson, 2000[N]). At a very limited capability still, preschoolers can alter or substitute their goals for a certain situation (e.g., playing alone instead of with a frustrating peer) to regulate emotional arousal (Thompson, 1991[N]). Further, they begin to regulate themselves in terms of significant others' goals and standards for them, also in the absence of surveillance (Higgins, 2016[N]).

Socialization of Self-Regulatory Abilities, Goals, and Motivation

Similar to the literature on self-regulation during infancy, no clear distinction between the impact of socialization processes on the development of toddlers' and preschoolers' self-regulatory abilities, goals, and motivation is made, and hence we report on these findings together.

Parents. Whereas infants almost completely rely on their parents for regulation, toddlers and preschoolers become increasingly able to self-regulate by gaining a more internalized set of regulatory strategies (Calkins, 2007[N]; Cox et al., 2010[N]; Foley, 2017[N]; Garner, 2010[S]; Housman, 2017[N]). Still, parents play a major role in helping their children to regulate in various situations by using similar co-regulation strategies as in infancy (Blair & Raver, 2015[N]; Fay-Stammbach et al., 2014[N]; Foley, 2017[N]; Gennis et al., 2022[M]; Higgins, 2016[N]; Karreman et al., 2006[M]; Kiff et al., 2011[N]; Kiss et al. 2014[N]; D. W. Murray et al., 2019[N]; Ramsdal et al., 2015[N]; Tayler, 2015[N]). Parents may for instance calm their child by removing the child from situations of excessive stress, provide reassurance through physical or verbal comfort, or provide opportunities for distraction such as initiating play (Farroni et al., 2022[N]; Foley, 2017[N]; Thompson, 1991[N]). Toddlers and preschoolers will further learn about self-regulation by practicing during interactions with parents and by imitating their parents' own self-regulatory behaviors (e.g., self-calming strategies) that serve as a role model of self-regulation (Bronson, 2000[N]; Davis et al., 2017[M]; Foley, 2017[N]; Thompson, 1991[N]; Zeman et al., 2006[N]).

The way in which parents behave in specific co-regulating situations over time can be attributed to differences in parenting styles that may uniquely contribute to the development of children's self-regulatory abilities. First, parental sensitivity or responsiveness is assumed to reduce discomfort, stress, and emotional negativity in children with benefits to the development and internalization of regulatory strategies (Fay-Stammbach et al., 2014[N]; Kiss et al., 2014[N]; Samdan et al., 2020[S]). Nevertheless, evidence about the association between parental sensitivity/responsiveness and toddlers' self-regulation is still mixed. Although parental sensitivity/responsiveness and mind-

mindedness have been positively related to composite executive functions (Aldrich et al., 2021[M]; Valcan et al., 2018[M]), parental sensitivity/responsiveness has not been associated with compliance, inhibition and emotion regulation in children aged 2 to 5 years old (Karreman et al., 2006[M]).

Second, young children's regulatory abilities may further be fostered through positive/supportive behavioral control, including parental behaviors such as limit-setting and directiveness (Fay-Stammbach et al., 2014[N]). Parents adopting an authoritative style involve their children in decision making and model effective coping strategies that promote their children's use of effective self-regulatory strategies. In contrast to the authoritative style, authoritarian parenting—the demand of unquestioning obedience and rigid control without warm communication—can undermine the development of self-regulation and thereby manifest itself in inadequate social competencies, as parents model negative behaviors and fail to teach prosocial skills (Kiss et al., 2014[N]). Evidence has shown that parental supportive behavioral control is positively associated with compliance, whereas parental negative (i.e., power-assertive, harsh and intrusive) control relates to lower levels of compliance and executive functions in toddlers and preschoolers (Karreman et al., 2006[M]; Valcan et al., 2018[M]). No significant associations between either positive or negative control with inhibition or emotion regulation were observed (Karreman et al., 2006[M]).

Third, parenting behaviors that are more focused on the child's learning are parental scaffolding and stimulation. Higher levels of parental scaffolding, through verbal or non-verbal guidance, but also autonomy support and praise of children's decisions, have been associated with higher levels of executive functioning in toddlers and preschoolers (Fay-Stammbach et al., 2014[N]; Valcan et al., 2018[M]). Parental stimulation involves enriched interactions such as reading to the child with the aim of providing children with opportunities to develop cognitive skills. It prospectively relates to higher self-regulatory abilities including inhibitory and attention control, cognitive flexibility, working memory, and planning in toddlers and preschoolers (Fay-Stammbach et al., 2014[N], Valcan et al., 2018[M]).

As parenting styles, in particular parental sensitivity, significantly contribute to the formation of an attachment style between the parent and the child (Kiss et al., 2014[N]), research has further focused on the association between attachment security and the child's self-regulation. Attachment security assessed in toddlerhood has been concurrently and longitudinally associated with children's self-regulatory abilities such as executive functions and regulatory strategies (Fay-Stammbach et al., 2014[N]; Kiss et al., 2014[N]; Pallini et al., 2018[M], 2019[M]). To exemplify, securely attached toddlers, compared to resistant and avoidant ones, have been shown to use regulatory strategies more flexibly as through seeking maternal proximity and asking the mother for help (Cox et al., 2010[N]; Kiss et al., 2014[N]). Further, a positive behavioral synchrony between the parent and the child, reflected in interactions in which partners are attuned to each other behaviorally and emotionally, is beneficial for the development of self-regulation from early childhood on (Davis et al., 2017[M]).

Teachers. As compared to the extensive evidence on parental influences, the role of teachers in the development of self-regulation in toddlerhood and the preschool years is still underrepresented in the reviewed literature. As outlined next, the reviewed literature focused mainly on teachers' influences on self-regulatory abilities, particularly on those employed in the regulation of behavior.

It is thought that young children's exposure to supportive versus negative, conflictual interactions with teachers shapes individual differences in attention control and emotion regulation (Blair & Raver, 2015[N]). Similarly, gains in preschoolers' executive functions have been associated with teachers being more approving and using a positive emotional tone (Clements et al., 2016[N]).

Teachers can further promote the development of self-regulatory abilities through implementing specific activities in preschool: By offering structured games, they can provide young children with opportunities to practice mastering a set of rules and encourage perseverance when tasks become difficult (Li et al., 2021[M]; McClelland et al., 2007[N]; Tayler, 2015[N]). During problem solving activities, teachers can encourage children to engage in private speech, and take on a role model to teach this skill (McClelland et al., 2007[N]). These and other teacher-guided activities such as "pretend play" and "waiting for your turn" can be implemented in classroom curricula, with a prominent one being "Tools of the Mind" (Bodrova & Leong, 2008[N]; Diamond & Lee, 2011[N]). In these classroom curricula, children learn self-regulatory abilities that they can apply to other contexts (Blair & Raver, 2015[N]). However, evidence has shown that the effect of classroom curricula on 4- to 6-year-olds' executive functions was small and only marginally significant (Takacs & Kassai, 2019[M]).

In addition to fostering self-regulatory abilities, a positive relationship with one's teacher during preschool may set the stage for important motivational processes as apparent for instance through more productive work habits and classroom engagement (Blair & Raver, 2015[N]; Eisenberg, Valiente & Eggum, 2010[N]; Li et al., 2021[M]; McClelland et al., 2007[N]).

Peers. Little is known from the reviewed literature about the role of peers in affecting the development of self-regulation in toddlerhood and the preschool years. With respect to the regulation of behavior, around age 3, preschoolers start to engage in symbolic play, either on their own or together with peers. They pretend that objects would be something else, requiring the inhibition of the actual function of the object, meta-communication, and role taking (Foley, 2017[N]; Higgins, 2016[N]; Pahigiannis & Glos, 2020[N]; Savina, 2014[N]). With respect to the regulation of emotions, as compared to the more scaffolded interactions with parents or teachers, interactions with peers may provide more challenging practice opportunities for self-regulation such as during conflicts (Miller et al., 2020[N]). Modeling of self-regulation by peers further starts in the preschool years (Miller et al., 2020[N]).

Childhood (6-11 years)

Self-Regulatory Abilities
Abilities for the Regulation of Behavior. Abilities such as <u>executive functioning</u> continue to develop during childhood, albeit at a slower rate, compared to toddlerhood and early childhood (Deater-Deckard, 2014[N]). Simple abilities develop into more complex capabilities, congruent with the development of physical and neural systems and the gradual internalization of control during childhood (Nigg, 2017[N]). For instance, children's <u>working memory</u> capacity increases, and children become more proficient in retrieving information in different contexts (Ziv et al., 2017[N]). Children are also likely to develop their <u>inhibitory control</u> abilities (Nigg, 2017[N]) and consequently can manage increasingly more complex <u>inhibition</u> tasks. This <u>inhibitory control</u> includes the ability to inhibit an action despite a concrete command (e.g., in the game "Simon says") or despite social pressure (e.g., when a peer invites a child to throw rocks at a window; I. T. Petersen et al., 2016[M]). Compared to preschoolers, improvements in memory and <u>inhibition</u> allow older children to cope with greater environmental demands, to pursue mastery in more complex tasks, and to engage in more goal-directed behavior in academic settings (Ziv et al., 2017[N]). Children become increasingly self-reliant and their self-regulatory strategies become more differentiated and sophisticated (Zimmer-Gembeck & Skinner, 2011[N]). For instance, children develop more advanced memory strategies, such as relying on heuristics (e.g., an educated guess, or a rule of thumb) and grouping (Ziv et al., 2017[N]).

Abilities for the Regulation of Emotion. For infants and toddlers, regulation of emotion is often co-regulated, and accomplished with help of others. During childhood, however, children improve their capability to manage their own emotions and expression (Eisenberg & Spinrad, 2004[N]), resulting in an increase in self-reliance (Thompson, 1991[N]; Zimmer-Gembeck & Skinner, 2011[N]). Children become more proficient in <u>executive functions</u> (Eisenberg & Sulik, 2012[N]), and show increased ability to intentionally direct <u>attention</u> to positive features of stressful situations (Zimmer-Gembeck & Skinner, 2011[N]). Support seeking becomes more complex, and the ability to take others' perspectives and understand that different situations may require different <u>coping</u> responses begins to form (Compas et al, 2017[M]). Children gain understanding of emotional display rules, the multiple dimensions of emotions and the simultaneity of different emotions, and the consequences of one's emotional expressions for social partners (Thompson, 1991[N]; Zeman et al., 2006[N]). Moreover, children better understand the negative consequences associated with expressing the "wrong" emotions during social interactions and get better at identifying these situations and consequently hiding their feelings in these instances (Garner, 2010[S]). Children also recognize that other's emotional reactions to a situation may not match their own and that others, too, may choose to alter their emotional expressions (Zeman et al., 2006[N]).

In addition to the increased understanding of emotion-laden interactions and attentional flexibility, children significantly expand their repertoire of strategies for

emotional self-regulation (Thompson, 1991[N]), and develop more efficacy and flexibility in the use of specific strategies with age (Compas et al., 2017[M]). In preschool, children comfort themselves mostly through behavior (Zimmer-Gembeck & Skinner, 2011[N]), whereas children in middle childhood start to make use of more cognitive forms of underlined emotion regulation (Compas et al., 2017[M]; D. W. Murray et al., 2019[N]; Tyson et al., 2009[N]; Zimmer-Gembeck & Skinner, 2011[N]). For instance, children learn to make use of cognitive distraction (thinking about something else) instead of behavioral distraction (doing something else; Compas et al., 2017[M], Thompson, 1991[N])—although cognitive strategies in this phase are typically used only when behavioral distraction is not an option (e.g., during a dental procedure; Zimmer-Gembeck & Skinner, 2011[N]). Moreover, school-aged children can regulate their emotions with more sophisticated strategies (Eisenberg, Hofer, et al., 2014[N]) such as reappraisal, where children try to re-interpret unpleasant events in ways that positively change their emotional response to the event (Gross, 2014[N]; Ziv et al., 2017[N]).

2

Socialization of Self-Regulatory Abilities

Parents. Just as in infancy and toddlerhood, parents play an important role by co-regulating (part of) children's regulating process. The growing self-regulatory ability of children allows for a gradual shift of responsibility from parents to children in this co-regulation (Binns et al., 2019[N]; Pino-Pasternak & Whitebread, 2010[S]). Co-regulating is most beneficial for the development of children's self-regulatory abilities if parents scaffold their support based on a child's readiness for responsibility (Pino-Pasternak & Whitebread, 2010[S]), striking a balance between overprotection and ignorance (Repetti & Robles, 2016[N]).

Just as in toddlerhood, parents positively contribute to the development of self-regulatory abilities when they are able to establish a secure attachment relationship with their child, and when they adopt responsive parenting styles characterized by warmth, synchrony, and connectedness. In contrast, power assertion and harsh and intrusive parenting styles are negatively associated with the development of self-regulatory abilities (Cox et al., 2010[N]; Deater-Deckard, 2014[N]; Eisenberg, Duckworth, et al., 2014[N]; Kiff et al., 2011[N]; Pallini et al., 2018[M], 2019[M]; Repetti & Robles, 2016[N]; Valcan et al., 2018[M]). In addition, parental autonomy support, scaffolding, and cognitive stimulation enhance the development of self-regulatory abilities, especially in younger children (Valcan et al., 2018[M]).

Furthermore, parents contribute to the development of self-regulatory abilities by modeling self-regulated behavior (Zeman et al., 2006[N]). Modeling encompasses the use of specific language, with which parents verbalize the process of regulation (Binns et al., 2019[N]). Modeling can, for instance, be used to improve children's understanding of emotions and their ability to regulate their emotions (Zeman et al., 2006[N]) although success of these strategies is to some degree dependent on a parent's own ability to regulate emotions (De Raeymaecker & Dhar, 2022[S]). Adults can use simple language to describe cause-effect relationships between mental states and behavior (e.g., 'The noise outside makes it difficult for me to concentrate on my book, I'm going to close the window'). Alternatively, parents can verbalize how they deal with their own negative emotions

(Garner, 2010[S]; Repetti & Robles, 2016[N]), explaining how they choose regulation strategies and why. Parents' use of emotion-based language helps clarify children's emotional states, intensifies their awareness of their own and others' emotions, and teaches their children how to respond appropriately to emotion-related experiences (Garner, 2010[S]). Moreover, because the regulation process is verbalized, they learn (De Raeymaecker & Dhar, 2022[S]) the relevant language needed to communicate about self-regulation (Binns et al., 2019[N]).

Teachers. In the first years of school, teachers acquire an important role in the development of a child's self-regulatory abilities. Teachers are to a large extent responsible for facilitating a learning environment that promotes self-regulatory abilities, for instance by incorporating activities that encourage reasoning and higher order thinking, such as classroom discussions and the use of open-ended questions (De Corte 2019[N]; Li et al., 2021[M]; Meusen-Beekman et al., 2015[N]; Vandenbroucke et al., 2018[M]). Moreover, teachers play an important role by co-regulating (part of) a child's regulating process (Skinner et al., 2020[N]). Teachers can model and even explicitly teach children relevant self-regulatory strategies and skills (Corno, 1994[N]; Donker et al., 2014[N]; Meusen-Beekman et al., 2015[N]), such as self-talk or how to monitor one's own behavior (Strayhorn, 2002[N]). In a more implicit way, teachers impact children's self-regulatory abilities during their teacher-child interactions (Li et al., 2021[M]; Sankalaite et al., 2021[S]; Savina, 2021[N]). For instance, children who experience more positive and less conflictual interactions with teachers regulate their stress better and are more confident (Vandenbroucke et al., 2018[M]).

Peers. As children enter school, peers are a relatively permanent part of a child's social environment. They become important models for children's behavior (Coplan & Bullock, 2012[N]; Zimmer-Gembeck & Skinner, 2011[N]), as children are more likely to reproduce modeled behavior if the model is alike on factors such as age, gender or status (Schunk & Zimmerman, 1997[N]). Peers also provide new opportunities to practice self-regulatory abilities through play. For instance, older children (7-11 years) are likely to engage in games with rules, either self-invented or initiated by an adult. This attending to rules, inventing a strategy to obtain a goal, and taking the perspective of the other players are ideal options for training self-regulatory abilities (Savina, 2014[N]).

Goals and Motivation
With age, children gradually develop a sense of history and time, which is reflected in the goals they formulate. Where young children mostly formulate goals in the present, older children gradually formulate more future-focused goals, although still mostly aimed at the nearby future (Higgins, 2016[N]; McInerney, 2004[N]). In line with this, goals more often include an intention to develop, as learning and growing becomes more and more something that is actively and intentionally pursued (Gestsdottir & Lerner, 2008[N]). Children's goals and motivation are also impacted by the new social environment they enter: primary education. Because children are expected to follow a somewhat predetermined curriculum, not all activities tend to be intrinsically motivating. Considering this, motivation focused on the

usefulness of certain topics for children's personal goals (i.e., <u>identified motivation</u>) starts to play a more crucial role than before (Kauffman & Husman, 2004[N]).

Moreover, children learn to better understand effort and ability when experiencing negative outcomes and consequently, their expectations and beliefs about their own ability become more accurate. This makes it easier for children to attain a <u>growth mindset</u> (i.e., the belief that one's current ability can be improved with enough effort; see e.g., Dweck, 2007) and to attribute success to ability and effort and failure to a lack of effort. Relatedly, children's motivation is higher when they attribute their academic failures to unstable, internal but controllable causes (like a lack of effort) and believe that academic abilities are incremental and modifiable (similar to <u>growth mindset</u>; Muenks et al., 2018[N]).

Socialization of Goals and Motivation

Parents. Next to influences on self-regulatory abilities, parents can also impact children's developing expectancy beliefs and motivation. For instance, maladaptive parental control (e.g., negative reactions to academic failure or the use of extrinsic rewards) affects children's understanding of sources of control and is related to extrinsic patterns of motivation (Pino-Pasternak & Whitebread, 2010[S]). In contrast, providing children with process praise (i.e., praising effort and learning) rather than personal praise (i.e., praising the child's intellectual capability) often leads to higher motivation, promotes a <u>growth mindset</u>, and improves perceived competence among children (Muenks et al., 2018[N]).

Teachers. Also, teachers play a role in children's motivation. When teachers hold high generalized expectations for student achievement and students actually perceive these expectations, this can enhance both feelings of competence and self-worth, which, in turn, benefits motivation (Muenks et al., 2018[N]). How strongly teachers influence <u>self-efficacy</u> depends in part on the experienced credibility of teachers. Teachers who communicate to children they are capable of performing a task lose their influence if a child continues to experience performance failure (Schunk & Zimmerman, 1997[N]). Last, children who experience more positive and less conflictual interactions with teachers are more likely to engage and persist in challenging activities (Li et al., 2021[M]; Vandenbroucke et al., 2018[M]).

Peers. Peers can also impact each other's motivation. When children start school, they begin to be evaluated by their teachers in systematic, formal, and normative ways. Partly as a result of this evaluation, they start to engage more systematically in social comparisons with peers as a way to judge their own abilities (Schunk & Zimmerman, 1997[N]), which can both positively and negatively impact children's motivation (Muenks et al., 2018[N]).

Adolescence (12-18 years)

Self-Regulatory Abilities
Abilities for the Regulation of Behavior. During adolescence, abilities that serve the regulation of behavior undergo marked improvements. <u>Executive attention</u>, <u>response</u>

inhibition, and working memory fully mature (Gestsdottir & Lerner, 2008[N]; Massey et al., 2008[S]; Nelson et al., 2019[N]; Nigg, 2017[N]) at the end of adolescence or in emerging adulthood (e.g., Luna et al., 2010[N]). Other abilities also improve during adolescence and continue to develop in emerging adulthood, such as attention, self-control, delay of gratification, cognitive flexibility, and metacognitive skills such as planning and strategy selection (Duckworth et al., 2019[N]; Gestsdottir & Lerner, 2008[N]; Martini & Shore, 2008[N]; Massey et al., 2008[S]; Miller et al., 2020[N]; Muis, 2007[N]; D. W. Murray et al., 2019[N]; Nelson et al., 2019[N]; Nigg, 2017[N]). These improved abilities underlie the emergence of Piagetian formal operational thought: the ability to form abstract ideas, to think about hypothetical problems and to formulate multiple hypotheses regarding an outcome of an event (Gestsdottir & Lerner, 2008[N]). These formal operational thought processes enable adolescents to use multiple rules to control behavior in different situations and to think about future events, (conflicting) goals, or tasks that require a lot of effort (Gestsdottir & Lerner, 2008[N]). Adolescents thus become better at problem solving and making long-term decisions like selecting courses to pursue future careers. However, as reward sensitivity also surges in early and middle adolescence (Miller et al., 2020[N]), adolescents' abilities may not have developed sufficiently to regulate behavior in highly rewarding situations (see Box B, Noël, 2014[N]; A. R. Smith et al., 2014[S]).

Abilities for the Regulation of Emotion. Several aspects of emotion regulation develop during adolescence (Zimmer-Gembeck et al., 2022[M]). In general, adolescents gain information about their personal experience of emotions (Thompson, 1991[N]). With adolescents being more aware of interpersonal consequences of their displayed emotions, their decisions about when to display certain emotions and to whom become more deliberate and flexible (Zeman et al., 2006[N]). Moreover, as the experience of negative emotions can interfere with applying mental processes, the suppression of negative emotions helps adolescents during learning situations (Garner, 2010[S]; Martínez-López et al., 2021[S]). Adolescents can also activate positive emotions (such as hope), or use reappraisal to gain more perceived control over (academic) situations and improve task performance (Martínez-López et al., 2021[S]). Feelings of stress can impact feelings of social competence in adolescents (Martínez-López et al., 2021[S]). To cope with this stress, adolescents can independently distract themselves, follow guided relaxation exercises, or decide which situations to avoid (Zimmer-Gembeck & Skinner, 2011[N]). Moreover, by selecting desired and avoiding undesired situations, adolescents start exercising more control over the emotional demands in their environment (Thompson, 1991[N]). Both emotion regulation and coping are linked to lower levels of internalizing and externalizing symptoms of psychopathology (Compas et al., 2017[M]).

Socialization of Self-Regulatory Abilities

Parents. Parental influences have mainly been reviewed in the domain of emotion regulation. Although adolescents' reliance on parents seems to decline with their increasing need for autonomy (Farley & Kim-Spoon, 2014[S]; Kiff et al., 2011[N]; Sheffield Morris

et al., 2007[N]), parental influences still affect adolescents' self-regulatory abilities such as their coping (Li et al., 2019[M]; Miller et al., 2020[N]; D. W. Murray et al., 2019[N]). Over-controlling parenting as well as neglectful parenting styles are, beyond earlier developmental periods, still related to impaired <u>inhibition</u> and emotion suppression <u>coping</u> during adolescence (Doan et al., 2022[N]; Li et al., 2019[M]; Sheffield Morris et al., 2007[N]; Percy, 2008[N]). On the contrary, secure parent-adolescent <u>attachment</u> relationships are related to better <u>effortful control</u> and less attention problems (Pallini et al., 2018[M], 2019[M]). Also, <u>modeling</u> or <u>social referencing</u> of parents' self-regulatory abilities such as <u>emotion regulation</u> is still present during adolescence (Sheffield Morris et al., 2007[N]). In previous developmental stages, parental touch impacted self-regulatory abilities. This regulatory effect of touch reduces in adolescence, although the early experiences of affective tactile interactions still impact self-regulation (e.g., <u>attention</u> or regulating anxiety in social situations) in adolescence (Farroni et al., 2022[N]).

Teachers. The transition to secondary schools at the beginning of adolescence provides adolescents with a more differentiated educational context compared to children at primary schools. On the one hand, the overall quality of the teacher-adolescent relationships seems to decrease, which is linked to lower self-regulation in adolescents (Garner, 2010[S]). On the other hand, teachers help to expand and refine adolescents' self-regulation repertoire by explaining how to use different self-regulation strategies for different problems, activating and interactive instructional techniques, and by establishing social norms to stimulate self-regulation activities (De Corte, 2019[N]; Li et al., 2021[M]; Meusen-Beekman et al., 2015[N]). With regard to <u>emotion regulation</u>, boys and girls seem to regulate their emotions in response to teachers' anger differently: whereas boys typically respond with externalized emotions such as anger and aggression, girls tend to express more internalized emotions such as sadness (Garner, 2010[S]).

Peers. The effects of peers have mainly been described on the regulation of emotion. With an increasing amount of time spent with peers, the level of peers' self-regulation becomes a significant predictor of adolescents' level of self-regulation and antisocial behavior (Farley & Kim-Spoon, 2014[S]). Peers also become important <u>social referencing</u> agents for adolescents' self-regulatory abilities (Sheffield Morris et al., 2007[N]), especially under emotionally challenging conditions (Miller et al., 2020[N]). Better quality friendships and romantic relationships with peers promote adolescents' <u>emotion regulation</u> (Farley & Kim-Spoon, 2014[S]). Adverse peer experiences, such as peer victimization and rejection, can impact adolescents' <u>emotion regulation</u> negatively, and enhance the use of maladaptive <u>emotion regulation</u> strategies and <u>emotion dysregulation</u> (Herd & Kim-Spoon, 2021[S]).

Goals and Motivation

Adolescence is a time that marks clear developments in *which* goals adolescents prioritize. Specifically, most adolescents prioritize goals related to education and occupation, social goals related to relationships (e.g., relationships with peers, social status, affiliation), and

goals that revolve around money, fame, and power (Massey et al., 2008[S]). Generally, leisure (i.e., social) goals are prioritized most commonly in early adolescence. Hereafter, goals concerning school and education are increasingly prioritized in middle adolescence (age 15), and goals related to new experiences, occupation, family, and property are more commonly prioritized in late adolescence (Garner, 2010[S]; Massey et al., 2008[S]). In addition, two types of demonstration goals (to demonstrate competence or to avoid negative evaluations) gain importance in adolescence. The first type of demonstration goals concerns normative goals, directed towards outperforming others, and the second type concerns appearance goals, directed towards appearing talented. Adolescents who adopt normative goals tend to have better self-regulation than adolescents holding appearance goals, but underlying mechanisms explaining why this holds true need to be disentangled further (Senko & Dawson, 2017[M]). Finally, autonomy and independence goals are also important for adolescents (Massey et al., 2008[S]).

The *structure* of adolescent goals becomes more complex in adolescence. Adolescents increasingly regulate their behavior to thrive in multiple domains (Lichenstein et al., 2016[N]). The goal structure of adolescents also becomes increasingly complex, because adolescents both formulate approach and avoidance goals, meaning that adolescents are guided by both their hopes (i.e., pursuing success) and their fears (i.e., avoiding failure; Massey et al., 2008[S]). For instance, adolescents need to balance their goal of approaching a likable peer and trying to make new friends, with their goal of avoiding rejection and losing social status.

Adolescents also develop in *how* they formulate and pursue goals. Goals are formed and pursued more deliberately (Gestsdottir & Lerner, 2008[N]). Developments in self-regulatory abilities enable adolescents to specify and pursue (abstract) longer-term goals than in childhood (Miller et al., 2020[N]). This longer-term future time perspective enables adolescents to prioritize large but delayed rewards, and indicates that long-term goal setting in adolescents is dependent on their ability to delay engagement with immediate rewards from other competing but lower-order goals (Bembenutty & Karabenick, 2004[N]; D. W. Murray et al., 2019[N]). For example, when adolescents become older, behaviors such as procrastination decline, probably because older adolescents increasingly adjust their behavior to future goals, even in the absence of an immediate reward (Steel, 2007[M]).

Generally, when children become older, their expectations about their own performances and abilities (self-efficacy beliefs) become more accurate (Gestsdottir & Lerner, 2008[N]; Massey et al., 2008[S]; Muenks et al., 2018[N]). In adolescence, these self-efficacy beliefs become more stable, and more differentiated, meaning that adolescents increasingly differentiate their self-efficacy in terms of ability, effort, and outcome. For example, adolescents understand that a large amount of training (effort) in combination with running fast (ability), will most likely enable them to score during matches (outcome). These insights impact adolescents' feelings of competency and their motivation to take part in goal-relevant activities (e.g., intense training; Muenks et al., 2018[N]). Adolescents are therefore increasingly guided by identified and integrated motivation.

Socialization of Goals and Motivation

Parents. Authoritative parenting styles with a balance between autonomy and control are also related to adolescents' successful goal-pursuit and realistic efficacy beliefs (Muenks et al., 2018[N]). Moreover, adolescents' educational and occupational goal endorsement is related to parental support, closeness, and parental involvement in and encouragement of learning, as well as to their parents having high aspirations for them or having high expectations for them achieving these goals (Massey et al., 2008[S]). However, too much emphasis on adolescents' success can result in achievement-related stress and depressive symptoms (Doan et al., 2022[N]). Parents can also provide adolescents with opportunities (e.g., going to museums or organizing extracurricular activities) to engage in domain-specific activities related to their goals (Muenks et al., 2018[N]). Similarly to endorsement and opportunity, goal prioritization is also highly dependent on sociodemographic factors, family values, and social context (Massey et al., 2008[S]).

Teachers. Teachers have an important impact on adolescents' goals and motivation in adolescence via their expectations about adolescent behaviors, active participation teaching, and their interactions with adolescents (Li et al., 2021[M]; Muenks et al., 2018[N]; Santhanasamy & Yunus, 2022[S]; Vandenbroucke et al., 2018[M]).

Peers. Peer influences are also visible in adolescent goal setting and motivation. Specifically, siblings affect adolescents' educational and occupational goal endorsement by demonstrating support, closeness, involvement in learning, encouragement, and interest, and by as well as to their siblings having high aspirations for them or having high expectations for them achieving these goals (Massey et al., 2008[S]). With regard to peer group norms, adolescents highly value belonging to a peer group. Consequently, peer group norms increasingly influence adolescents' goal priorities (Miller et al., 2020[N]). For instance, in peer groups that value high school achievement adolescents themselves have a higher motivation to get good grades (Muenks et al., 2018[N]). However, when peer norms foster deviant goals, such as gaining high status through criminal activities, being with these peers increases the likelihood of the adolescent pursuing these deviant goals (see Box B; Massey et al., 2008[S]).

[BOX B] Risky Behaviors in Adolescence

Interestingly enough, self-regulation tends to decrease in early adolescence (from ages 12 to 14) and then increases over the course of middle adolescence into adulthood (Atherton, 2020), which might be linked to goal prioritization and theories on risky behavior in adolescence. Many risky behaviors have their onset in adolescence, such as substance (ab)use, violence, vandalization, sexual risk taking (Noël, 2014; A. R. Smith et al., 2014), and delinquency (A. L. Murray et al., 2021). The neurobiological development associated with self-regulation plays an important role in the heightened risk taking of adolescents. One of the most often mentioned models to explain this is the dual systems model by Steinberg, which explains adolescents' heightened sensitivity to socioemotional cues through a maturational imbalance: there is heightened sensation seeking arising from a hyperactive reward system on the one hand, and a more slowly maturing <u>cognitive control</u> system on the other hand (A. L. Murray et al., 2021; Noël, 2014; A. R. Smith et al., 2014). The triadic model proposed by Ernst and colleagues adds a third dimension of a hyposensitive avoidance system and states that the <u>cognitive control</u> system is not sufficiently developed yet, which results in adolescents having trouble avoiding potentially harmful situations (Noël, 2014). Both models thus explain adolescents' risky behavior by the strong tendency to approach appetitive, rewarding situations that cannot yet be suppressed sufficiently by their deliberate <u>cognitive control</u> system (A. L. Murray et al., 2021; Noël, 2014; A. R. Smith et al., 2014).

Additionally, the Prototype Willingness Model explains why it may also be appealing for adolescents to behave in risky ways, which relates to their motivation and their goals (Gerrard et al., 2008). The image adolescents associate with certain behaviors (e.g., 'adolescents who smoke are cool') increases their motivation to behave similarly. When adolescents believe that risky behaviors will give them a desired image, and the perceived personal risk is low, they are more likely to engage in these behaviors (Gerrard et al., 2008). Consequently, the pursuit of goals that are directed to risky behaviors can, counterintuitively, also be indicative of successful self-regulation (Kopetz & Orehek, 2015). For example, if adolescents want to belong to a peer group, they can undertake risky behaviors (e.g., bullying, substance abuse, vandalization), if that contributes to their goal of group membership and comes from reasoned action. Altogether, developments in ability and goal-orientation together, make adolescents highly susceptible for carrying out risky behaviors.

DISCUSSION

An extensive body of empirical and theoretical work has demonstrated that self-regulation is an inherently social phenomenon (Bandura, 1991; Piaget, 1950; Vygotsky, 1986), and that—next to abilities—personally relevant goals and motivation are integral to self-regulation (Shenhav et al., 2013). Earlier work, however, has investigated these topics in isolation. In this meta-review, we synthesized 108 narrative reviews, 11 systematic reviews, and 18 meta-analyses on the socialization of self-regulation via self-regulatory abilities and via goals and motivation in typical development between infancy and adolescence (0–18 years). The review literature highlights continuity as well as age-related transitions in the abilities, goals, and motivation employed for self-regulation. Our results further demonstrate that proximal social agents such as parents, teachers, and peers rely on different behavioral repertoires to shape the development of self-regulation, with distinct behaviors influencing abilities separately from goals and motivation. We argue that socialization processes—via abilities, *and* via goals and motivation—are necessary for self-regulation to develop from being largely co-regulated by parents in infancy to being an independent, yet socially-calibrated process in adolescence involving multiple proximal agents. In the following, we synthesize our main findings based on the existing body of literature and discuss the theoretical and practical significance to research and practice.

Development and Socialization of Self-Regulatory Abilities

Increasing Complexity and Coordination among Self-regulatory Abilities
Our meta-review demonstrates two main developments of self-regulatory abilities occurring in the complexity of independent abilities and in the coordination across multiple abilities. The review literature showed that the gradual development of complex self-regulatory abilities is preceded and paralleled by developments in simple abilities. For instance, age-related improvements in executive functions (e.g., working memory, response inhibition, and set-shifting) are preceded and paralleled by developments in several endogenous attention control mechanisms. The review literature further revealed improved coordination across development among otherwise independent executive functions. For instance, although infants can perform successfully in simple inhibition procedures that require response inhibition, reliable performance in complex inhibition procedures that place higher working memory demands on top of response inhibition only becomes possible in toddlerhood and preschool. These findings are consistent with previous theoretical work arguing that improvements in the complexity and coordination of executive functions enable children to solve more complex self-regulation problems, such as dealing with novel, motivationally-laden contextual demands (e.g., Case et al., 1988; Chevalier et al., 2015; Diamond, 2013; Fischer & Rose, 1994; Garon et al., 2008, 2014; Kopp, 1982; Zelazo et al., 2003).

When making the distinction between reactive and proactive control processes and metacognitive strategies, two insights emerged. First, the earliest proactive use of

executive functions and metacognitive strategies reviewed appear to be predominantly language-based. For example, in toddlerhood working memory capacity is facilitated through rehearsal or verbally requesting emotional comforting and in preschool, working memory capacity is facilitated through self-directed speech. This is consistent with the idea of early language acquisition supporting executive functioning development (Kuvalja et al., 2013; Zelazo & Frye, 1998; Zelazo et al., 2003). Second, in contrast to reactive control processes, proactive control processes and metacognitive strategies involve the active maintenance of personal goals and contextual demands (Aron et al., 2011; Chevalier et al., 2015). Proactive control processes and metacognitive strategies became the predominant focus of review from childhood onward.

Distinctive Roles of Parents, Teachers, and Peers in Socializing Self-regulatory Abilities

Our meta-review clearly demonstrates that the development of self-regulatory abilities is an inherently social process, characterized by developmental transitions in the relative importance of different proximal social agents. In infancy, most reviews focused on the role of parents, whereas the roles of teachers and peers received increasing attention with children's school age and even more so in adolescence. Throughout development, parents broaden their own behavioral repertoire with increasingly more complex co-regulation strategies—from soothing and distraction techniques for regulating infant distress to modeling and emotion-based language in childhood and adolescence (D. W. Murray et al., 2019; Zimmer-Gembeck et al., 2022). Next to parenting styles such as authoritative parenting and autonomy support, a secure child-parent attachment relationship has been consistently positively related to self-regulatory abilities throughout development.

Similar to parents, teachers can influence self-regulatory abilities by expressing support and approval towards students, but also by offering structured classroom activities that support the practice of abilities such as self-talk or behavioral monitoring. Although only one review has covered peer influences in infancy, preliminary evidence suggests that peers provide contextual opportunities for practicing self-regulation already in the first year of life (Pahigiannis & Glos, 2020). Whereas infants show sensitivity to peer behavior by engaging in emotion regulation in response to peer distress, toddlers and preschoolers engage in interactive play, during which conflict situations offer opportunities for practicing emotion regulation and rule-based games foster behavioral regulation. The frequency of peer socialization increases throughout childhood and gradually expands to more contexts and peers that are self-selected—with close friends and romantic partners serving as a model for adolescents' own self-regulation.

Development and Socialization of Goals and Motivation

From Immediate to Long-term Goals, From Extrinsic to Intrinsic Motivation

Our meta-review demonstrates that infants and toddlers mostly focus on short-term goals concerning the self (e.g., regulating physiological states), the immediate environment (e.g., seeking proximity to the caregiver), and gaining autonomy in relation to their

immediate environment. With age, children expand their set of personally relevant goals and gradually learn to balance among competing goals (e.g., academic performance, social relationships). Furthermore, goals become more diverse and abstract, and span to the more distant future. From childhood onward, the motivation to self-regulate becomes more intentional, driven by self-efficacy beliefs and a shift from external to more internal forms of motivation to pursue personally valued goals. For instance, goals such as academic achievement that have been extrinsically motivated by parents may eventually gain personal significance and thereby become intrinsic. These findings are in line with the idea of a gradual development from extrinsic to intrinsic goals and motivation proposed by self-determination theory (Deci & Ryan, 2000). The development of goals and motivation also largely aligns with salient issues to be tackled in different developmental periods, such as forming effective attachment relationships and increasing autonomy (infancy and toddlerhood), the balancing of school and emerging social life, and developing identity (childhood and adolescence; Sroufe, 2016).

Distinctive Roles of Parents, Teachers, and Peers in the Socialization of Goals and Motivation

Whereas social influences on goals and motivation have been described separately from those on abilities in childhood and adolescence, review work that explicitly specifies social influences on goals and motivation is missing for earlier developmental periods. Thus, our discussion focuses on the existing review work from childhood onward, although we assume that the socialization of goals and motivation is also separable from the socialization of abilities earlier in life.

In childhood and adolescence, the roles of parents, teachers, and peers have been mostly reviewed in the contexts of education and social relationships. Whereas parents influence their child's motivation to engage in school through praising effort and learning, providing support, and being involved in learning, teachers can promote goal-setting and motivation by encouraging classroom engagement, productive work habits and persistence in challenging activities. The influence of peers on goals and motivation strengthens between childhood and adolescence. For example, social comparisons and feedback from peers motivate children, and even more so—adolescents—to pursue goals that are likely to elicit peer approval. Peer norms can then provide information on how desired goals can be achieved in different peer contexts. Thus, parents, teachers, and peers together influence academic and social goals, and the motivation to pursue these goals in childhood and adolescence.

Future Directions in Self-regulation Research

Underrepresented Topics in Self-Regulation Review Work

A strength of the meta-review approach used in this work is that it allows us to identify underrepresented topics warranting further research, which we outline below. Figure 3 summarizes the review papers per developmental period, demonstrating an imbalance

regarding the type of review work and topics studied. It is possible that some of these gaps have already been addressed in isolated empirical work; nevertheless, our meta-review shows that a more comprehensive and reliable evidence synthesis is missing.

A general issue that becomes apparent from Figure 3 is that the majority of the reviews on self-regulation are narrative—out of 136 reviews, only 11 were systematic reviews and 18 were meta-analyses. Narrative reviews provide selective, up-to-date, qualitative analyses of focused topics, which involves the critical discussion of theory, expert intuition and experience (Furley & Goldschmied, 2021). Systematic reviews, on the other hand, are necessary to deliver an unbiased literature overview that serves for meta-analyses—the primary method for assessing the robustness of scientific findings (Pae, 2015). Our results highlight that future systematic synthesis is needed to aggregate and quantify empirical findings on the development and socialization of self-regulation. Furthermore, quality assessment methods for evaluating evidence strength in systematic meta-reviews are available in the medical science context (e.g., GRADE Working Group, 2004), and their further adaptation to the context of developmental research would be an important future endeavor. To this end, however, quality assessments of the primary research papers should first become a standard practice in both qualitative as well as quantitative developmental reviews (e.g., using mixed methods appraisal tools such as Harrison et al., 2021; Hong et al., 2018; Pluye et al., 2011).

Although commonly used definitions of self-regulation conceptualize personally-valued goals and motivation as prerequisites for using self-regulatory abilities, disproportionately few reviews have focused on the development and socialization of self-regulatory goals and motivation as opposed to self-regulatory abilities (Figure 3). This knowledge gap was particularly evident in reviews focusing on infancy to preschool, perhaps largely due to the methodological challenges (discussed in the following section). Furthermore, review work on the socialization of self-regulation focused mostly on the role of parents in the early life stages, whereas promising evidence from one narrative review (Pahigiannis & Glos, 2020) highlighted that infants and toddlers are able to learn emotion regulation also through peer interactions. Taken together, the development and socialization of goals and motivation and the influence of peers on self-regulation in the early stages of life remain important avenues for future (review) studies.

Finally, despite strong theoretical motivations (e.g., Smith & Thelen, 2003; Van Der Maas et al., 2006; Van Geert, 2009), we encountered limited review work assessing reciprocal relationships between self-regulatory abilities, goals, motivation, and the social agents and processes involved. To encourage future expansions of our conceptual framework, we have summarized the evidence regarding reciprocal interactions between social agents and children's self-regulation in Box C. Future work can expand our conceptual model by assessing feedback loops between abilities, goals, and motivation. For example, goals and motivation may influence what children learn from the activities they engage in, and may thereby affect the development of specific abilities (Sophian, 1997). Conversely, children may be more motivated to pursue goals when they believe they can accomplish those goals (Deci & Ryan, 2000). Such belief in their own ability to achieve success supports

their sense of competence, which, according to the Self determination theory, is an innate psychological need to feel capable and effective in one's actions. When children perceive themselves as competent, it fosters intrinsic motivation and enhances their engagement and persistence in goal pursuit (Deci & Ryan, 2000). Likely, the abilities pathway and the goals and motivation pathway do not operate independently; rather, they work together to shape self-regulation over time.

[BOX C] Reciprocal Interactions between Socialization Processes and Children's Self-Regulation

> Although the primary focus of this meta-review is on the socialization processes involved in the development of self-regulatory abilities, goals, and motivation, various studies show that self-regulation develops through continuous, reciprocal interactions with the social environment. Several reviews synthesized empirical work on reciprocal relations between child-specific characteristics and parental (Hendry et al., 2016; Kiff et al., 2011; Kiss et al., 2014; Masek et al., 2021; Samdan et al., 2020) and peer behaviors (Coplan & Bullock, 2012; Farley & Kim-Spoon, 2014). For instance, greater levels of frustration, impulsivity, irritability, and less advanced effortful control skills during childhood and adolescence were found more likely to elicit negative parenting behaviors such as anger, intrusiveness and hostility that in turn further reinforce these child-specific temperamental characteristics (Kiff et al., 2011). Moreover, poorer self-regulatory abilities in adolescence have been associated with poorer parent-child relationship quality (Farley & Kim-Spoon, 2014). Reciprocal interactions between peers and children's self-regulation abilities are further reported during childhood and adolescence (Coplan & Bullock, 2012). Children with more advanced self-regulation skills were shown to behave more socially competent, which was positively associated with the quality and quantity of peer relationships (Coplan & Bullock, 2012; Farley & Kim-Spoon, 2014). This association was also found for romantic relationships, as adolescents' behavioral and emotional self-regulation abilities may promote romantic relationship quality (Farley & Kim-Spoon, 2014). However, peers may also promote antisocial behavior such as bullying and aggression reciprocally (Dishion & Tipsord, 2011). In the school setting, students who were shown to be low in effortful control were more likely to form a negative student-teacher relationship that could in turn lead to less positive feedback and instruction (Eisenberg, Valiente, & Eggum, 2010).

Improving Terminological Consistency and Measurement in Self-Regulation Research
This meta-review focused on including and analyzing a large pool of diverse information sources based on a broad literature search on self-regulation and related constructs. As a consequence, we encountered variations in definitions, measures, methodologies, and conceptual scope in the primary source reviews. Systematizing and aggregating these detailed and heterogeneous information sources along the components of our conceptual framework (i.e., self-regulatory ability, goals and/or motivation, or the influence of social agents) allowed us to identify global developmental patterns that persisted across the fine-grained, specific developments in the processes underlying self-regulation. Nevertheless, it is important to emphasize that the depth of the evidence synthesis in a meta-review

will depend on the evidence detail and quality assessment provided in the primary source reviews (and the primary source empirical work underneath). Below we discuss recommendations for several recurring issues in self-regulation literature that hamper future meta-review work with a more fine-grained in-depth focus.

Similarly to previous work (Eisenberg et al., 2019; Nigg, 2017; Zhou et al., 2012), we encountered terminological inconsistencies in the self-regulation literature. Terminological inconsistencies are problematic for tracing specific self-regulation developments in review papers because the lack of development and/or empirical work on specific self-regulatory developments can be confounded with the failure to retrieve relevant empirical work that uses different terminology. Thus, further work attempting to bridge terminology that targets the same underlying construct between studies and disciplines is required (e.g., Nigg, 2017; Zhou et al., 2012).

Another obstacle to deriving conclusions about self-regulation development from review literature is that some studies lack an explicit operationalization of the aspect of self-regulation that is being measured and the concrete developmental timing under consideration. For example, review work repeatedly mentioned developments in efficacy beliefs between childhood and adolescence, but the respects in which efficacy beliefs changed at specific ages were not specified. Although such specificity might be lacking partly due to the coarseness of operationalizations and measures employed in the empirical work underlying the reviews, this level of descriptiveness is required to specifically pinpoint developments of constructs within developmental stages.

At the same time, the exact manifestations of self-regulation changes between infancy and adolescence (*heterotypic continuity*, Cicchetti & Rogosch, 2002), which in turn requires age-appropriate measures to validly capture the construct. To interpret findings from a developmental perspective, continuous evidence and theory-based updating of age-specific operational definitions and measures (as done in I. T. Petersen et al., 2016) are important preconditions. Only then, we can interpret whether age-related changes observed in the construct of interest are due to true differences in the underlying construct rather than due to differences at the measurement level (i.e., lack of measurement invariance; Grouzet et al., 2006). To stimulate further work aimed at systematically analyzing developmental trends in self-regulation processes as a function of operationalization and measurement methods (in similar vein to Friedman & Gustavson, 2022; I. T. Petersen et al., 2016), all data on self-regulation definitions and self-regulation measures extracted for this meta-review are accessible on OSF: https://osf.io/zmcth?view_only=309bd9845d354b88968c57c48e2d9e62.

Finally, our meta-review stresses that goals and motivation are important factors that determine whether children intend to use abilities for self-regulation in the first place—however, these factors are often neglected in self-regulation studies. For the infancy and preschool periods, methodological challenges involved in quantifying goals and motivation from non-verbal responses could in part explain the lack of reviews on goals and motivation. Therefore, more scientific attention should be devoted to the development of methods that directly measure age-relevant goals and motivation, specifically in the

context of self-regulation. Our review provides a starting point for experimental work by outlining the type of goals that have been seen as relevant in the context of self-regulation throughout the first years of life. Only when children are fully motivated, can we observe their true abilities to self-regulate. To this end, future studies could experimentally manipulate task rules or circumstances to activate age-relevant goals and motivation to a varying extent (e.g., an experimental task in which toddler autonomy is manipulated; see Dovis et al., 2012 for an example on adolescents). Nevertheless, future review work should still be mindful of cultural or contextual factors that might influence what constitutes adaptive self-regulation (further discussed in Box D).

[BOX D] What Constitutes Adaptive Self-Regulation?

Although we primarily focused on typical development without consideration of cultural or contextual variability, what is considered as adaptive self-regulation can be relative to the broader social context. More specifically, whether specific self-regulatory abilities are (evolutionarily) adaptive or beneficial depends to a large extent on the living context (see 'fast life history perspective'; Belsky et al., 1991; Dishion & Véronneau, 2012; Fenneman & Frankenhuis, 2020). For instance, in classical experiments designed to measure self-regulation (e.g., the Marshmallow task), better delay of gratification has been interpreted as indicating high self-regulatory abilities (Mischel, 2014; Mischel et al., 1989; Shoda et al., 1990). However, in more volatile environments (e.g., poverty, violence, unreliability), foregoing an immediate reward might not be an adaptive survival strategy (Fenneman & Frankenhuis, 2020; Kidd et al., 2013). Moreover, risky behavior in adolescence might be an adaptive response in circumstances that benefit social status and reproductive strategies (Ellis et al., 2012). Scholars have further argued that risk taking can maximize positive group outcomes, thereby having beneficial effects for society as a whole (Williams & Taylor, 2006). Thus, a broader perspective on what constitutes adaptive self-regulation seems an important avenue for future (meta-)review work.

Practical Implications for Interventions

Based on our results on how social agents can influence the development of self-regulation, we can provide implications for current and future interventions. First, this meta-review emphasizes the importance of incorporating social agents in interventions targeting self-regulatory abilities (see also D. W. Murray et al., 2019). Currently, there are several interventions that specifically target parents in infancy and toddlerhood (e.g., Feinberg et al., 2009; Morawska et al., 2019), and childhood and adolescence (e.g., Sanders et al., 2013). To a lesser extent, similar interventions also target teachers (e.g., Boekaerts & Como, 2005; Razza et al., 2015) and peers (e.g., Vandevelde et al., 2017), which could be particularly beneficial in childhood and adolescence. To improve possibilities for the use of these kinds of interventions in practice, we encourage future research to develop and test more self-regulatory interventions that specifically target social agents.

Second, by giving insight into the mechanisms behind social influences on self-regulation, our meta-review may be used to improve current interventions or to develop

new interventions. For instance, social agents can improve children's self-regulatory abilities by modeling more advanced self-regulatory strategies that are beyond the child's abilities. An intervention approach could be to train these social agents in how to most effectively model good self-regulated behavior (Sanders et al., 2013; Duffy et al., 2020) in order to optimize modeling effects on self-regulatory abilities.

Third, the fact that social agents can influence self-regulation via goals and motivation opens avenues for interventions. An example of how this can be done is the Roots intervention (Paluck et al., 2016). In this intervention, a group of adolescents convey new norms of desired behavior in schools by spreading posters, hashtags, having a 'Roots day', and by rewarding positive behaviors. By setting the stage for what is desired behavior in these schools, this intervention was able to reduce conflicts by 25% (Paluck et al., 2016).In this way, social agents can stimulate healthy behavior by creating healthy and prosocial behavior norms, by trying to enhance goals that prioritize healthy behavior, and by maximizing motivation to pursue these goals.

CONCLUSION

Our meta-review demonstrates the importance of adopting an integrative view on self-regulatory abilities, goals, and motivation—and how they are shaped by socialization processes—to understand the long-term development of self-regulation. In line with our developmental differentiation between abilities and goals and motivation, our meta-review identified two socialization pathways on self-regulation: 1) via the *ability pathway* through which social agents influence improvements in the cognitive and emotional skills children employ to self-regulate, and 2) via the *goals and motivation pathway* through which social agents are involved in shaping the motivation for enacting self-regulation. Our findings indicate that self-regulation development is driven by the interplay between abilities, goals, and motivation, which are shaped by social agents. Together, the two socialization pathways allow self-regulation to develop from being largely co-regulated in infancy primarily by parents to an independent, yet socially-calibrated process in adolescence involving multiple proximal agents. This meta-review features a valuable first step to identify the development of self-regulation as a multi-facetted, inherently social process.

SECTION 2

CHAPTER 3

Social Goals and Gains of Adolescent Bullying and Aggression:
A Meta-Analysis

ABSTRACT

There is a long-standing debate on the goals that underlie adolescent socially coercive behaviors, such as bullying, relational aggression, and instrumental aggression. Knowledge about these goals is critical for the development of effective interventions. Bridging evolutionary and social-cognitive perspectives, we propose and substantiate a Social Goals and Gains Model of Adolescent Bullying and Aggression. The model holds that adolescents who hold agentic goals (i.e., getting ahead of others), rather than communal goals (i.e., getting along with others), engage in more bullying and aggression. Engaging in bullying and aggression, in turn, may lead adolescents to gain popularity but lose likeability. To substantiate this model, we meta-analyzed data of 164,143 adolescents (age range: 8–20 years), from 148 independent samples, with Meta-Analytic Structural Equation Modeling (MASEM). Our results both support and refine our model. As hypothesized, adolescents' agentic goals were associated with higher levels of bullying and aggression. Bullying and aggression, in turn, were associated with higher popularity but lower likeability. However, there was no significant association between adolescents' communal goals and bullying or aggression. These findings suggest that socially coercive behaviors, such as bullying and aggression, can be fueled by agentic goals and potentially lead to gains in popularity but losses in likeability. This suggests that intervention programs could reduce bullying and aggression by changing the means through which adolescents pursue agentic goals.

Keywords: agency, bullying, aggression, likeability, popularity, MASEM

INTRODUCTION

Seneca has argued that "all cruelty springs from weakness" (c. 4 BCE-CE 65; Seneca & Grimal, 1969). Following Seneca's perspective, traditional views characterize socially coercive behaviors as maladaptive behaviors that are carried out by children who lack social skills (e.g., Garner & Hinton, 2010; Grigsby & Stevens, 2000; Zelazo et al., 1997). However, from the perspective of evolutionary and social-cognitive theories, socially coercive behaviors can be seen as strategic, goal-directed behaviors carried out by children who possess refined social skills (e.g., Volk et al., 2015; Volk, Dane et al., 2022). Challenging traditional views and extending evolutionary and social-cognitive perspectives, we argue that socially coercive behaviors do not always spring from weakness but can also be strategic behaviors that serve the goal of getting ahead of others. Here, we propose and substantiate a Social Goals and Gains Model of Adolescent Bullying and Aggression. Doing so, we extend existing perspectives that underline the adaptiveness of these behaviors (e.g., Hawley, 1999; Ojanen et al., 2005; Volk et al., 2015; Volk, Dane et al., 2022). Specifically, we propose that adolescents are more likely to engage in bullying and aggression to the extent that they hold agentic goals (i.e., getting ahead of others) rather than communal goals (i.e., getting along with others). Such bullying and aggression, in turn, may lead adolescents to gain popularity but lose likeability. In this article, we report a meta-analysis to test and refine our model.

Socially Coercive Behaviors in Adolescence

We focus broadly on adolescents' socially coercive behaviors, which are often aggressive (Hawley, 2014a). Aggression is defined as any behavior characterized by an intention to inflict harm on others (Archer & Coyne, 2005). We focus on forms of aggression that can serve specific social goals, more than just to harm another person. These forms of aggression are often premeditated, instrumental, and "cold-blooded," as opposed to impulsive, reactive, and "hot-headed" (Archer & Coyne, 2005). We identify three such forms of aggression: bullying, instrumental aggression, and relational aggression. *Bullying* refers to aggressive behavior that is intentional, occurs repeatedly, and is directed toward individuals that cannot easily defend themselves (Olweus, 1992). *Instrumental aggression* refers to goal-directed, pro-active aggression aimed at obtaining certain objects, territories, or privileges (Hartup, 1974). *Relational aggression* refers to aggression that involves using others, spreading rumors, gossiping, and excluding others from the group or ignoring them (Archer & Coyne, 2005). By studying these related but distinct forms of aggression, our meta-analysis has a broad scope and will be able to demonstrate the broad applicability of the Social Goals and Gains Model. If this model explains bullying, instrumental aggression, and relational aggression (rather than just one of these behaviors), it has broad theoretical and applied implications.

It is critical to gain more insight into the underlying mechanisms of adolescent bullying and aggression (Berger, 2007). Being a victim of bullying can lead to long-term negative outcomes in health, financial, behavioral, and social domains (Wolke et al., 2013).

Additionally, bullying and aggression do not only harm victims but also put perpetrators at risk for psychosomatic problems (Gini & Pozzoli, 2009), delinquency (Card & Little, 2006), alcohol use, weapon carrying (Nansel et al., 2004), as well as suicidal ideation and suicide attempts (Holt et al., 2015; Van Geel et al., 2014). The effects of engaging in bullying and aggression are measurable well into adulthood (e.g., Bender & Lösel, 2011; Copeland et al., 2014; Sigurdson et al., 2015). Despite the harmful consequences of bullying and aggression, interventions to reduce these behaviors are often of limited effectiveness, especially in adolescence (Yeager et al., 2015), partly because there is little attention for the goals that drive adolescent bullying and aggression.

Why do Adolescents Bully or Aggress Against Others?
Traditionally, bullying and aggression have been viewed as maladaptive behaviors that stem from functional deficits or inabilities within an individual. According to the problem-solving framework (Zelazo et al., 1997), aggressive behaviors arise from deficits in executive functioning such as planning, execution, and evaluation. Likewise, it has been argued that bullying arises from deficits in frontal lobe functioning (Grigsby & Stevens, 2000), which hinders following directions and inhibiting aggressive behaviors. These frameworks have been supported by empirical studies. For example, previous studies indicate that adolescents who engage in bullying or aggression lack the skills to cope with situations in a prosocial way due to inaccurate or limited social information processing (Randall, 1997; Ziv et al., 2013), have a hostile attribution style (Steinberg & Dodge, 1983), or poor emotion regulation skills (Garner & Hinton, 2010; Olweus, 1993; Pakaslahti, 2000) such as inhibition problems (Verlinden et al., 2014).

Although this deficit perspective is supported by empirical evidence and has provided important insights into the causes of bullying and aggression, it fails to account for the fact that bullying and aggression can also be goal-directed. Resource control theory (Hawley, 1999) proposes that people are routinely exposed to challenging environments, in which they adapt their behavior to attain their evolutionarily relevant goals. Human's overarching evolution goals are survival and reproduction, which might be more easily obtained when one has certain resources such as status and power. Notably, resource control theory holds that bullying and aggression are often driven by the goal to obtain social resources (e.g., popularity). Such resources are limited and inspire competition (Darwin, 1859). One way to attain these resources is being cooperative, yet another powerful way to attain resources is being socially dominant, which includes social coercion, such as aggression (Hawley, 1999). Using both strategies (and shifting flexibly between them) might be a particularly effective manner to acquire resources (Farrell & Dane, 2020; Hawley, 1999). It was long believed that bullying does not bring social benefits because it is often targeted at lower-ranked individuals. Yet, recent research shows that bullying can give access to social resources, such as popularity, even if the bullying is targeted at lower-ranked individuals (Reijntjes et al., 2018; Volk, Andrews et al., 2022). Volk and colleagues complemented resource control theory by arguing that bullying has an evolutionary basis: it serves evolutionarily relevant somatic, sexual, and dominance goals and is heritable (Volk et al., 2012; Volk, Dane et al.,

2022). Although being liked and having friendships also contribute to reproductive success and health, under some circumstances, adolescents will pursue popularity and dominance, even if this means losing likeability, because this will give them access to resources such as food, influence over others, or dating opportunities (Volk et al., 2012; Volk, Dane et al., 2022). Indeed, adolescents who bully may value popularity over likeability, or believe that they are disliked anyway (Garandeau & Lansu, 2019). Thus, the gains of bullying and aggression may outweigh their costs (Volk et al., 2014).

Empirical studies underscore the adaptiveness of bullying and aggression. Children who are coercive seem to gain social skills, material success, and social attractiveness, indicating that other children would like to be affiliated with them (Hawley, 2014a). These resources are especially important during adolescence, when testosterone increases may lead to a higher need for social admiration and status (Blakemore et al., 2010; Cardoos et al., 2017) and social cognition develops rapidly (Blakemore & Choudhury, 2006; Caravita & Cillessen, 2012). Other studies show that adolescents who engage in bullying or aggression often have more resources, such as social dominance (Reijntjes et al., 2013a) and more sexual opportunities (Volk et al., 2015). Dominance and prestige are two distinct pathways to achieve social status (Cheng et al., 2013; Henrich & Gil-White, 2001; Maner & Case, 2016), and it is possible that adolescents who engage in bullying and aggression display more dominance (e.g., using force, threats, compulsion) than prestige (e.g., excelling, being skilled, using persuasion). Although resource control theory explains why and how bullying and aggression can yield social rewards, it does not fully capture why some adolescents are more likely to engage in these behaviors than others.

Social information processing models (Crick & Dodge, 1994; Dodge & Crick, 1990) propose that aggression can be explained by individual differences in the processing of social information. Although this model suggests that impairments in individual functioning may contribute to antisocial behavior, it also emphasizes the role of individual response decisions based on differences in social goals (Crick & Dodge, 1994; Dodge & Crick, 1990). More specifically, social information processing models suggest that adolescents who are aggressive may value instrumental goals over relational goals (Crick & Dodge, 1996). Adolescents who prioritize obtaining status and popularity (i.e., agency) may be more likely to be aggressive, whereas adolescents who prioritize obtaining affiliation and being liked (i.e., communion) may not partake in these behaviors. Prior research suggests that adolescents who refrain from aggression tend to prioritize communion and might feel less need to pursue popularity, possibly because they receive fewer cues that motivate them to pursue agency now at the cost of communion later (Volk et al., 2012). Adolescents with stronger agentic goals tend to be more aggressive (e.g., Ojanen et al., 2005; Sijtsema et al., 2009), and some adolescents who are aggressive might be capable to identify the social dynamics of the group rather well (e.g., Salmivalli et al., 2000). This is reflected in classrooms with strong inequalities in social status, in which adolescents with higher social dominance goals are more likely to use aggression to gain their position on the social ladder (Pan et al., 2020). From this perspective, adolescents who use aggression need to use various self-regulatory processes (such as inhibition of other goals or long-term planning)

to attain their goals (Baumeister & Vonasch, 2015; Kopetz & Orehek, 2015). Some bullying and aggression might thus best be defined as goal-directed behaviors, reflecting skillful social and emotional functioning (Sutton et al., 1999).

Bullying and aggression have been linked with the endorsement of various goals, including dominance, status, resources or rewards, revenge, justice, belonging, romance or dating benefits, identity, well-being, and entertainment or recreation (Farrell & Vaillancourt, 2019; Runions et al., 2018; Sanders et al., 2021). It has also been proposed that bullying can be evoked by a desire for material resources (e.g., food; Volk et al., 2012), which might be particularly important for adolescents who are financially deprived. Of these goals, goals that relate to social standing are most often represented in the empirical literature on adolescence (i.e., dominance, status, and belonging; Sanders et al., 2021). These goals gain importance in adolescence. Even though there might be other (non-social) goals that play an important role in bullying and aggression, social goals seem to gain the most attention in adolescence and are the focus of current empirical research. This allows us to only meta-analyze the social goals of bullying and aggression—while we do acknowledge the potential role that somatic and reproductive goals can play in adolescent bullying and aggression.

An Integrative Model: Social Goals and Gains of Adolescent Bullying and Aggression

We propose a new model of adolescent bullying and aggression by bridging resource control and social information process theories while zooming in on the social goals and gains of adolescent bullying and aggression. Our Social Goals and Gains Model of Adolescent Bullying and Aggression (Figure 1) combines theories on how bullying and aggression relate to the two fundamental dimensions of agency and communion (social goals) with the dual components of social competence (social gains). We argue that adolescents make a conscious or unconscious cost-benefit analysis (Volk et al., 2012; Volk et al., 2014; Volk, Dane et al., 2022). For some adolescents, the potential gains of bullying and aggression outweigh their potential costs (Garandeau & Lansu, 2019; Volk et al., 2012; Volk, Dane et al., 2022). We predict that some adolescents prioritize agentic goals, which makes them more inclined to show bullying and aggression, which, in turn, makes them more popular among their peers. Other adolescents prioritize communal goals, which makes them less inclined to show bullying and aggression, which, in turn, makes them better liked by their peers.
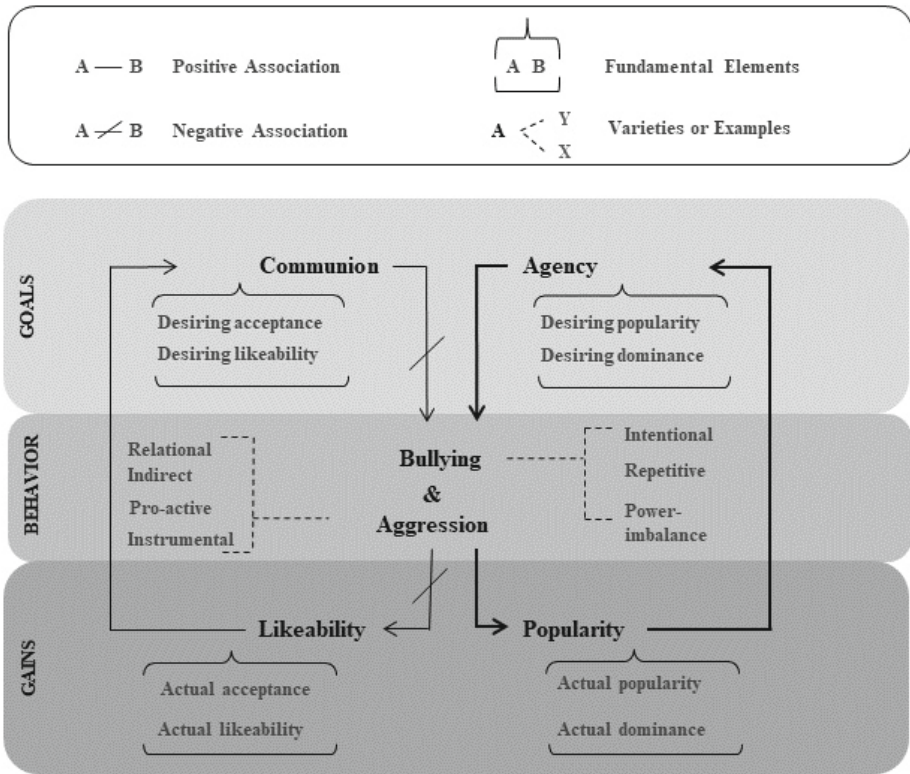
Figure 1. *The Social Goals and Gains Model of Adolescent Bullying and Aggression*

First, our model identifies social goals that underlie bullying and aggression. We separate goals to get ahead of others (i.e., agentic goals) from goals to get along with others (i.e., communal goals; Abele & Wojciszke, 2014; Hogan & Hogan, 1991). These two dimensions are related to two core challenges that adolescents face: the challenge to acquire status and to feel competent (i.e., agency) and the challenge to form intimate, social connections with others (i.e., communion; Ybarra et al., 2008). Adolescents with agentic goals pursue influence and uniqueness, which is related to being popular among their peers (Abele & Wojciszke, 2014). Adolescents with communal goals pursue intimacy, bonding, socializing, and love, which is related to being liked by their peers (Abele & Wojciszke, 2014). Our model holds that (a) agentic goals encourage adolescents to engage in bullying and aggression, because these behaviors help secure popularity, even though coming at a cost of likeability; and (b) communal goals discourage adolescents from engaging in bullying and aggression because these behaviors come at a cost of likeability.

Second, our model identifies the social consequences of bullying and aggression. Communal and agentic goals are differentially linked to social outcomes; people showing agency are generally more popular, whereas people showing communion are generally

better liked (Wojciszke et al., 2009). Popularity and likeability are defined as separate constructs (Cillessen & Marks, 2011; van den Berg et al., 2020) and are grounded in the dual-component model of social competence (Cillessen, 2008). Popularity is often defined as perceived popularity (i.e., a reputation of being popular or of high rank), and likeability is often defined as sociometric popularity (i.e., being accepted and liked). Although popularity and likeability are positively related in early adolescence, this relation weakens with age, which shows that they are distinct forms of status (Van den Berg et al., 2020). Adolescents who are argumentative, coercive, forceful, and manipulative are usually more popular (Cillessen, 2008). Adolescents who are generally more prosocial and cooperative are usually better liked (Cillessen, 2008). Accordingly, our model holds that engaging in bullying and aggression leads to gains in terms of popularity but losses in terms of likeability.

The Social Goals and Gains Model is consistent with the nature of adolescent development. The instrumental value of bullying and aggression might be amplified in high school contexts in comparison to primary- or college students because the peer context and social admiration are extremely important in adolescence (Rodman et al., 2017; Steinberg, 2017; Steinberg & Morris, 2001; van den Bos, 2013; Yeager et al., 2018) and bullying and aggression, therefore, happen more often and on a larger scale (Volk et al., 2016). Adolescents experience a period of rapid growth and heightened susceptibility to social evaluation, which might be linked to hormone-specific developments such as increases in the secretion of adrenal androgens, gonadal steroids, and growth hormone (Crone & Dahl, 2012; Dahl et al., 2018). In their daily lives, adolescents care deeply about how they are evaluated by others (Steinberg, 2017; Steinberg & Morris, 2001; van den Bos, 2013; Yeager et al., 2018), and peer evaluations are of great importance in adolescence (Rodman et al., 2017). However, our model might be especially relevant in early adolescence (12–14 years). First, at this age, agentic goals become increasingly salient. For example, early adolescents prioritize agency more than younger children and older adolescents (LaFontana & Cillessen, 2010). Second, at this age, agentic goals become more strongly linked to popularity, whereas communal goals become more strongly linked to likeability (Caravita & Cillessen, 2012). Third, especially in early adolescence, bullying and aggression might be considered adaptive ways to achieve agentic goals. For example, in early adolescence, bullying is more strongly related to popularity than in other age groups (Caravita & Cillessen, 2012).

The Current Meta-Analysis

The aim of this meta-analysis was to substantiate and refine our Social Goals and Gains Model of Adolescent Bullying and Aggression. We synthesized both correlational and longitudinal empirical studies that focus on the association between social goals (i.e., agency and communion), socially coercive behavior (i.e., bullying, instrumental aggression, and relational aggression), and social outcomes (i.e., popularity and likeability). First, we hypothesized that agentic goals are positively associated with adolescent bullying and aggression, and that communal goals are negatively associated with bullying and

aggression. Second, we hypothesized that adolescent bullying and aggression are positively associated with popularity and negatively associated with likeability. Third, and importantly, we hypothesized that bullying and aggression mediate the association between agentic goals and increased popularity, providing direct evidence for the view that bullying and aggression are goal-directed behaviors that are linked with social gains. Fourth, we hypothesized that reduced bullying and aggression mediates the association between communal goals and increased likeability, providing evidence for the view that prioritizing being liked and the prospect of being liked, buffers adolescents from aggressing towards others. We also hypothesized that associations are stronger in early adolescence than in middle and late adolescence.

Our meta-analysis substantially extends existing research. Existing meta-analyses have examined associations of social goals with bullying (Samson et al., 2022) and aggression (Samson et al., 2012) or associations of bullying with social status (Wiertsema et al., 2022). However, these meta-analyses are unable to substantiate our Social Goals and Gains Model of Adolescent Bullying and Aggression, because they examined bullying and aggression in isolation and did not examine the mediating role of bullying and aggression in a full conceptual model linking social goals to social gains. Thus, we extended existing meta-analyses in two important ways. First, we developed and tested a full conceptual model—from social goals to social status through bullying and aggression. We did so using Meta-Analytic Structural Equation Modeling (MASEM), a novel technique that enables researchers to test a mediation model based on data from previous studies that did not necessarily test the same mediation model (Jak, 2015; for an example of application of MASEM see van Dijk et al., 2020). Second, we tested whether and how the conceptual model differed between bullying and aggression. Doing so, we bridge two literatures that often remain separate. If bullying and aggression have similar antecedents and consequences, this could help finetune existing interventions to target both socially coercive behaviors simultaneously. By taking these steps, we provide a comprehensive empirical test of our Social Goals and Gains Model of Adolescent Bullying and Aggression.

METHOD

Literature Search

We searched three databases (PsycInfo, ERIC, Web of Science) until June 2022 for articles that focused on the relationship between bullying and aggression and social goals (e.g., communal, agentic, popularity goals) or between bullying and aggression and social outcomes (e.g., acceptance, likeability, popularity, dominance) in adolescence. An overview of all search strings is included in supplemental materials (S1). We then included other eligible articles that we found by scanning reference lists and via personal contact with scholars in the field of adolescent bullying research. Figure 2 presents the number of articles that were retrieved from the different search methods.
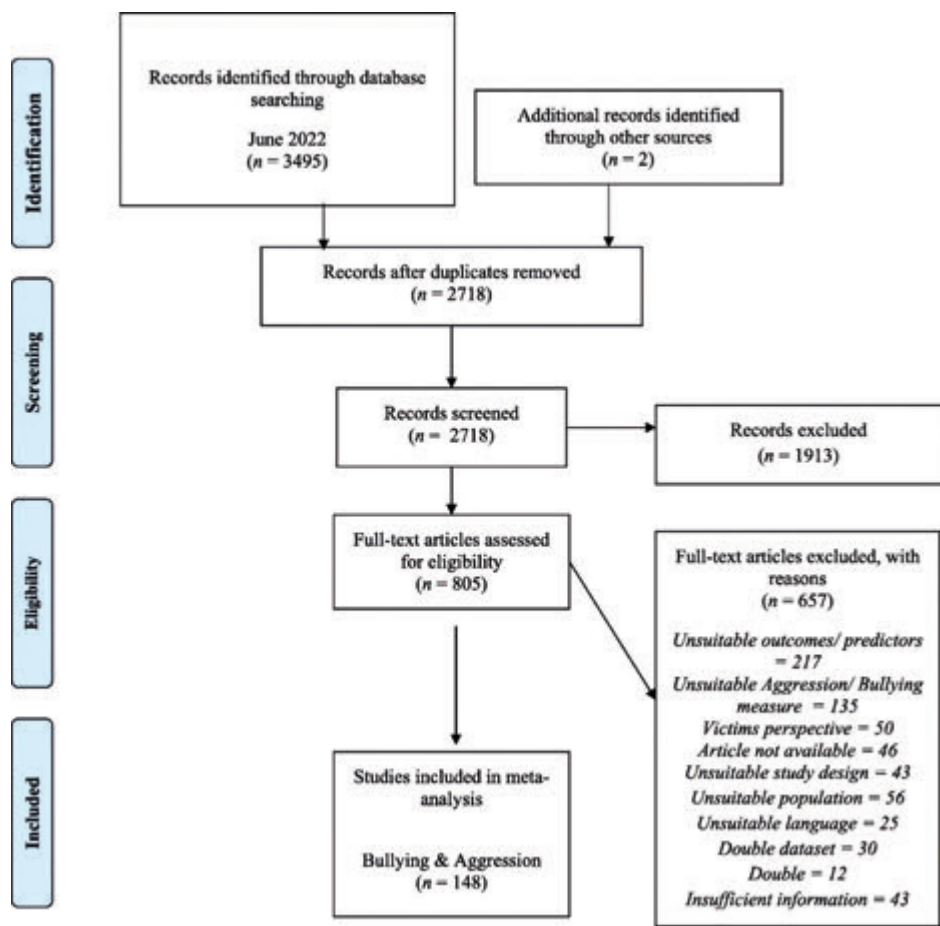
Figure 2. *Flow-Chart of Search Strategy, Screening, and Coding Process*

Selection of Studies

After removing duplicate articles, we screened all study titles and abstracts for eligibility. We included empirical studies, published in English, that included participants that fell in the 12-18-year age range. If the age range minimum or maximum was slightly below or above our preferred age range but the study also included adolescents within our age range and other inclusion criteria were met, articles were included which led to a final age range of approximately 8 to 20 years old (see Table 1). To be included, studies had to assess bullying (traditional, cyber, or both) or social, relational, indirect, instrumental, or proactive aggression and a goal (e.g., agentic, communal) and/or an outcome (e.g., popularity, likeability). We excluded qualitative studies or studies that measured bully- or aggression-related variables (e.g., defending, attitudes) but not bullying or aggression itself. After this screening, 805 articles were eligible for full-text screening. Out of all articles we intended to screen, some were not accessible online ($k = 57$). We contacted authors and

received some articles ($k = 11$), of which only a few were eligible to include ($k = 2$). Next, we assessed all available full texts and identified: (a) 46 studies as eligible for inclusion for bullying and (b) another 92 studies that were eligible for aggression. The first author and three research assistants triple-screened and coded 20% of the articles. For inclusion screening, agreement ranged between 75% and 85%. For the coding of included articles, there was 84% agreement between the four coders. Coder's disagreement was resolved through discussion until a consensus was reached. Included studies are presented in Table 1 and are denoted with asterisks in the reference list.

Table 1. *Included Articles and Supporting Information*

	Lead Author (year)	**Bull/Aggr**	**Country**	**Age**
1	Arnocky (2012)	Bullying	Canada	*M*=12.5
2	Berger (2016)	Bullying	Chile	Range: 10–13
3	Bouman (2012)	Bullying	The Netherlands	Grade 4–6
4	Calvete (2010)	Bullying	Spain	Range: 12–17
5	Caravita (2012)	Bullying	Italy	*M*range= 10.4–13.5
6	Cerezo (2005)	Bullying	Spain/ England	Range: 10–12
7	Chang (2004)	Bullying	China	Range: 13–16
8	*Cillessen (2014[a])	Bullying	The Netherlands	*M*=11.07
9	Ciucci (2014)	Bullying	Italy	Range: 10–15
10	De Bruyn (2006)	Bullying	The Netherlands	*M*= 13.05
11	De Bruyn (2010)	Bullying	The Netherlands	*M*=13.6
12	Dijkstra (2008)	Bullying	The Netherlands	*M*=14.02
13	Dollar (2017)	Bullying	United States	Range: 11–15
14	Duffy (2017)	Bullying	Australia	Range: 10.85–13.63
15	Espelage (2001)	Bullying	United States	Grade 6–8
16	Festl (2016)	Bullying	Germany	Range: 11–18
17	Foshee (2016)	Bullying	United States	Range: 13–16
18	Garandeau (2014)	Bullying	Finland	*M*=14.57
19	Garandeau (2019[a])	Bullying	The Netherlands	Range: 11.43–17.8
20	Hafen (2013)	Bullying	Finland	Range: 14–17
21	Isaacs (2013)	Bullying	Finland	Range: 10–13
22	Kochel (2015)	Bullying	United States	*M*=12.28
23	*Lansu (2013)	Bullying	The Netherlands	*M*=11.1
24	Lenzi (2014)	Bullying	Italy	Range: 11–13
25	Longobardi (2018)	Bullying	Italy	Range: 11–14
26	Lucas-Molina (2014)	Bullying	Spain	Range: 8–13
27	McVean (2018)	Bullying	United States	Grades: 6–8

Table 1. Continued.

	Lead Author (year)	Bull/Aggr	Country	Age
28	Nocentini (2013)	Bullying	Italy	Grades: 9–11
29	Olthof (2011)	Bullying	The Netherlands	M=11.3
30	Palacios (2016)	Bullying	Chile	Grade 4–6
31	*Peeters (2010)	Bullying	The Netherlands	M=13.37
32	Postigo (2012)	Bullying	Spain	Range: 12–17
33	Pouwels (2016)	Bullying	The Netherlands	M=16.38
34	Pronk (2017)	Bullying	The Netherlands/India	M=13.8
35	Pronk (2018)	Bullying	The Netherlands	M=12.5
36	Romera (2017)	Bullying	Colombia	Range: 10–19
37	Runions (2018)	Bullying	Australia	M=13.2
38	Sentse (2007)	Bullying	The Netherlands	M=13.4
39	Sentse (2015)	Bullying	Finland	Mrange=11.2–14.4
40	*Sijtsema (2009)	Bullying	Finland	Range: 10–15
41	Strohmeier (2012)	Bullying	Norway	Grade: 8–10
42	Thunfors (2008)	Bullying	United States	Grade:6–8
43	Vaillancourt (2003)	Bullying	Canada	Range 11–17
44	Vanden Abeele (2013)	Bullying	Belgium	M=16.1
45	Wegge (2016)	Bullying	Belgium	M=13.24
46	Wei (2012)	Bullying	Taiwan	M=12.8
47	Bardach (2020)	Bullying	Austria	M=15.67
48	Garandeau (2019[b])	Bullying	The Netherlands	M=11.06
49	Garandeau (2019[c])	Bullying	Austria	M=12.31
50	Garandeau (2021)	Bullying	Finland	M=13.37
51	Guy (2019)	Bullying	England	Range: 11–16
52	Kisfalusi (2022)	Bullying	The Netherlands	M=10
53	Košir (2022)	Bullying	Slovenia	M=15.48
54	Kretschmer (2021)	Bullying	The Netherlands	M=14
55	*Lansu (2021)	Bullying	The Netherlands	Range: 9.12–13.13
56	Lee (2021)	Bullying	South Korea	M=13
57	*Malamut (2020[a])	Bullying	The Netherlands	Range: 11.29–17.80
58	Pan (2020)	Bullying	China	M=10.9
59	Pozzoli (2021)	Bullying	Italy	Range: 10–14
60	Romera (2019)	Bullying	Spain	Range: 11–15
61	Romera (2021)	Bullying	Spain	Range: 11–16
62	*Van den Bos (2018)	Bullying	The Netherlands	Range: 12–18
63	*Van den Broek (2016)	Bullying	The Netherlands	Range: 14–19

Table 1. Continued.

	Lead Author (year)	Bull/Aggr	Country	Age
64	Wang (2021)	Bullying	China	M=13.66
65	Andreou (2006)	Aggression	Greece	M=11.2
66	Badaly (2013)	Aggression	United States	Grade 9–10
67	Bowker (2014[a])	Aggression	United States	M=12.04
68	Bowker (2012[a])	Aggression	India	M=13.35
69	Bowker (2012[b])	Aggression	United States	M=12.74
70	Bowker (2014[b])	Aggression	United States	M=13.20
71	Casper (2017)	Aggression	United States	M=12.03
72	Chen (2018)	Aggression	China	M=15.98
73	Chen (2019)	Aggression	China	Range: 12–16
74	*Cillessen (2014[a])	Aggression	The Netherlands	M=11.07
75	Cillessen (2014[b])	Aggression	The Netherlands	M=14
76	Closson (2009)	Aggression	Canada	Grades 6–8
77	Cristina (2001)	Aggression	Canada	M=12.8
78	Dijkstra (2011)	Aggression	The Netherlands	Range:11–12
79	Dijkstra (2010)	Aggression	Chile	Range: 12–14
80	Dumas (2019)	Aggression	Canada	M=14.98
81	Ellis (2007)	Aggression	Canada	M=12.05
82	Ettekal (2020)	Aggression	United States	Grades 8–11
83	Ettekal (2015)	Aggression	United States	Grades 7–8
84	Ferguson (2016)	Aggression	Australia	Range 9–13
85	Findley (2013)	Aggression	Finland	Range 12–14
86	Flack (2017)	Aggression	Norway	M=14
87	Hartl (2020)	Aggression	Canada	M=12.50
88	Hawley (2007)	Aggression	Germany	M=14.65
89	Hill (2006)	Aggression	United States	Grades 3–12
90	Hoff (2009)	Aggression	United States	Grades 6–8
91	Houser (2015)	Aggression	United States	Grade 9
92	Juvonen (2013)	Aggression	United States	Grades 7–8
93	Kiefer (2016)	Aggression	United States	Grade 6
94	Kim (2018)	Aggression	South Korea	Range 14–16
95	Kokkinos (2020)	Aggression	Greece	Range 12–15
96	Kornbluh (2016)	Aggression	United States	Grades 3–8
97	Kraft (2018)	Aggression	United States	Grades 6–8
98	Lansford (2009)	Aggression	United States	Range 11–14
99	*Lansu (2013)	Aggression	The Netherlands	M=11.1

Table 1. Continued.

	Lead Author (year)	Bull/Aggr	Country	Age
100	*Lansu (2021)	Aggression	The Netherlands	Range: 9.12–13.13
101	Lee (2020)	Aggression	United States	M=14.2
102	Li (2018)	Aggression	China	Grades 5–6
103	Li (2014)	Aggression	United States	Range 11–15
104	Lu (2018)	Aggression	China	Grades 7–12
105	Malamut (2022)	Aggression	United States	M=15.10
106	Malamut (2020[b])	Aggression	United States	M–14.4
107	*Malamut (2020[a])	Aggression	The Netherlands	Range: 11.29–17.80
108	Malamut (2021)	Aggression	The Netherlands	M=13.66
109	Mayeux (2008)	Aggression	Canada	Grades 8–12
110	Mayeux (2014)	Aggression	United States	Grades 9–12
111	Mayeux (2018)	Aggression	United States	Grades 6–8
112	McQuade (2014)	Aggression	United States	Range 9–14
113	Niu (2016)	Aggression	China	M=14.27
114	Ojanen (2012)	Aggression	Finland	Range 12–14
115	Ojanen (2014)	Aggression	Finland	Range 12–14
116	Ojanen (2019)	Aggression	United States	Range 11–15
117	Orue (2011)	Aggression	Spain	Grades 4–6
118	Pattiselanno (2015)	Aggression	The Netherlands	M=14.02
119	*Peeters (2010)	Aggression	The Netherlands	M=13.37
120	Peets (2014)	Aggression	Finland	Range: 12–13
121	Prinstein (2003)	Aggression	United States	Range: 15–17
122	Puckett (2008)	Aggression	United States	Grades 7–8
123	Rose (2004[a])	Aggression	United States	Grades 3–9
124	Rose (2004[b])	Aggression	United States	Grades 7–9
125	Rose (2009)	Aggression	United States	Grades 7–9
126	Rosie (2020)	Aggression	United States	M=12.01
127	Salmivalli (2000)	Aggression	Finland	Range 15–16
128	Salmivalli (2005)	Aggression	Finland	Range 11–13
129	Sandstrom (2010)	Aggression	United States	Grades 9–12
130	Schwartz (2017)	Aggression	United States	Grades 6–7
131	Schwartz (2019)	Aggression	United States	Grades 9–10
132	Seo (2021)	Aggression	United States	Grades 7–8
133	Shin (2020)	Aggression	South Korea	M=12.46
134	Shin (2021)	Aggression	South Korea	M=12.46
135	*Sijtsema (2009)	Aggression	Finland	Range 14–15

Table 1. Continued.

	Lead Author (year)	Bull/Aggr	Country	Age
136	Smith (2010)	Aggression	United States	Grades 7–9
137	Stevens (2013)	Aggression	Samoa	Range 13–19
138	Stoltz (2016)	Aggression	The Netherlands	Grades 7–8
139	Vaillancourt (2006)	Aggression	Canada	Range 11–17
140	Van den Berg (2019)	Aggression	The Netherlands	Grades 7–9
141	Van den Berg (2015)	Aggression	The Netherlands	Range 9.5–13.8
142	*Van den Bos (2018)	Aggression	The Netherlands	Range: 12–18
143	*Van den Broek (2016)	Aggression	The Netherlands	Range: 14–19
144	Van Hazebroek (2017)	Aggression	The Netherlands	Range 11–14
145	Voulgaridou (2022)	Aggression	Eastern Macedonia and Thrace	Range: 13–16
146	Wang (2020)	Aggression	United States	Grade 7
147	Wang (2017)	Aggression	China	M=13.58
148	Wang (2015)	Aggression	China	Range 11–16
149	Washington (2018)	Aggression	China	Grades 3–6
150	Wright (2014)	Aggression	China	M=13.42
151	Wright (2013)	Aggression	United States	M=13.05
152	Yavuzer (2021)	Aggression	Turkey	Range 13–14
153	Zhou (2021)	Aggression	China	Range 12–15
154	Zimmer-Gembeck (2007)	Aggression	Australia	Range 9–13
155	Zimmer-Gembeck (2013)	Aggression	Australia	Range 10–15
156	Zwaan (2013)	Aggression	The Netherlands	M=13.60

Note. In case it was available, we reported the age range of the study in this table, if this wasn't (fully) available, we reported the mean age, if that was not available, we reported the grades. [a]first cited publication by the same author in the same year, [b]second cited publication by the same author in the same year, [c]third cited publication by the same author in the same year, *article reported correlations both for bullying and aggression.

Data Extraction

Effect Sizes
We extracted correlations between (a) social goals and bullying and aggression, (b) bullying, aggression, and social gains, (c) different types of social goals (communal vs. agency goals), (d) different indicators of social gains (likeability vs. popularity), (e) social goals and social gains. If a relevant correlation was not reported in the article, we emailed the authors to ask them to provide their correlation matrix. Of the 66 authors emailed, 29 provided their full correlation matrix, and 1 provided some correlations. Reasons not to

provide correlation matrices were: no access to the dataset anymore ($n = 13$), no time/access to the dataset due to the COVID-19 regulations ($n = 2$), or being on a holiday/sabbatical ($n=1$). Other authors did not respond to our request ($n = 20$). In case we did not receive a correlation matrix, we calculated the correlations from other test statistics available when possible. When authors reported correlations for boys and girls separately (rather than for the full sample), we calculated the mean of those correlations. When authors reported correlations for multiple waves, we averaged these correlations. If betas were reported, we used the formula: $r = β + 0.5λ$, where λ is 1 if β is nonnegative and 0 if β is negative (Peterson & Brown, 2005), to calculate correlations. Nonnegative and negative variables were treated differently to account for differences in how nonnegative and negative $β$'s relate to their corresponding r values (for an explanation see; Peterson & Brown, 2005).

Study Variables

To create uniformity in our definitions, we categorized social goals and social gains based on the agentic and communal subdimensions (Abele & Wojciszke, 2014) and sociometric and perceived popularity (Cillessen, 2008). We assessed and interpreted the measures that authors used (rather than following the terminology they used) to see to which category their measure belonged, as we will describe here further.

Social Goals

We categorized social goals as communal or agentic. Communal goals reflected a desire to be accepted or to be liked (acceptance and liking). Agentic goals reflected a desire to be popular or to be dominant (popularity and dominance). We operationalized acceptance goals as a desire for peer acceptance, a tendency to conform to group norms, and submissive goals. We operationalized liking goals as a desire for friends and a desire to be liked. We operationalized popularity goals as a desire to be popular, status goals, popularity goals, popularity prioritization, and hierarchy goals. We operationalized dominance goals as a desire for power or influence and a desire for (social) dominance. Here, we included only self-reports because we sought to capture adolescents' own, subjectively endorsed goals, rather than goals that were inferred by others.

Social Gains

We categorized social gains as gains reflecting likeability or popularity. Likeability reflected acceptance or likeability. Popularity reflected dominance or popularity. We operationalized acceptance as a peer-reported form of acceptance (being accepted within a group). We operationalized likeability as being nominated by peers as liked or likable, sociometric popularity, and as being a friend (or a tie). We operationalized popularity as peer-nominated status, hierarchy, and (perceived) popularity. We operationalized dominance as peer measures of power, influence, and (social) dominance. We included only peer reports since we aimed to capture the social consequences of bullying, rather than perpetrators' subjective perceptions of those consequences. In case one study had multiple indicators of likeability and popularity (e.g., both popularity and dominance were measured in

association with bullying), we chose the strongest indicator for getting along for likeability (for example: being friends), and we choose the strongest indicator for getting ahead for popularity (for example: being dominant). For likeability, this was the case for 2 studies; for popularity, this was the case for 4 studies.

Socially Coercive Behaviors

Bullying. Bullying refers to aggressive behavior that occurs repeatedly, intentionally, and with a power imbalance (Olweus, 1992). Studies were identified as eligible when they used one of the 26 questionnaires that were previously identified as adequate ways of measuring bullying (Berne et al., 2013; Vivolo-Kantor et al., 2014) or when they used one of the 52 questionnaires we identified that explicitly referred to bullying. For a complete list of approved questionnaires, see Supplemental Materials (S3). We included both self-reported and peer-reported measures of bullying. If both were provided, we used the peer-reported measure of bullying because peer reports are more strongly linked with peer-reported status than self-reports of bullying (Bouman et al., 2012). In some cases, one study assessed multiple forms of bullying (i.e., traditional and cyber or physical and verbal bullying). Because preliminary analyses showed that the associations we found were similar for the different forms of bullying, we took the mean of all observed correlations for different bullying forms (see supplementary materials for these preliminary analyses, S2. table a—d).

Aggression. We focused on relational aggression and instrumental aggression as specific forms of aggression that are goal-directed and pertain to acquiring social goals. Relational aggression was defined as relational aggression and indirect aggression (Archer & Coyne, 2005). We also included instrumental and proactive aggression, because these forms of aggression are often premeditated, instrumental, and "cold-blooded," as opposed to impulsive, reactive, and "hot-headed" (Archer & Coyne, 2005). We included both self-report and peer-report measures of aggression. In case both were reported, we choose the peer-report measure over the self-report measure because peer aggression reports might be more strongly linked with peer status reports, consistent with our bullying indicator (Bouman et al., 2012).

Quality Assessment

We performed a quality assessment of included studies to assess the risk of bias. We used criteria for quantitative descriptive studies, developed for the Mixed Methods Appraisal Tool (MMAT; Pluye et al., 2011). First, we assessed whether the sampling strategy was relevant to address the quantitative research questions by assessing whether the source of the sample was relevant, whether there was a standard procedure for sampling, and whether the sample size was justified. Second, we assessed whether the sample was representative of the population under study by assessing whether inclusion and exclusion criteria were explained, and reasons why eligible individuals chose not to participate were explained. Third, we assessed whether measurements were appropriate by considering

whether variables were clearly defined and accurately measured, whether measurements were justified and appropriate for answering the research question, and whether measurements reflect what they were supposed to measure. Fourth, in case a study was longitudinal, we assessed whether there was an acceptable response rate (60% or higher). We then calculated a final score between the range of 0–8 or 0–9 for longitudinal studies. Studies with a score of 0–2 were ranked as low quality, studies with a score of 3–5 were ranked as medium quality, and studies with a score of 6–8 or 6–9 were ranked as high quality. All studies were coded by two researchers, which led to an absolute agreement of 71%. This level of agreement was initially not sufficient (Hartmann, 1977). Therefore, disagreements were discussed until a consensus was reached. Eventually, zero studies were coded as low quality, 74 as medium quality, and 74 as high quality.

Data Analysis Strategy

To test our hypothesized models, we conducted a multilevel one-stage MASEM with moderation analysis, with bullying and aggression as the mediator. This technique enabled us to test a mediation model based on data from previous studies that did not necessarily test the same mediation model (Jak, 2015). We used a random effects model to control for the multilevel structure of the data (i.e., multiple correlations of interest tested within one study). To be able to include continuous moderators, we conducted a one-stage MASEM with an online tool (https://sjak.shinyapps.io/webMASEM/; developed by Jak et al., 2021). We first tested mediation. We then tested moderation: we conducted a multi-group comparison by age to provide an overall test of whether one of the paths was moderated by age. If the multigroup effect was significant, we tested, for each hypothesized path, whether it was moderated by age (Jak & Cheung, 2020). We also performed two sensitivity analyses: We examined whether the results were different when we included (vs. excluded) longitudinal studies, and we examined whether the results were different from our main model (which includes both bullying and aggression) when we tested the model separately for bullying and aggression.

We used several fit indices: $\chi 2$, RMSEA, and CFI values (RMSEA values of lower than .05 and CFI values above .95 indicate satisfactory model fit, see Hu & Bentler, 1999). We evaluated standardized coefficients for their effect size based upon previous guidelines for correlational estimates (Cohen, 1969), with values of .10 indicating small effects, .30 indicating moderate effects, and .50 indicating large effects.

RESULTS

Descriptive Statistics

Demographics

We pooled correlational meta-analytical data from 164,143 participants in 148 independent samples (see Table 2). The pooled dataset includes participants from 23 different countries (Italy, the USA, the Netherlands, Norway, Colombia, Spain, Australia, Finland, Germany,

India, Belgium, England, Canada, China, Chile, Turkey, Slovenia, South Korea, Samoa, Greece, Eastern Macedonia and Thrace, Austria, and Taiwan), with most of the studies coming from the United States ($n = 44$), The Netherlands ($n = 33$), Finland ($n = 13$), and China ($n = 13$). The mean age (used for moderation analyses) ranged from 9.80 to 16.8 years ($M_{meanage} = 13.23$, $SD = 1.54$), and the overall age ranged from approximately 8 to 20 years old.

Correlations

First, we obtained the unrestricted average correlation matrix by fitting a multivariate meta-analysis. We assessed the pooled correlations between agency, communion, bullying and aggression, popularity, and likeability (Table 2). Agentic goals were positively correlated with bullying and aggression, whereas communal goals were not significantly correlated with bullying and aggression. Bullying and aggression were positively correlated with popularity and negatively correlated with likeability.

Table 2. *Sample Size (and Number of Independent Samples) per Correlation Above Diagonal. Pooled Correlation Matrix Based on the Random Effects Model Below Diagonal*

Variable					
Communion	-	15308 (20)	16605 (23)	1912 (4)	2577 (6)
Agency	0.134*	-	32081 (43)	6325 (12)	8000 (15)
Bull&Agg	0.008	0.181***	-	101203 (110)	96757 (106)
Likeability	0.095***	0.000	-0.145***	-	53803 (69)
Popularity	0.092***	0.172***	0.279***	0.359***	-

*<.05, ** <.01, *** <.001

One-Stage MASEM Analysis

Model Specification

We estimated a matrix with between-study variances and covariances. We then estimated random effects at the study-level variance. Next, we fitted our proposed model to the data. Exact model fit was rejected, $\chi2_{(2)} = 8.424$, $p = .015$. However, other fit indices (RMSEA = 0.004, CFI = 0.982) indicated a good fit to the data.

Mediation Model

We first estimated the mediation model (see Figure 3). We then estimated indirect effects of agentic goals via bullying and aggression on popularity, $\beta = 0.047$, 95% CI [0.035; 0.069], and of the communal goals via bullying and aggression on likeability, $\beta = -0.001$, 95% CI [-0.011; 0.012]. As confidence intervals indicated, the indirect effect of agentic goals on popularity via bullying and aggression was significant, indicating that adolescents with higher agentic goals achieved higher popularity via bullying and aggression. Mediation was partial, given that the direct effect of agentic goals on popularity was still significant, $\beta = 0.131$, $p <$

.001. Bullying and aggression, in turn, were associated with higher popularity and lower likeability. By contrast, the indirect effect of communal goals on likeability via bullying and aggression was not significant. Although there was a positive association between communal goals and likeability, this was not mediated by bullying and aggression, as there was no significant association between communal goals and bullying and aggression.
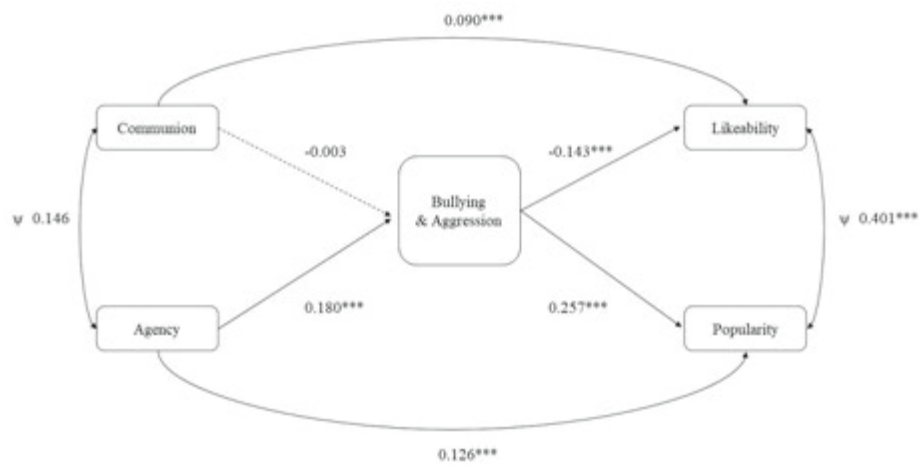
Figure 3. *Mediation Model with Model Parameters*

We conducted exploratory analyses to examine whether communal goals were associated with popularity and agentic goals were associated with likeability. Communal goals and popularity were positively correlated, albeit weakly (Table 2). There was no significant indirect effect of communal goals on popularity via bullying and aggression, $\beta = 0.001$, 95% CI [-0.020; 0.023]. There was, however, an indirect significant effect of agentic goals on likeability via bullying and aggression, $\beta = -0.028$, 95 %CI [-0.037; -0.019], with adolescents who hold agentic goals being less liked by others as they show more bullying and aggression. There was no significant direct effect of agency on likeability, $\beta = 0.013$, $p = .066$, indicating full mediation.

Additional Analyses

Moderation of Age
We examined whether the effects were moderated by age. There was no overall moderation effect by age in the main model $\chi2_{(4)} = 4.497$ $p = .343$, or in the models with indirect effects $\chi2_{(6)} = 1.401$, $p = .966$. This indicated that none of the individual paths (i.e., from social goals to bullying and aggression, and from bullying and aggression to social gains) and none of the mediation paths (i.e., from social goals to social gains via bullying and aggression) were significantly different depending on age.

Sensitivity Analyses

We investigated whether the study design (i.e., cross-sectional vs. longitudinal) moderated the paths in our model. Of all included samples, 21 included both cross-sectional and longitudinal correlations. We compared our original one-stage MASEM results including only cross-sectional correlations to one-stage MASEM results including both cross-sectional and longitudinal associations (see supplementary materials, S2. table f). Including the longitudinal studies did not affect our findings (i.e., no significant path became non-significant, and no non-significant path became significant).

Because our main model included both bullying and aggression, we ran models separately for bullying and aggression. We compared a one-stage MASEM for bullying ($n = 64$) to a one-stage MASEM for aggression ($n = 92$), and we compared both to the main model (see S2. table g and h). The direct model paths did not differ significantly between the bullying and aggression model, and the paths in these models did not differ significantly from the paths in the main model (i.e., no significant path became non-significant, and no non-significant path became significant).

DISCUSSION

The aim of this meta-analysis was to develop and test a new conceptual Social Goals and Gains model of adolescent bullying and aggression. The meta-analysis included 148 independent samples including 164,143 adolescents. Supporting the model, results showed that agentic goals (i.e., getting ahead of others) had a small-to-moderate positive association with bullying and aggression which, in turn, had a small-to-moderate positive association with popularity and a small-to-moderate negative association with likeability. By contrast, communal goals (i.e., getting along with others) were not significantly related to bullying and aggression. These associations did not differ in strength between different phases within adolescence. Together, these results provide converging evidence for our model, which suggests that bullying and aggression can be seen as self-regulatory and socially skilled behaviors that are driven, in part, by agentic goals and relate to gains in popularity—at the loss of likeability.

A Social Goals and Gains Model of Adolescent Bullying and Aggression

Over the past decades, several scholars suggested that adolescent socially coercive behaviors, such as bullying and aggression, can be goal-directed (e.g., Ojanen et al., 2005; Salmivalli, 2000; Sanders et al., 2021; Sijtsema et al., 2009) and socially adaptive, enabling perpetrators to obtain social resources that have evolutionary significance, such as popularity (e.g., Hawley, 1999; Volk et al., 2012; Volk, Dane et al., 2022). We combined these theories in our Social Goals and Gains Model of adolescent bullying and aggression. Supporting the model, our findings show that adolescent bullying and aggression can be both goal-directed (elicited by agentic goals) and adaptive (linked with popularity). Thus, adolescents who bully and who use aggression might just gain what they desire (i.e., popularity), although it comes at the cost of lower likeability. Adolescents who bully

and use aggression may strive for popularity, even when this means sacrificing likeability, because they tend to value popularity over likeability (Garandeau & Lansu, 2019).

Traditional views of adolescent bullying and aggression have described these behaviors as self-regulatory failures. Challenging these traditional views, our results demonstrate that bullying and aggression instead can be defined as socially skilled behaviors of adolescents with agentic goal orientations. Thus, in line with a core definition of self-regulation (Moilanen, 2007), adolescent bullying and aggression are behaviors that can be strategically activated and monitored in response to environmental stimuli (e.g., peer norms that allow adolescents who aggress against others to earn popularity) and that can be adapted to feedback from others (e.g., receiving respect after bullying and aggression) in an attempt to attain personally relevant agency goals. This fits theories on how harmful behaviors can also reflect adequate self-regulatory skills (Baumeister & Vonasch, 2015; Kopetz & Orehek, 2015).

Based on previous theories of interpersonal goals (Abele & Wojciszke, 2014), we expected that adolescents who prioritize communion would refrain from bullying and aggression because these behaviors might reduce their likeability. However, contrary to our predictions, adolescents' communal goals were not significantly related to bullying and aggression. A possible explanation is that it might be the interplay between communal and agentic goals that predicts whether adolescents are likely to engage in or refrain from bullying and aggression. Perhaps communal goals might only act as a buffer against bullying once agentic goals are weak, because when both goals are important for adolescents, they tend to prioritize gaining popularity over losing likeability (Garandeau & Lansu, 2019). Or perhaps agentic goals have a weaker connection with aggression when communal goals are strong, which has been established previously in middle adolescence (Sijtsema et al., 2020). This seems to indicate that the effect of communal goals may take the form of modulating the effect of other, agentic goal orientations instead of it having an effect on bullying and aggression on its own. It would be insightful to test this 'profile hypothesis' in future research to disentangle the buffer effect of communal goal orientation on bullying and aggression in adolescence.

Adolescents who hold agentic goals are more likely to engage in bullying and aggression. These behaviors, in turn, are linked with higher popularity but lower likeability. This phenomenon cuts across the different adolescent stages, contrary to what we expected. Even though older adolescents might be less inclined to endorse agentic goals (LaFontana & Cillessen, 2010), our results now demonstrate that the social goals and gains of bullying and aggression remain stable across adolescence. This finding extends previous work and fits an evolutionary perspective (Hawley, 1999; Volk et al., 2012; Volk, Dane et al., 2022), suggesting that acquiring social status is a relevant motive across different developmental stages.

Implications for Interventions

Prevention and intervention programs to reduce bullying in schools are not yet optimally effective for adolescents (Hensums et al., 2022). It remains important to ask how these

programs can be improved (Salmivalli et al., 2021). Our findings suggest that programs should target adolescents' goals, helping them fulfill their agentic goals in prosocial (rather than antisocial) ways. Because agentic goals are important in adolescence (Abele & Wojciszke, 2014) and adolescents want to feel respected and autonomous (Yeager et al., 2018), we suggest that interventions should not reduce agentic goals but instead change the means through which adolescents pursue their agentic goals (Reijntjes et al., 2013a; Sanders et al., 2021). Adolescents who hold agentic goals have high need for status and want to feel competent, influential, and unique (Abele & Wojciszke, 2014). To accomplish those feelings, schools and institutions can help channel adolescents' agentic goals in meaningful and prosocial ways. For example, in the Meaningful Roles intervention (Ellis et al., 2016), students are assigned to different jobs (e.g., cheerleaders, ecologist, human resource manager, newscaster) that can make them influential and visible within the school or class context and provide them with popularity status in a prosocial manner. This might enable adolescents to achieve social rank through prestige rather than dominance (Cheng et al., 2013; Henrich & Gil-White, 2001; Maner & Case, 2016). To achieve this, schools can launch initiatives (online or offline) that give platforms to students (e.g., sports, music, theatre), where they can thrive in everyday settings and fulfill their agentic goals by showing their unique talents and feeling competent, without harming others.

To make these approaches optimally effective, it will be critical to address group norms that reward adolescent bullying and aggression with popularity (Reijntjes et al., 2013b). Aggressive popularity norms (providing popularity to aggressive students) increase aggressive behaviors in individuals exposed to these norms (Laninga-Wijnen et al., 2017), whereas prosocial popularity norms (providing popularity to pro-social students) encourage prosocial behaviors in individuals exposed to these norms (Laninga-Wijnen et al., 2018). Changing norms seems to be an important avenue for interventions and has been done successfully in the past (Paluck et al., 2016; Perkins et al., 2011), although there are some limitations to overcome in this field (e.g., including other measures than self-reports; Miller & Prentice, 2016).

In addition, interventions can help reduce bullying by activating other goals or changing adolescents' belief systems (e.g., their implicit theories about the nature of social status). For example, adolescents with an *entity theory of personality* believe that social-status designations (e.g., whether they are winners or losers, bullies or victims, popular or unpopular) are fixed rather than malleable (Yeager et al., 2011). They may believe that acquiring or losing status will reflect on the adequacy or inadequacy of their whole self (e.g., "I am a winner"). Consequently, they may pursue social demonstration goals (i.e., demonstrating their social competence) rather than social development goals (i.e., developing their competence through learning; Ryan & Shim, 2008), and they may use bullying and aggression as means to gain social status or protect against the loss of social status (Lee & Yeager, 2020). Consistent with this theoretical framework, interventions teaching an *incremental theory of personality*—a belief in the potential for personal change—reduce aggressive desires (Yeager, Miu et al., 2013) and aggression in response to victimization (Yeager, Trzesnieuwski et al., 2013). Bridging this work with

our meta-analytic findings, future interventions can examine whether an incremental theory of personality intervention would induce social development goals and weaken the association of agentic goals with bullying and aggression.

One challenge in designing interventions is that bullying can occur in both online and offline settings. Adolescents who engage in traditional bullying are more likely to also engage in cyberbullying (Estévez et al., 2020), interventionists might consider addressing online and offline contexts simultaneously. For example, the Meaningful Roles intervention could expand into the online world (Ellis et al., 2016), so as to give adolescents meaningful roles in online environments (e.g., making them the administrator of the class's WhatsApp group, with the goal of monitoring the group's behavior and encouraging a safe climate). Future research should examine whether targeting online environments makes anti-bullying and aggression interventions more effective.

Strengths, Limitations, and Future Directions

Through our meta-analysis, which included 164,143 adolescents participating in 148 studies, we developed a Social Goals and Gains Model of Adolescent Bullying and Aggression. To do so, we used an innovative MASEM technique. MASEM allowed us to pool individual studies into one overarching model. Our study also has limitations, which provide interesting avenues for future studies. First, most included studies were cross-sectional, which limits the conclusions that we can draw about the direction of influences and the long-term consequences of social goals and bullying and aggression. When we included the 21 longitudinal correlations that we had, the results did not change, and there are studies that show the hypothesized longitudinal effects (e.g., agentic goals predicting increased aggression over time; Ojanen & Findley-Van Nostrand, 2014). To make even stronger claims in the future, we call for more longitudinal and intervention studies to establish temporally informative and causal long-term effects. Second, all studies assessed social goals via questionnaires. However, goals might also influence adolescents' behavioral strategies unconsciously (Custers & Aarts, 2010; Volk, Dane et al., 2022), so future research should measure goals using implicit measures—for example, using approach-avoidance tasks—to investigate whether explicit and implicit orientations might have different associations with behavior (Lansu et al., 2012).

Third, our meta-analysis did not examine how the peer group can reinforce bullying and aggression. Studies have established that social learning is critical in the maintenance of antisocial behavior (Cohen & Prinstein, 2006; Dishion et al., 1996; Juvonen & Ho, 2008). Future research should examine whether our model holds better in contexts with pro-bullying and -aggression norms (versus anti-bullying and -aggression norms). It is possible, for example, that adolescents who hold agentic goals shift their behavior flexibly, in a self-regulated manner, in contexts that award popularity for prosocial rather than antisocial behavior. Fourth, our literature search revealed that little is known about how social goals might lead to ostracism or social rejection. We call for longitudinal and experimental research that examines these associations, so as to establish whether our model also holds for other forms of socially coercive behaviors in the peer context. Fifth, we were

not able to distinguish between cyberbullying and other forms of bullying, as there were too few studies that assessed the social goals and gains of cyberbullying to estimate a full cyberbullying model. It will be important to investigate similarities and differences in the future. Adolescents who engage in traditional bullying are more likely to engage in cyberbullying (Estévez et al., 2020), but little is known about the consequences of social goals in online environments. On the one hand, cyberbullying can be anonymous. If anonymous, adolescents might not gain social status, but they might also not be deterred by the threat of losing likeability. On the other hand, cyberbullying can reach a large audience instantaneously; if so, it might grant perpetrators even more status than traditional forms of bullying would. Therefore, it is important that future research zooms in on the role of social goals and gains of cyberbullying.

More broadly, our meta-analysis focused on perpetrators (rather than targets) of bullying and aggression. We encourage future research to examine reciprocal processes between perpetrators and targets, so as to develop a complete understanding of their mutual influence. How do targets respond to being bullied or aggressed against? How do these responses, in turn, influence the perpetrator's social goals? For example, does the target's withdrawal (rather than retaliation) satisfy the perpetrator's agentic goals? And if so, does this reduce the perpetrator's bullying or aggression in the moment while reinforcing it in the long run? Addressing these questions using experience sampling methods, which track perpetrators and targets intensively over time, will shed light on the dynamic nature of bullying and aggression. Before doing so, validated measures should be developed that can reliably measure adolescents' bullying perpetration and aggression using experience sampling methods (see Borah et al., 2021 for an example in young adults).

Future research can further substantiate our model. One challenge is to examine our model longitudinally and experimentally. Do agentic goals predict increased bullying and aggression over time? And do these behaviors, in turn, predict higher popularity but lower likeability over time? Or are there self-reinforcing spirals, where higher popularity feeds agentic goals, leading to even higher levels of bullying and aggression? And what is the impact of evaluative feedback on social media platforms on adolescent popularity status and behavior in real-life settings (e.g., Lee et al., 2020). In some cases, experimental methods can be suitable (Brummelman & Walton, 2015): Experimental research can target social goals to examine its causal effects on subsequent bullying and aggression (e.g., reducing agentic goals to examine its causal effects on bullying and aggression, or changing social norms that reward bullying and aggression with popularity). In other cases, however, experimental methods do not seem feasible. For example, randomly assigning adolescents to conditions in which they would bully or engage in aggression cannot reveal the antecedents (e.g., social goals) of these behaviors, as the experimental manipulation would eliminate the motivational aspect that would normally make some adolescents more likely to bully or use aggression than others. Another challenge is to better understand potential interactions between communal and agentic goals (Sijtsema et al., 2020). For example, can communal goals buffer the impact of agentic goals on bullying and aggression? And which goal profiles (e.g., moderate agentic goals, high

communal goals) predispose adolescents to bully through reinforcer or assistant roles (e.g., see Salmivalli, 1999)? Finally, there might also be other, non-social goals and gains that relate to bullying and aggression, such as somatic and sexual goals and gains (e.g., desiring sexual activity and being sexually active). There is little research examining these proposed links; we call for future research to examine them, so that our Social Goals and Gains Model can be expanded to include them (Volk et al., 2014). Once we know more about which social and non-social goals inspire bullying and aggression, we can find better ways to redirect the efforts of adolescents to achieve those goals.

A key challenge will be to investigate for whom, and under which circumstances our model holds best. Firstly, certain personality traits might create a heightened susceptibility to partake in coercive strategies to gain desired resources (e.g., agency), such as fewer prosocial personality traits (Book et al., 2012), low hostility-humility traits (de Vries et al., 2020), and higher levels of narcissism which is characterized by a strong desire for social status (Grapsas et al., 2020). Second, gaining social resources, such as popularity, might be particularly important in certain environments, such as environments characterized by hostility or poverty (Belsky et al., 1991; Cheng et al., 2012; Dodge & Albert, 2012; Ellis et al., 2012) or environments with strong status hierarchies (Pan et al., 2020). Therefore, agentic goals might be more strongly linked to coercive behaviors in these contexts. Lastly, personality traits can also interact with environments to predict whether adolescents are likely to use coercive strategies to gain desired agentic goals. For example, individuals who possess higher selfish, impulsive, or antisocial personality traits and who grow up in violent environments, are more likely to use coercion instead of cooperation to gain dominance (Volk et al., 2021).

Consistent with evolutionary perspectives on adolescent bullying and aggression (Dodge & Albert, 2012), our findings raise two important questions for future work. One question is whether there is a tipping point from which bullying and aggression lose their adaptiveness and, consequently, fail to generate social benefits. For example, if adolescents show bullying and aggression in extreme ways, without adjusting these behaviors to contextual demands, they may not gain popularity among their peers. Another question is why some adolescents pursue agentic goals through bullying and aggression whereas others do not. For example, as resource control theory (Hawley, 1999) suggests, some adolescents might control resources through coercion, whereas other adolescents control them through cooperation. It is therefore important to recognize, and further explore, individual variability in the general applicability of the social goals and gains model of adolescents' varying levels of bullying and aggression.

CONCLUSION

The Social Goals and Gains model holds that bullying and aggression have social goals and social gains: adolescents who bully or aggress against others hold agentic (rather than communal) goals and are more popular (but liked less). Our meta-analysis supported and refined this model, providing insight into the goals and gains that motivate adolescent

bullying and aggression, identifying these behaviors as self-regulated and goal-directed. Reflecting back on Seneca (c. 4 BCE-CE 65; Seneca & Grimal, 1969), perhaps not all cruelty springs from weakness. Some cruelty springs from a desire for agency and the prospect of gaining popularity through cruelty.

3

CHAPTER 4

Behaving Selfishly to Earn Status in Adolescence

ABSTRACT

Would adolescents engage in selfish behavior when they learn that such behavior will result in status? Would this be most pronounced for adolescents higher in narcissism or agentic goals, who desire status strongly? We tested these hypotheses in a preregistered between-subjects experiment ($N = 519$, $M = 13.47$, $SD = 1.35$, 96% Dutch). Adolescents were asked to distribute lottery tickets between themselves and a classmate (in a selfish or egalitarian manner) while being observed by peers. Beforehand, they were shown that a peer's selfish distribution resulted in status gain (peer 'likes') or status loss (peer 'dislikes'), conveying an injunctive norm. Importantly, they were told that receiving likes would contribute to their popularity. Adolescents, especially those higher in narcissism but not those higher in agentic goals, behaved more selfishly after seeing that selfishness could lead to status gain. Thus, egalitarianism in adolescence can be fostered by reducing status gains for selfishness.

Keywords: Adolescence, Status, Narcissism, Agentic Goals

INTRODUCTION

Adolescents have a strong desire for gaining and retaining *social status* (i.e., prominence, respect, and influence in a social group), even more so than do children and adults (LaFontana & Cillessen, 2010; Yeager et al., 2018). Consequently, adolescents often behave in ways that may contribute to their social status (Hensums et al., 2023; Terburg & van Honk, 2013; Yeager et al., 2018). When adolescents enter new environments, they readily detect social norms indicating which behaviors are rewarded with social status. We theorize that these norms are powerful tools to change adolescent behavior. In a well-powered and preregistered between-subjects experiment, we investigated whether adolescents would behave more selfishly when they learn that such behavior may lead to status gains. We also investigated whether this effect would be more pronounced for adolescents who desire status more strongly.

Status Pursuit in Adolescence

Adolescence, the transition from childhood to adulthood, prepares individuals for their role in society (Lerner & Steinberg, 2004) and is characterized by heightened sensitivity to social status. Adolescents are preoccupied with prominence, respect, and influence in a social group (Sullivan, 1953; Yeager et al., 2018). Between ages 12 and 16, adolescents prioritize popularity over other outcomes (e.g., friendships and personal achievement), more so than do younger or older individuals (LaFontana & Cillessen, 2010). For example, adolescents are more motivated to receive social feedback (e.g., whether others want to befriend them) than do adults, and they feel worse after peer rejection than do adults (Rodman et al., 2017; Rodman et al., 2023). The motivation to gain status or avoid status loss in adolescence coincides with increased testosterone levels (Cardoos et al., 2017; Terburg & van Honk, 2013) and increased neural activation in brain areas related to social cognition in response to status threat (Gunther Moor et al., 2010). Driven by their heightened sensitivity to social status, adolescents may readily adapt their behavior to gain status or avoid status loss (Yeager et al., 2018).

   Although this desire for status can inspire behavior that is beneficial to the group (such as leadership; Brummelman et al., 2021; Tacket et al., 2023), it can also inspire behavior that is detrimental to the group. For example, the desire for status may lead to selfish behavior. Evolutionary theories suggest that selfish behavior, including bullying and aggression, can be strategic attempts to control resources, including status (Hawley, 1999; Reijntjes et al., 2013a; Reijntjes et al., 2013b; Volk et al., 2012; Volk, Dane et al., 2022). Resources aid survival and reproduction (Hawley, 1999; Volk et al., 2012; Volk, Dane et al., 2022). This challenges the traditional notion that selfish behavior stems from deficits in adolescent's social cognition, executive functioning, response inhibition, or other abilities (Garner & Hinton, 2010; Grigsby & Stevens, 2000; Zelazo et al., 1997). These views are supported by research showing that adolescents who engage in more selfish behaviors (e.g., bullying, aggression) have higher status (e.g., popularity) in their social groups (Hensums et al., 2023). In some cases, these individuals sacrifice likeability in the pursuit of status (e.g., they may

be popular but disliked; Hensums et al., 2023). We theorize that adolescents would behave more selfishly when they learn that selfish behavior will lead to status gains.

How do adolescents learn whether selfish behavior would lead to status gain? They may do so through peer norms, which are group-based standards or rules about which behaviors and attitudes are appropriate (Cialdini, 1988). While *descriptive norms* reflect what most people do, *injunctive norms* reflect what most people believe should be done (Cialdini, 1988). For example, when most classmates behave selfishly, adolescents learn that this is what most people do (i.e., descriptive norm). By contrast, when one classmate behaves selfishly but the other classmates approve such behavior, adolescents learn that this is what should be done (i.e., injunctive norm). A growing body of research shows that adolescents attune their status pursuit to injunctive norms. For example, in classrooms where bullies have high status, adolescents are more likely to bully themselves (Laninga-Wijnen et al., 2018). Similarly, when risky sexual behavior is approved by friends, adolescents are more likely to engage in such behavior themselves (Baumgartner et al., 2011). Thus, injunctive norms may inspire adolescent status pursuit by indicating which behaviors are rewarded with status gains.

Adolescents With a Stronger Need for Status

Although it is normative for adolescents to desire status (Yeager et al., 2018), some adolescents desire status more strongly than do others. One example is adolescents high in narcissism. Narcissism is an everyday personality trait characterized by feelings of importance and entitlement (Krizan & Herlache, 2018; Thomaes & Brummelman, 2016). Narcissism emerges around age 7, when children can assess their superiority over others, and it is relatively high in adolescence (Carlson & Gjerde, 2009; Brummelman et al., 2016). At its core, narcissism is characterized by a dominant motive for social status (Brummelman & Sedikides, 2021; Grapsas et al., 2020; Zeigler-Hill et al., 2019). Driven by this motive, adolescents high in narcissism quickly detect status-relevant social cues, and they readily engage in behaviors that are instrumental in gaining status (Grapsas et al., 2020). Unsurprisingly, then, these adolescents often obtain popularity and positions of leadership in the classroom (Brummelman et al., 2021; Poorthuis et al., 2021). In their pursuit of status, adolescents high in narcissism may resort to selfish behavior (Paulhus & Trapnell, 2008; Trapnell & Paulhus, 2012). For example, adolescents high in narcissism may engage in physical and relational aggression (Ojanen et al., 2012). Thus, adolescents high in narcissism may be particularly likely to behave selfishly if they learn that such behavior is rewarded with status.

Another example is adolescents high in agentic goals. Adolescents high in agentic goals prioritize goals that contribute to personal achievement or mastery, are geared toward self-importance, and may result in power and status (Abele & Wojciszke, 2014; Ojanen et al., 2005; Paulhus & Trapnell, 2008). Agentic goals are associated with traits such as independence, ambition, and a drive for personal success (Abele & Wojciszke, 2014). Agentic goals become more salient in adolescence (LaFontana & Cillessen, 2010), and may fuel the need to increase one's prominence, respect, and influence in a social group (Abele

& Wojciszke, 2014). Adolescents high in agentic goals may engage in selfish behavior, such as bullying and aggression, partly because this results in higher popularity in the peer group (Caravita & Cillessen, 2011; Hensums et al., 2023; Ojanen & Findley-Van Nostrand, 2014). Hence, like adolescents high in narcissism, those high in agentic goals may behave more selfishly when they learn that such behavior may lead to status gain.

This Study

In this preregistered between-subjects experiment, we investigated whether adolescents would engage in more selfish behavior when they learn that such behavior will result in status gains. We also investigated whether this effect would be more pronounced for adolescents who desire status more strongly. Using the Dictator game (Forsythe et al., 1994; Molleman et al., 2022), we indexed whether adolescents distributed lottery tickets equally between themselves and someone from their grade (i.e., egalitarian) or kept more lottery tickets for themselves (i.e., selfish). Adolescents were told that they would be evaluated by peers. Beforehand, they were shown that a peer's selfish distribution resulted in either status gain (peer 'likes') or status loss (peer 'dislikes'), setting injunctive norms. Adolescents were told that receiving likes would contribute to their classroom popularity. We hypothesized that adolescents would behave more selfishly (vs. egalitarian) when they had learned that such behavior would lead to status gain (vs. status loss). We also hypothesized that this effect would be more pronounced for adolescents with higher narcissism or stronger agentic goals.

METHOD

Participants

Participants were 519 adolescents (46% girls, 51% boys, 3% who did not identify as a boy or girl) ages 10–19 years ($M = 13.47$, $SD = 1.35$), most of them born in the Netherlands (96%), with different educational levels (vocational education = 14%; general academic and pre-university education = 86%). They were recruited from 10 secondary schools in the Netherlands. Data were collected between March and December 2021. Our design, hypotheses, and data-analysis plans were preregistered via OSF at: https://osf.io/y957b. Our study data and materials are accessible via OSF at: https://osf.io/huje6/?view_only=52ffc6bc9d9742d5b00a9d3ebc4072ed. The study was approved by the Ethics Review Board of the Faculty of Social and Behavioural Sciences, University of Amsterdam (2020-CDE-12637).

We conducted post-hoc power analyses for our preregistered logistic regression analyses ($N = 519$, α = .05, two-tailed). We had excellent power (.99) to detect a small-to-moderate main effect of experimental condition on selfishness ($OR = 2.25$; Chen et al., 2010), given a binomial distribution and equal group sizes (G*Power 3.1.9.2.; Faul et al., 2007). We also had excellent power (.90) to detect a small-to-moderate continuous moderator effect ($OR = 2.50$; Chen et al., 2010) of narcissism or agentic goals (Van Lissa, 2017).

Procedure

Experimental Task
We designed a new version of the dictator game (based on Forsythe et al., 1994; Molleman et al., 2022) to examine the effects of prospective status gains on adolescents' selfish behavior (piloted carefully before the study; S2). Before the study, adolescents were told that the study investigates adolescent decision-making. Adolescents first played round 1 of the game. They were told that they would partake in a lottery where they could win a 20-euro voucher. They were given 10 lottery tickets, which they could distribute between themselves and another student from the same grade (Figure 1). They could choose between an egalitarian distribution (i.e., 5 for themselves, 5 for the other student) or a selfish distribution (i.e., 7 for themselves, 3 for the other student) (0 = egalitarian; 1 = selfish). To rule out systematic order effects, we randomized which of these distributions was labeled as "A" or "B." The more tickets they kept for themselves, the higher the likelihood of winning the voucher.
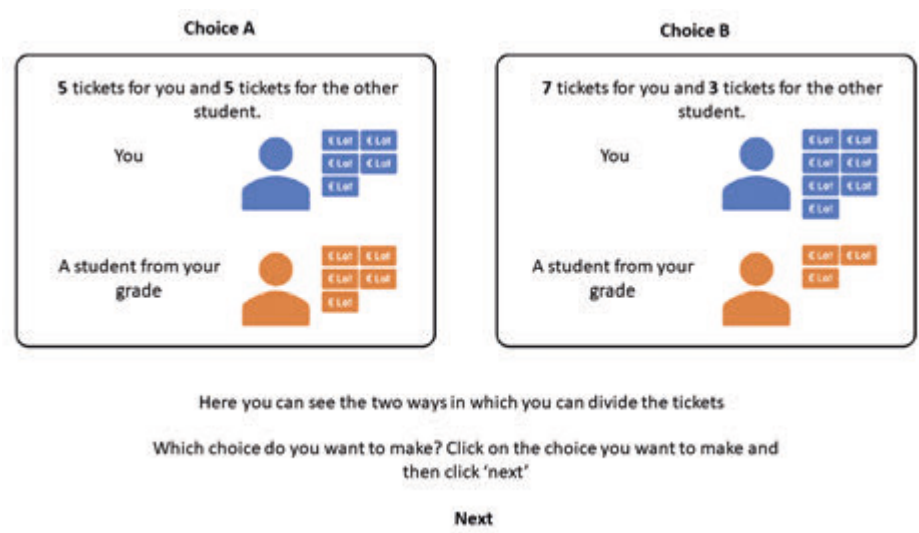
Figure 1. *Overview of Dictator Game Interface*

Note. Adolescents chose between an egalitarian distribution (i.e., 5 for themselves, 5 for the other student) or a selfish distribution (i.e., 7 for themselves, 3 for the other student). We randomized which of these distributions was labeled as "A" or "B." The more tickets they kept for themselves, the higher the likelihood of winning the voucher.

After the first round, adolescents were randomly assigned to the status-gain ($n = 207$) or status-loss ($n = 249$) condition (S1 for more information regarding the distribution of conditions in terms of age, gender, narcissism, agentic goals, and selfishness). In both

conditions, adolescents were passive observers of another student from the same grade playing the game (Figure 2). Adolescents observed the other student distributing the tickets in a selfish manner (i.e., 7 for themselves, 3 for the other student) while this student was observed by 25 other students online. These other students provided 'likes' or 'dislikes' in response to the distribution. In the *status-gain condition*, 18 students provided likes, whereas seven provided dislikes, thereby linking a selfish distribution to status gain. In the *status-loss condition*, 18 students provided dislikes, whereas seven provided likes, thereby linking a selfish distribution to status loss.

After the experimental manipulation, adolescents were told that they would play the game again while being observed by these 25 other students who would give likes or dislikes in response to their distribution. They were also told that researchers would publish a list of names from the three most popular students per class (students with the most likes and fewest dislikes), thereby linking their behavior more forcefully to status gain or loss. Adolescents could distribute tickets between themselves and another student from their grade (0 = egalitarian; 1 = selfish).

As manipulation checks, we asked adolescents: (1) "How many likes did the 25 students give to the other student?" (7, 18, or 25); (2) "What did you expect to receive when you would distribute the lottery tickets unequally the second time?" (likes or dislikes). When all students in a school had participated, adolescents were debriefed (e.g., informed about the aims of the study and the experimental manipulation).

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Figure 2. *Experimental Manipulation*

Note. Adolescents were randomly assigned to the status-gain or status-loss condition. In both conditions, adolescents were passive observers of another student from the same school playing the game (Figure 2). Adolescents observed the other student distributing the tickets in a selfish manner (i.e., 7 for themselves, 3 for the other student) while this student was observed by 25 other students online. These other students provided 'likes' or 'dislikes' in response to the distribution. In the *status-gain condition*, 18 students provided likes, whereas seven provided dislikes, thereby linking a selfish distribution to status gain (Panel A). In the *status-loss condition*, 18 students provided dislikes, whereas seven provided likes, thereby linking a selfish distribution to status loss (Panel B).

Questionnaires

After completing the experimental task, adolescents completed a series of questionnaires (for a complete overview, see OSF: https://osf.io/huje6/?view_only=52ffc6bc9d9742d5b00a9d3ebc4072ed). Consistent with our preregistration, we focus on narcissism and agentic goals.

Narcissism was measured using the 10-item Childhood Narcissism Scale (Thomaes et al., 2008). This scale captures narcissism as a unified, subclinical, and normally distributed personality trait (Thomaes & Brummelman, 2016). Example items of this scale are: "I think it is important to stand out" and "I am a very special person" (0 = *Not at all true*,

3 = *Completely true*). Responses were averaged across items, with higher scores reflecting higher narcissism ($M = 1.05$, $SD = 0.53$; $\omega = .83$).

Agentic goals were measured using subscales of the 33-item Interpersonal Goal Inventory (Ojanen et al., 2005; Thomaes et al., 2008), which is based on the interpersonal circumplex model (Gurtman, 1992; Locke, 2000). Adolescents were presented with the stem "When with your classmates, how important is it that…", followed by 33 items (ω of 0.83) tapping into various blends of agentic goals (e.g., "…the other respects and admires you") and communal goals (e.g., "…that you feel close to the others"). Adolescents rated the importance they ascribed to each goal (0 = *Not at all*, 3 = *Very much*). The inventory has eight subscales reflecting the different goal blends (ω range = 0.54–0.78; for details per subscale, see S3). Agentic goals were obtained by calculating vector scores for each participant (as described in Ojanen et al., 2005): Agentic – Submissive + (.707 × [Agentic and Communal + Agentic and Separate – Submissive and Communal – Submissive and Separate]) ($M = -6.63$, $SD = 4.48$), with higher scores reflecting higher agentic goals.

Data-Analysis

We conducted hierarchical logistic regression analyses, with selfishness as the dependent variable (0 = egalitarian, 1 = selfish). In Step 1, we added pre-manipulation selfishness (0 = egalitarian, 1 = selfish) as a covariate. In Step 2, we added experimental condition. In Step 3, we added the continuous predictor (narcissism or agentic goals). In Step 4, we added the experimental condition × continuous predictor interaction. We conducted three separate regression analyses: one for narcissism, one for agentic goals, and one for both narcissism and agentic goals. The latter analysis constrained as predictors: narcissism, agentic goals, the experimental condition × narcissism interaction, and the experimental condition × agentic goals interaction. We used two-tailed tests with $\alpha = .05$.

For each analysis, we assessed potential multivariate outliers using Cook's distance (Cook, 1977). There were no such outliers (all Cook's distances < 1). Although all participants had complete data on pre-manipulation selfishness, experimental condition, and post-manipulation selfishness, some had missing data on the questionnaires (508 adolescents had complete data on agentic goals, and 502 adolescents had complete data on narcissism).

RESULTS

Preliminary Analyses

There were no significant differences between conditions in gender, $X^2 = 5.30$, $p = .071$, pre-manipulation selfishness, $X^2 = 0.96$, $p = .328$, narcissism, $F(1, 500) = 1.32$, $p = .251$, or agentic goals, $F(1, 506) = 1.50$, $p = .222$, indicating that random assignment to conditions was successful.

The experimental manipulation was successful. In the status-gain (vs. status-loss) condition, adolescents were more likely (1) to report that the other student received 18 likes (rather than 7 likes) for their selfish behavior and (2) to expect receiving status gains (rather than status loss) when displaying selfish behavior (S4).

Preregistered Analyses

There was a significant main effect of the experimental condition on selfishness, $b = 0.98$, OR = 2.66, 95% CI = [1.73, 4.07], $p < .001$. As hypothesized, adolescents in the status-gain condition displayed more selfishness than did adolescents in the status-loss condition.

There was a significant main effect for narcissism on selfishness, $b = 0.57$, OR = 1.76, 95% CI = [1.17, 2.66], $p = .007$. Adolescents higher in narcissism displayed more selfish behavior. As hypothesized, there was a significant experimental condition × narcissism interaction on selfishness, $b = 0.94$, OR = 2.55, 95% CI = [1.09, 5.98], $p = .032$ (Figure 1). We followed up this significant interaction via simple slopes and simple effects analyses (PROCESS, Version 4.1; Hayes, 2013). Simple slopes analysis showed that, in the status-gain condition, there was a significant main effect of narcissism on selfishness, $b = 0.94$, $SE = .28$, $p < .001$, 95% CI = [0.39, 1.48]. By contrast, in the status-loss condition, there was no significant main effect of narcissism on selfishness, $b = 0.00$, $SE = .33$, $p = 0.999$, 95% CI = [-0.65, 0.65]. Simple effects analysis showed that the status gain (vs. status loss) condition increased selfish behavior among adolescents high in narcissism ($M + 1$ SD), $b = 1.42$, 95% CI = [0.81, 2.04], $p < .001$, and adolescents average in narcissism, $b = 0.93$, 95% CI = [0.49, 1.37], $p < .001$, but not among adolescents low in narcissism ($M - 1$ SD), $b = 1.42$, 95% CI = [-0.21, 1.08], $p = .182$.
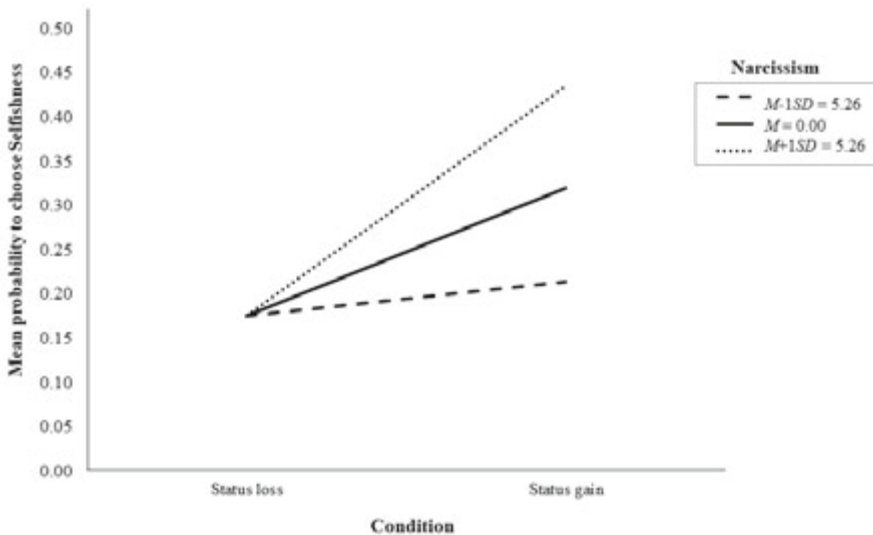
Figure 3. *The Interaction Between Experimental Condition and Narcissism on Selfishness*

There was a significant main effect of agentic goals on selfishness, $b = 0.05$, OR = 1.06, 95% CI = [1.01, 1.11], $p = .030$. Adolescents higher in agentic goals displayed more selfish behavior. Contrary to our hypothesis, there was no significant experimental condition × agentic goals interaction on selfishness, $b = 0.08$, OR = 1.08, 95% CI = [0.98, 1.20], $p = .114$.

When we added narcissism and agentic goals as predictors to the same model, the significant main effect of agentic goals on selfishness became non-significant, $b = 0.04$,

OR = 1.04, 95% CI = [0.99, 1.09], p =.163, but the significant main effect of narcissism on selfishness remained significant, b = 0.48, OR = 1.61, 95% CI = [1.05, 2.47], p = .028. When both two-way interactions were included in the model, the significant experimental condition × narcissism interaction became non-significant, albeit marginally, b = 0.82, OR = 2.28, 95% CI = [0.94, 5.52], p = .068. Given the positive correlation between agentic goals and narcissism, $r(500)$ = 0.30, p < .001, this finding suggests that part of the significant experimental condition × narcissism interaction is driven by agentic goals.

Exploratory Analyses

We explored how adolescents' selfishness changed (or did not change) from before to after the experimental manipulation. In the status-gain condition, 45% of adolescents were persistently egalitarian (i.e., making the egalitarian choice both pre- and post-manipulation), 29% were persistently selfish (i.e., making the selfish choice both pre- and post-manipulation), 10% switched from egalitarian to selfish, and 16% switched from selfish to egalitarian. By contrast, in the status-loss condition, 53% of adolescents were persistently egalitarian, 14% were persistently selfish, 7% switched from egalitarian to selfish, and 27% switched from selfish to egalitarian. This reveals two core differences between conditions: (1) In the status-gain condition, adolescents were more often persistently selfish (15% more compared to the status-loss condition). (2) In the status-loss condition, adolescents switched more often from selfish to egalitarian (11% more compared with the status-gain condition).

DISCUSSION

The aim of this preregistered experiment was to examine whether adolescents would engage in more selfish behavior in peer contexts that reward such behavior with social status. We also examined whether this effect would be more pronounced for adolescents higher in narcissism or agentic goals. Our results show that adolescents—especially those high in narcissism—engaged in more selfish behavior when they learned that such behavior could result in status gain. By contrast, adolescents high in agentic goals were not more likely than others to engage in selfish behavior in these contexts. Together, these results indicate that the prospect of gaining status can be an important incentive for adolescents to engage in selfish behavior, especially for adolescents high in narcissism.

Theoretical Implications

Our findings show that adolescent selfishness can be motivated by the prospect of gaining status. This is consistent with the view that social status is an important resource that adolescents seek to obtain, even when this means engaging in selfish behavior. As such, in some contexts, selfishness may be seen as behavior that serves the pursuit of status (Hawley, 1999; Reijntjes et al., 2013b; Volk et al., 2012; Volk, Dane et al., 2022). Our findings also underline that injunctive peer norms—which provide information on how status can be gained or lost—are important environmental cues that direct adolescent behavior

(Cialdini, 1988; Walton & Yeager, 2020; Yeager et al., 2019). Together, these insights suggest that some socially harmful behaviors might be considered forms of skillful self-regulation, rather than self-regulation failure (Baumeister & Vonasch, 2015; Kopetz & Orehek, 2015).

Our exploratory analyses show that adolescents who learned that selfishness leads (vs. does not lead) to status gains were more likely to be persistently selfish. What does this mean? This suggests that the prospect of gaining status licensed, rather than elicited, selfish behavior. That is, when adolescents behaved selfishly initially, they continued to behave selfishly when they learned that such behavior could lead to status gain. However, when they learned that selfishness could lead to status loss, they became more egalitarian. This is consistent with the view that selfishness can be instrumental in adolescence, benefiting autonomy and identity formation (Zimmer-Gembeck & Collins, 2008). Thus, adolescents may refrain from such behavior only when they learn that such behavior would result in status loss.

As we hypothesized, adolescents high in narcissism were more likely to behave selfishly when they learned that such behavior could lead to status gain. This is consistent with theoretical models suggesting that narcissism is characterized by a dominant motive for social status (Brummelman & Sedikides, 2021; Grapsas et al., 2020; Zeigler-Hill et al., 2018). Adolescents high in narcissism may readily detect status-relevant cues and engage in status-pursuing behaviors, even if those behaviors harm the interests of others (Grapsas et al., 2020). In fact, adolescents high in narcissism may not experience deficits in social cognition but rather use their social-cognitive skills to pursue selfish aims (Eddy, 2023).

Contrary to what we hypothesized, adolescents high in agentic goals were not more likely to behave selfishly when they learned that such behavior could lead to status gain. One explanation is that agentic goals capture more than just a desire for social status. For example, scholars have argued that agentic goals may reflect different desires, including autonomy (Deci & Ryan, 2000), dominance, and competence (Chen et al., 2014). Some adolescents high in agentic goals may have behaved selfishly because they could exert dominance or show competence by winning material resources. Other adolescents high in agentic goals may have paid little attention to what their peers endorsed because they wanted to make an autonomous choice. Thus, adolescents high in agentic goals may have multiple (and sometimes competing) desires, some of which may lead them to refrain from pursuing status or behaving selfishly.

Practical Implications

Changing adolescent behavior is notoriously difficult. In fact, some scholars have argued that "programs that target adolescents have not been established to be as effective as programs that target earlier ages" (Heckman & Kautz, 2013, p. 35). This also holds for programs that seek to discourage selfish behavior, such as bullying (e.g., Hensums et al., 2022; Yeager et al., 2015). One explanation is that traditional programs do not align with adolescents heightened status sensitivity (e.g., they impart information in ways that make adolescents feel infantilized; Yeager et al., 2018). Consistent with our findings, we suggest that adolescent behavior can be changed effectively by linking desirable behaviors to

status in a peer context (also see Chierchia et al., 2020; Molleman et al., 2022; van Hoorn et al., 2016). This is consistent with a series of interventions showing that changing classroom- or school-level social norms (e.g., teaching adolescents that prosocial behavior can lead to more status) can reduce conflict and bullying in adolescents (Paluck et al., 2016; Perkins et al., 2011). Such interventions treat adolescents as active agents who have a leading role in creating a positive and healthy environment for themselves and their peers, which makes adolescents feel respected. We call for intervention research that works closely with adolescents to redefine and spread classroom- or school-level social norms to encourage egalitarianism.

Strengths, Limitations, and Future Directions

Our study has strengths. We conducted a well-powered and pre-registered experimental test of how status pursuit can contribute to selfishness in adolescence by manipulating peer norms that reward selfish behavior with status gain or status loss. We showed that a seemingly minor social cue—observing another peer's behavior being rewarded with status gain or loss—can lead to behavioral change in adolescence, underscoring the power of peer norms.

Our study also has limitations. First, our study focused exclusively on injunctive norms. Descriptive norms can also be powerful in adolescence (Baumgartner et al., 2011; Grønhøj & Thøgersen, 2012; Manning, 2009). Future research could examine whether a combination of descriptive and injunctive norms (e.g., showing that selfish behavior is not only uncommon but also punished with status loss) is especially powerful in reducing selfishness. Second, our study was conducted in a controlled environment outside of a regular classroom to establish causality. How do adolescents detect injunctive peer norms in their regular classrooms? And how do these peer norms, in turn, affect their selfishness? These questions should be examined in observational-longitudinal work. Third, our experimental manipulation focused on social status. Of course, adolescents are not only motivated by social status, but also by other rewards, such as inclusion in a peer group (i.e., communal goals; Abele & Wojciszke, 2014, Hogan & Hogan, 1991). Future research could examine whether the prospect of inclusion (and the threat of exclusion) would similarly motivate adolescent behavior.

Our findings also generate new questions for future research. One question is when and why the motive for social status is most pronounced. Some scholars suggest that adolescents desire status more strongly in contexts characterized by resource scarcity or instability (Belsky et al., 1991; Dodge & Albert, 2012; Ellis et al., 2012; Hawley, 1999; Pan et al., 2020). Would adolescents pursue status more vigorously in contexts of resource scarcity or instability? If so, would this pursuit be more likely to contribute to selfishness in contexts that reward such behavior with status? Another question is how the motive for social status differs across cultures (Torelli et al., 2020). Individualistic cultures prioritize personal goals over ingroup goals, whereas collectivistic cultures prioritize ingroup goals over personal goals (Singelis et al., 1995). Would adolescents in individualistic cultures be more likely to behave selfishly in contexts that reward selfishness with status? Conversely, would

adolescents in collectivistic cultures be more likely to behave in an egalitarian manner in contexts that reward egalitarianism with status? Addressing these questions will help elucidate the conditions under which injunctive peer norms guide adolescent behavior.

CONCLUSION

Would adolescents engage in selfish behavior when they learn that such behavior will result in status? Would this be most pronounced for adolescents high in narcissism or agentic goals, who desire status strongly? Our results show that adolescents, especially those higher in narcissism (but not those higher in agentic goals), behaved more selfishly after learning that such behavior could lead to status gain. Our findings underscore the power of peer norms for changing adolescent behavior—for better and for worse. Adolescents will likely engage in behaviors that contribute to a resource they care about deeply: social status.

4

CHAPTER 5

YouTube Vloggers set the Stage:
How Public (Non) Compliance with
COVID-19 Regulations Affects Adolescents

ABSTRACT

Introduction: YouTube vloggers may be important socialization figures, yet their influence on adolescents' health-related behaviors and cognitions is largely untested. In this two-study mixed-method project, we first assessed the extent of (non)compliance to COVID-19 regulations by vloggers on YouTube and how viewers reacted to this. Second, we experimentally assessed the effects of vlogger behavior paired with viewer evaluations on adolescents' COVID-19-related attitudes, intentions, and behavior.

Methods: For Study 1, we coded 240 vlogs of eight popular Dutch vloggers on YouTube recorded in the period of February 2020–March 2021. For our 2×2 between-subjects experiment in Study 2, Dutch adolescents ($N = 285$, $M_{age} = 12.99$, $SD = 1.02$, 41.8% girls) were randomly assigned to conditions in which they saw vlogs showing either compliance or noncompliance to COVID-19 regulations, and to conditions in which they saw either supportive or dismissive comments under these vlogs.

Results: Study 1: Vloggers' noncompliance with COVID-19 regulations was not uncommon and received relatively more viewer support than compliance, suggesting that portrayed noncompliance may be potentially influential. Study 2: adolescents were more worried about COVID-19 after they watched a compliant (vs. noncompliant) vlogger. Also, vlogger noncompliance decreased adolescents' perceived importance of COVID-19 regulations and rule-setting for adolescents who identified strongly with the vloggers they watched.

Conclusions: Vloggers' (non)compliance affects adolescents' COVID-19 related worrying, and attitudes and behavior of adolescents who identify with vloggers strongly. This seems concerning given the sometimes harmful and risky behaviors vloggers portray online but could potentially also be employed to encourage healthy behaviors.

Keywords: YouTube, Vloggers, Socialization, COVID-19, Online Peer Influence, Adolescence

INTRODUCTION

December 2019 marked the beginning of the COVID-19 pandemic (WHO, 2020). Authorities enacted restrictions to prevent the disease from spreading, and debates and initiatives that supported or thwarted COVID-19 restrictions received attention. One online campaign (#I'mOut), in which famous Dutch influencers publicly stated that they stopped complying with the restrictions and also encouraged their followers to stop complying, even went viral (BBC, 2020). Such statements raise societal questions about influencers' impact on their young followers, but there is little empirical research to provide answers. We conducted two studies with a mixed-method approach. Study 1 featured a content analysis assessing whether vloggers showed (non)compliance to COVID-19 enacted regulations, whether verbal comments of vloggers about COVID-19 supported or dismissed COVID-19 regulations, and how viewers reacted to different types of content. Study 2 featured an experiment, in which we exposed adolescents to compliant or noncompliant content of YouTube vlogs gathered in Study 1, as well as peers' dismissive or supportive evaluations of these behaviors, to test the effects of vlogger (non)compliance and viewer evaluations on adolescents' COVID-19 related attitudes, intentions, and behaviors. As such, Study 1 provided insight into the COVID-19-related vlogger content that adolescents were exposed to in their daily lives, and Study 2 examined whether this (non)compliant vlogger content influenced adolescent viewers positively or negatively.

(Online) Social Learning in Adolescence

According to the theory of reasoned action (Fishbein & Ajzen, 1975), (non)compliance with COVID-19 regulations is influenced by the interplay between individuals' attitudes, behavioral intentions, and their perception of social norms. Social norms are group-based standards about appropriate behaviors and attitudes and are communicated in two different ways: descriptively, by how everyone behaves, and injunctively by discussing what should be done (Cialdini, 1988). Social norms can be informative sources for adolescents (Laursen & Veenstra, 2021).

Because adolescents' social lives increasingly take place online—a youth monitor showed that 96% used social media, and 84% of this group (almost) daily (Rombouts et al., 2020)—social norms in the peer context are also communicated online. Adolescents pick up on social norms in online interactions with familiar and unfamiliar peers, like influencers—influential people on (social) media (Elmore et al., 2017; Strasburger & Wilson, 2002). One popular type of influencer is "vloggers". Vloggers, sometimes having up to millions of followers, regularly upload vlogs—video blogs—showing their daily lives. Vloggers communicate descriptive norms by showing their behavior, and injunctive norms by discussing what behavior is appropriate or should lead to certain evaluations.

Vloggers are popular among adolescents, and adolescents are more likely to copy high-status peers' behaviors compared with low-status peers (Bandura, 1977; Choukas-Bradley et al., 2015; Cohen & Prinstein, 2006; Gradassi et al., 2022). On YouTube, vloggers can receive supportive or dismissive evaluations from their viewers, in terms of (dis)likes

and positive or negative comments, which communicates injunctive norms about how behavior is rewarded. When adolescents witness vlogger behaviors as being rewarded with supportive evaluations, adolescents might model these behaviors (Bandura, 1977). Even when these behaviors are dangerous or illegal, supportive online evaluations can lower adolescents' inhibition to partake in these behaviors (Sherman et al., 2018). Especially during early adolescence (Reiter et al., 2021), susceptibility to peer influence and concerns with social rewards both online and offline increase (Laursen & Veenstra, 2021; Sherman et al., 2016). Thus, vloggers are potentially powerful socialization agents because of their popularity, and by providing supportive evaluations of vloggers' behaviors peer viewers can further increase the likelihood of adolescents modeling vloggers' attitudes and behavior.

Few studies investigated online socialization processes related to vloggers and health cognitions and behavior by directly assessing how content of influential social media figures impacts adolescent followers' health-risks (for a review see Alves de Castro et al., 2021). This is important, however, as health risk behaviors generally increase throughout adolescence (Mahalik et al., 2013), and have been especially concerning during the COVID pandemic (Shroff et al., 2022) which may lead to general deterioration of adolescent health (Hale & Viner, 2012). Experimental evidence that does exist suggested that children who were exposed to influencers promoting unhealthy (vs. healthy) snacks also consumed more unhealthy snacks (Coates et al., 2019). Longitudinal evidence on broader media influencers demonstrated that non-smoking adolescent girls whose idols smoked (vs. did not smoke) in movies had an increased risk to start smoking (Distefan et al., 2004). It remains to be uncovered whether, to what extent, and for whom vloggers socialize taking health risks during a pandemic. We conducted two studies examining (1) which COVID-19-related norms vloggers convey, and (2) whether vloggers who comply or do not comply with COVID-19 regulations and who receive supportive instead of dismissive evaluations for it evoke similar attitudes, intentions, and behaviors in adolescents.

Study 1

In Study 1, we performed an exploratory content analysis of popular Dutch YouTube vlogs during the pandemic, assessing 1) vloggers' compliance and noncompliance with COVID-19 regulations in the Netherlands (descriptive norms), 2) vloggers' statements about COVID-19 and about following COVID-19 regulations (injunctive norms), and 3) how YouTube videos with different levels of (non)compliance and supportive and dismissive comments were evaluated by viewers.

METHODS

Participant Selection

Ethical approval from the University of Amsterdam was provided for all procedures (ERB number 13130). Eight Dutch vloggers (four female) were selected (See S1 for more information), their age ranged from 19 to 34 (M_{age} = 24.5, SD = 4.50), and their number of subscribers ranged from 148,000–2,560,000 on February 18th, 2021.

Setting and Data Collection

We identified five different COVID-19 regulation phases in the Netherlands from February 2020-March 2021, in which COVID-19 severity and enacted regulations were different (S2). Per vlogger we selected six vlogs per regulation phase, to obtain equal number of vlogs across all regulation-phases and vloggers. When a vlogger had more than six vlogs in a particular COVID-19 regulation phase, we randomly selected six vlogs (S1) leading to a total of 240, 30 per vlogger. The vlogs were coded by seven coders each following the codebook (https://osf.io/me8yx), 18% of the vlogs were double-coded.

Content Analysis

We performed a qualitative content-analysis of vlogs (https://osf.io/tpw7z, Krippendorff, 2018; Tong et al., 2007). We derived meaning from the observed content (behavioral and verbal) by categorizing behavior (compliant or noncompliant) and statements (neutral, supportive, dismissive) of vloggers. We coded the number of likes, dislikes, and views of each vlog and performed a content-analysis on the comments under videos, categorizing comments as neutral, supportive, or dismissive. We based our categorizations on previous content-analyses on social media platforms (Beullens & Schepers, 2013; Hendriks et al., 2018). Absolute agreement of coding was 74% (range 67%–82%) which was adequate (Hartmann, 1977).

Vlogger Behavior and Statements

Vlogger Behaviors. Per regulation phase, we coded whether vloggers complied with the respective COVID-19 regulations that were in effect (Table 1; S2) and the frequency of compliance and noncompliance for specific regulations in the videos (e.g., how often a vlogger wore a face mask in different scenes in one video).

Vlogger Statements. We coded how vloggers verbally evaluated COVID-19 and the regulations in place, whether statements were neutral ("We cannot go to the cinema because it is closed due to COVID-19."), supportive ("I find the regulations important and I therefore comply with them."), or dismissive ("COVID-19 is just a flu, everybody is lying.").

Viewer Evaluations

Like Rate. We subtracted the number of likes, dislikes, and views on February 18th, 2021. We calculated a like-rate by subtracting the number of dislikes from likes, dividing this by the total views and multiplying this by one hundred (Niu et al., 2021).

Comments. We substracted the COVID-19 related comments from viewers under vlogs on February 18th 2021. We coded comments that concerned the vlogger (in relation to COVID-19), COVID-19, or the enacted regulations. We coded whether comments were neutral, supportive, or dismissive. Comments that were not within one of these categories were coded as ambivalent.

Table 1. *Coded (Non)Compliance with COVID-19 Regulations*

1.	Keeping social distance (in the Netherlands this was 1.5 meter)
2.	Working from home
3.	Staying at home and testing when you experience symptoms
4.	The maximum number of people inside (differs per phase)
5.	The maximum number of people outside (differs per phase)
6.	Making use of 'contact-jobs', such as going to the hairdresser
7.	Traveling outside of the country (and going in quarantine after returning home)
8.	Wearing a face mask
9.	Going into quarantine after a positive COVID-19 test result
10.	Going to the shops alone
11.	Keeping curfew

Strategy for Analysis

We examined how often regulations were violated and complied with and how often neutral, supportive, and dismissive statements were made by vloggers. Next, we compared vlogs with more noncompliance than compliance, and more dismissal than support (and vice versa), examining whether these vlogs received none or at least one supportive or dismissive comment about the vlogger from viewers. Finally, we calculated bivariate correlations between and within vlogger- and viewer outcomes.

RESULTS

Vloggers' (non)Compliance, Support, and Dismissal of COVID-19 Regulations

Across all videos ($N = 240$) and for all regulations combined, the average number of violations per vlog was $M = 4.90$, $SD = 5.37$, and of compliance per vlog was $M = 37.01$, $SD = 29.18$, with an average time per vlog of 28.06 minutes ($SD = 15.08$). Among the three most popular vloggers, who had more than 1 million followers, one was relatively compliant with regulations, one was in the middle on compliance, and one was relatively non-compliant, indicating there was much variation in COVID-19 regulation compliance between the most popular vloggers. The regulation of social distancing was violated in over half of the vlogs (68.4%), working from home was violated in approximately a third of the vlogs (27.1%), and the regulation of wearing a face mask was violated in approximately a fifth of the vlogs (19.2%).

Statements that were related to COVID-19 regulations were infrequent; vloggers did not often speak about COVID-19 regulations. Most statements were neutral ($M = 2.53$, $SD = 4.52$), followed by dismissive ($M = 0.81$, $SD = 1.96$), and supportive statements ($M = 0.69$, $SD = 1.50$). For more descriptive information and examples of violations and statements see S3.

Linking Vloggers' Behavior and Statements with Viewer Evaluations

Viewers provided support and dismissal for vlogs that portrayed varying levels of (non)-compliance, support, and dismissal (Table 2).

Table 2. *Viewers' Support for and Dismissal of Vlogs*

	Percentage of vlogs with at least 1 supportive comment for vlogger by viewers	Percentage of vlogs with at least 1 dismissive comment for vlogger by viewers
Vloggers' (non)compliance and Statements in vlogs:		
More compliance than noncompliance ($N = 204$)	38.24%	39.71%
More noncompliance than compliance ($N = 11$)	54.55%	81.82%
As much compliance as noncompliance ($N = 25$)	32.00%	52.00%
More support than dismissal ($N = 45$)	55.56%	51.11%
More dismissal than support ($N = 46$)	58.70%	43.48%
As much support as dismissal ($N = 149$)	26.85%	40.27%

Correlations indicated that when vloggers showed more noncompliance, viewers expressed more dismissal of the vlogger. When vloggers showed more compliance, there was a lower like rate. When vloggers were more dismissive *and* when they were more supportive about COVID-19, there was a lower like-rate, and viewers expressed more

support and more dismissal of the vlogger and of COVID-19. These were small or small to moderate correlations, with exception of the large correlation between dismissive COVID-19-related statements of vloggers and viewer dismissal of COVID-19. More descriptive information and interpretation of correlations are presented in S3.

Table 3. *Bivariate Correlations Between the Main Variables of Interest*

	1.	2.	3.	4.	5.	6.	7.	8.	9.
Vloggers									
1. Noncompliance	-								
2. Compliance	.114	-							
3. Dismissal	.004	.050	-						
4. Support	-.191**	.094	.390*	-					
Viewers									
5. Like Rate	.084	-.377**	-.177**	-.212**	-				
6. Support vlogger	-.034	-.044	.237*	.190**	-.015	-			
7. Support COVID-19	-.028	.066	.130*	.158*	-.119	.454**	-		
8. Dismissal vlogger	.134*	-.081	.243*	.169*	.057	.730**	.571*	-	
9. Dismissal COVID-19	-.005	-.048	.466*	.215**	-.098	.645**	.551**	.610*	-

Note. * Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed)

DISCUSSION

Study 1 examined COVID-19 related norms portrayed in popular YouTube vlogs. Both compliance and noncompliance with COVID-19 regulations were modeled by vloggers, and vloggers both supported and dismissed COVID-19 regulations. Although vloggers mostly showed compliance and received relatively more dismissive comments for being noncompliant than vloggers who complied, noncompliant vloggers also received relatively more support from viewers. When vloggers verbally dismissed COVID-19 and the regulations in place, this was reflected in more dismissive comments about COVID-19 made by viewers—signaling a shared vlogger-viewer perspective. These results demonstrated that adolescents have ample opportunity and motivation to learn noncompliance from vloggers, emphasizing the need to unravel to what extent vloggers may influence adolescents' attitudes, intentions, and behavior.

Study 2

In order to test the causal effect of vlogger COVID-19-related behaviors we conducted a 2×2 between-subjects experimental study in which we randomly exposed adolescents to either compliant or noncompliant behavior of vloggers, and either supportive or

dismissive comments of viewers on vloggers' behaviors. We hypothesized that when adolescents were exposed to vloggers that did not comply (vs. complied) with regulations, adolescents would have 1) less cautious attitudes as indicated by lower levels of perceived importance of adhering to COVID-19 regulations; 2) less cautious COVID-19-related behavioral intentions; and 3) less cautious behavior as indicated by looser COVID-19 rule-setting. We hypothesized that this effect would be more pronounced in conditions where other viewers provided supportive, instead of dismissive, evaluations of vloggers' noncompliance. Exploratively, we included adolescents' COVID-19-related worrying and identification with the vlogger.

METHODS

Participants
 In March and April 2022, 285 adolescents (41.8% girls, 0.7% who identified as non-binary, 0.7% who preferred not to disclose) aged 11–16 years ($M = 12.99$, $SD = 1.02$) from average or higher level (47.4%) secondary education participated. Adolescents came from 19 school classes in two different secondary schools in the Northern and Eastern part of the Netherlands. The schools were situated in regions with relatively high income per inhabitant.

Recruitment and Procedure
All study procedures (S4) were approved by the University of Amsterdam (ERB number 14267). This study was preregistered on the Open Science Framework (OSF; https://osf.io/qdjty). Caregivers provided active consent and adolescents provided assent to participate. Data collection took place in classrooms via computers. Adolescents filled in the first set of questionnaires, conducted the experiment, then filled in the second set of questionnaires. Afterward, adolescents were debriefed about the different conditions in our experiment. Schools received information about our general study findings, social media, and adolescent development.

   First, adolescents chose one out of four vloggers to watch. Adolescents were then randomized into either a 1) compliant or 2) noncompliant vlogger condition, and a 1) supportive or 2) dismissive viewer evaluation condition. Adolescents then watched three clips from vloggers showing three different occasions in which the vlogger either complied or did not comply with the regulations. One clip focused on social distancing, one on the number of people inside the house, and one on wearing a face mask. The order of clips was randomized within adolescents. After each clip, adolescents saw three comments from other anonymous viewers that evaluated the behavior of the vlogger. Manipulation checks occurred after each clip and after each comments section. Adolescents indicated whether the vlogger complied with the regulation or did not comply and whether the viewers agreed or disagreed with the vlogger. Adolescents 'passed' when most of the questions were answered correctly: 99.65% of adolescents interpreted correctly whether vloggers

complied or did not comply with the regulations in place, and 92.28% of adolescents interpreted the comments of other viewers correctly.

Conditions

Vlogger (Non)compliance. The vlogger complied with the enacted regulations (compliance condition coded as 0), or the vlogger did not comply with the enacted regulations (noncompliance condition coded as 1).

Viewer Evaluations. Supportive evaluated behavior was for example: 'Good that you follow the corona rules!!', or 'You give a good example, you should NOT follow the regulations' (coded as 0). Dismissive evaluated behavior was for example 'Screw you, why would you be mindful of corona, bullshit', or 'No respect for you since you don't give a shit about the regulations' (coded as 1).

Measures

We asked adolescents: '*Imagine that a new variant of COVID-19 comes to the Netherlands. We don't know whether this variant is worse or less bad than the previous variants that we had here. We might need to go into lockdown again. Imagine what your answers would be in that situation.*'

Perceived Importance of Adhering to COVID Regulations

This is a 7-item questionnaire about which regulations adolescents find important (I find it important to… 'Wear face masks in public places', and 'Avoid meeting up with groups of friends'), answered on a 4-point Likert scale (0 = strongly disagree, 3 = strongly agree). We derived an average score of perceived importance of regulations, with higher scores indicating greater importance ($\omega = 0.887$).

Perceived Risk of Becoming Infected, Hospitalized, or Dying from COVID

For three questions, adolescents indicated on a scale from 0% to 100% how high they think certain chances are regarding COVID-19. An example statement was: 'How high do you think the chance is that you get COVID-19?' A total risk perception was derived by averaging the risk perception across the three items, with higher scores indicating a higher risk perception. The questionnaire had an insufficient reliability score of $\omega = 0.502$. Therefore, we only report the preregistered analyses with own-risk perceptions in the supplementary materials (S5) and we did not include the risk perception variable in our explorative analyses.

Intentions to Comply with Regulations

This was a 7-item questionnaire (e.g., what would you do? 'Wear face masks in public places'), answered on a 4-point Likert scale (0= not at all likely, 3 = very likely). We derived an average score of behavioral intentions, with higher scores indicating more cautious behaviors ($\omega = 0.878$).

COVID-19 Rule-Setting

This was a 7-item questionnaire where adolescents were asked to imagine that they were the minister who gets to decide the COVID-19 regulations in the Netherlands. They were asked which rules they would set (e.g., 'People must wear face masks in public places as much as possible'), answered on a 4-point Likert scale (0 = I would certainly not set this rule, 3 = I would certainly set this rule). We derived an average score for the task, with higher scores indicating stricter rule-setting ($\omega = 0.853$).

Identification with Vlogger

This was a Dutch translation of the Other in the Self scale (Aron et al., 1992). Adolescents were presented with seven pictures showing two circles representing themselves and the vlogger that overlapped to varying degrees, they were instructed to select the one that best described their connection with the vlogger that they chose to watch vlogs from in our study. More overlap in the circles indicated more perceived overlap and a higher level of identification with the vlogger.

Worrying about COVID-19

This was a 4-item questionnaire about COVID-19 related worrying of adolescents based on a similar questionnaire used by Bazzoli et al., (2021; e.g., 'COVID-19 is a big threat for the health of people'). The questions were answered on a 4-point Likert scale (0=Not at all true, 3=Completely true). Average scores of COVID-19 related worrying were derived, with higher scores indicating greater levels of worrying ($\omega = 0.770$).

Statistical Analyses

We carried out three separate ANOVAs, one for each dependent variable: (1) perceived importance of adhering to COVID regulations; (2) intentions to comply with COVID regulations; and (3) advocation of tighter or more relaxed COVID regulations.

To test Hypothesis 1, we conducted ANOVAs with vlogger (non)compliance as the between-subjects variable. Hypothesis 1 was confirmed when the main effect of vlogger (non)compliance was significant, showing significantly (i) lower perceived importance of adhering to COVID regulations; (ii) weaker intentions to comply with COVID regulations; and (iii) advocating more relaxed COVID regulations after watching a noncompliant vlogger.

To test Hypothesis 2, we conducted ANOVAs with vlogger (non)compliance and viewer evaluations, and their interaction as the between-subjects variables. Hypothesis 2 was confirmed when the (non)compliance × viewer evaluations interaction was significant, showing that the hypothesized main effects of vlogger noncompliance (vs. compliance) on adolescents' perceived importance of the regulations, intentions to comply with regulations, and COVID-19 rule-setting are stronger if vlogger behavior is followed by supportive (instead of dismissive) viewer evaluations.

For all tests, we used two-tailed tests with $a < .05$ as an indicator for significance. We performed one sensitivity analysis regarding the manipulation checks. All analyses were

carried out twice, once with the entire sample and once without the adolescents that failed the manipulation checks (S6). Whenever this led to significant differences in any of our analyses, we interpreted the results of the sample without the adolescents that failed the manipulation checks.

RESULTS

Descriptive Analysis
The conditions were distributed equally (S7). Three adolescents stopped the experiment prior to the random assignment of conditions and were removed from analyses. Adolescents with higher perceived importance of adhering to regulations also had higher intentions to comply with the regulations and set stricter COVID-19 rules and adolescents with higher intentions to comply with the regulations also set stricter COVID-19 rules (large effects; Table 4).

Table 4. *Correlations Variables of Interest*

	M	*SD*	*N*	1	2	3	4	5
1. Perceived importance of adhering to regulations	1.66	0.73	281	-				
2. Intentions to comply with regulations	1.84	0.68	277	.84**	-			
3. COVID Rule setting	1.88	0.65	276	.75**	.71**	-		
4. COVID-19 related Worrying	1.11	0.65	279	.53**	.55**	.50*	-	
5. Identification with vlogger	0.71	1.21	285	-.06	.02	-.10	-.10	-

R Note. - = sig. at the 0.05 level, ** = sig. at the 0.01 level [two-tailed].

Main Analyses
Assumptions for ANOVA were met (S8). None of the analyses showed significant differences between conditions—adolescents watching noncompliant or compliant vloggers—in adolescents' perceived importance of adhering to the regulations, behavioral intentions to comply with the regulations, and COVID-19 rule-setting (Table 5). In addition, the effect of vloggers' behavior on adolescent outcomes was not moderated by other viewers' evaluations.

Table 5. *NOVA Main Analyses of the Effect of Vlogger (non)Compliance and Viewer Evaluation on our Main Outcomes*

	Sum of Squares	df	Mean Square	F	p	η²
Perceived Importance of Adhering to Regulations						
N = 281, R²=.011						
Vlogger non(compliance)	0.121	1	0.121	0.121	.728	.000
Viewer evaluation	1.289	1	1.289	1.290	.257	.005
Vlogger non(compliance)* Viewer evaluation	1.734	1	1.734	1.735	.189	.006
Behavioral Intentions to Comply with Regulations						
N = 277, R²=.019						
Vlogger (non)compliance	.016	1	.016	.016	.900	.000
Viewer evaluation	2.314	1	2.314	2.333	.128	.008
Vlogger (non)compliance* Viewer evaluation	2.821	1	2.821	2.844	.093	.010
COVID-19 Rule-Setting						
N = 276, R²=.007						
Vlogger non(compliance)	.128	1	.128	.127	.721	.000
Viewer evaluation	.103	1	.103	.103	.749	.000
Vlogger (non)compliance* Viewer evaluation	1.642	1	1.642	1.635	.202	.006

Note. -* = sig. at the 0.05 level, ** = sig. at the 0.01 level [two-tailed].

Exploratory Analyses

COVID-19 Related Worrying

We assessed whether vloggers' behavior affected adolescents' levels of worrying. The behavior of vloggers had a significant effect on adolescents' levels of worrying, $F(1, 275) = 4.018$, $p = .046$, $R^2 = .027$, $η^2 = .014$. This small effect (Cohen & Cohen, 1983) indicated higher levels of worrying among adolescents who saw vloggers comply (vs. not comply) with the COVID-19 regulations. There was no moderating effect of the evaluations of viewers $F(1, 275) = 0.654$, $p = .419$.

Moderation of Identification with Vloggers

To investigate whether identification with the vlogger moderated the effect of vloggers' behavior on all outcomes, we used PROCESS models of Hayes (Model 2; Hayes, 2013). Before conducting the analyses, data inspection revealed skewed data for the variable Vlogger identification with low frequencies for the last answer categories. We used truncation and collapsed answer categories 4, 5, and 6 into one.

When identification with the vlogger was higher, adolescents were more likely to perceive lower importance regulation adherence, and to endorse looser rule-setting when they saw a noncompliant vlogger (Table 6, Figure 1). This was a small effect for perceived importance regulation adherence, $\Delta R^2 = .018$, $f^2 = 0.018$, $p = .030$, and a large effect for rule-setting, $\Delta R^2 = .029$, $f^2 = 0.408$ $p = .006$ (Cohen, 1992). As these results were significantly

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different when we removed data of adolescents who failed the manipulation checks, we reported the results that only included adolescents who passed the manipulation checks.

Table 6. *Interaction Effects with Identification with Vlogger* **After Manipulation Check Removal**

	b(SE)	t	95% CI Lower	95% CI Upper
Perceived Importance of Adhering to the Regulations $N = 260$, R²= .036				
Vlogger (non)compliance	.002 (.194)	0.010	-0.380	0.384
Viewer Evaluation	-.294 (.168)	-1.753	-0.625	0.036
Vlogger (non)compliance* Viewer Evaluation	.403 (.247)	1.632	-0.083	0.889
Identification	.060 (.078)	0.774	-0.093	0.213
Vlogger (non)compliance* Identification	-.249* (.114)	-2.180	-0.474	-0.024
Behavioral Intentions $N = 258$, R²= .042				
Vlogger (non)compliance	-.048 (.195)	-0.246	-0.433	0.337
Viewer Evaluation	-.375*ᵃ (.169)	-2.221	-0.707	-0.042
Vlogger non(compliance)* Viewer Evaluation	.445 (.248)	1.792	-0.044	0.933
Identification	-.003 (.078)	-0.041	-0.157	0.151
Vlogger (non)compliance* Identification	-.202 (.115)	-1.759	-0.427	0.024
COVID-19 Rule-Setting $N = 257$, R²= .047				
Vlogger (non)compliance	-.018 (.194)	-0.093	-0.340	0.364
Viewer Evaluation	-.100 (.168)	-0.597	-0.431	0.231
Vlogger (non)compliance* Viewer Evaluation	.378 (.246)	1.536	-0.107	0.864
Identification	.064 (.078)	0.822	-0.089	0.218
Vlogger (non)compliance* Identification	-.315** (.114)	-2.766	-0.540	-0.091
Worrying $N = 258$, R²= .030				
Vlogger (non)compliance	-.426* (.183)	-2.143	-0.817	-0.034
Viewer Evaluation	-.299 (.172)	-1.741	-0.637	0.039
Vlogger (non)compliance* Viewer Evaluation	.271 (.252)	1.075	-0.226	0.768
Identification	-.009 (.080)	-0.112	-0.166	0.148
Vlogger (non)compliance* Identification	.041 (.117)	0.354	-0.188	0.271

Note. -* = sig. at the 0.05 level, ** = sig. at the 0.01 level [two-tailed].
ᵃ This significant main effect of viewer evaluations indicated that when adolescents saw negative evaluations (regardless of whether this was a negative evaluation of compliance or noncompliance) adolescents were likely to have lower behavioral intentions to follow the regulations.
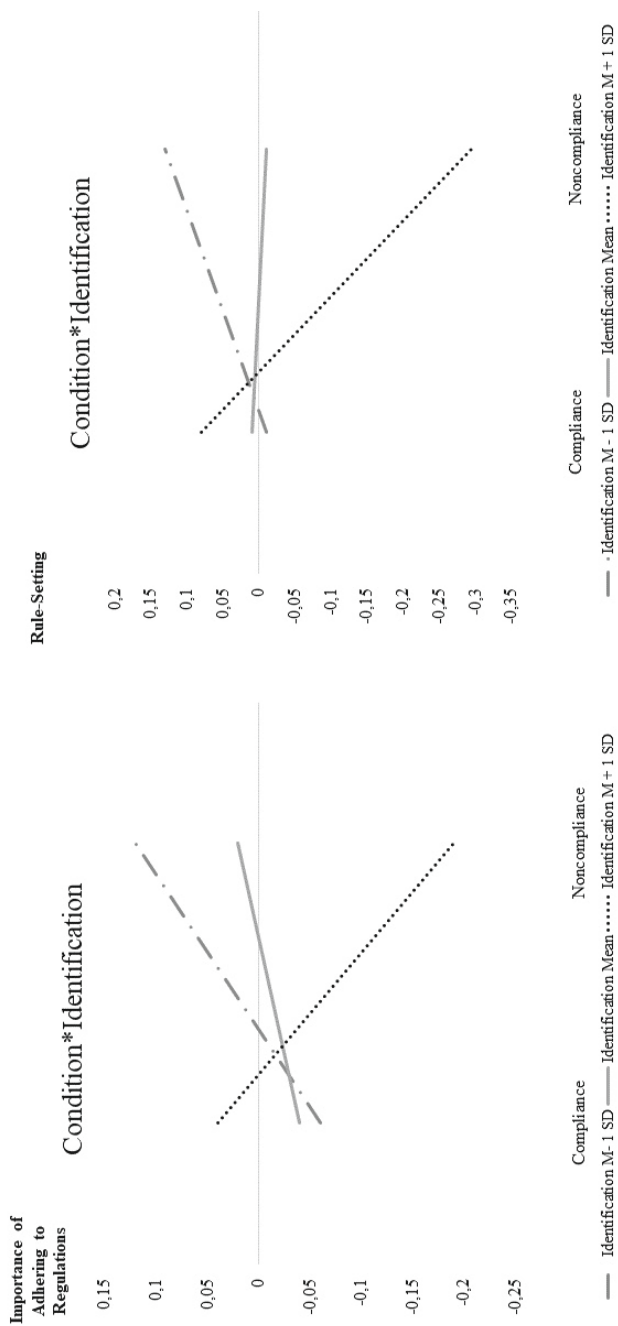
Figure 1. *Identification by Vlogger Behavior on Perceived Importance of Regulations and Rule-setting*

Note. We generated regions of significance with Johnson-Neyman intervals for the significant interactions (Hayes, 2013). The intervals indicated that the effect of vloggers' behavior became significant at higher levels of identification with the vlogger (I.e., 3.448 and above for attitudes, and 1.634 and above for rule-setting). Of the participants, approximately 4% scored above 3.488 on identification, and 18% scored above 1.634 on identification.

GENERAL DISCUSSION

In two studies, we applied social learning theory (Bandura, 1977) to an online context, examining whether vloggers were effective socialization agents in times of the COVID-19 pandemic. Our content-analysis indicated that vloggers mostly showed compliance, but vloggers' noncompliance was not uncommon, and although receiving more dismissal than compliance, noncompliance also received relatively more support—suggesting that noncompliance may be potentially influential. Our experimental findings showed that although there was no main effect of vlogger (non)compliance on adolescents (except for levels of worrying), explorative analyses indicated that vlogger socialization effects were present for some adolescents; vloggers' behaviors affected perceived importance of adhering to the regulations and COVID-19 rule setting for adolescents with higher levels of identification with the vlogger.

Opening the Black Box of Vlogger Socialization

We did not find much evidence for general vlogger socialization effects, apart from the effect of vloggers' (non)compliance on adolescents' levels of worrying—when vloggers complied adolescents worried more, and when vloggers did not comply, adolescents worried less. Worrying about COVID-19 was previously linked with the development of mental health problems in adolescents during the pandemic (Nearchou et al., 2020), which, counterintuitively, also signals a potential threat of modeled compliance and buffer-effect of modeled noncompliance.

The theory of planned behavior might provide an explanation for the absence of more general socialization effects, related to perceived behavioral control (Ajzen, 1985). Perceived behavioral control refers to the belief one has that one can engage in specific behavior, depending on resources, opportunities, or lack of obstacles, and was previously identified as a relevant contributor to adolescents' COVID-19 behaviors (Park & Oh, 2022). Adolescents might perceive more obstacles (parental monitoring and control), less opportunities (social gatherings), and less resources (money or social contacts) than they perceive vloggers to have. This may impact whether adolescents believe that what vloggers do holds relevance for their own situation.

Another explanation for the absence of main effects may be that online socialization processes occur more on an automatic (i.e., social reaction) than reflective (i.e, reasoned action) level (Gibbons et al., 2003). According to the prototype willingness model, engaging in health (risk) behaviors might, albeit volitional, not always be intentional (Gerrard et al., 2008). Perhaps, vloggers influence adolescents more subconsciously: when adolescents find themselves in similar situations as the vlogger portrayed, adolescents might have an increased willingness to engage in behaviors because they recall the favorable image of the vlogger engaging in such behaviors (Gerrard et al., 2008).

Our explorative findings, however, did reveal that vlogger socialization effects occurred in subgroups of adolescents with higher levels of identification with the vlogger. Consistent with social learning theory (Bandura, 1977) and previous studies investigating

media socialization (Anschutz et al., 2014; Croes & Bartels, 2021), our findings emphasized identification with the referent as an important motivator to model vloggers' behavior. High-identifying adolescents adjusted their perceived importance of adhering to the regulations and COVID-19 rule setting to behavior of the vloggers. Interestingly, this effect occurred only when vloggers showed noncompliance, suggesting only negative socialization effects for this subgroup of adolescents. This is especially relevant because even though Study 1 findings showed that vlogs portrayed more compliance than noncompliance, Study 2 indicated that noncompliance affected adolescents with high identification, whereas compliance did not. Additionally, high-identifying adolescents' behavioral intent was not influenced by vloggers (non)compliance, which might point more to a direct social reaction than a reasoned action path (Gibbons et al., 2003).

Strengths, Limitations, and Future Directions
By combining a content analysis with an experimental design, we gained insight into the socialization effects of real vlogger content on health-related attitudes, intentions, and behavior of adolescents. Our experimental design allowed us to assess the causal and independent effects of clear, non-ambiguous messages of vloggers and peer viewers on YouTube.

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However, our studies also have limitations. For one, we operationalized supportive evaluations of other viewers as an attitude and behavior-stimulating variable. However, because other viewers were anonymous, and their evaluations were not tied explicitly to adolescents' own gains or losses, this may have led to an underestimation of true peer viewer effects. Another limitation is that we were not able to fully discount peer selection effects (Laninga-Wijnen & Veenstra, 2021). An especially relevant question with regard to our Study 1 findings is whether viewers select content to watch because they feel similar to the vlogger (selection) or whether viewers become more similar to the vlogger over time because they watch the vloggers' content (influence)? Even in our experiment, we may not have been able to fully eradicate peer selection effects, because adolescents might have had preexisting beliefs of how specific vloggers complied prior to our experiment. Additionally, although our behavioral task allowed us to measure behavior in a controlled setting, it may be that, to uncover the true nature of adolescent reactions to vlogger health behaviors and communications, we need to include records of behavior or behavioral observations, instead of using behavioral tasks that might require reflective reasoning. Moreover, we could not reliably assess adolescents' own risk perceptions in this study, which calls for future studies to develop valid COVID-19-related risk perception measures in adolescents. Another limitation is that the final sample consisted of adolescents from average or higher secondary education, which might have led to an underestimation of population effects as adolescents with varying intelligence levels may differ in how they resist influence (Paus et al., 2008), although this is not always replicated (Wagemaker et al., 2022). Finally, the experiment was conducted relatively late in the pandemic, when regulations were loosened and vaccinations available. This is why we asked adolescents to imagine a new lockdown situation, for which they did not know how severe it would

be. We cannot rule out that this may have been less threatening and personally relevant for adolescents, which may have led to an underestimation of effects compared with conducting the experiment in the peak of the pandemic.

Notwithstanding these limitations, our study provided evidence for vlogger socialization effects in adolescents who identify with them—this seems especially relevant in light of the relatively small dosage of content that we exposed adolescents to, in a time in which they most likely were exposed to much more information (Cinelli et al., 2020; Gupta et al., 2022). This provides us with three considerations. For one, we should study the cumulative effects of being exposed to multiple types of influencer content over time. On YouTube, adolescents easily end up in algorithm loops; if they watch certain types of content, they will likely be directed to similar content in the future (Matamoros-Fernandez et al., 2021). Such algorithm biases may lead to a *false consensus effect;* when multiple sources share similar messages, people tend to believe there is consensus on what the majority of people believe or do, even when that consensus is based upon misinformation or inappropriate experts (Höttecke &Allchin, 2020; Yousif et al., 2019). However and secondly, as shown in our first study, adolescents might also be exposed to mixed messages within vlogs. When adolescents are exposed to content that encourages *and* discourages health-risk behaviors, that is at times rewarded *and* punished by other viewers, (how) does that influence adolescents? Third, future research could expand our findings by experimentally assessing whether vlogger socialization processes are generalizable to health-risk contexts other than the COVID-19 pandemic (e.g., substance use, risky driving, or self-image-related behavior such as working out or eating patterns).

Practical Implications

Health-risk behaviors, such as violating COVID-19 regulations, may harm adolescents and the people in their surroundings. Our two studies show that one possible way to diminish these behaviors is by addressing risky vlogger content that adolescents consume online, especially for high-identifying youth. For example, by providing adolescents with media-literacy training in school settings. Such training can provide adolescents with knowledge of media influence and tools to critically evaluate and interpret the content they consume online (Jeong et al., 2012). On a positive note, vloggers mostly showed healthy behaviors in their vlogs. Our findings imply that we may also be able to employ vloggers to target adolescents' emotions positively, which is an opportunity to explore further.

CONCLUSION

Our first study indicated that the majority of vloggers were compliant most of the time, but adolescents have ample opportunity and motivation to also learn noncompliance from vloggers, which emphasized the importance to investigate whether adolescents actually model this (non)compliance in our second study. Although we did not find much direct evidence for vlogger socialization effects on adolescents, except for levels of worrying, subgroup analyses revealed that vloggers *negatively* influence attitudes and behavior of

adolescents who identify with the vlogger strongly. Perhaps, the concerns following the #I'mOut campaign in the Netherlands were legitimate, at least for a portion of adolescent followers. Having opened the black box of vlogger socialization effects in these studies, our findings call for a deeper understanding and a continuation of research on vlogger socialization for different subgroups of youths in various (health-related) contexts.

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SECTION 3

CHAPTER 6

What Works for Whom in School-Based Anti-Bullying Interventions? **An Individual Participant Data Meta-Analysis**

ABSTRACT

The prevalence of bullying worldwide is high (UNESCO, 2018). Over the past decades, many anti-bullying interventions have been developed to remediate this problem. However, we lack insight into for whom these interventions work and what individual intervention components drive the total intervention effects. We conducted a large-scale individual participant data (IPD) meta-analysis using data from 39,793 children and adolescents aged five to 20 years (M_{age} = 12.58, SD = 2.34) who had participated in quasi-experimental or randomized controlled trials of school-based anti-bullying interventions (i.e., 10 studies testing nine interventions). Multi-level logistic regression analyses showed that anti-bullying interventions significantly reduced self-reported victimization (d = -0.14) and bullying perpetration (d = -0.07). Anti-bullying interventions more strongly reduced bullying perpetration in younger participants (i.e., under age 12) and victimization for youth who were more heavily victimized before the intervention. We did not find evidence to show that the inclusion of specific intervention components was related to higher overall intervention effects, except for an iatrogenic effect of non-punitive disciplinary methods—which was strongest for girls. Exploratory analyses suggested that school assemblies and playground supervision may have harmful effects for some, increasing bullying perpetration in youth who already bullied frequently at baseline. In conclusion, school-based anti-bullying interventions are generally effective and work especially well for younger children and youth who are most heavily victimized. Further tailoring of interventions may be necessary to more effectively meet the needs and strengths of specific subgroups of children and adolescents.

Keywords: individual participant data (IPD) meta-analysis; anti-bullying interventions; effectiveness; bullying; victimization

INTRODUCTION

The prevalence of bullying worldwide is high. Across continents, one in three children are bullied once or repeatedly every month (UNESCO, 2018). In some regions (Canada, Europe, and Australia), one in ten children experiences cyberbullying (UNESCO, 2018). Consequently, in many countries, bullying has been on the scientific and political agenda for some time, resulting in the development and implementation of anti-bullying interventions. Possibly, as a result, traditional bullying has declined in almost half of the countries worldwide in the past decade (UNESCO, 2018). However, not all youth benefit from anti-bullying interventions to the same extent (Smith et al., 2005). Despite positive trends, we lack insight into for whom these bullying interventions are specifically effective, and what makes them work. This knowledge is crucial to develop more effective and tailored anti-bullying programs (Ttofi & Farrington, 2009). Therefore, we conducted an individual participant data (IPD) meta-analysis to examine for whom these school-based anti-bullying interventions are more or less effective and which individual intervention components drive the effects of anti-bullying interventions.

Consequences of Bullying and Victimization

Bullying refers to aggressive physical and relational behavior intended to harm the other that occurs repeatedly in a relationship characterized by a power imbalance (Olweus, 1993). It is one of the most common expressions of violence in the peer context (Menesini & Salmivalli, 2017) and can be detrimental for those victimized, even more so when those victimized also partake in bullying (i.e., 'bully-victims'; see Arseneault et al., 2006). Victims and bully-victims are more likely to develop problems such as anxiety, loneliness, and depression (Christina et al., 2021; Reijntjes et al., 2010), have worse physiological outcomes when under social stress (Giletta et al., 2018), and are more likely to engage in suicidal ideation and suicide attempts (Van Geel et al., 2014). Engaging in bullying may also be harmful to perpetrators. Bullies are more likely to abuse substances (Ttofi et al., 2016), to become criminal offenders (Ttofi et al., 2011), and are at heightened risk for suicide ideation and attempts (Holt et al., 2015). For some, negative consequences of bullying persist well into adulthood (e.g., Sigurdson et al., 2015).

Anti-Bullying Intervention Effects

Anti-bullying interventions are designed to prevent and decrease bullying behavior. Most of these interventions are multifaceted packages that combine intervention components. Some of these intervention components focus on cognitive-emotional skills to improve bystanders' and bullies' emotion-regulation and increase empathy for victims (e.g., Trip et al., 2015). Other components address the victims' (and sometimes bullies') social skills to teach them how to cope with negative feelings and situations (e.g., DeRosier, 2004). Yet other components focus on individual behaviors, group norms, and promoting a positive social climate in schools (e.g., Paluck et al., 2016).

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Extensive research has examined the effects of anti-bullying interventions. Meta-analyses indicate anti-bullying interventions are moderately effective. Gaffney and colleagues (2019a) evaluated four anti-bullying interventions (KiVa, NoTrap!, Olweus Bullying Prevention Program, and ViSC) across 12 different countries. These interventions were found to reduce bullying perpetration by 19–20% and victimization by 15–16%. De Mooij and colleagues (2020a) found anti-bullying programs had a moderately strong effect ($d = .67$) on victimization and bullying perpetration, which is in line with another review, showing that anti-bullying interventions reduce bullying and victimization by 20–23% (Ttofi & Farrington, 2009).

What Works for Whom?

Although generally effective, the magnitude and direction of anti-bullying intervention effects differ between interventions (Gaffney et al., 2019b). This may be due to variation in program composition and implementation of specific components (Chorpita et al., 2005), raising the question of which components are more or less effective for whom. Finding an answer to this question increases insight into what works—and what does not—and can stimulate the development of efficient, cost-effective, and tailored intervention programs (De Mooij et al., 2020a).

Anti-bullying interventions differ regarding their underlying theoretical frameworks, target populations, and components related to *anti-bullying policies or rules* and *the skills taught and practiced* (Farrington & Ttofi, 2009). Components at the policy level may require schools to adopt a school-wide anti-bullying policy, set classroom rules, use (non-)punitive disciplinary methods, increase supervision at bullying 'hotspots' like playgrounds, and use peer educators. Skill-oriented components might be psychoeducation (enhancing students' knowledge and awareness about the bullying-victimization process), teaching social or cognitive-emotional skills, and psychophysical exercises to reduce victimization and bullying.

The 'what works for whom' question has been posed but not yet examined as such. Rather, previous studies have examined 'what works' (e.g., De Mooij et al., 2020a; Gaffney et al., 2019b; Gaffney et al., 2021; Ttofi & Farrington, 2009) or 'for whom does it work' (e.g., Garandeau et al., 2014a; Nocentini et al., 2019; Yeager et al., 2015) in isolation—with the former group of studies examining effects of components in the total samples, and the latter group of studies examining the effects of interventions across subgroups. For instance, a recent aggregate data meta-analysis (Gaffney et al., 2021) examined 'what works' in anti-bullying interventions, showing that the presence of specific components (i.e., a whole-school approach, anti-bullying policies, classroom rules, information for parents, informal peer involvement, and work with victims) was linked to larger effect sizes for school bullying perpetration and victimization outcomes. This study provided valuable insights, but it is necessary to take the next step: harnessing the power of numbers in an individual participant data (IPD) meta-analysis by pooling data across different anti-bullying intervention studies. This is especially important with analyses that necessitate the delineation of subgroups, either in terms of interventions that have (or do not have)

specific components or in terms of subgroups of children and adolescents receiving the intervention.

Assuming different subgroups of youth are differentially affected by anti-bullying interventions (De Mooij et al., 2020a; Smith et al., 2005), identifying these subgroups can help better tailor interventions to children's and adolescents' individual needs. In this paper, we delineate subgroups according to youth's age, sex, ethnicity, socioeconomic status, and initial levels of victimization and bullying.

We could not develop specific hypotheses about individual components that work better for specific subgroups based on the extant literature. It was possible to develop hypotheses about whether separate components, *in general,* would work better for some. We expected that 1) children below 12 years benefited more from school-based anti-bullying intervention components than those above 12 years, based on research that showed that anti-bullying interventions become less effective from grade eight onwards and may then even induce iatrogenic effects, possibly because current anti-bullying interventions do not meet adolescence-specific needs for status and respect (Yeager et al., 2015; 2018); 2) boys benefited more from school-based anti-bullying intervention components than girls, as research has shown that interventions may gravitate towards visible, more explicit—typically male—bullying (Barbero et al., 2012; Volk et al., 2012); 3) school-based anti-bullying interventions are more effective for ethnic majority than minority youth, because interventions generally do not attend to ethnicity-related issues, such as race and ethnicity-based stereotype harassment (Peguero & Williams, 2013; Vervoort et al., 2010; Yeager et al., 2015); 4) youth with higher socioeconomic status (SES) benefited more from school-based anti-bullying interventions than youth with lower SES, as lower SES youth may need a relatively intense intervention since they might be more likely to engage in bullying or to become victimized, although this might be different across countries (Hosozawa et al., 2021; Tippett & Wolke, 2014); and 5) youth who bully or who are victimized prior to intervention benefited more from school-based anti-bullying interventions, based on research that showed intervention effects to be larger for those victimized or bullied before the intervention (e.g., Ferguson et al., 2007; Juvonen et al., 2016—for an exception, see Kaufman et al., 2018). This suggests that interventions are more relevant and engaging for youth with more severe problems, who may also have more room for behavior change.

This Study

This study combined data from different studies on the effects of school-based anti-bullying interventions. The individual participant data (IPD) approach synthesizes individual data from randomized or quasi-experimental trials, allowing for analyzing intervention effects at the individual level instead of at the aggregate study level. Consequently, an IPD meta-analysis has greater power to test moderators and reduce potential bias compared with an aggregate data meta-analytic approach (Riley et al., 2010). Our objectives were to assess 1) the overall effect of school-based anti-bullying interventions, 2) which youth benefited more from school-based anti-bullying interventions as a whole ('for whom'), and 3) which youth benefited most from specific intervention components ('what works for whom').

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METHODS

Identification and Selection of Studies

We performed a systematic search in PsycINFO, Medline, Web of Science, and ERIC in January 2019. Search terms included bullying (cyberbullying or traditional bullying) combined with school-based intervention studies with a (quasi-)experimental design in primary, middle, or high schools (S1). An initial title screening by SK assessed eligibility, abstracts were screened by four authors. Disagreements regarding eligibility of a study were discussed until consensus was reached. Finally, SK screened the full text of the remaining 95 studies.

Studies of school-based anti-bullying interventions in primary, middle, and high schools worldwide were eligible for inclusion, provided they had an experimental (i.e., randomized controlled trials) or quasi-experimental design (with at least a control group) and used a bullying and/or victimization measure before and after interventions. Studies were included if published in peer-reviewed scientific journals, focused on behavior, and included either self or peer-reported class- or school-based measures. We excluded studies when the intervention aimed to reduce other forms of aggression or harassment and did not specifically mention to target bullying—not all forms of aggression can be characterized as bullying, and interventions aimed at decreasing aggression take many different forms and have many different outcome measures (hindering successful harmonization of data). In the second phase of screening, we retrieved study data. Due to our IPD design, studies were only included if PIs were able and willing to send us the raw data. Finally, studies were only included when bullying or victimization was measured on a frequency scale for harmonization purposes.

After the first phase of screening, 41 papers, reporting on 36 unique studies were eligible for inclusion and the principal investigators (PIs) were contacted to request the anonymized data (See S6 for more information on the eligible studies). The PIs of 13 studies (36.11%) shared their data, of which 10 studies could be included (SupMat2). For other studies, data were not shared due to ethical considerations, time constraints, a lack of possibility or willingness to share data, or contact with the authors could not be established. PIs completed a data-sharing agreement and provided the raw individual item-level data. Data were then checked for missingness and to assess whether we received the correct dataset after which two studies were excluded (S2). Next, data were harmonized (see coding of subgroups or harmonization of outcome measures) and merged. SupMat4 provides an overview of included studies. Combined, these studies included 39,793 primary, middle, or high school participants aged five to 20 years (M_{age} = 12.58, SD = 2.34). All study procedures were approved by the TNO research ethics board (ethics committee file number: 2019-85).

Coding of Subgroups ("Whom")

Subgroups identified in our analyses pertained to age, sex, ethnicity, SES, and initial severity of bullying and victimization. Sex was coded as 0 = *boys* and 1 = *girls*. We differentiated

between younger (< age 12) and older participants. SES was defined as low, medium, or high. If this estimation was not already made within studies, we estimated the within-study SES variability and coded values 1.5 *SD* below mean as low SES, values 1.5 *SD* above mean as high SES and coded the rest as medium SES. Ethnicity was coded as minority or non-minority. If not already included in the dataset, we coded ethnicity as non-minority if participants were born in the study country of origin or if their native language was that of the study country. Baseline levels of bullying perpetration and victimization were used as indicators of problem severity before intervention.

Coding of Intervention Components ("What")
MH and BM coded intervention components based on information provided in papers and supplementary materials (S4). Disagreements were discussed and adjusted accordingly. PIs were consulted to verify the coding. We used a coding scheme based on previous schemes by Farrington and Ttofi (2009), Gaffney et al. (2019b), and De Mooij and colleagues (2020a; S3). We coded whether the intervention included a school anti-bullying policy, school assemblies (during which students were informed about bullying or collective psychoeducation), playground supervision (including an increase in supervision in 'hot-spots'), a monitor which identifies bullies, victims, and possible other bullying roles and reports back to school personnel, classroom rules, classroom placement strategies (changing seating arrangements to prevent bullying or to intervene after a bullying incident), peer involvement, and disciplinary methods. Disciplinary methods could be punitive (focusing on confronting the bully and insisting on changing behavior) or non-punitive (focusing on a positive approach, e.g., increasing empathy for victims).

Child-focused components of interventions were also coded. We coded whether the intervention included psychoeducation (transferring knowledge about bullying and/or victimization), psychophysical exercises (focused on physical relaxation, assertiveness, and resilience), interpersonal skill-building (exercises to improve prosocial or [non]verbal communication skills), or cognitive-emotional skill-building (intrapersonal skills aimed at improving the recognition and adequate regulation of emotions and thoughts). The interventions only included psychoeducation and cognitive-emotional skill-building components but not psychophysical exercises and interpersonal skill-building, which were thus omitted from our analyses. Because all interventions included psychoeducation, we could not compare interventions with and without psychoeducation. Additionally, only one intervention included peer involvement and students' active engagement, and thus this component was not included in our analyses.

Harmonization of Bullying and Victimization Outcome Measures
All studies measured bullying perpetration and victimization with (an adapted version of) the Olweus bullying and victimization questionnaire (Olweus, 1996), which uses a frequency scale; participants indicated how often they bullied and were victimized by others. Some studies used one general question to assess bullying and victimization ("How often were you bullied/did you bully in the past/this term") that was answered on a 5-point

scale. Others used a multi-item questionnaire that taps into specific forms of bullying (e.g., kicking and hitting, gossiping, vandalizing other's property), resulting in a sum score. We harmonized the different outcome measures into one outcome measure (SupMat5), and created a clinically relevant dichotomized outcome measure by combining categories 'never and rarely bullied/bully' and categories 'regularly and daily bullied/bully'.

Risk of (Publication) Bias

Risk of bias in the included studies was assessed on their bias in participant selection, classification of interventions, deviations from the intended intervention, missing data, and measurement of outcomes (Sterne et al., 2016). This provided an overall bias score (low, moderate, or serious) per study (S6). Bias was assessed by BM and SK (ICC = .72). None of the studies had a serious risk of bias-score. We also assessed whether included studies differed from eligible studies that were not included in our IPD. We found no significant differences based on the year of publication, location and design of the study, and reported effects (S6).

Statistical Analyses

A one-stage meta-analysis with random intercepts at the study level was conducted on the pooled dataset of harmonized study data. Participants (level 1) were nested in schools (level 2), nested in intervention studies (level 3), which was accounted for by fitting multilevel regression models. Most datasets did not include a variable identifying what school participants were in (i.e., they only coded whether participants were in the intervention or control condition), so we fitted two-level regression models to correct for variance explained at the study level. We estimated logistic regression models using odds ratios, 95% confidence intervals, and -2 log-likelihood [-2LL] fit estimates. We treated missing data in our univariate analyses with listwise deletion, this was done for computational efficiency given our large dataset and focused analyses. We conducted separate univariate regression analyses for the post-intervention outcomes of victimization and bullying perpetration. The entire pooled dataset ($n = 39{,}793$) was used for our primary analyses and to assess *for whom* the interventions work best. We created a subgroup ($n = 22{,}101$) by omitting all participants that did not receive an intervention to assess *what works* in school-based anti-bullying interventions and *what works for whom*.

To control Type I error rate, we applied a Benjamini-Hochberg FDR correction (25%). Critical levels of interaction effects were corrected per subgroup analysis. Effect sizes for odds ratios were calculated using Hasselblad and Hedges' method (1995). Additionally, 'leave-one-out' sensitivity analyses were conducted to assess stability of significant findings to further guard against type I errors (S10). Analyses were repeated, excluding one study at a time, to assess if specific studies drove results. In line with the data sharing agreement, studies that changed the results were not disclosed.

RESULTS

In the total sample, 4,698 participants (16.1%) reported being victimized regularly to daily, and 2,142 participants (7.6%) reported bullying at least regularly to daily. To compare participants from different subgroups on post victimization and perpetration levels, we conducted univariate multilevel logistic regression analyses. We controlled for variance explained at the level of study characteristics. Results indicated that participants who were victimized at baseline were more likely to be victimized at posttest (OR= 6.149, p < .001), and participants who bullied at baseline were more likely to bully at posttest (OR= 8.480, p < .001). Girls were less likely to be victimized or to bully at posttest (victimization: OR= 0.772, p < .001, perpetration: OR= 0.443, p < .001). Older participants were less likely to be victimized at posttest (OR= 0.888, p < .001) yet were more likely to bully at posttest (OR= 1.089, p < .01). Participants from ethnic minorities were more likely to be victimized and to bully at posttest (victimization: OR= 1.222, p <.01, perpetration: OR= 1.380, p < .01). And participants from high and medium SES were less likely to be victimized at posttest (high SES: OR= 0.560, p <.001, medium SES: OR = 0.745, p = .018), no differences were found for posttest perpetration. See SupMat7 for more test statistics and baseline comparisons of subgroups. Pearson correlation between self-reported bullying and victimization was r = .23 (p <.001); participants who were victimized more often also reported bullying more.

Do School-Based Anti-Bullying Interventions Work?
The two univariate, multilevel logistic regressions demonstrated that school-based anti-bullying interventions significantly reduced victimization (t = -6.61, OR = 0.77, *95% CI* = 0.71; 0.83, p < .001, d = -0.14) and bullying perpetration (t = -2.30, OR = 0.88, *95% CI* = 0.79; 0.98, p < .05, d = -0.07) in schools. 'Leave one out' sensitivity analyses indicated that effects were unaffected by exclusion of all (victimization) or almost all (n-2) studies (bullying perpetration).

For Whom Do School-Based Anti-Bullying Interventions Work?
Results of the multilevel logistic regression models found no significant differential effects in reducing victimization across different subgroups (of sex, age, ethnicity, SES, and initial bullying or victimization levels). Across almost all subgroups, results indicated no differential reductions in reported victimization (Table 1, S8). There was one exception: anti-bullying interventions were more effective in reducing victimization in participants who reported higher initial victimization before the intervention compared with participants who reported lower initial victimization. Sensitivity analyses showed that this result was affected by exclusion of four individual studies. Results also indicated that no differential reductions were found in reported perpetration across almost all subgroups, with one exception: anti-bullying interventions reduced bullying perpetration more in younger (< 12 years) than in older participants. Sensitivity analyses indicated that this result was unaffected by exclusion of almost all (n-1) studies.

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Table 1. *Interaction Effects of Subgroup × Intervention Status on Post-Intervention Victimization and Bullying Perpetration (for whom does it work)*

Victimization Model	Coefficient	*SE*	*t*	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
Sex	-0.262	0.057	-4.599	<.001	0.769	[0.69, 0.86]		
Intervention	-0.305	0.054	-5.679	<.001	0.737	[0.66, 0.82]		
Sex * intervention	0.093	0.078	1.197	.231	1.098	[0.94, 1.28]	4	.167
Age	-0.158	0.089	-1.768	.077	0.854	[0.72, 1.02]		
Intervention	-0.306	0.058	-5.286	<.001	0.736	[0.66, 0.83]		
Age * intervention	0.175	0.091	1.919	.055	1.191	[0.99, 1.42]	2	.083
Ethnicity	0.286	0.120	2.384	.017	1.330	[1.05, 1.68]		
Intervention	-0.277	0.044	-6.368	<.001	0.758	[0.70, 0.83]		
Ethnicity * intervention	-0.141	0.151	-0.933	.351	0.868	[0.65, 1.17]	6	.250
SES high	-0.614	0.191	-3.221	.001	0.541	[0.37, 0.79]		
SES medium	-0.386	0.181	-2.129	.033	0.680	[0.48, 0.97]		
Intervention	-0.282	0.216	-1.307	.191	0.754	[0.49, 1.15]		
SES (high) * intervention	0.390	0.276	1.414	.157	1.477	[0.86, 2.54]	3	.125
SES (medium) * intervention	0.307	0.259	1.186	.236	1.360	[0.82, 2.26]	5	.208
Initial victimization	1.913	0.061	31.398	<.001	6.775	[6.01, 7.64]		
Intervention	-0.202	0.049	-4.145	<.001	0.817	[0.74, 0.90]		
Initialvictimiz.* intervention	-0.168	0.081	-2.065	.039	0.845	[0.72, 0.99]	1	.042
Perpetration Model	Coefficient	*SE*	*t*	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
Sex	-0.630	0.082	-7.684	<.001	0.533	[0.45, 0.63]		
Intervention	-0.105	0.068	-1.540	.124	0.901	[0.79, 1.03]		
Sex * intervention	-0.068	0.113	-0.601	.548	0.934	[0.75, 1.17]	5	.208
Age	-0.022	0.115	-0.191	.848	0.978	[0.78, 1.23]		
Intervention	-0.342	0.091	-3.756	<.001	0.710	[0.59, 0.85]		
Age * intervention	0.357	0.121	2.954	.003	1.429	[1.13, 1.81]	1	.042
Ethnicity	0.112	0.166	0.675	.500	1.119	[0.81, 1.55]		
Intervention	-0.148	0.059	-2.514	.012	0.863	[0.77, 0.97]		
Ethnicity * intervention	0.252	0.208	1.212	.226	1.287	[0.86, 1.94]	2	.083
SES high	-0.132	0.265	-0.498	.619	0.877	[0.52, 1.47]		
SES medium	-0.200	0.276	-0.723	.470	0.819	[0.48, 1.41]		
Intervention	0.062	0.335	0.186	.852	1.064	[0.55, 2.05]		
SES (high) * intervention	0.349	0.379	0.920	.358	1.417	[0.67, 2.98]	3	.125

Table 1. Continued.

SES (medium) * intervention	0.266	0.399	0.666	.506	1.304	[0.60, 2.85]	4	.167
Initial perpetration	2.160	0.089	24.354	<.001	8.670	[7.29, 10.32]		
Intervention	-0.115	0.064	-1.803	.071	0.891	[0.79, 1.01]		
Initialperpetr * intervention	-0.042	0.121	-0.347	.728	0.959	[0.76, 1.22]	6	.250

What Works for Whom in School-Based Anti-Bullying Interventions?

Multilevel logistic regression models found no evidence supporting that interventions worked differently depending on the use of specific intervention components (Table 2, S8). There was one exception: interventions including non-punitive disciplinary methods had an iatrogenic effect on bullying perpetration and victimization compared with interventions that did not use any disciplinary methods. Sensitivity analyses showed this effect was affected by exclusion of four individual studies.

Next, we tested whether intervention components had differential effects across subgroups (S9). For some combinations, not enough participants were available in each cell (e.g., ethnicity and cognitive-emotional skill-building combined), so these were removed from analyses. We did not find significant interaction effects for victimization and perpetration between individual intervention components and age, ethnicity, and SES subgroups. For sex, however, analyses did show that interventions that included non-punitive disciplinary methods had iatrogenic effects on victimization levels that were stronger for girls than for boys. Sensitivity analyses showed that this interaction effect was unaffected by exclusion of almost all (*n*-2) studies. The what works for whom-analyses also showed that school assemblies and playground supervision had iatrogenic effects on perpetration for participants who bullied regularly to daily at baseline, compared with participants who never or rarely bullied at baseline. The sensitivity analyses showed that this result was unaffected by exclusion of almost all (*n-1*) studies.

Table 2. *Exploration of Main Effects of Intervention Components on Post-Intervention Victimization and Bullying Perpetration (what works)*

Victimization Model	Coefficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
School policy	0.638	0.369	1.727	.084	1.892	[0.92, 3.90]	3	.094
Monitor	0.097	0.551	0.176	.861	1.102	[0.37, 3.25]	8	.250
Classroom rules	0.638	0.369	1.727	.084	1.892	[0.92, 3.90]	2	.063
School assemblies	0.077	0.363	0.211	.833	1.080	[0.53, 2.20]	6	.186
Playground supervision	0.077	0.363	0.211	.833	1.080	[0.53, 2.20]	7	.219
Disciplinary methods								
Non-punitive	0.879	0.402	2.187	.029	2.408	[1.10, 5.29]	1	.031
Non-punitive and punitive	0.466	0.381	1.223	.221	1.594	[0.76, 3.37]	5	.156
Cognitive-emotional	1.049	0.697	1.504	.132	2.854	[0.73, 11.19]	4	.125
Perpetration Model	Coefficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
School policy	1.270	0.723	1.758	.079	3.561	[0.86, 14.68]	3	.107
Monitor	-0.293	0.955	-0.306	.759	0.746	[0.12, 4.85]	5	.179
Classroom rules	1.270	0.723	1.758	.079	3.561	[0.86, 14.68]	2	.071
School assemblies	0.118	0.675	0.175	.861	1.125	[0.30, 4.23]	7	.250
Playground supervision	0.118	0.675	0.175	.861	1.125	[0.30, 4.23]	6	.214
Disciplinary methods								
Non-punitive	1.782	0.776	2.297	.022	5.940	[1.30, 27.16]	1	.036
Non-punitive and punitive	0.894	0.690	1.296	.195	2.444	[0.63, 9.44]	4	.143

DISCUSSION

This individual participant data (IPD) meta-analysis assessed intervention effects of school-based anti-bullying interventions among 39,793 children and adolescents and found that anti-bullying interventions effectively reduce victimization and bullying perpetration. Contrary to our expectations, we could not find evidence indicating that anti-bullying interventions work differently for girls and boys, ethnic minorities and majorities, youth with low, middle, and high SES, and youth with low and high initial perpetration levels. There were two exceptions: children below the age of 12 benefited more from anti-bullying interventions than older adolescents, and youth with high initial victimization levels benefited more from anti-bullying interventions than youth with low initial victimization levels before the intervention. In addition, we found no evidence indicating that intervention effects depended on the inclusion of specific intervention components, except for interventions that contained non-punitive disciplinary methods, which yielded iatrogenic effects on bullying perpetration and victimization. Additionally, we found that

these iatrogenic intervention effects of non-punitive disciplinary methods were stronger for girls' victimization levels and that school assemblies and playground supervision had iatrogenic effects on bullying perpetration for youth who bullied regularly to daily at baseline.

School-Based Anti-Bullying Intervention Effects

Our findings show that school-based anti-bullying interventions yield favorable effects in reducing bullying and victimization, which is in line with previous meta-analyses (De Mooij et al., 2020a; Gaffney et al., 2019; Ttofi & Farrington, 2009). The effects seem to be statistically small. Perhaps, because school-wide anti-bullying interventions target all children and adolescents in the school, even youth who are not victimized or who do not bully. These small effects are consistent with effects of other whole-school programs with a universal approach (Greenberg & Abenavoli, 2017). Despite small effects, the clinical importance of the decrease in bullying is high. Victims and bullies are at risk for maladjustment, even when only small groups of victimized or bullying youth benefit, this is critical for their healthy development (Ttofi et al., 2016).

For Whom Do School-Based Anti-Bullying Interventions Work

Looking at subgroups of children and adolescents, this IPD meta-analysis could not find evidence supporting our hypothesis that school-based anti-bullying interventions work differently for boys and girls, youth from ethnic majority and minority groups, youth with different levels of initial perpetration, and youth from different SES backgrounds. This may indicate that anti-bullying programs are effective across many contexts and populations. However, two interesting differences emerged. First, anti-bullying interventions were more effective for youth with high initial levels of victimization than those with low initial levels of victimization. This finding, which was in line with previous research outcomes (Ferguson et al., 2007; Juvonen et al., 2016—but see Kaufman et al. (2018) for an exception), suggests that interventions implemented school-wide may successfully target youth that need it most. This finding may be explained by the simple fact that there is more room for behavioral improvement in youth who report more initial victimization. These children and adolescents may have a higher motivation to engage with the intervention or a higher likelihood to be targeted by some intervention components. Notably, as bullying perpetration also decreased in general, severely victimized youth may benefit most from the general decrease in perpetration because they are most confronted with bullying.

The second finding that emerged, which was more robust, was that school-based anti-bullying interventions were less effective in reducing bullying perpetration for adolescents of 12 years and older. This finding aligns with our hypothesis (Yeager et al., 2015). Perhaps a disconnect between current anti-bullying intervention approaches and the changing nature of bullying in adolescence causes these differential effects for age. Specifically, anti-bullying interventions implemented in adolescence need a different 'tone' with stronger emphasis on adolescents' strive for autonomy and respect (Yeager et al., 2018). Adolescents may be more sensitive than younger children to being treated with respect

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and less willing to accept the authority of adults (Yeager et al., 2018). Also, the motivation to bully might differ between adolescents and children, with adolescents focusing more on gaining status by bullying (Volk et al., 2012). Thus, one interesting possibility may be to gear anti-bullying interventions in adolescence towards offering prosocial ways to gain popularity (Yeager et al., 2018). Also, because bully-victim patterns may have become more fixed in adolescence (e.g., Sentse et al., 2015), interventions aimed at adolescents may need to be more intensive, targeting those directly involved in bullying perpetration to change their mindset (Yeager et al., 2018).

What Might (Not) Work for Whom?

Although explorative, our findings indicate that there might be subgroup differences in what works in school-based anti-bullying interventions. For example, non-punitive disciplinary methods seemed to yield iatrogenic effects in general, but with even higher post-intervention levels of victimization for girls. However, because of the explorative nature of this analysis and the lack of robustness of this particular finding, future studies should investigate this further. Another, more robust, finding indicated that, compared with interventions that did not include these components, both school assemblies and playground supervision may yield iatrogenic effects in children and adolescents with high initial levels of perpetration. Compared with youth with low initial levels of perpetrations, these children and adolescents reported higher instead of lower levels of perpetration after interventions that included school assemblies and playground supervision.

How can we explain such effects? Both components are geared towards increasing the visibility of perpetration, and publicly addressing this issue, which might teach youth new ways of bullying others. Moreover, publicly addressing bullying might make the initial bully feel exposed or told on, which might increase anger and a desire for revenge. Yet other explanations could be that in publicly addressing bullying, teachers are inadvertently enhancing the bully's image and reputation of being in power, or that this public address leads to an increased awareness of what bullying is, leading bullies to report more bullying perpetration than before. Addressing the school as a whole and publicly condemning and punishing bullying, as is done with these components within universal programs, comes with the risk of reaching subgroups of youths who react differently to these measures. School assemblies and playground supervision may work well as preventive measures for youth who do not often bully others but may be counterproductive for a subgroup of more severe bullies.

Strengths and Limitations

Our IPD meta-analysis assessed the effects of school-based anti-bullying interventions using an innovative approach, yielding superior power, based on a large sample size of 39,793 children and adolescents. Collecting data from different individual studies allowed us to build a comprehensive dataset on school-based anti-bullying intervention effects and to perform a novel investigation focused on for whom anti-bullying interventions

work as well as to explore which specific anti-bullying intervention components might work (or yield iatrogenic effects) for subgroups of youth.

Several limitations of our approach also warrant mentioning. First, we did not consider implementation level and quality. The determination of intervention components was based on the presence of these components in the manuals and not on the actual implementation of the intervention components during the studies. This may limit the generalizability of our findings, given that a certain implementation threshold or intervention dosage may be a prerequisite for establishing intervention effects in the first place (De Mooij et al., 2020a; Horner et al., 2006). It is important to include the level of implementation of the intervention (components) in studies on the effectiveness of anti-bullying interventions. Another limitation is that we did not investigate longer-term intervention effects. Sustainability of both the implementation and effects may be different across specific components. Also, our findings should be interpreted carefully because we based our analysis on interventions that combine different components. We cannot exclude the possibility that our effect estimates for specific components are to some extent dependent on the specific combination with other components, yielding synergistic, or 1+1=3, effects (Low & van Ryzin, 2014). Furthermore, due to harmonization purposes, we were limited in operationalizing ethnicity and SES. Ethnic minorities and majorities might be identified differently in different countries. We calculated high, medium, or low SES within studies making it harder to assess the relative SES between studies. This led to quite some variation in SES within two out of four studies. However, the other two studies had some underrepresentation of either low SES (3.1%) or high SES (0%). Findings should be interpreted with these limitations in mind.

Finally, this IPD meta-analysis does not provide a comprehensive representation of the entire body of anti-bullying intervention research but rather represents a non-representative set of studies (published in peer-reviewed scientific journals) for which analyzable IPD could be obtained. The findings should be generalized with caution outside of Europe, as the continents Asia and Africa are not represented and the continents America and Oceania both only account for 10% of the included studies. The manifestation of bullying may differ between countries, which could reflect social and cultural differences in bullying and might also have different implications for national policies (e.g., Craig et al., 2009). In addition, our sensitivity analyses suggest that although most findings came out generally robust, some findings might have been statistically more dependent on the in or exclusion of specific studies. Lastly, our study would benefit from more heterogeneity in the included intervention programs; currently, one intervention program is represented largely (i.e., KiVa) while others are missing. Our future aim is to replicate these findings in an IPD meta-analysis with more studies, allowing for an even more stringent analysis of a more heterogeneous set of intervention programs and components implemented worldwide.

Future Research Directions
In general, future school-based anti-bullying intervention research could benefit from examining program effects in different subgroups instead of only assessing effects in the

sample as a whole. In addition, it may be worthwhile to examine specific components instead of complete packages. Possibly, not all interventions can be implemented harmlessly for everyone; caution is warranted. To further explore the 'what works for whom' question, we encourage future scholars to use experimental designs to sort out component effects for specific subgroups of youths, such as factorial designs (Bonsergent et al., 2013) or microtrials (De Mooij et al., 2020b; 2020c). Another interesting new approach in testing component effectiveness is to assess clusters of components together with network meta-analyses (Cartose et al., 2019). Future studies can further differentiate between the degree of victimization and bullying; how do (components of) interventions affect youths who are severely victimized or who severely bully others before interventions? Although beyond the scope of our study, previous studies indicated that interventions might work less well or have iatrogenic effects on other developmental outcomes for these children and adolescents, which is worthy of further investigation (e.g., Huitsing et al., 2019; Kaufman et al., 2018).

IMPLICATIONS AND CONCLUSION

School-based anti-bullying interventions generally reduce bullying victimization and perpetration. Our findings do not provide evidence that interventions were differentially effective across different subgroups of sex, ethnic background, and SES, but anti-bullying interventions implemented to reduce perpetration amongst adolescents above 12 are less effective. This study shows that anti-bullying interventions are more effective in reducing victimization for youth with higher initial victimization levels. Although this is generally promising, it also suggests that we may need more preventive strategies to help youth who are only 'sometimes' victimized. Further research is needed to answer the 'what works for whom' question, with appropriate research designs that allow for disentangling specific component effects.

Our findings highlight the importance of tailoring interventions to children and adolescents' age and initial victimization levels. Tailoring interventions enables maximizing intervention efforts (where effect sizes now seem relatively small). However, practical implementation might be challenging. Although tailoring interventions for individual students seems promising, we cannot target group norms or peer group dynamics as effectively as whole-school programs. The solution might be somewhere in the middle: going beyond the single whole-school program toward a multitier approach of interventions. Interventions should have the ability to be flexibly deployed by using both universal, selected, and indicated components. Moving away from a 'one size fits all' to a multitier approach enables schools to effectively meet the needs of the different subgroups that comprise the school populations while also addressing the norms and group dynamics of the entire school population.

CHAPTER 7

General Discussion

DISSERTATION OBJECTIVES AND SUMMARY OF MAIN FINDINGS

In the current dissertation, my main aim was to investigate the hypothesis that adolescent harmful social behavior stems from skillful self-regulation, driven by how adolescents can achieve important goals in their peer context. Through various methods (i.e., systematic review, meta-analyses, experimental paradigms, content-analysis), I provided an overview of the development and socialization of self-regulation (section 1), tested the goal-directedness of adolescent harmful social behavior in three different studies in real-life and online peer contexts (section 2), and assessed current intervention practices of one form of harmful social behavior (bullying) to link my findings to practice (section 3). First, I will provide a summary of the main findings of the three sections.

Summary Main Findings

Section 1: How can the Different Aspects Involved in Self-regulatory Processes (i.e., Abilities, Goals/ Motivation, and Social Agents) Explain Harmful Social Behavior in Adolescence?

Section 1 assessed the development and socialization of self-regulation. I conducted a meta-review in **Chapter 2**, for which I searched reviews and meta-analyses on self-regulation in typical development (0-18 years), identifying 1.935 records, from which 136 articles were included and systematically coded. The meta-review indicated that self-regulation development is driven by the interplay between abilities, goals, and motivation, which are all distinctively shaped by social agents. Socialization processes—via abilities, and via goals and motivations—are necessary for self-regulation to develop from being largely co-regulated by parents in infancy to being an independent, yet socially-calibrated process in adolescence. From infancy to adolescence, peers become increasingly important socialization agents. In adolescence, social comparisons and feedback from peers motivate adolescents to pursue goals that are likely to elicit peer approval. Peer norms can provide information on how desired goals can be achieved in different peer contexts.

Many harmful social behaviors have their onset in adolescence. From a self-regulation perspective, this can be explained by both dual and triadic systems models (Murray et al., 2021; Noël, 2014; Smith et al., 2014) and the prototype-willingness model (Gerrard et al., 2008). According to these models, on the one hand, adolescent harmful social behavior can originate from the strong tendency to approach appetitive, rewarding situations that cannot yet be suppressed sufficiently by deliberate cognitive control. On the other hand, adolescents are likely to adjust their behavior to examples of behavior from others that may help them gain desired outcomes ('images'), such as status. This is information they skillfully deduct from peer norms. In sum, although some harmful social behavior can thus come forth from inadequate self-regulation due to an underdeveloped cognitive control system, some harmful social behavior may—counterintuitively—actually be an outing of adequate self-regulation, when engaging in the behavior leads to the acquisition of important peer-status-related goals.

Section 2: To what Extent do Adolescents Adjust Their Behavior to Descriptive and Injunctive Norms that Provide Information on how they can Gain Status in Their Peer Group, and for Whom is this Effect more Pronounced

Section 2 assessed whether adolescents engaged in harmful social behavior when they could reach status by doing so. First, I meta-analyzed data of 164,143 adolescents (age range: 8–20 years), from 148 independent samples, with Meta-Analytic Structural Equation Modeling (MASEM; **Chapter 3**). Here, I found that adolescents who desire popularity and dominance (agency) engage in more bullying and aggression, which was linked with higher popularity (but lower likeability). A preregistered between-subjects experimental study (N = 519, M = 13.47 years, SD = 1.35, 46% girls) in **Chapter 4** showed that adolescents engaged in selfish behaviors when they could gain peer status for it from other students from their school and this was even more the case for adolescents with higher levels of narcissism but not for adolescents with stronger agentic goals. A second preregistered between-subjects experimental study (N = 285, M = 12.99, SD = 1.02, 41.8% girls) in **Chapter 5** showed that when adolescents witnessed COVID-19-related behavior of influential people online (vloggers) this did not directly influence all adolescents' COVID-19-related attitudes, intentions, and behavior, although it did influence adolescents' worrying. Noncompliant behavior of vloggers themselves, regardless of whether it was approved or disapproved of by other viewers, did impact adolescents' COVID-19-related attitudes and behaviors of adolescents who identified with vloggers strongly, towards more noncompliance of COVID-19 regulations. A content analysis of 240 vlogs of eight popular Dutch vloggers on YouTube recorded in the period of February 2020–March 2021 presented in **Chapter 5** as part of preparation for the experimental study, indicated that vloggers did indeed model quite some noncompliance in their vlogs during the COVID-19 pandemic, underscoring the societal relevance of the experimental findings.

Altogether, these chapters provided compelling evidence for the proposition that adolescents—some more than others—may skillfully and strategically adjust their behavior to descriptive and injunctive peer norms providing information on how they could gain status in their peer context. Even when this means they must engage in social behavior that harms (the interest of) someone else.

Section 3: Are Current Intervention Practices Effectively Reducing (Subgroups of) Adolescents' Harmful Social Behavior, and are There Interventions that Consist of Certain Components that are more or less Effective?

Section 3 assessed current intervention practices regarding one particular form of harmful social behavior: bullying. **Chapter 6** contained a large-scale Individual Participant Data Meta-Analysis (IPDMA) using data from 39,793 children and adolescents aged five to 20 years (M_{age} = 12.58, SD = 2.34) who had participated in quasi-experimental or randomized controlled trials of school-based anti-bullying interventions (i.e., 10 studies testing nine interventions). I assessed what works for whom in school-based anti-bullying intervention programs worldwide. Results on bullying perpetration in particular provided four insights. First, anti-bullying intervention programs to date effectively reduced bullying perpetration

although effect sizes were small. Second, school assemblies and playground supervision had iatrogenic effects on bullying perpetration for youth who bullied regularly to daily at baseline. Third, anti-bullying intervention programs were less effective in reducing bullying perpetration for adolescents compared with children. Fourth, there was only one intervention that included a component specifically related to peers, indicating that this is a missing piece thus far in interventions aiming to reduce bullying perpetration. Moreover, all but one intervention focused on cognitive or emotional skill-building, which contrasts with my earlier findings that—especially adolescent—harmful social behavior might not be deficient, but rather skillful behavior.

To conclude, there are differences in how effective anti-bullying interventions with certain components are for different subgroups of youths. These findings indicate that, certainly for the adolescent population, interventions can still improve. One way in which they can, is by incorporating the status-pursuit perspective more, by teaching adolescents how they can reach status in more prosocial ways and by changing peer norms that reward harmful social behavior with status gains.

GENERAL DISCUSSION

Together, the results of the current studies provide insights into the two questions that I posed in the introduction: Can adolescent harmful social behavior be seen as strategic attempts to obtain social status? And how can we incorporate this status-pursuit perspective more into current interventions that aim to reduce harmful social behavior? I will first discuss the two questions in depth, after which I will provide a reflection on limitations and future research directions, ending with my final conclusions.

Question 1: Can Adolescent Harmful Social Behavior be seen as Strategic Attempts to Obtain Social Status?

When I combine the findings of **Chapters 3, 4,** and **5**, I conclude that adolescent harmful social behavior can be an instrument to gain status in specific peer contexts. In daily life settings such as in **Chapter 3**, adolescents who hold status goals may potentially acquire such status by bullying or aggressing against others. In experimental settings such as in **Chapters 4** and **5**, adolescents may act selfishly when selfishness is rewarded with peer approval, which could lead to public status. And COVID-19 noncompliance of popular peers online induced more non-compliant attitudes and behavior of adolescents who identified with the popular peers.

Thus, adolescents may actively align their behavior to environmental cues that provide information about how they can gain important status goals, even when this results in social behaviors that harm (the interest of) others. In line with the self-regulation operationalization that I provided in **Chapter 2** (Moilanen, 2007), I would classify such goal-directed harmful social behavior as strategic and adequate self-regulation, instead of inadequate self-regulation (also see Baumeister & Vonasch, 2015; Kopetz & Orehek, 2015). This cuts across a multitude of behavioral outcomes (i.e., aggression, selfishness, and

rule-breaking), suggesting it is not specific to a single form of harmful social behavior but instead suggesting that adolescents employ different forms of harmful social behavior as a means to the same end: status.

These findings add to the broader notion that skillful and strategic self-regulation does not always entail that behavior is morally 'right', or desired (Baumeister & Vonasch, 2015; Kopetz & Orehek, 2015). There is a traditional tendency to classify adequate self-regulation as behaviors that align with societal expectations and society-wide moral codes. Based on the general findings of this dissertation, I argue that we should disentangle what is morally right from what is adequately skillful. If we reconceptualize what constitutes strategic and skillful self-regulation and acknowledge that some undesired, morally 'wrong', behaviors might be characterized as skillful self-regulation, we can more effectively target such behaviors in preventive and intervention programs. Contrary to traditional beliefs, harmful social behavior is not always a product of something going wrong in the developmental process (Smokowski & Kopasz, 2005; Walden & Beran, 2010) but can also be strategically carried out by adolescents who undergo normative development in an attempt to acquire resources (Hawley, 1999; Volk et al., 2012; Volk, Dane et al., 2022).

However, not all strategic harmful social behavior is part of normative development. Being well able to regulate behaviors in order to gain desired goals such as status can, at the extreme end of the continuum, also be a characteristic of psychological disorders, such as personality disorders (Skodol et al., 2011), or clinical narcissism disorder (Hill & Laspley, 2011). For these adolescents, other developmental goals could be compromised. Even though they can self-regulate some of their behaviors extremely well and successfully acquire some of their goals, this may come at the cost of other important developmental tasks that they need to attend to, and it may impair their quality of life (Hill & Lapsley, 2011; Skodol et al., 2011).

Additionally, not all strategic harmful social behavior is adaptive. The goals that adolescents set are hierarchical, with abstract goals on top as higher-order goals, followed by more concrete, lower-order goals that contribute to these higher-order goals (Powers, 1973). The higher a goal is in the hierarchical order, the more likely it is that this goal is selected (Rasmussen et al., 2006). Evolution theory would argue that on top of the hierarchy, there are two goals of survival and reproduction (Darwin, 1859). When adolescent behavior compromises their survival situation (e.g., too much risk-taking leading to injury or impaired functioning) or compromises reproduction opportunities (e.g., too much aggression or selfishness leading to isolation), this cannot be deemed adaptive. Therefore, there are likely boundaries and tipping points to what can be considered adaptive, which depend on the extent to which adolescents can balance attaining multiple important developmental tasks and whether their behavior does not compromise survival or reproduction goals.

Conditions Under Which Status Pursuit is More or Less Pronounced

There are three noteworthy observations regarding the conditions that affect the intensity of the status-pursuit mechanism in adolescents.

For one, the type of status affordance matters. There are two forms of social status that hold importance for adolescents: getting along with others and getting ahead of others (Hogan & Hogan, 1991). Adolescents who aspire to get along want to form intimate, social connections with their peers, which would lead to a status affordance of being liked or having friends (Ybarra et al., 2008). Adolescents who aspire to get ahead want to acquire status and feel competent, which would lead to a status affordance of being popular or having social dominance (Ybarra et al., 2008). As shown in **Chapter 3**, adolescent harmful social behavior does not make adolescents get along well with their peers, but it does lead to adolescents getting ahead of their peers and gaining a position of power, which adolescents seem to prioritize (Garandeau & Lansu, 2019; Hawley, 1999; Volk et al., 2014).

Second, some peer evaluative contexts are more powerful than others. When I observe the peer evaluative contexts in **Chapters 3, 4**, and **5**, I conclude that public affordances by known and relevant peers lead to direct social consequences, which provide the strongest motivation possible to engage in harmful social behavior (Figure 1). There are different steps involved when adolescents witness peer norms. First, adolescents witness a peer engaging in certain behaviors (descriptive norm) and this behavior is evaluated by their peers (injunctive norm). This injunctive norm becomes more relevant for adolescents when they believe that the peers who set this injunctive norm will evaluate them too. From the perspective of social learning (Bandura, 1977), adolescents are most likely to be influenced by peers that are popular or that they identify with, which is information they cannot derive when evaluators are completely anonymous. Therefore, the extent to which this injunctive norm is relevant depends on whether these peers are known to the adolescent, either because they know them directly or because they know the group to which these peers belong (such as classmates). Second, the adolescent needs to estimate what the consequence will be of conforming to the injunctive peer norm, as they are likely to model rewarding behaviors (Bandura, 1977). As peer status is a reputation (Cillessen, 2008), it is expected to be most powerful when the adolescent believes that (relevant) peers know how they are evaluated.
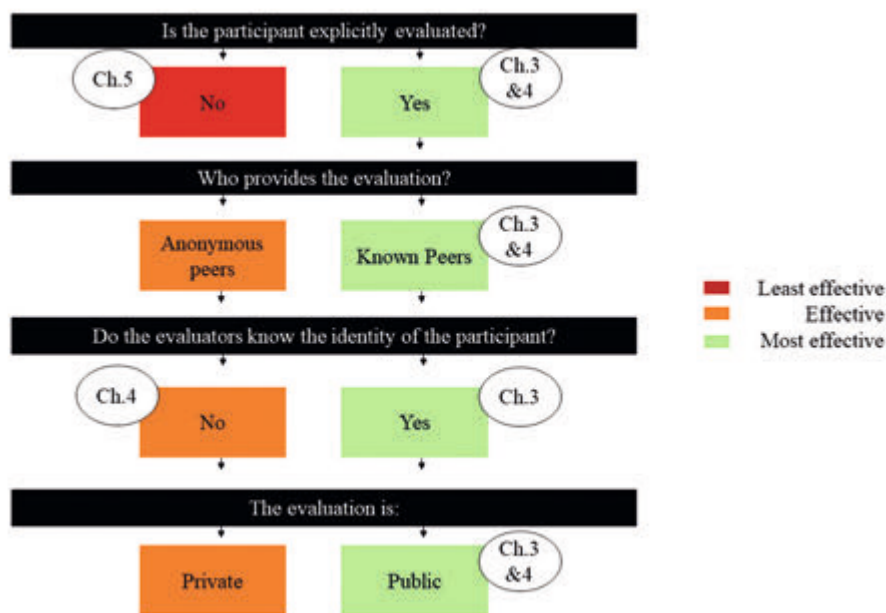
Figure 1. *Multi-Factorial Model of Peer Evaluation Impact*

Third, status pursuit might be less intuitive online. Notably, I could only find evidence that a subgroup of adolescents adjust their behavior to cues about how peer status could be obtained online, which could possibly be explained by the more complex structure of online social networks compared with the structure of real-life social networks. Even though studies show that adolescents' real life is connected to their online life and their most frequent interactions are with similar people online and in real-life (Reich et al., 2012; Subrahmanyam et al., 2008), there are also considerable differences between the two contexts regarding with whom adolescents interact (Courtois et al., 2012; Subrahmanyam et al., 2008). The internet is hypothesized to strengthen social networks through *bonding* and *bridging* (Putnam, 2000). Social media allow for more bonding and connection with strong real-life ties, which results in strong homogenous, cohesive online groups such as cliques. But social media also bridges, because they allow for connecting with weaker real-life ties, resulting in heterogeneous, diffusive social networks, which allow for having interactions with a broader public and enables forming broader identities (Putnam, 2000). Especially in more heterogeneous, diffusive online social networks, the effect of peer norms on adolescents' behavior might be less pronounced.

In heterogeneous, diffusive online social networks, the peers that set an injunctive norm online may not always be the ones that will provide status. As the online social networks of adolescents become more heterogeneous and differentiated based upon individuals' own interests and preferences (Putnam, 2000), it might be that the people who follow you and thus have the opportunity to provide you with status in terms of likes and positive comments, do not interact with the same people that you interact with.

Reflecting back on Figure 1, the peers that provide evaluations, might not be exposed to similar descriptive and injunctive norms as the one they are evaluating, which may make status pursuit less successful. This is different in real-life settings, as peers often are exposed to similar norms in classrooms, school settings, or other relevant groups. Another complex matter in heterogeneous, diffusive online contexts is that social media platforms potentially bring together peer groups with varying descriptive and injunctive norms that are separated in real-life. This might mean that an adolescent, for instance, uses coercion at school, whereas he or she uses cooperation in the soccer team. It is fairly easy to separate the two peer groups in real-life settings, when they rarely interact. But social media may bring these two groups together. If this adolescent wants to receive likes from both their schoolmates and their fellow soccer players, what should they do on their social media platforms; be kind or cruel?

Which Adolescents are Most Likely to Show Harmful Social Behavior to Obtain Social Status?

My study findings of **Chapters 3, 4,** and **5** indicate that there are some adolescents who more strongly pursue status and attune to norms, and who are thus more likely to engage in harmful social behavior when peer norms reward such behavior with status affordances.

Higher Status Pursuit Through Agentic Goals? Adolescents who hold agentic goals are geared towards (social) achievement and self-importance, which makes them likely to pursue status and influential positions in the social hierarchy (Abele & Wojciszke, 2014; Paulhus & Trapnell, 2008; Trapnell & Paulhus, 2012). My meta-analytic findings from **Chapter 3** indicate that adolescents who hold agentic goals more strongly are also more likely to engage in harmful social behavior, such as aggression and bullying, because it leads them to gain popularity status. This is consistent with earlier findings, connecting agentic goals to more harmful social behavior, mostly aggressive in nature (e.g., Caravita & Cillessen, 2012; Ojanen & Nostrand, 2014). However, I was not able to replicate heightened susceptibility in adolescents with higher agentic goal orientations in my experimental study in **Chapter 4**. Perhaps, adolescents with agentic goal orientations are well able to adjust their behavior to existing norms in their daily lives with longer-term goals in mind (**Chapter 3**), but less able to adjust their behavior to presented norms on a short-term, momentary scale (**Chapter 4**). Another explanation might be that, although a desire for status may drive some of the behaviors of adolescents high in agentic goals, they have other (sometimes competing) desires that also affect their behavioral choices. For example, agentic goals may be related to desires such as autonomy (Deci & Ryan, 2000), dominance, and competence (Chen et al., 2014). Perhaps, the experimental study in **Chapter 4** consisted of competing elements, such as winning status or winning material resources, which are two competing ways of gaining dominance. Another explanation may be that adolescents with agentic goals are willing to bully and aggress against others for which the potential consequences for victims might be less tangible for perpetrators (**Chapter 3**), and less willing when potential negative consequences for victims may be more tangible for perpetrators—when taking away lottery tickets from peers this is a very concrete and visible, direct consequence for

everyone (**Chapter 4**). And perhaps, adolescents with higher agentic goal orientations might have been aware of social desirability in the behavioral task they conducted in the experimental study in **Chapter 4**, leading to an underestimation of moderator effects. But when these adolescents were in their naturalistic settings as in **Chapter 3**, they did partake in harmful social behavior to gain status, as reported by themselves and their peers.

The inconsistency in findings regarding the contribution of agentic goals to adolescent harmful social behavior generates questions for future research. Are adolescents with agentic goals able to deduct status gain information from manipulated peer norms or are they primarily capable of doing so in their daily life settings, surrounded by their peers and daily routines? What do adolescents high in agentic goals prioritize when they have to choose between conflicting agentic desires? Are adolescents with agentic goals willing to employ all sorts of harmful social behavior or are there behaviors that cross their boundaries, and they are not willing to employ?

Higher Status Pursuit Through Narcissism. Narcissism is a subclinical personality trait that translates into a feeling of entitlement and being more important than others (Krizan & Herlache, 2018). Adolescents higher in narcissism may have a heightened need for status and subsequently direct their energy toward enhancing, retaining, or restoring their status (Campbell & Foster, 2007; Grapsas et al., 2020). Therefore, adolescents higher in narcissistic traits might be more susceptible to attuning their behavior to peer norms that provide information about how status can be gained. In line with previous empirical studies (e.g., Ojanen et al., 2012), my findings from **Chapter 4** indicate that adolescents higher in narcissistic traits are indeed more likely to approach status gains by using selfish behaviors when peer norms reward such behavior with status gains. These adolescents successfully seem to attune their behavior to what gains them status in the peer group, implicating that they may use their well-developed social skills strategically for their self-interest (Eddy, 2023).

More Norm-Attunement due to Identification with the Referent. My findings from **Chapter 5** indicate that adolescents who more strongly identify with a popular referent who sets an online descriptive norm, are more likely to attune their attitudes and behavior to what the referent does. In general, (non)compliant COVID-19-related behavior of YouTube vloggers did not impact COVID-19-related attitudes and behaviors of adolescents, although it did affect levels of worrying about COVID-19. However, in line with previous empirical studies on broader media socialization in other health domains (e.g., Anschutz et al., 2014; Croes & Bartels, 2021), identification with the online referent seemed an important moderator, as for adolescents with higher levels of identification with the vloggers, non-compliant behaviors of vloggers induced more non-compliant COVID-19-related attitudes and behaviors. In social norm theories, it is often theorized that within communities, there are certain community members with high levels of connections that can be particularly influential (Bandura, 1977; Sherif et al., 1964). Because these individuals are often so central within a community and are viewed as people who know what others like or desire, these

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individuals are often viewed as important sources of normative information (Bandura; 1977; Sherif et al., 1964). When popular and influential people model unhealthy behaviors online, this may justify such behaviors or signal that this is a means to gain popularity status, which particularly affects adolescents who identify with the popular referent strongly.

Question 2: How can we Incorporate the Status-Pursuit Perspective more into Current Interventions that aim to Reduce Harmful Social Behavior?

One of the central goals of this dissertation was to take an in-depth look at how we are currently intervening in regard to one specific form of harmful social behavior, bullying (**Chapter 6**), to address to what extent we can apply the knowledge I gained in this dissertation more in the field. One of the overarching conclusions is that interventions are already quite capable of decreasing bullying in primary and high schools across the world. However, effects are less pronounced in high schools and some of the interventions that contain certain components had iatrogenic effects on youth who bully severely before the interventions start. When looking at the components that interventions included in **Chapter 6**, only one of them included a component geared toward the influence of peers, and none of the other interventions did. Additionally, all but one of the interventions included components of cognitive or emotional skill-building. This contrasts with the broader conclusions of the current dissertation, classifying adolescent harmful social behavior as seemingly skillful behavior carried out in the context and through the encouragement of peers and peer norms. Potentially, this is the current mismatch between adolescents' changing nature of harmful social behavior and current intervention practices that I identified in **Chapter 6** (also see Yeager et al., 2018). This leads me to conclude that we can integrate the current dissertation findings more into current intervention practices. Therefore, I identified two pillars to more effectively target adolescent harmful social behavior in future intervention efforts.

These pillars are geared towards inducing prosocial behavior in adolescents. Prosocial behavior is 'voluntary behavior intended to benefit another' (Eisenberg et al., 2006, p. 646). Prosocial behavior is classified as prosocial when it is motivated by other-concerning motives, such as having empathic or sympathetic concern for someone else (Hawley, 2014b). However, also when prosocial behavior is motivated by self-concerning motives, such as enhancing good feelings about the self, external incentives, or reputational benefits, this classifies as prosocial behavior. This is what makes prosocial behavior different from altruistic behavior, which is always truly motivated by other-concerning motives (Hawley, 2014b). Reaching true altruism is a difficult task, even for adults, as it entails reaching the highest levels of moral reasoning (Kohlberg, 1971), and thus many prosocial behaviors are ultimately instrumental in practice (Hawley, 2014b). Therefore, stimulating more prosocial behavior instead of altruism—even when prosociality is instrumental—is a first and important step to take to try to diminish the detrimental consequences for victims and perpetrators of harmful social behavior. This entails not trying to change motivations into other-concerning motives, but instead working towards using prosocial behavior for self-concerning motives.

Pillar 1: Teach Adolescents Prosocial Ways to Achieve Their Status Goals

Status goals are normative in adolescence (Abele & Wojciszke, 2014). Biological and social changes that adolescents undergo coincide with adolescents having a heightened sensitivity for social evaluation which results in a desire for belonging and admiration and a fear of rejection (Blakemore, 2012; Gunther Moor et al., 2010; Steinberg, 2017; Steinberg & Morris, 2001; Terburg & van Honk, 2013). Rather than trying to trivialize status needs, intervention efforts might be more effective when they acknowledge and work with this normative desire instead. To reduce harmful social behavior, interventions could aim to change the means through which adolescents pursue their status goals (Reijntjes et al., 2013b; Sanders et al., 2021). In this manner, adolescents can gain social status via prestige rather than dominance (Cheng et al., 2013; Henrich & Gil-White, 2001; Maner & Case, 2016), and can use more meaningful and prosocial ways to achieve influence, competence, and uniqueness (Abele & Wojciszke, 2014). For example, in the Meaningful Roles intervention (Ellis et al., 2016), students in schools are assigned to different roles (like homework chiefs, ecologists, newscasters) that can increase their status and prestige. These roles are carefully assigned to students, based on their status and behaviors prior to the intervention. By acknowledging and respecting the status needs that adolescents have, and by providing them with alternative prosocial ways to acquire their status, adolescents don't have to and are therefore probably less likely to resort to harmful social behavior

Pillar 2: Change Norms that Reward Harmful Social Behavior with Status

Before adolescents are likely to employ new behaviors to acquire status, it is important that their environment also legitimizes these behaviors as a way to gain psychological status affordances (Walton & Yeager, 2020). If the rewarding effect that harmful social behavior has, is changed, it will no longer be a means to acquiring popularity and changing behavior might not lead to status losses—especially when prosocial behaviors are afforded with status gain. Previous studies indicated that in classes with high prosocial popularity norms (providing popularity to pro-social students) prosocial behaviors are encouraged in individuals exposed to these norms (Laninga-Wijnen et al., 2018), showing the potential of prosocial norms to induce prosocial behaviors. A recent social-norms intervention (Roots) provides evidence for this view (Paluck et al., 2016). In this intervention, adolescents encouraged friendly and anti-conflict behaviors in their peers by publicly encouraging behaviors such as helping others via posters in school and hashtags on social media as well as by handing out wristbands and giving compliments when they saw peers carrying out these behaviors. The intervention effectively reduced conflicts by 25% over 12 months (Paluck et al., 2016). There are more examples of interventions that aim to influence adolescent behavior by changing peer norms (e.g., Perkins et al., 2011), yet most of these interventions target descriptive norms by providing information about how many other students engage in desired behaviors or they use injunctive norms but without tying it explicitly to status gains or losses. The general findings of the current dissertation emphasize the power of injunctive peer norms and underline the importance of showing how engaging in certain behaviors could affect adolescents' status. If norms

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can shift from: "harming others makes you popular" to "harming others makes you unpopular", this could potentially change the actual status that adolescents who engage in harmful social behavior are rewarded with. The peer group and peer norms are crucial factors in adolescent harmful social behavior: if you do not change these, then individual behavior will probably not change (as strongly) because the prospect of gaining status by engaging in certain behaviors might be too tempting. By encouraging peer norms that reward prosocial behavior with status gains and punish harmful social behavior with status loss, adolescents may attune their behaviors to the prosocial norms to gain status and consequently, adolescent harmful social behavior might decrease.

Additional Insights: Influencers' Norm Setting

Influencers who set a *negative* example may influence adolescents' attitudes and behaviors when these adolescents identify with the influencer strongly. This calls for caution in the type of content that adolescents watch online from their favorite influencers, indicating that caregivers and educators may need to step in by providing, for example, parental or teacher mediation of health-related media use by adolescents. In addition, in my study on Youtube vloggers (**Chapter 5**) I was not able to convincingly show that descriptive norms that influencers set online can also influence adolescents *positively*. This is still an area to explore further in future studies. To exemplify, the Dutch Countess Eloise van Oranje was sitting on a terrace with friends when she accidentally found herself in a social experiment being recorded with hidden cameras (NOS, 2023). When one of her neighbors made racist remarks about a black woman in the group, the countess confronted the racist man: 'You are a racist. Someone needs to put you in your place.' The footage from the hidden cameras was published online and in this way, the popular countess, with many followers on Instagram, set an important example for her young followers. But, does that also influence her young followers towards standing up against racism themselves? When we know more about positive influencer effects, we can also employ positive influencer messages as a means to encourage more prosocial and healthy behaviors among adolescents.

Limitations and Future Research Directions

The current dissertation contains a combination of (individual participant data) meta-analytic research, a systematic review of reviews, experimental studies, and a qualitative content analysis. It highlighted the motivational aspect of self-regulation, which is often neglected in explaining harmful social behavior. Furthermore, it assessed multiple forms of harmful social behavior across real-life and online contexts[3]. Yet, several study limitations were apparent as well. These limitations relate to valuable insights into how we can improve the continuation of research in this specific research area. Lastly, the findings of this dissertation generate new research questions for future research.

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3   The dissertation (more specifically **Chapters 4 and 5**) took place during the COVID-19 pandemic providing a unique and challenging setting to study adolescent (health) behaviors and development (Shroff et al., 2022; WHO, 2020). Although we were mindful of the historical context that our studies took place in, it is important to take it into account when interpreting our study findings.

Concrete Guidelines for Future Research on Peer Norms
Based on my studies presented in **Chapters 3, 4,** and **5**, I here provide concrete guidelines for future research lines investigating the status-pursuit mechanism in adolescent harmful social behavior. There are five important sequential steps to undertake when designing an experimental study to assess this status-pursuit mechanism. (1) Adolescents need to witness a descriptive norm. Someone engages in a certain behavior, preferably someone who is relevant to adolescents in the online or real-life context. (2) Adolescents need to witness an injunctive norm regarding the behavior they just observed. People reward or punish the behavior with a gain or loss in status (i.e., popularity not likeability), preferably people who are relevant to adolescents in the online or real-life context. (3) Adolescents need to believe they are going to be evaluated by the same people who set the injunctive norm in step 2. (4). Participating adolescents will then engage in similar behaviors as seen in step 1. They need to choose between several behavioral options, including the behavioral option that led to a gain or loss in status. (5). Adolescents need to believe they will then be evaluated by peers, and that this evaluation will eventually be made public, non-anonymously. By applying these five steps to differential conditions and behavioral scenarios, we can gain a fuller understanding of how status pursuit and peer norms motivate adolescent harmful social behavior.

When reflecting back on the approaches in my experimental studies, **Chapter 5** provided a less optimal test of the status-pursuit mechanism than **Chapters 3** and **4** did, which may possibly explain why I did not find an effect of injunctive norms in **Chapter 5**. I successfully conducted a parsimonious test to uncover the potential effects of online norms on adolescents, by exposing adolescents to descriptive and injunctive norms that either approved or disapproved of vloggers' (non)compliance. However, I did not connect that directly to the personal gains or losses of participating adolescents whenever they would partake in similar behaviors as the vloggers did (Figure 1). This may have led to an underestimation of the effect of injunctive online norms on adolescent attitudes, intentions, and behaviors, as Figure 1 indicates that there are other routes that lead to more effect of peer evaluation such as being evaluated by known peers who provide you with public evaluations. To uncover this further, future experimental studies should expand experimental designs by adding another layer of peer evaluation which could lead to public status gains or losses, conducted by the same (relevant) peers that set the injunctive norms adolescents were exposed to.

Situational and Cultural Variation in Status Pursuit
Chapters 3, 4, and **5**, provided insights into individual differences in status pursuit. Yet, there is more to uncover about potential cultural or situational variation in status pursuit and in norm attunement. From a life history perspective, it is emphasized that what constitutes an adaptive strategy is partly defined by the circumstances children grow up in (Belsky et al., 1991; Dishion & Véronneau, 2012; Fenneman & Frankenhuis, 2020). Peer norms are part of the circumstance but are not all-encompassing. There might be more cultural and situational factors that contribute to the function of adolescent harmful

social behavior that I was not able to capture in the current dissertation. For example, are adolescents more likely to pursue status (and subsequent resources) in communities or households where resources are scarce and unpredictable compared with plentiful and predictable (Fenneman & Frankenhuis, 2020; Kidd et al., 2013)? Arguably, the COVID-19 pandemic may have been such an unpredictable context containing resource scarcity, affecting human behavior (e.g., triage in hospitals and grocery hoarding). This scarcity may have strengthened adolescents' inclination to choose material resources for themselves (i.e., lottery tickets) or status affordances in **Chapter 4**, but this situation was relatively comparable across all participants, which hindered the study of contextual differences. Another example is that what constitutes power may differ between individualistic or collectivistic cultures (Torelli et al., 2020). In individualized cultures, power is defined as personalized power which revolves around self-centered goals. In collectivistic cultures, power is defined as socialized power which revolves around prosocial goals (Torelli et al., 2020). Would peer norms to obtain status be more communal in collectivistic cultures, and more agentic in individualistic cultures (Hofstede, 2011; Torelli et al., 2020)? Moreover, are there cultural differences in what constitutes status, and how status can be reached across cultures, as less is known about this to date (Torelli et al., 2020)? Cross-cultural and cross-contextual comparisons like the ones suggested above can provide interesting insights concerning the cultural and situational variation of the universal function of harmful social behavior.

Conscious and Automatic Motivational Processes

As argued in this dissertation, considering motivational underpinnings of adolescent behavior is crucial, but this can be challenging. In **Chapters 3** and **4**, I relied upon conscious goals that I asked adolescent to self-report. However, internal forces that are driven by goal-pursuit can also be less conscious and more automatic (Custers & Aarts, 2020; Hawley, 2014b; Lansu et al., 2012; Volk, Dane et al., 2022), and conscious goals can also interact with automatic processes (Hawley, 2014b). Solely relying on conscious goal-pursuit processes may limit our understanding of the complexity in which goals contribute to adolescent behavior. Future experimental studies can manipulate how goals, that were identified as developmentally normative in **Chapter 2**, can be reached—as we did in **Chapters 4** and **5**. In doing so, future scholars may measure conscious goals (i.e., questionnaire) *and* automatic strategies that adolescents may have, for example by using implicit measures such as approach-avoidance tasks (Lansu et al., 2012), to investigate how they impact behavior individually, but also in interaction with each other.

Intervention Research

Whether the two pillars that I identified effectively decrease adolescent harmful social behavior should be systematically evaluated in future intervention research. In this process, three key considerations warrant attention. For one, future scholars can investigate the two pillars in isolation, for example by conducting micro-trails (see de Mooij et al., 2020b; de Mooij et al., 2020c), instead of solely assessing interventions (i.e., Roots, Meaningful

Roles) as a whole. By conducting such specific tests, future scholars can more precisely pinpoint the exact mechanisms of change behind intervention packages, which may help to develop lean and cost-effective interventions that decrease the burden placed on high school staff and students. Second, as pointed out by the findings of **Chapter 6**, it is likely that one size does not fit all. Therefore, it is vital to test not only whether the pillars work, but also for whom, by conducting relevant moderator analyses. In **Chapter 6**, we mostly assessed personal characteristics, such as gender and age, as moderator variables. Based on the findings of **Chapters 3, 4,** and **5**, I would also suggest to include moderators such as goal orientation and personality traits (e.g., narcissism). Lastly, when conducting intervention research, the implementation level and quality should be closely monitored. Due to a demanding workload, compromised motivation, and a lack of autonomy of teachers to implement programs, the implementation of universal interventions to reduce harmful social behavior is often substandard (de Castro et al., 2018) which may impact intervention effectivity. I could not evaluate the implementation level and quality in **Chapter 6** because this information was not measured by all primary studies, but this is important to systematically evaluate, also in future (IPD) meta-analyses.

CONCLUSION

I posed two questions at the start of this dissertation, namely: (1) Can adolescent harmful social behavior be seen as strategic attempts to obtain social status? And (2) How can we incorporate this status-pursuit perspective more into current interventions that aim to reduce harmful social behavior? The current dissertation shows that when peer norms reward adolescent harmful social behavior with status affordances that are highly relevant in adolescence (i.e., peer-perceived popularity or gaining likes that may lead to popularity status), adolescents are more inclined to engage in harmful social behavior. Also when influential others who have high popularity status model harmful social behavior online, this may lead adolescents who identify with these influencers to adopt similar attitudes and behaviors. On the other hand, adolescents may be likely to refrain from harmful social behavior when such behavior leads to a potential loss of popularity status. Thus, in peer contexts where adolescent harmful social behavior leads to the acquisition of status, adolescents may strategically and skillfully use harmful social behavior as a means to acquire this resource. Importantly, consistent with the operationalization of self-regulation, adolescent harmful social behavior may be classified as skillful self-regulation in instances where such behavior leads to the acquisition of status goals (Kopetz & Orehek, 2015; Moilanen, 2007). This complements evolutionary theories that point to the adaptivity of harmful social behavior in social hierarchical settings (Hawley, 1999; Volk et al., 2012; Volk, Dane et al., 2022).

Crucially, evolutionary theories also emphasize that cooperation and collectivism are important routes to survival and reproduction too (De Waal, 2010; Hawley, 1999). As such, evolutionary theories do not only justify the selfish side of human nature but also emphasize our empathetic and cooperative human tendencies (de Waal, 2010). The current

dissertation adds that we can reach more adolescent cooperation and collectivism than we are currently promoting via interventions in two ways: one, teach adolescents how they can achieve status by behaving prosocially and two, change peer norms that reward harmful social behavior with popularity into peer norms that reward prosocial behavior with popularity. When we attune to adolescents' normative status goals and treat real-life and online peer norms as crucial targets for interventions, we can more effectively trigger adolescents' innate cooperative and collectivistic tendencies in their attempts to control social resources. We can encourage them to behave prosocially, *in the name of status.*

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APPENDICES

References
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* = *Reviews and meta-analyses (also) included in Chapter 2*
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Supplementary Materials

Chapter 2

Development and Socialization of Self-Regulation from Infancy to Adolescence: A Meta-Review Differentiating between Self-Regulatory Abilities, Goals, and Motivation

S1. Number of References per Database

Table 1.1. *Number of References per Database from the Original and Updated Search Systematic Search*

Database	Age group	Original Search	Updated Search
PsycINFO	Total	406	473
	Infancy	52	60
	Toddlerhood	64	82
	Childhood	125	142
	Adolescence	165	189
ERIC	Total	109	136
	Infancy	5	6
	Toddlerhood	19	24
	Childhood	49	61
	Adolescence	36	45
Web of Science	Total	1,563	779
	Infancy	109	54
	Toddlerhood	188	130
	Childhood	793	258
	Adolescence	473	337
Medline	Total	199	435
	Infancy	28	60
	Toddlerhood	15	112
	Childhood	94	66
	Adolescence	62	197
	Overall total	2,277	1,823
	After deduplication	1,289	635

Note. The search was performed in July 2019 and updated on 29 September 2022. All records from the updated search that were also retrieved in the original search were removed based on accession numbers following the procedure described in https://osf.io/e9z76.

S2. Number of References Included in Results Section

Table 2.1. *Number of References Included in Results Section Grouped by Review Topic and Type*

Infancy		Narrative reviews	Systematic reviews	Meta-analyses	Total
Capacities		30	1	2	33
Goals and motivation		10			10
Socialization via	Parents	20	1	3	24
	Teachers				0
	Peers	1			1
Total		61	2	5	68
Total without duplicates*		51	1	5	57
Toddlerhood/ Preschool		Narrative reviews	Systematic reviews	Meta-analyses	Total
Capacities		21	1	2	24
Goals and motivation		6			6
Socialization via	Parents	17	2	7	26
	Teachers	7		2	9
	Peers	5			5
Total		56	3	11	70
Total without duplicates*		37	2	10	49
Childhood		Narrative reviews	Systematic reviews	Meta-analyses	Total
Capacities		12	1	2	15
Socialization of capacities via	Parents	7	3	3	13
	Teachers	7	1	2	10
	Peers	4			4
Goals and motivation		5			5
Socialization of goals and motivation via	Parents	1	1		2
	Teachers	2		2	4
	Peers	2			2
Total		40	6	9	53
Total without duplicates*		31	5	7	43
Adolescence		Narrative reviews	Systematic reviews	Meta-analyses	Total
Capacity		12	5	2	19
Socialization of capacities via	Parents	7	1	3	11
	Teachers	2	1	1	4
	Peers	2	2		4

Table 2.1. Continued.

Goals and motivation		7	2	2	11
Socialization of goals and motivation via	Parents	2	1		3
	Teachers	1	1	2	4
	Peers	2	1		3
Total		35	14	10	59
Total without duplicates*		24	7	9	40
Total all periods without duplicates*		142	16	31	189
Boxes		Narrative reviews	Systematic reviews	Meta-analyses	Total
Box A	Bidirectional influences	6	2		8
Box B	Broader contextual influences	5	1		6
Box C	Risky behavior	5	1		6
Total		16	4		20
Total without duplicates*		15	3		18
Total all review-type references without duplicates*		157	19	31	**207**

Note. *Count of unique references per developmental period (but duplicates across developmental periods).

Chapter 3
Social Goals and Gains of Adolescent Bullying and Aggression: A Meta-Analysis

S1. Search Strings

PsycINFO*

#1a Bullying
bullying/ OR cyberbullying/ OR (bullies OR bully* OR victimi*ation OR victimi*ed OR peer harassment* OR cyberbull* OR cybervictimi*).ti,ab,id.

#1b Aggression
Proactive aggres* OR relational aggres* OR instrumental aggres*.ti,ab,id.

#2 Adolescents
adolescence 13 17 yrs.ag. OR middle school students/ OR junior high school students/ OR high school students/ OR (child* OR teen* OR young* OR youth* OR girl* OR boy* OR adolesc* OR (student* AND (secondary OR middle school* OR high school* OR highschool*)) OR high schooler* OR 7th-grade* OR seventh-grade* OR grade 7 OR grade seven OR 8th-grade* OR eight-grade* OR grade 8 OR grade eight OR 9th-grade* OR ninth-grade* OR grade 9 OR grade nine OR 10th-grade* OR tenth-grade* OR grade 10 OR grade ten OR 11th-grade* OR eleventh-grade* OR grade 11 OR grade eleven OR 12th-grade* OR twelfth-grade* OR grade 12 OR grade twelve).ti,ab,id.

#3 Social Goals
(agency goal* OR communal goal* OR popularity goal* OR social demonstration goal* OR social goal* OR antisocial goal* OR prosocial goal* OR goal* endorsement OR motive*).ti,ab,id.

#4 Social Gains
popularity/ OR belonging/ OR sociometric tests/ or sociometry/ OR (peer preference* OR peer rejection* OR peer acceptance* OR liked OR disliked OR likeability OR likability OR likeable OR likable OR sociometric* OR socio-metric* OR ((peer* OR group* OR hierarch*) ADJ3 status) OR popularity OR social prominen* OR centrality OR social dominance OR (imbalance ADJ3 power) OR machiavelliani* OR resource control* OR social status).ti,ab,id.

#5 NOT younger than adolescents
(preschool age 2 5 yrs OR school age 6 12 yrs).ag. NOT adolescence 13 17 yrs.ag.
1a AND 2 AND (3 OR 4) NOT 5
1b AND 2 AND (3 OR 4) NOT 5
*Adapted to fit other databases (ERIC, Web Of Science) if necessary

S2. Different Datasets

In case multiple correlations were noted within one study about the same link but with slightly different variables, the researchers had to select which correlations to include.

Table a. Standardized regression coefficients of dataset 1: physical and direct and traditional bullying

Relation	Estimate	Pr (>|z|)
Communion → Bullying	β 0.02	0.761
Agency → Bullying	β 0.19	<0.001
Bullying → Likeability	β -0.14	<0.001
Bullying → Popularity	β 0.23	<0.001

Model fit: $\chi2_{(2)} = 7.38$, $p = 0.03$, RMSEA = 0.005, CFI = 0.964

Table b. Standardized regression coefficients of dataset 2: verbal and indirect and traditional bullying

Relation	Estimate	Pr (>|z|)
Communion → Bullying	β 0.02	0.780
Agency → Bullying	β 0.19	<0.001
Bullying → Likeability	β -0.14	<0.001
Bullying → Popularity	β 0.23	<0.001

Model fit: $\chi2_{(2)} = 7.37$, $p = 0.03$, RMSEA = 0.005, CFI = 0.964

Table c. Standardized regression coefficients of dataset 3: physical and direct and cyber bullying

Relation	Estimate	Pr (>|z|)
Communion → Bullying	β 0.02	0.780
Agency → Bullying	β 0.19	<0.001
Bullying → Likeability	β -0.14	<0.001
Bullying → Popularity	β 0.23	<0.001

Model fit: $\chi2_{(2)} = 7.38$ $p = 0.03$, RMSEA = 0.005, CFI = 0.964

Table d. Standardized regression coefficients of dataset 4: verbal and indirect and cyber bullying

Relation	Estimate	Pr (>|z|)
Communion → Bullying	β 0.02	0.784
Agency → Bullying	β 0.19	<0.001
Bullying → Likeability	β -0.14	<0.001
Bullying → Popularity	β 0.23	<0.001

Model fit: $\chi2_{(2)}$ = 7.37, p < 0.03, RMSEA = 0.005, CFI = 0.964

Table e. Standardized regression coefficients of dataset 5: means of different bullying indicators and aggression cross sectional

Relation	Estimate	Pr (>|z|)
Communion → Bull&Agg	β -0.00	0.937
Agency → Bull&Agg	β 0.18	<0.001
Bull&Agg → Likeability	β -0.14	<0.001
Bull&Agg → Popularity	β 0.26	<0.001

Model fit: $\chi2_{(2)}$ = 8.42, p = 0.02, RMSEA = 0.004, CFI = 0.982

Table f. Standardized regression coefficients of dataset 6: means of different bullying indicators and aggression longitudinal

Relation	Estimate	Pr (>|z|)
Communion → Bull&Agg	β -0.01	0.787
Agency → Bull&Agg	β 0.18	<0.001
Bull&Agg → Likeability	β -0.14	<0.001
Bull&Agg → Popularity	β 0.26	<0.001

Model fit: $\chi2_{(2)}$ = 9.29, p = 0.01, RMSEA = 0.005, CFI = 0.98

Table g. Standardized regression coefficients of dataset 7: bullying only*

Relation	Estimate	Pr (>|z|)
Communion → Bull&Agg	β 0.02	.719
Agency → Bull&Agg	β 0.19	<.001
Bull&Agg → Likeability	β -0.14	<.001
Bull&Agg → Popularity	β 0.22	<.001

Model fit: $\chi2_{(2)}$ = 7.35 , p = .03 , RMSEA = 0.005 , CFI = 0.963

Table h. Standardized regression coefficients of dataset 8: aggression only*

Relation	Estimate	Pr (>|z|)
Communion → Bull&Agg	β -0.04	.307
Agency → Bull&Agg	β 0.17	<.001
Bull&Agg → Likeability	β -0.14	<.001
Bull&Agg → Popularity	β 0.28	<.001

Model fit: $\chi2_{(2)} = 2.64$, *p=-.27* , RMSEA = 0.002 , CFI = 0.997

* For the aggression sample there was only one study that reported correlations between communal goals and likeability, which hindered between-study comparisons. This resulted in large standard errors when plotting the indirect effects, which made it impossible to estimate the indirect effects reliably. The indirect effects for the bullying sample were similar to the indirect effects of the overall model for all studies combined.

S3. Approved Questionnaires for Bullying

Questionnaires that were included in the current meta-analysis based on systematic reviews:

1. California Bullying victimization Scale (Felix et al., 2011)
2. Olweus Bully/ victim Questionnaire (Solberg & Olweus, 2003)
3. Participant role Questionnaire (Salmivalli & Voeten, 2004)
4. Peer Relationship Survey (Cho et al., 2009)
5. Peer Relations Assessment Questionnaire (Rigby & Slee, 1993)
6. Reactive – Proactive Aggression Questionnaire (Raine et al., 2006)
7. Reynolds Bully- Victimization Scale for Schools (Peters & Bain, 2011)
8. School Climate and Bullying Scale (McConvill & Cornell, 2003)
9. Retrospective Bullying Questionnaire (Schafer et al., 2004)
10. Social Bullying Involvement Scales (Fitzpatrick & Bussey, 2011)
11. The Swearer Bully Survey (Swearer & Cary, 2003)
12. The Cyberbullying Questionnaire (CBQ) (Calvete et al., 2010)
13. Cyber bullying and victimization questionnaire (Campfield, 2006)
14. Survey (Li; 2005, 2006, 2007, 2008)
15. Cyberbullying Scale (CS) (Menesini et al., 2011)
16. European Cyberbullying Research Project (ECRP) (Mishna et al., 2010)
17. The Berlin Cyberbullying – Cybervictimisation Questionnaire (CByQ) (Schultze-Krumbholz et al., 2009)
18. Cyberbullying Questionnaire (Slonje & Smith, 2008; Smith et al., 2008)
19. Cyberbully Poll (Varjas et al., 2009)
20. Cyber Harassment student Survey (Beran & Li, 2005)
21. Online (Survey) Questionnaire (Coyne et al., 2009)
22. Victimization in chat room and bullying in chat room (Katzer et al., 2009)
23. Lodz Electronic Aggression Prevalence Questionnaire (LEAPQ) (Pyzalski, 2009)
24. Self/Peer nominations where [our] definition of bullying is given to students
25. Mount Hope Family Center Bully–Victim Questionnaire (Shields & Cicchetti, 2001)
26. California Bullying Victimization Scale (Felix et al., 2011)

Decisions based on Systematic Reviews of:

a. Vivolo-Kantor, A.M., Martell, B.N., Holland, K.M., & Westby, R. (2014). A systematic review and content analysis of bullying and cyber-bullying measurement strategies. *Aggression and Violent Behavior, 19*, 423–434. https://doi.org/10.1016/j.avb.2014.06.008
b. Berne. S., Frisén, A., Schultze-Krumbholz, A., Scheithauer, H., Naruskov, K., Luik, P., Katzer, C., Erentaite, R., & Zukauskiene, R. (2013). Cyberbullying assessment instruments: A systematic review. *Aggression and Violent Behavior, 18*, 320–334. https://doi.org/10.1016/j.avb.2012.11.022

Other questionnaires that were included provided authors indicated that they measured/studied bullying

1. Adolescent Peer Relations Instrument (Finger et al., 2008)
2. Aggression Scale (Orpinas & Frankowski, 2001)
3. Bull-S Questionnaire (Cerezo & Ato, 2005)
4. Bullying-Behavior Scale (Austin & Joseph, 1996)
5. Child Social Behavior Questionnaire (Warden et al., 2003)
6. C-Sharp (Farmer & Aman, 2009)
7. Children's Social Behavior Scale – Self Report (Crick & Grotpeter, 1995)
8. Cyber victim & Bullying Scale (Cetin et al., 2011)
9. Direct & Indirect Patient Behavior Checklist – Prisoner version (Ireland, 1999)
10. Gatehouse Bullying Scale (Bond et al., 2007)
11. Homophobic Bullying Scale (Prati, 2012)
12. Homophobic Content Agent Target Scale (Poteat & Espelage, 2005)
13. Illinois Bully Scale (Espelage & Holt, 2001)
14. Introducing my Classmates (Gottheil & Dubow, 2001)
15. Modified Aggression Scale (Bosworth et al., 1999)
16. Modified Peer nomination inventory (Perry et al., 1988)
17. Multidimensional Peer-Victimization Scale (Mynard & Joseph, 2000)
18. New Participant Role Scale (Goossens et al., 2006)
19. Pacific Rim Bullying Measure (Konishi & Hymel, 2009)
20. Peer Interactions in Primary School Questionnaire (Tarshis & Huffman, 2007)
21. Perception of Teasing Scale (Thompson et al., 1995)
22. Personal Experiences Checklist (Hunt et al., 2012).
23. Physical Appearance Related Teasing Scale (Thompson et al., 1991)
24. Self Report Inventory of Setting the Record Straight (Gottheil & Dubow, 2001)
25. Survey of Knowledge of internet Risk & Internet Behaior (Gable et al., 2011)
26. The School Life Survey (Chan et al., 2005)
27. Traditional Bullying and Cyberbullying Survey (Hinduja & Patchin, 2010)
28. Victimization of Self and Victimization of Others (Vernberg et al., 1999)
29. Victimization Scale (Orpinas et al., 2003)
30. Weight- Based Teasing Scale (Eisenberg, 2003)
31. Cyberbullying and Cybervictimization Questionnaire (Ang & Goh, 2010)
32. Questionnaire of Cyberbullying (QoCB) (Aricak et al., 2008)
33. Cyberbullying Questionnaire (Aricak, 2009)
34. The Victimization of Self (VS) Scale with cyber-aggression questions (Dempsey et al., 2009)
35. School Crime supplement (Dinkes et al., 2009)
36. Revised Cyber Bullying Inventory (RCBI) (Erdur-Baker, 2010) (or other authors combined with this author)
37. Mental Health and Violence dimensions survey (Goebert et al., 2011)

38. Cyberbullying Survey (Harcey, 2008)
39. Cyber Bullying Victimization Scale (Hay & Meldru, 2010)
40. Cyberbullying and Online Aggression (Hinuja & Patchin, 2007-2010)
41. Cyberbullying student Survey (not reported)
42. Checking in online: 'what happening in cyberspace?' (Mishna et al., 2010)
43. Peer aggression/ victimization questionnaire (Pornary & Wood, 2010)
44. Text and email bullying (Rivers & Noret, 2010)
45. Cuberbullying Survey (Salvatore, 2006)
46. The student survey of bullying behavior – Revised 2 (Varjas et al., 2009)
47. Cyberbullying survey for middle school students (Wright et al., 2009)
48.   Who bullies Whom (Rodkins & Berger, 2008)
49. (Revised) Peer Experiences Questionnaire (self-reports) (RPEQ; Prinstein, Boergers, & Vernberg, 2001; Vernberg et al., 1999)
50. The Overt Aggression Participant Role Behavior Scale (Casper et al., 2017)
51. Revised Class Play (Masten, Morison, & Pellegrini, 1985)
52. Prosocial and Aggressive behavior (Caprara & Pastorelli, 1993)

Chapter 4
Behaving Selfishly to Earn Status in Adolescence

S1. Background Information Conditions and Choices Made

Table S1.1. *Descriptive Statistics Within the Two Conditions*

	Peer Disapproval	Peer Approval
	M (SD) or N	*M (SD) or N*
Age	14 *(1)*	13 *(1)*
Narcissism	1.02 *(0.51)*	1.07 *(0.54)*
Agentic Goals	-6.89 *(4.63)*	-6.40 *(4.34)*
Girls	126	115
Boys	119	144
Other	4	11

Table S1.2 *escriptive Information about the Frequency of Egalitarian and Selfish Choices in the First and Second Round per Condition.*

		Choice 1		Choice 2	
		Egalitarian	Selfish	Egalitarian	Selfish
Condition	Peer Disapproval	148	101	198	51
	Peer Approval	149	121	165	105

S2. Pilot

Several choices that had to be made within the experiment were piloted with a convenience sample of adolescents (N = 21) in the age range of 12-18 years old. We asked adolescents to rate all possible divisions of 10 lottery tickets between two people with likes or dislikes. Their answers indicated that there was a big drop in likes after the 6/4 distribution, which remained stable from then onwards (i.e., 7/3, 8/2, 9/1, 10/0). Therefore, we decided to choose the first division after the big drop in likes, which was the 7/3 division (i.e, 7 tickets for themselves, 3 for the other). In this way, we offered adolescents a choice that was generally disliked but that was not the most extreme choice they could make, to ensure the lowest possible threshold to make an unequal choice that is generally disapproved of. Hereafter, we asked adolescents how many likes/dislikes were realistic to provide in situations where lottery tickets were unequally distributed. Their answers provided us with the information that we had to be careful with the likes/dislikes distribution, because too many likes for selfish behavior would be too unrealistic. Based on their answers, we choose a 7/18 division.

In this pilot we also tested whether the general information was clear and we tested whether our visual representation of the behavioral choices and likes/dislikes were clear.

All pilot materials are uploaded on OSF [https://osf.io/huje6/?view_only=52ffc6bc9d97 42d5b00a9d3ebc4072ed]

S3. Interpersonal Goal Inventory – Additional Information

The 33-item Interpersonal Goal Inventory (Ojanen et al., 2005; Thomaes et al., 2008) measures eight different goal orientations and asked about what is important for adolescents when they are together with their peers. The eight goal orientations were: 1. Agentic goals (e.g., 'How important is it for you that the other respects and admires you' or 'How important is it for you that you appear self-confident and make an impression on the others'; $M = 4.35$, $SD = 1.66$). 2. Agentic and communal goals (e.g., 'How important is it for you that you say exactly what you want' or 'How important is it for you that the others listen to your opinion'; $M = 7.52$, $SD = 2.08$). 3. Communal goals (e.g., 'How important is it for you that you feel close to the others' or 'How important is it for you that you can put the others in a good mood'; $M = 9.14$, $SD = 2.01$). 4. Submissive and communal goals (e.g., 'How important is it for you that you let the others decide' or 'How important is it for you that you agree with the others about things'; $M = 9.00$, $SD = 2.31$). 5. Submissive goals (e.g., 'How important is it for you that the others do not get angry with you' or 'How important is it for you that you do not annoy the others'; $M = 7.41$, $SD = 2.37$). 6. Submissive and separate goals (e.g., 'How important is it for you that you do not say stupid things when the others are listening' or 'How important is it for you that you do not make a fool of yourself in front of the others'; $M = 6.60$, $SD = 2.57$). 7. Separate goals (e.g., 'How important is it for you that you do not let anyone get too close to you' or 'How important is it for you that you do not give away too much about yourself'; $M = 6.77$, $SD = 3.40$). 8. Agentic and separate goals (e.g., 'How important is it for you that the others agree to do what you suggest' or 'How important is it for you that the others do what you say'; $M = 3.05$, $SD = 1.60$).

S4. Additional Information Manipulation Checks

In the status gain condition, 75% of adolescents indicated that the other student received 18 likes for selfishness (Table S4.1). In the status loss condition, 48% of adolescents indicated that the other student received 7 likes for selfishness. In both conditions, adolescents were more likely to provide the correct answer than one of the two incorrect answers, although the majority of adolescents in the status gain condition did not recall the number of likes correctly.

Adolescents with higher levels of agentic goals overestimated the number of dislikes that the other student received whereas adolescents with higher levels of narcissism underestimated the number of likes that the other student received. In both cases, adolescents with higher levels of agentic goals and narcissism indicated that the other student was evaluated less favorably than was actually the case.

Table S4.1. *How Many Likes did the Student Receive From the 25 Other Students?*

		7 Likes	18 Likes	25 Likes
Status Gain Condition		60_a	196_b	14_b
	Agentic Goals	-6.06_a	-6.46_a	-6.92_a
	Narcissism	12.20_a	10.19_b	$12.00_{a,b}$
Status Loss Condition		130_a	107_b	12_b
	Agentic Goals	-7.13_a	$-6.92_{a,b}$	-3.78_b
	Narcissism	10.08_a	10.09_a	12.00_a

Note. Values in the same row not sharing the same subscript are significantly different at $p < .05$, in the two-sided test of equality for column proportions or column means. Higher scores indicate higher levels of agentic goals and narcissism.

In both conditions, the majority of adolescents expected to receive dislikes instead of likes after being selfish (Table S4.2). However, in the status gain condition, twice as many adolescents expected to receive likes than in the status loss condition. This indicated that witnessing peer approval for selfishness only once can already induce the expectation of receiving likes for selfishness for a portion of adolescents.

Adolescents with higher levels of agentic goals and narcissism were more likely to expect to receive likes in the status gain condition. However, adolescents with higher levels of agentic goals were also more likely to expect to receive likes in the status loss condition, reflecting a more general expectation of receiving likes.

Table S4.2. *What did you Expect to get When you Would Distribute Tickets Unequally?*

		Dislikes	Likes
Status Gain Condition		172$_a$	98$_b$
	Agentic Goals	-7.02$_a$	-5.30$_b$
	Narcissism	10.18$_a$	11.68$_b$
Status Loss Condition		204$_a$	45$_b$
	Agentic Goals	-7.27$_a$	-5.09$_b$
	Narcissism	10.05$_a$	10.74$_a$

Note. Values in the same row not sharing the same subscript are significantly different at $p < .05$, in the two-sided test of equality for column proportions or column means. Higher scores indicate higher levels of agentic goals and narcissism.

Chapter 5

YouTube Vloggers Set the Stage: How Public (Non)Compliance With COVID-19 Regulations Affects Adolescents

S1. Information about Vloggers and Vlogs

Selection of Vloggers

To find out who the most popular vloggers were in the Netherlands, we asked 50 Dutch adolescents (M_{age} = 13.5, *SD* = 1.20, Girls = 52%, average secondary education = 54%, higher secondary education = 46%) to indicate which vloggers they followed online. Based on the results of the 50 adolescents, we selected YouTube vloggers that uploaded vlogs of their daily activities at least once a week in the period of February 2020 to March 2021. From this group, we selected the eight most popular YouTubers (as indicated by their number of followers in February 2021).

Table S1.1. *Background Information YouTube Vloggers*

Vlogger	Gender	Age	Upload Frequency	Amount of Subscribers	Amount of Vlogs
1	Male	27	Daily	2.560.000	4.737
2	Male	22	Daily	1.300.000	1.952
3	Male	22	Daily	1.000.000	1.111
4	Female	25	Weekly	539.000	1.233
5	Male	19	Weekly/Daily	532.000	908
6	Female	23	Weekly	354.000	137
7	Female	34	Twice a week	305.000	499
8	Female	24	Weekly	148.000	122

Note. Age, number of subscribers and number of vlogs was determined in February 2021.

Randomization of Vlogs

We randomly selected six vlogs via randomizer.org. In order to randomly select six vlogs, we first counted the total number of eligible vlogs that were uploaded in one period by one vlogger. We then indicated on randomizer.org that we wanted six random numbers in the range from one to the total number of vlogs uploaded in that period. These six numbers then corresponded to six vlogs that we selected.

S2. Different Periods in the Pandemic

Table S2.1. *COVID-19 Regulation-phases in the Netherlands (February 2020 to March 2021)*

Period	Name	Dates
1	Start of COVID-19 and regulations in NL	February 17 2020–March 30 2020 *[42 days]*
2	Intelligent Lockdown	March 31 2020–May 6 2020 *[36 days]*
3	Reduction of Regulations	May 7 2020–October 12 2020 *[158 days]*
4	Partial Lockdown	October 13 2020–December 13 2020 *[61 days]*
5	Hard Lockdown	December 14 2020–March 1 2021 *[77 days]*

Table S2.2. *Example of Coding Behavior in Different Periods: The Maximum Amount of People Inside*

Period	Behavior Vlogger	Code
1		(March 24 – 2020) Complied
2		(April 9 – 2020) Complied
3	2 people that do not belong to household visit vlogger at home	(June 24 – 2020) Regulation not in effect
4		(November 3 – 2020) Complied
5		(January 23 – 2021) Did not comply

S3. Additional Descriptive Information about Vloggers' Behavior, Statements, and Viewers' Evaluations

Vlogger Behavior

For each of the regulations, we coded per vlog whether the YouTuber: a. complied, b. did not comply, c. both showed compliance and noncompliance in one vlog, d. was not in the context in which a regulation is relevant or, e. the regulation was not in effect. The regulations that were violated most are mentioned in the manuscript. The other regulations were violated in less than a fifth of the vlogs, with using contact-jobs (0.8%), quarantine after a positive test (0%), and curfew (0.4%) hardly ever being violated. When there was a violation in a vlog, we counted the frequency of violations per vlog to provide information on the amount of exposure to violations in vlogs. The highest number of violations per vlog was made for social distancing, going abroad, working from home, and amount of people that are allowed inside. We also calculated the number of violations per minute, by dividing the number of violations and occasions of compliance by the total length of the vlog. There were 0.219 violations per minute and 1.433 occasions of compliance per minute on average per vlog.

Table S3.1. *Descriptive Norms: Frequency of Occurrence of Different Categories for each Regulation, this Table Provides Information on* **Whether or not** *Regulations were Violated in a Vlog.*

	Compliance	Non-compliance	Compliance and noncompliance	% non-compliance*
1. Social distancing	32	52	112	68.4%
2. Working from home	85	21	44	27.1%
3. Stay home/ get tested with symptoms	2	0	2	0.8%
4. Amount of people allowed inside	155	4	31	14.6%
5. Amount of people allowed outside	153	8	26	14.1%
6. Going abroad	182	1	2	1.2%
7. Using contact-jobs	127	1	1	0.8%
8. Wearing facial mask	22	29	17	19.2%
9. Quarantine after positive test	38	0	0	0%
10. Going to shops alone	19	19	5	10%
11. Curfew	18	0	1	0.4%

*Note. Percentage noncompliance is the percentage of noncompliance added to the percentage of both compliance and noncompliance, as this also reflects noncompliance in the vlog.

Table S3.2. *Descriptive Norms: Frequency of Violations per Regulation. This Table Provides Information on **how Often** Regulations were Violated.*

Regulation	*N* (vlogs)	Min	Max	*M (SD)*	%
1. Social distancing (1.5 feet)	240	0	14	3.15 (3.45)	42.42%
2. Working from home	240	0	8	0.57 (1.18)	28.57%
3. Stay home/ get tested with symptoms	240	0	6	0.03 (0.39)	66.67%
4. Amount of people allowed inside	240	0	8	0.26 (0.90)	25%
5. Amount of people allowed outside	240	0	7	0.25 (0.83)	28%
6. Going abroad	240	0	12	0.12 (1.10)	20.69%
7. Using contact-jobs (i.e., hairdresser)	240	0	1	0.01 (0.09)	2.13%
8. Wearing facial mask	240	0	6	0.40 (1.04)	27.27%
9. Quarantine after positive test	240	0	0	0 (0)	0%
10. Going to shops alone	240	0	2	0.11 (0.34)	8.7%
11. Curfew	240	0	2	0.01 (0.13)	25%

Note. Percentage is calculated by adding the number of violations to the amount of compliance, and by using the following formula: violence*100/compliance.

To exemplify; the social distance regulation was violated with a friend in the hot tub, at work with colleagues, and in the car with (non-household) family members. The stay home with symptoms regulation was violated while meeting with friends outside, in public places (a trampoline park and in a restaurant), and in the car with friends. Finally, the working from home regulation was violated by going to the office (with co-workers), going to companies that vloggers do advertisements for (for example, car-stores), and going to locations where tv and radio content was recorded (in the studio or on site).

A one-way ANOVA indicated that there were significant differences in the number of vlogger violations per period, $F (4, 235) = 11.648$, $p = <.001$. Post-Hoc evaluations with Bonferroni corrections indicated that least of the violations were made in the first two periods, and that there were significant differences between period 1 and 2 with period 3, 4, and 5, during which vloggers showed more violations. All regulations had little vlogger violations during the start of the COVID-19 pandemic in the Netherlands and during the intelligent lockdown, had a peak in the period with less regulations, and remained high during the partial and hard lockdown.

Table S3.3. *Injunctive Norms: Neutral, Supportive, and Dismissive Statements in The Vlogs, and Valence Score.*

	N	Min	Max	*M (SD)*
Neutral statements	240	0	35	2.53 (4.52)
Supportive statements	240	0	10	0.69 (1.50)
Dismissive statements	240	0	14	0.81 (1.96)
Valence	240	-13	9	-0.14 (1.88)

We also calculated the number of dismissal or support per minute, by dividing the number of dismissal and occasions of support by the total length of the vlog. When controlling for the length of the vlog, there were 0.027 supportive statements per minute and 0.033 dismissive statements per minute on average per vlog.

Examples of neutral statements were: '*Vlogger 1*: A lot of my events are cancelled' and '*Vlogger 6*: Normally we would be in schools on Mondays, except in these times'. Examples of dismissive statements were: '*Vlogger 4*: The measures are crooked' and '*Vlogger 7*: Mouth masks don't hold back the virus'. Examples of supportive statements were: '*Vlogger 7*: Keep regulations in mind; together we can prevent it from getting worse', and '*Vlogger 8*: Stay safe, stay home'.

Vloggers with higher levels of noncompliance also made less supportive statements, and when vloggers made more dismissive statements they also made more supportive statements. We also assessed whether vloggers' injunctive norms differed per period, by looking at the valence of comments made during the vlogs. A one-way ANOVA indicated that there was no significant difference between vloggers' injunctive norms over time, $F(4, 235) = 2.24$, $p = 0.06$.

Viewer Evaluations
On average, vlogs were viewed 303,609.52 times ($SD = 294,237.61$), received 9319.17 likes ($SD = 10,580.60$), and 183.89 dislikes ($SD = 191.22$). On average, there were 1.78 ($SD = 5.81$) supportive comments about the vlogger, 0.61 ($SD = 2.25$) supportive comments about COVID-19, 1.87 ($SD = 4.92$) dismissive comments about the vlogger, and 1.40 ($SD = 4.02$) dismissive comments about COVID-19.

Like Rate
We explored how viewers evaluated the YouTube vlogs. The likes, dislikes, and views per vlog were all subtracted on February 18th, 2021. The average like-rate for vlogs was $M = 2.77$ ($N = 240$, $SD = 1.06$, min = 1.03, max = 5.45), with higher rates indicated more popular vlogs controlling for the number of views that a vlog had.

Comments about Vloggers and about COVID-19
We assessed the comments that were made under vlogs whenever this was possible ($N = 228$). Most comments that were made under a YouTube vlog were neutral about COVID-19, followed by neutral comments about the vlogger. More supportive comments were made about the vlogger than dismissive comments, and more dismissive comments were made about COVID-19 than supportive comments. The average valence for comments about vloggers and comments about COVID-19 was slightly more dismissive than supportive, with a higher dismissive valence for comments about COVID-19/ the regulations. Both valence scores indicated a small difference.

Table S3.4. *Evaluation of Viewers: Neutral, Supportive, Dismissive, and Ambivalent Comments Placed Under the Vlogs by Viewers, and the Valence Score of Comments about the Vlogger and Comments about COVID-19/ the Regulations*

	N	Min	Max	M (SD)
Neutral comments about vlogger	228	0	63	1.07 (4.93)
Neutral comments about COVID-19/ regulations	228	0	154	5.16 (14.96)
Supportive comments about vlogger	228	0	44	1.78 (5.81)
Supportive comments about COVID-19/ regulations	228	0	30	0.61 (2.25)
Dismissive comments about vlogger	228	0	38	1.87 (4.92)
Dismissive comments about COVID-19/ regulations	228	0	34	1.40 (4.02)
Ambivalent comments	228	0	8	0.16 (0.82)
Valence Vlogger	228	-16	29	-0.14 (4.00)
Valence COVID-19/ regulation	228	-28	13	-0.42 (3.08)

When viewers made more supportive comments about the vlogger, they also made more supportive comments about COVID-19, more dismissive comments about the vlogger, and more dismissive comments about COVID-19. When viewers made more supportive comments about COVID-19, they also made more dismissive comments about COVID-19, and more dismissive comments about the vlogger. When viewers made more dismissive comments about the vlogger, they also made more dismissive comments about COVID-19. All these correlations were significant and (moderate to) large.

A one-way ANOVA indicated that there were no significant differences between viewers' comments over time, this held for comments about vloggers $F(4, 223) = 1.76$, $p = 0.14$, and for comments about COVID-19, $F(4, 223) = 2.02$, $p = .09$.

Correlating Vloggers Behavior and Statements with Viewer Evaluations

The correlation table is presented in chapter 5. The correlations between norms and evaluations indicate that when vloggers made more violations, they also showed more compliance, and when vloggers had more dismissive statements, they also expressed more support for COVID-19. Either vloggers did not engage in situations in which they could violate or comply with regulations, or they did engage in these situations and showed both occasions of violations and compliance. Relatedly, either vloggers did not express themselves about COVID-19 or they did and expressed both support and dismissal. Vlogs with more violations had higher like-rates, indicating that these vlogs received more appreciation. Vlogs with more dismissive comments by the vloggers received more supportive *and* more dismissive comments about the vlogger by viewers, and more dismissive comments about COVID-19 by viewers. However, vlogs with more supportive comments by the vloggers also received more dismissive comments about COVID-19 by viewers. This indicated that vloggers who were more dismissive, received more support and dismissal, whereas vloggers who were more supportive only received more dismissive comments about COVID-19 in general. Lastly, supportive and dismissive comments about the vlogger and COVID-19 were all positively correlated, indicating that there were discussions taking place under some vlogs.

S4. Additional Information about Sample and Procedure Experiment

Participants

An a-priori power analysis indicated that we needed approximately 210 adolescents to conduct ANOVA with a 2x2 experimental design, in which we assessed the main- and interaction effects. With 210 adolescents, we have a power of $\beta = 0.95$, to detect effect sizes of $f = 0.25$, with $\alpha = 0.05$. Data-collection took place in March/April 2021. We recruited schools until we reached our desired number of participants, and we continued with data collection in those recruited schools until everyone who wanted to, participated. Therefore, we exceeded the number of participants that was indicated by our power analysis.

Procedure

Schools received an information letter and information about the project via email and later by phone. A total of 124 schools were contacted. After schools agreed to participate, parents of adolescents received an information letter three weeks prior to data-collection. Parents could indicate active consent for participation of their child by filling in an online link via Qualtrics. Out of all parents that filled in the consent form, 95% of them provided consent and 5% of them did not provide consent for their child to participate. Adolescents who had received active consent could provide assent during data-collection and voluntarily chose to participate in the experiment. Adolescents were told the researchers wanted to assess their COVID-19 knowledge, they were notified that they could stop at any time during the experiment without further consequences, and that their answers would not be shared with their parents or teachers. There were 45 adolescents who did not participate although they had parental consent, either because they were absent during data-collection or because they did not want to participate.

S5. Own-Risk Perceptions-Preregistered Analyses

As reported in the manuscript, we were unable to reliably assess own risk perceptions of getting, being hospitalized, or dying from COVID-19. Therefore, we conducted the preregistered analyses and report them in the supplementary materials. In doing so, we refrain from interpreting these results, as we are unsure about the construct we measured.

Table S5.1. *ANOVA Main Analyses Before Manipulation Check Removal*

	Sum of Squares	df	Mean Square	F	p	η^2
Risk Perception (Own)						
N = 281, R²=.009						
Vlogger (non)compliance	0.197	1	0.197	0.197	.658	.001
Viewer evaluation	2.403	1	2.403	2.400	.122	.009
Vlogger (non)compliance* Viewer evaluation	.042	1	.042	.042	.837	.000

Note. -* = sig. at the 0.05 level, ** = sig. at the 0.01 level [two-tailed].

Table S5.2. *ANOVA Main Analysis After Manipulation Check Removal*

	Sum of Squares	df	Mean Square	F	p	η^2
Risk Perception (Own)						
N = 260, R²=.011						
Vlogger (non)compliance	0.801	1	0.801	0 .003	.955	.000
Viewer evaluation	660.504	1	660.504	2.669	.104	.010
Vlogger (non)compliance* Viewer evaluation	59.900	1	58.900	0.238	.626	.001

Note. -* = sig. at the 0.05 level, ** = sig. at the 0.01 level [two-tailed].

S6. Sensitivity Analyses

The analyses were carried out with and without adolescents who failed the manipulation check. In case there were no significant differences between these analyses, we reported the analyses with all adolescents included in the manuscript. In this supplementary, we reported the other analyses, without adolescents who failed the manipulation check.

In case there were significant differences between these analyses, we reported the analyses without adolescents who failed the manipulation check in the manuscript. In this supplementary, we reported the other analyses, with adolescents who failed the manipulation check.

Main Analyses

The results were not significantly different with and without adolescents who failed the manipulation check. Therefore, the analyses with all adolescents included were reported in the manuscript. Here, we report the results ($N = 260$) without adolescents who failed the manipulation check (Table S6.1).

Table S6.1. *ANOVA Main Analyses*

	Sum of Squares	*df*	Mean Square	*F*	*p*	η^2
Attitudes $N = 260$, $R^2 = .014$						
Vlogger (non)compliance	0.060	1	0.060	0.115	.735	.000
Viewer evaluation	0.386	1	0.386	0.734	.393	.003
Vlogger (non)compliance* Viewer evaluation	1.325	1	1.325	2.517	.114	.010
Behavioral Intentions $N = 258$, $R^2 = .020$						
Vlogger (non)compliance	0.058	1	0.058	0.126	.723	.000
Viewer evaluation	0.756	1	0.756	1.660	.199	.006
Vlogger (non)compliance* Viewer evaluation	1.335	1	1.335	2.929	.088	.011
Rule-Setting $N = 257$, $R^2 = .009$						
Vlogger (non)compliance	0.029	1	0.029	0.069	.793	.000
Viewer evaluation	0.147	1	0.147	0.350	.555	.001
Vlogger (non)compliance* Viewer evaluation	0.906	1	0.906	2.158	.143	.008

Note. -* = sig. at the 0.05 level, ** = sig. at the 0.01 level [two-tailed].

Explorative Analyses

The results of the first set of explorative analyses were not significantly different with and without adolescents who failed the manipulation check. Therefore, the analyses with all adolescents included were reported in the manuscript. Here, we report the results ($N = 260$) without adolescents who failed the manipulation check (Table S6.2).

Table S6.2. *ANOVA Explorative Analysis Worrying*

	Sum of Squares	df	Mean Square	F	p	η²
Worrying **$N = 260$, R²=.029**						
Vlogger (non)compliance	1.843	1	1.843	4.401	.037	.017
Viewer evaluation	0.691	1	0.691	1.649	.200	.006
Vlogger (non)compliance* Viewer e valuation	0.493	1	0.493	1.178	.279	.005

Note. -* = sig. at the 0.05 level, ** = sig. at the 0.01 level [two-tailed].

The results of the second set of explorative analyses were significantly different with and without adolescents who failed the manipulation check. Therefore, the analyses without adolescents who failed the manipulation check were reported in the manuscript. Here, we report the results with all adolescents included (Table S6.3).

Table S6.3. *Interaction Effects with Identification with Vlogger*

			95% CI	
	b(SE)	t	Lower	Upper
Attitudes **$N = 281$, R²=.027**				
Vlogger (non)compliance	.035 (.185)	0.191	-0.328	0.398
Viewer Evaluation	-.284 (.168)	-1.694	-0.614	0.046
Vlogger (non)compliance *Viewer Evaluation	.298 (.238)	1.254	-0.170	0.767
Identification	.061 (.078)	0.778	-0.093	0.214
Vlogger (non)compliance * Identification	-.209 (.109)	-1.913	-0.424	0.006
Behavioral Intentions **$N = 277$, R²= .037**				
Vlogger (non)compliance	-.061 (.185)	-0.328	-0.426	0.304
Viewer Evaluation	-.384* (.168)	-2.297	-0.714	-0.055
Vlogger (non)compliance *Viewer Evaluation	.395 (.239)	1.656	-0.075	0.864
Identification	.003 (.078)	0.031	-0.151	0.156
Vlogger (non)compliance * Identification	-.176 (.109)	-1.611	-0.391	0.039

Table S6.3. Continued.

	b(SE)	t	95% CI	
			Lower	Upper
Rule Setting				
N = 276, R²= .034				
Vlogger (non)compliance	-.007 (.186)	-0.039	-0.373	0.359
Viewer Evaluation	-.106 (.168)	-0.630	-0.437	0.225
Vlogger (non)compliance *Viewer Evaluation	.289 (.239)	1.208	-0.182	0.760
Identification	.065 (.079)	0.829	-0.090	0.220
Vlogger (non)compliance * Identification	-.265* (.110)	-2.417	-0.481	-0.049
Worrying				
N = 279, R²= .028				
Vlogger (non)compliance	-.373* (.185)	-2.013	-0.738	-0.008
Viewer Evaluation	-.294 (.168)	-1.751	-0.626	0.037
Vlogger (non)compliance *Viewer Evaluation	.196 (.239)	0.822	-0.274	0.666
Identification	-.008 (.079)	-0.103	-0.163	0.146
Vlogger (non)compliance * Identification	.053 (.110)	0.486	-0.163	0.269

Note. -* = sig. at the 0.05 level, ** = sig. at the 0.01 level [two-tailed].

S7. Distribution of Conditions

50.7% of adolescents saw vloggers comply and 50.5% of adolescents saw supportive evaluations of vloggers' behavior.

Table S7.1. *Information about Distribution between Conditions*

	Vloggers comply + supportive evaluation	Vloggers comply + dismissive evaluation	Vloggers do not comply + supportive evaluation	Vloggers do not comply + dismissive evaluation
Group size	75	69	70	69
Girls (identify as other)	32 (3)	31 (0)	30 (0)	24 (1)
Higher level education	30	33	38	34

S8. Assumptions Anova

Specifically, we tested the assumption of homogeneity of variance, which is met when Levene's test is insignificant (Levene, 1960) However, because we have relatively equal sample sizes of conditions, the analyses will be quite robust against violations of this particular assumption. Second, we tested the assumption of the normality of distribution of the scores, we assessed the curve in histograms and looked at Skewness & Kurtosis values (with values below or above 1 indicating problematic non-normality; Hair et al., 2021). We also assessed the assumption of independence of the data, which was accounted for by our study design. Lastly, we assessed Cook's distance to detect multivariate outliers in each of our main analyses, with values > 1 indicating significant outliers (Cook, 1977).

First, Levene's test statistic indicated that the assumption of homogeneity of variance was met for almost all outcome measures except for attitudes, $F (3, 277) = 3.162$, $p = .025$, and COVID-19 rule setting, $F (3, 272) = 2.685$, $p = .047$. However, since the group sizes were distributed equally, the ANOVA test was quite robust against violations of homogeneity of variance. Second, the assumption of normality of the distribution of scores was met as well. The highest Skewness value was 0.605, the lowest Skewness value was –0.533, the highest Kurtosis value was 0.305 and the lowest Kurtosis value was –0.475. We assessed Cook's distance for multivariate outliers and identified zero significant outliers.

References

Cook, R. D. (1977). Detection of influential observation in linear regression. *Technometrics, 19*(1), 15–18. https://doi.org/10.1080/00401706.1977.10489493

Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). A primer on partial least squares structural equation modeling (PLS-SEM). Sage publications.

Levene, H. (1960). Robust tests for equality of variances. *Contributions to Probability and Statistics,* 278–292.

Chapter 6
What Works for Whom in School-Based Anti-Bullying Interventions? An Individual Participant Data Meta-Analysis.

S1. Search Strings for PsychINFO (search strings are adjusted accordingly to other databases)

Full Search String for PsychINFO
#1 (cyber)bullying and/or (cyber)victimization
bullying/ OR cyberbullying/ OR (bullies OR bully* OR victimi*ation OR victimi*ed OR peer harassment* OR cyberbull* OR cybervictimi*).ti,ab,id.

#2 Intervention
intervention/ OR training/ OR school based intervention/ OR group intervention/ OR curriculum/ OR (training* OR intervention* OR program*).ti,ab,id.

#3 children and adolescents (6-18 years old)
(school age 6 12 yrs OR adolescence 13 17 yrs).ag. OR elementary school students/ OR primary school students/ OR middle school students/ OR junior high school students/ OR high school students/ OR (child* OR kid OR kids OR prepubescen* OR prepuberty* OR teen* OR young* OR youth* OR juvenile* OR girl* OR boy* OR preadolesc* OR adolesc* OR elementary school* OR primary school* OR K-12* OR K12 OR 1st-grade* OR first-grade* OR grade 1 OR grade one OR 2nd-grade* OR second-grade* OR grade 2 OR grade two OR 3rd-grade* OR third-grade* OR grade 3 OR grade three OR 4th-grade* OR fourth-grade* OR grade 4 OR grade four OR 5th-grade* OR fifth-grade* OR grade 5 OR grade five OR 6th-grade* OR sixth-grade* OR grade 6 OR grade six OR intermediate general OR secondary education OR secondary school* OR 7th-grade* OR seventh-grade* OR grade 7 OR grade seven OR 8th-grade* OR eight-grade* OR grade 8 OR grade eight OR 9th-grade* OR ninth-grade* OR grade 9 OR grade nine OR 10th-grade* OR tenth-grade* OR grade 10 OR grade ten OR 11th-grade* OR eleventh-grade* OR grade 11 OR grade eleven OR 12th-grade* OR twelfth-grade* OR grade 12 OR grade twelve OR junior high* OR highschool*).ti,ab,id.

#4 Study type
(followup study OR "treatment outcome/clinical trial").md. OR followup studies/ OR (random* OR longitud* OR ((follow up OR followup) ADJ3 (study OR studies)) OR ((interaction OR direct OR indirect OR causal OR generali#ed OR treatment) ADJ1 (effect OR effects)) OR (control ADJ3 group*) OR repeated measure* OR treatment condition* OR control condition* OR quasi experiment* OR quasiexperiment* OR RCT).ti,ab,id.

S2. Flowchart for Inclusion of Studies in IPD Meta-Analysis.

PRISMA IPD Flow Diagram
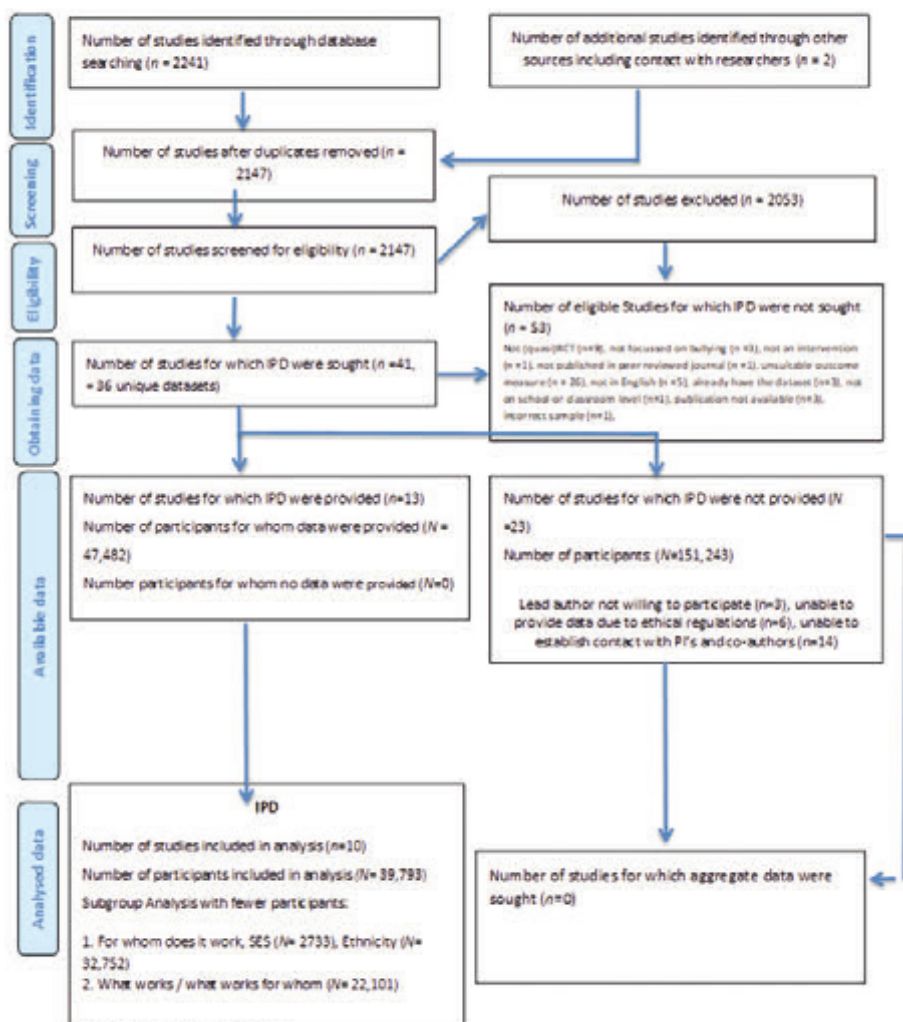
The PRISMA IPD flow diagram

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S3. Coding Scheme Intervention Components

Coding scheme IPD anti-bullying programs
Bullying Interventions Research Consortium (BIRC)

Information coders:
Name coder: …………………………………………………………………………………
Date of coding: …………………………………………………………………………………
Name second coder:………………………………………………………………………………
Date discussion between coders: …………………………………………………………………

Information article:
First author:……………………………………………………………………………………
Title of article (in short):…………………………………………………………………………

Information program:
Name of the program:………………………………………………………………….........
Information from Manual
or article? …………………………………………………………………………………...

References:

De Mooij, B., Fekkes, M., Scholte, R.H.J., & Overbeek, G. (2020). Effective components of social skills training programs for children and adolescents in nonclinical samples: A multilevel meta-analysis. *Clinical Child and Family Psychology Review,* 1–15. https://doi.org/10.1007/s10567-019-00308-x

Farrington, D. P., & Ttofi, M. M. (2009). School-based programs to reduce bullying and victimization. *The Campbell Collaboration*, *6*, 1-149.

PROGRAM COMPONENTS	

Theory of change
Which mechanisms of change does the program target (what is most important).
Open question.

…………………………………………………
❏ Unclear (999)

Definition of bullying
How is bullying defined by the program.
(Olweus: repetitive, intentional, power imbalance).

❏ Based on Olweus (0)
❏ Other (1)
❏ Unclear (999)

School anti bullying policy
Presence of a formal anti-bullying policy on behalf of the school

❏ No (0)
❏ Yes (1)
❏ Unclear (999)

Monitor
Does the program use a bully/victim monitor to identify and address students' roles.

❏ No (0)
❏ Yes (1)
❏ Unclear (999)

Classroom rules
The use of rules against bullying that students are expected to follow

❏ No (0)
❏ Yes (1)
❏ Unclear (999)

School assemblies
School assemblies during which children were informed about bullying (collective psychoeducation)

❏ No (0)
❏ Yes (1)
❏ Unclear (999)

Student placement
Are teachers instructed to change the seating arrangements to prevent bullying or to intervene after a bullying incident

❏ No (0)
❏ Yes (1)
❏ Unclear (999)

Work with peers
Formal engagement of peers in tackling bullying (e.g. mediation, peer mentoring).

❏ No (0)
❏ Yes (1)
❏ Unclear (999)

Improved playground supervision
Identification of hotspots/hot-times for bullying and increasing supervision.

❏ No (0)
❏ Yes (1)
❏ Unclear (999)

Disciplinary methods
Use of punitive methods in dealing with bullying situations (e.g. expelling bully).
Use of non-punitive methods in dealing with bullying situations (e.g. restoring the harm that has been done, "positive" approach).

❏ None (0)
❏ Punitive methods (1)
❏ Non-punitive methods (2)
❏ Punitive and non-punitive methods (3)
❏ Unclear (999)

CHILD-FOCUSED TRAINING - CONTENT	

Psychoeducation
Children are informed about bullying, changing attitudes

❏ Not included (0)
❏ Included (1)
❏ Unclear (999)

Psychophysical
Relaxation, posture, etc.

❏ Not included (0)
❏ Included (1)
❏ Unclear (999)

Social skills
(Non-)verbal communication skills, engagement, intepersonal problem solving skills, etc.

❏ Not included (0)
❏ Included (1)
❏ Unclear (999)

Cognitive-emotion skills
Emotion recognition (own or other's), impulse regulation, cognitive restructuring (transforming unhelpful thoughts into helpful thoughts), empathy (understanding other's behavior)

❏ Not included (0)
❏ Included (1)
❏ Unclear (999)

S4. Included Trials and Trial Information

Cross, D., Monks, H., Hall, M., Shaw, T., Pintabona, Y., Erceg, E., Hamilton, G., Roberts, C., Waters, S., & Lester, L. (2011). Three-year results of the Friendly Schools whole-of-school intervention on children's bullying behaviour. *British Educational Research Journal, 37*, 105–129. https://doi.org/10.1080/01411920903420024

DeSmet, A., Bastiaensens, S., Van Cleemput, K., Poels, K., Vandebosch, H., Deboutte, G., Herrewijn, L., Malliet, S., Pabian, S., Van Broeckhoven, F., De Troyer, O., Deglorie, G., Van Hoecke, S., Samyn, K., & Bourdeaudhuij, I. (2018). The efficacy of the Friendly Attack serious digital game to promote prosocial bystander behavior in cyberbullying among young adolescents: A cluster-randomized controlled trial. *Computers in Human Behavior, 78*, 336-347. https://doi.org/10.1016/j.chb.2017.10.011

Huitsing, G., Lodder, G.M.A., Browne, W.J., Oldenburg, B., Van der Ploeg, R., Veenstra, R. (2020). A large-scale replication of the effectiveness of the KiVa antibullying program: A randomized controlled trial in the Netherlands. *Prevention Science, 21*, 627-638. https://doi.org/10.1007/s11121-020-01116-4

Joronen, K., Konu, A., Rankin, H. S., & Åstedt-Kurki, P. (2011). An evaluation of a drama program to enhance social relationships and anti-bullying at elementary school: A controlled study. *Health Promotion International, 27*, 5–14. https://doi.org/10.1093/heapro/dar012[4]Juvonen, J., & Schacter, H. L. (2016). "Can a school-wide bullying prevention program improve the plight of victims? Evidence for risk × intervention effects": Correction to Juvonen et al. (2016). *Journal of Consulting and Clinical Psychology, 84*(6), 483–483. https://doi.org/10.1037/ccp0000116

Kärnä, A., Voeten, M., Little, T. D., Poskiparta, E., Kaljonen, A., & Salmivalli, C. (2011). A large-scale evaluation of the KiVa antibullying program: Grades 4–6. *Child development, 82*(1), 311–330. https://doi.org/10.1111/j.1467-8624.2010.01557.x

Kärnä, A., Voeten, M., Little, T. D., Alanen, E., Poskiparta, E., & Salmivalli, C. (2013). Effectiveness of the KiVa Antibullying Program: Grades 1–3 and 7–9. *Journal of Educational Psychology, 105*(2), 535. doi:10.1037/a0030417

Leadbeater, B., & Sukhawathanakul, P. (2011). Multicomponent programs for reducing peer victimization in early elementary school: A longitudinal evaluation of the WITS primary program. *Journal of Community Psychology, 39*(5), 606-620. https://doi.org/10.1002/jcop.20447

Nocentini, A., & Menesini, E. (2016). KiVa anti-bullying program in Italy: Evidence of effectiveness in a randomized controlled trial. *Prevention Science, 17*, 1012–1023. https://doi.org/10.1007/s11121-016-0690-z

Palladino, B.E., Nocentini, A., & Menesini, E. (2016). Evidence-based intervention against bullying and cyberbullying: Evaluation of the NoTrap! Program in two independent trials. *Aggressive Behavior, 42*, 194–206. doi:10.1002/ab.21636

Salmivalli, C., Kaukiainen, A., & Voeten, M. (2005). Anti-bullying intervention: Implementation and outcome. *British Journal of Educational Psychology, 75*(3), 465–487. https://doi.org/http://dx.doi.org/10.1348/000709905X26011

Solomontos-Kountouri, O., Gradinger, P., Yanagida, T., & Strohmeier, D. (2016). The implementation and evaluation of the ViSC program in Cyprus: Challenges of cross-national dissemination and evaluation results. *European Journal of Developmental Psychology, 13*(6), 737–755. https://doi.org/10.1080/17405629.2015.1136618

4　Juvonen et al., (2016), Kärnä et al., (2011), Salmivalli et al., (2005) share the same dataset. They were all willing to contribute to our IPD and thus are referred to individually but their data were only included once.

Table 1. *Study and Trial Characteristics.*

Trial	Intervention	Country	N	Setting	Age (Mean, SD)		Sex (n)		SES (%)		Risk of Bias
Solomontos-Kountouri et al. (2016)	ViSC	Cyprus	1652	Middle school	12.62	0.61	Girls	801	Low / Middle	10.9 / 30.3	Moderate
DeSmet et al. (2018)	Friendly Attac	Belgium	251	Middle school	13.99	0.68	Girls	143	Low / Middle	2.0 / 25.1	Moderate
Joronen et al. (2011)	Drama Program	Finland	134	Primary school	10.39	0.67	Girls	67	Low / Middle	NA / NA	Moderate
Leadbeater et al. (2012)	WITS	Canada	830	Primary school	7.33	0.85	Girls	411	Low / Middle	21.3 / 77.2	Moderate
Nocentini & Menesini (2016)	KiVa (Italy)	Italy	2184	Primary and Middle school	9.92	1.14	Girls	1001	Low / Middle	NA / NA	Low
Huitsing et al. (2020)	KiVa (NL, NL+)	Netherlands	4724	Primary school	8.66	0.69	Girls	2405	Low / Middle	NA / NA	Low
Palladino et al. (2016)	NoTrap!	Italy	622	High school	14.58	0.88	Girls	245	Low / Middle	NA / NA	Moderate
Cross et al. (2011)	Friendly Schools	Australia	1968	Primary school	8.56	0.55	Girls	976	Low / Middle	19.8 / 40.8	Moderate
Kärna et al. (2011) & Juvonen et al. (2016) & Salmivalli et al. (2005)	KiVa	Finland	8237	Primary school	11.00	1.11	Girls	9527	Low / Middle	NA / NA	Moderate
Kärna et al. (2013)	KiVa	Finland	19191	Middle school	14.36	0.89	Girls	4115	Low / Middle	NA / NA	Moderate

Note. SES = Social-economic status; NA = Not available.

Table 2. *Included Components of Anti-Bullying Interventions.*

	School policy	Monitor	Class rules	School assemblies	Student placement	Peer involvement	Playground supervision	Solely non-punitive disciplinary methods	Both non-punitive and punitive disciplinary methods	Psycho-education	Cognitive emotional skill-building
ViSC	*		*					*		*	*
Friendly Attack										*	
Drama program								*		*	*
WITS programs	*		*	*			*	*		*	*
KiVa (IT)	*		*	*			*		*	*	*
KiVa (NL)	*		*	*			*	*		*	*
KiVa+ (NL)	*	*	*	*			*	*		*	*
NoTrap!						*				*	*
Friendly schools	*	*	*	*	*		*		*	*	*
KiVa (original)	*		*	*			*		*	*	*

S5. Harmonization of Bullying and Victimization Measures

To harmonize different outcome measures into single 5-point scores for victimization and bullying perpetration, we (1) used all studies that employed the one-item, 5-point Likert scale to obtain the percentile distribution across the score categories, (2) calculated the percentile thresholds for the sum scores per study that used a multiple-item outcome, and (3) used these percentile thresholds to transform the sum score into a 5-point score. To examine if our harmonization approach was successful, we calculated correlations and chi-square coefficients to assess the association and agreement between the original and transformed outcome measure in four studies that used both the one-item and multiple-item bullying and victimization measures. The transformed 5-point outcome was moderately correlated (rs = .53 to .66) with the original (1 item) 5-point outcome measure and had good weighted agreement—defined as the percentage of scores falling in the same score category or one category off—between the transformed and original scale of 0.88 to 0.95.

Table 1. *Cumulative percentage distribution of the pre- and post-intervention 5 point scale.*

Measure	0	1	2	3	4
Victim pre	60	84	90	94	100
Victim post	64	87	92	96	100
Bully pre	68	92	96	98	100
Bully post	73	93	97	98	100

Table 2. *Threshold values for the sum scores to transform to the 5 point scale for each trial.*

Measure	Trial 5	Trial 7	Trial 11	Trial 1	Trial 6	Trial 4
Victim pre	3-8-10-15-52	3-6-8-10-27	1-4-6-8-42	3-8-11-15-44	5-13-17-22-40	4-8-10-13-20
Victim post	3-8-11-15-38	2-5-6-8-23	1-4-6-10-42	4-12-16-22-44	3-10-13-18-40	4-8-9-11-20
Bully pre	2-6-8-13-56	4-10-16-21-37	1-5-8-12-42	3-10-15-22-44	1-8-15-21-40	NA
Bully post	2-6-9-12-32	4-10-14-15-23	1-5-10-14-42	4-15-22-25-44	0-4-11-16-40	NA

Table 3. *Comparing the observed 5pt scores to the transformed scores.*

Measure	Correlation 5pt to sum score	Correlation 5pt to transformed	Agreement[a]	Weighted agreement[b]
Victim pre	0.654	0.577	0.62	0.88
Victim post	0.661	0.621	0.69	0.92
Bully pre	0.536	0.558	0.70	0.94
Bully post	0.575	0.584	0.76	0.95

Note: [a]Agreement is the percentage of the scores that fall in the same category in both the measured 5pt score and the transformed 5pt score. [b]Weigthed agreement is the percentage of the scores that fall in the same category or 1 category off.

Table 4. *Cumulative percentage distribution of the transformed pre- and post-intervention 5 point scale*

Measure	0	1	2	3	4
Victim pre scale	64	86	91	95	100
Victim post scale	70	88	92	96	100
Bully pre scale	73	93	96	98	100
Bully post scale	77	94	97	98	100

S6. ROBINS-I Risk of Bias and Risk of Publication Bias

Table 1. *Overview of risk of bias of the included trials based on the ROBINS-I.*

Trial	Overall Risk of Bias	Participant selection	Classification of interventions	Deviations from intended interventions	Missing data	Measurement of outcomes
Solomontos-Kountouri et al. (2016)	Moderate	Moderate	Low	Low	Moderate	Low
DeSmet et al. (2018)	Moderate	Low	Low	Low	Moderate	Moderate
Joronen et al. (2011)	Moderate	Low	Low	Moderate	Moderate	Low
Leadbeater et al. (2012)	Moderate	Moderate	Low	Moderate	Moderate	Low
Nocentini & Menesini (2016)	Low	Low	Low	Low	Low	Low
Huitsing et al. (2020)	Low	Low	Low	Low	Low	Low
Palladino et al. (2016)	Moderate	Moderate	Low	Moderate	Moderate	Low
Cross et al. (2011)	Moderate	Low	Low	Low	Moderate	Low
Kärna et al. (2011), Juvonen et al. (2016), Salmivalli et al. (2005)	Moderate	Low	Low	Moderate	Low	Low
Kärna et al. (2013)	Moderate	Low	Low	Low	Moderate	Low

Table 2. *Overview of studies selected after screening for which researchers were contacted to request full datasets.*

| | Data shared | | | | Data not shared | | | | |
Study#	PubYear	Location	Design	Reported effects	Study#	PubYear	Location	Design	Reported effects
1	2016	Cyprus	Quasi-experimental	**CODE = 1.1** Significant quadratic effects victimization and perpetration (steeper increase c/w control but over time this increase became smaller in intervention compared with control) Small to medium effects.	14	2017	Turkey	RCT	**CODE = 4** Non-significant change in intervention group on bullying behavior. Significant change in intervention group on victimization.
2	2018	Belgium	Cluster RCT	**CODE = 2** No significant effects on (cyber-)bullying victimization or perpetration ES_{range}: -0.15; 0.09).	15	2007	United States	Quasi-experimental	**CODE = 2** Non-significant changes in intervention group on victimization.
3	2011	Finland	Quasi-experimental	**CODE = 2** Reduction (1.6 – 5.9%) in bulling behavior, non-significant difference between intervention and control group. Reduction (1.6 – 20.7%) in victimization, non-significant difference between intervention and control group.	16	2016	Sweden	Quasi-experimental	**CODE = 2** Non-significant changes in intervention group on victimization.
4[c]	2016	Canada	RCT	**CODE = 1.1** No direct effects of the intervention on victimization reported.	17	2018	UK	RCT	**CODE = 1.3** Significant changes in intervention group on victimization (ES_{range}: -.05 to -.08)
5	2016	Italy	RCT	**CODE = 1.1** Victimization and bullying decreased significantly over time in intervention groups (ES_{range}: .21 to .38).	18	2016	Germany	RCT	**CODE = 4** Significant changes in intervention group on traditional bullying and cyberbullying behavior (ES_{range}: -.25 to -.27). Non-significant effect of intervention on victimization.

Table 2. Continued.

| | | | Data shared | | | | | Data not shared | |
Study#	PubYear	Location	Design	Reported effects	Study#	PubYear	Location	Design	Reported effects
6	2020	Netherlands	RCT	**CODE = 1.1** Victimization and bullying reduced more strongly in intervention schools compared with control schools, with stronger effects after two school years than after one school year of implementation The odds for intervention students to be victimized or to bully were 1.34 and 1.67 lower than for control students (after two intervention years)	19	2017	Turkey	Quasi-experimental	**CODE = 1.1** Significant change in intervention groups on bullying behavior and victimization.
7	2016	Italy	Quasi-experimental	**CODE = 1.1** Trial 1 Significant decrease of victimization and bullying over time in intervention group Trial 2 Significant decrease of victimization and bullying over time in intervention group (ES_{range}: .25 to .26).	20	2017	New Zealand	RCT	**CODE = 2** Non-significant change in intervention group on bullying behavior (child report).
8[a]	2015	United States	Quasi-experimental	**CODE = 2** No significant treatment effects were identified for bullying perpetration and victimization	21	2018	Spain	RCT	**CODE = 1.3** Significant change in bullying victimization in the intervention group (ES = .60).
9	2011	Australia	RCT	**CODE = 1.3** Significant change in intervention group on victimization	22/37	2014/2016	Austria	RCT	**CODE = 1.1** program is effective in preventing cyberbullying and cyber-victimization and the effects are sustainable after 6 months.

Table 2. Continued.

Study#	PubYear	Location	Data shared		Study#	PubYear	Location	Data not shared	
			Design	Reported effects				Design	Reported effects
10/11/13	2005/ 2011/ 2016	Finland	RCT	**CODE = 1.1** Only significant intervention effects on bullying and victimization in grade 4 (in expected direction) (ES$_{range}$: -56% to -79%) in high level implementation schools Strongest intervention effects for children with higher baseline levels of victimization. Significant intervention effects on self-reported bullying behavior and victimization at 9-month follow-up (ES$_{range}$: .10 to 17).	23/41	2003/ 2012	Canada	Quasi-experimental	**CODE = 1.3** Significant decrease in physical and relational victimization in the intervention group (ES$_{range}$: .17 to 20). Intervention moderately related to decreases in classroom levels of victimization
12	2013	Finland	RCT	**CODE = 4** Significant intervention effects on bullying behavior and victimization in Grades 1-3. Non-significant intervention effects on bullying behavior and victimization in Grades 8-9.	24/25	2007/ 2010	United States	RCT	**CODE = 4** Non-significant change in bullying in intervention group (OR = 1.16). Non-significant change in victimization in intervention group (OR = 1.12). Significant reduction in victimization in intervention group compared to control group at 12-month follow-up. Non-significant reduction in bullying behavior in the intervention group compared to the control group at 12-month follow-up.

Table 2. Continued.

			Data shared					Data not shared	
Study#	PubYear	Location	Design	Reported effects	Study#	PubYear	Location	Design	Reported effects
39[b]	2009	United States	Cluster randomized design	**CODE = 4** Universal intervention was associated with reductions in victimization; the selective intervention was not associated with changes in victimization.	26	2014	Cyprus/Greece	RCT	**CODE = 1.1** Significant effect of intervention of bullying behavior and victimization (ES_{range}: .46 to 70)
42	2011	Canada	Quasi-experimental	**CODE = 1.3** Children in the program showed more rapid declines in peer victimization over time compared with children in control schools.	27	2018	United States	Quasi-experimental (extended age cohort)	**CODE = 1.1** Significant reductions in victimization and bullying Large to very large Less effective/non-significant in some grades
					28[d]	2012	United States	Quasi-experimental	**CODE = 1.1** Perpetrating and being victimized **by physical and relational aggression** were statistically significantly lower, in the treatment than in the comparison schools. Relatively weak in terms of effect size, explaining only 3% of the variance in the outcomes.
					29	2010	UK and Germany	Non-randomized controlled trial	**CODE = 4** 26% decrease in victimization risk in the intervention group compared to the control group but only at follow-up 1 (further analysis showed this was only the case for UK students) No difference in bullying perpetration among students

Table 2. Continued.

	Data shared				Data not shared			
Study#	PubYear	Location	Design	Reported effects	PubYear	Location	Design	Reported effects
					30	2018	Italy	Experimental design	**CODE = 4** Significant decrease both in cyberbullying and cybervictimization among students who received the intervention with a follow-up period of six months.
					31	2013	Netherlands	RCT	**CODE = 1.1** Assessed risk-groups effects The results indicated that the intervention is effective for some children but less for others
					32	2015	Romania	Quasi-experimental	**CODE = 2** No behavioral change was found in the 2 experimental groups when compared with the control group.
					33	2013	Finland	RCT	**CODE = 4** Significant intervention effect on cybervictimization; odds of students in the control condition reporting more frequent cybervictimization were 29% greater than the odds of students in the intervention conditions. Cohen's $d = .14$ Effect of the intervention on cyberbullying varied as a function of student's age – only sig. effective for younger students. Cohen's $d = .03$

Table 2. Continued.

			Data shared		Data not shared			
Study#	PubYear	Location	Design	Reported effects	Design	Location	Study# PubYear	Reported effects
					Pre-post test (randomly assigned classes within schools)	Germany	34 & 40 / 2014/2015	**CODE = 1.2** Reduced cyberbullying behavior within intervention classes compared with control group only for long-term intervention; ES = -.64
					Quasi-experimental	China	35 / 2011	**CODE = 1.2** Full intervention group had significant reduction of bullying, compared with partial intervention and the control group (ES = .18)
					Quasi-experimental	China	36 / 2012	**CODE = 1.1** Highly significant main effect: reduction in victimization/ bullying in intervention schools (F = 7.70). Most significant reductions occurred when a whole-school intervention was used (F = 10.73). Composite score of both victimization and perpetration

Table 2. Continued.

			Data shared					Data not shared	
Study#	PubYear	Location	Design	Reported effects	Study#	PubYear	Location	Design	Reported effects
					38	2007	Australia	Randomized prospective design	**CODE = 4** No differences in the degree to which reported victimization changed over time between students in the 'intervention' versus 'control' schools. Significant difference between the 'control' and 'intervention' schools in the number of students who reported having bullied others (only for boys in 1 school).

Note. Only the results on self-reported bullying behavior and victimization reported in the included and not included papers are reported in this table. Studies may have included additional variables. CODE = 1.1: Significant intervention effects in expected direction reported for both bullying behavior and victimization; CODE = 1.2: Significant intervention effects in expected direction reported for bullying behavior only; CODE = 1.3: Significant intervention effects in expected direction reported for victimization only; CODE = 2: Non-significant effects reported; CODE = 3: Significant intervention effects in unexpected direction (i.e., increased bullying behavior/victimization) reported; CODE = 4: Mixed intervention effects reported.

[a] This study was not included in the final dataset because researchers provided a different dataset that was not identified through screening and at the time of checking and identifying the difference it was too far in the process to add new datasets.

[b] This study was not included in the final dataset because upon receiving the data the intervention appeared not to fit our scope.

[c] This study was not included in the final dataset due to a miscommunication.

[d] The full dataset from this study was requested, but the outcome measure did not fit our scope. Thus, this study was excluded after a second full-text screening.

Publication bias analysis

Year of publication
· Studies for which data was requested and shared were published between 2005 and 2020.
· Studies that data was requested for but not shared were published between 2003 and 2018.
· Exclusion of studies 4, 8, 39, and 28 did not change the range of publication dates.

Location of study (by continent)
· Of the studies for which data was requested and shared 61.54% of the data were gathered in Europe, 0% in Asia, 0% in Africa, 30.77% in America, and 7.69% in Oceania.
· Of the studies for which data was requested but not shared 64% of the data were gathered in Europe, 8% in Asia, 0% in Africa, 20% in America, and 8% in Oceania
· After exclusion of studies 4, 8, 39, and 28, which were all conducted in America, the percentages changed: Of the studies for which data was requested and shared, 80% was gathered in Europe (vs. 66.67% for studies that did not share data), 0% in Asia (vs. 8.33% for studies that did not share data), 0% in Africa (which is similar for studies that did not share data), 10% in America (vs. 16.67% for studies that did not share data), and 10% in Oceania (vs. 8.33% for studies that did not share data).

Design
· five papers (38.46%) for which data was requested and shared had a quasi-experimental design, and eight had a RCT design (61.54%).
· 13 papers (56.52%) for which data was requested but not shared had a quasi-experimental design, and ten had a RCT design (43.48%).
· After exclusion of studies 4, 8, 39, and 28, for studies for which data was requested and shared, the percentage of studies with a quasi-experimental design was 40% versus 60% with a RCT design, and for studies for which data was requested but not shared, the percentage of studies with a quasi-experimental design was 54.55% versus 45.45% with a RCT design

Reported effects
· Seven studies (58.34%) for which data was requested and shared reported significant intervention effects on bullying behavior and/or victimization that were all in the expected direction, three studies (25%) reported non-significant intervention effects, and two studies (16.67%), reported mixed intervention effects. One study did not report direct effects and was thus not given a code.
· 12 studies (52.17%) for which data was requested but not shared reported significant intervention effects on bullying behavior and/or victimization that were in the expected direction, four studies (17.39%) reported non-significant intervention effects, and seven studies (30.43%) reported mixed intervention effects.

· After exclusion of studies 4, 8, 39, and 28, for studies for which data was requested and selected, seven studies (70%) reported significant intervention effects on bullying behavior and/ or victimization that were as expected (vs. 50% for studies for which data was not shared), two studies (20%) reported non-significant intervention effects (vs. 18.18% for studies for which data was not shared), and one study (10%) reported mixed intervention effects (vs. 31.82% for studies for which data was not shared).

Final judgement of bias

No significant differences were found between studies that were eligible and shared their data and studies that were eligible and did not share their data on: the continent that they gathered data in, the effects that they reported (i.e., significant and as expected, non-significant, or mixed), and the design that they used (i.e., RCT or quasi-experimental). See Table 3 for test statistics.

It is important to emphasize that the studies included in our IPD did not gather data in Asia or Africa, which might hold implications for the generalizability of our findings to these continents.

Table 3. *Chi-Square test assessing differences between studies that were identified as eligible and shared their data and studies that were eligible and did not share their data*

	X^2	df	p
Full sample (*N*=36)			
Continent	1.412	3	.703
Effects	2.664	3	.446
Design	1.084	1	.298
After Exclusion (*N*=32)			
Continent	5.482	6	.476
Effects	3.629	6	.727
Design	1.440	2	.487

S7. Baseline Frequencies and Proportions of Bullying and Victimization.

Table 1. *Baseline Logistic Regression Comparisons between Subgroups on Pretest Victimization and Bullying Perpetration*

Victimization Model	Coefficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
Sex	-0.245	.033	-7.452	<.001	0.783	[0.734; 0.835]
Age	-0.168	.020	-8.239	<.001	0.845	[0.812; 0.880]
Ethnicity	0.236	.062	3.793	<.001	1.266	[1.121; 1.429]
SES high	-0.541	.135	-4.020	<.001	0.582	[0.447; 0.758]
SES medium	-0.223	.115	-1.948	.052	0.800	[0.639; 1.001]
Intervention vs. Control	-0.021	.034	-0.626	-.532	0.979	[0.917; 1.046]
Perpetration Model	Coefficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
Sex	-0.797	.048	-16.600	<.001	0.451	[0.410; 0.495]
Age	0.075	.030	2.511	.012	1.078	[1.017; 1.144]
Ethnicity	0.283	.084	3.388	.001	1.328	[1.127; 1.564]
SES high	-0.371	.185	-2.007	.045	0.690	[0.480; 0.992]
SES medium	-0.092	.188	-0.489	.625	0.912	[0.631; 1.319]
Intervention vs. Control	-0.065	.047	-1.399	.162	0.937	[0.855; 1.026]

Table 2. *Post-intervention Logistic Regression Comparisons between Subgroups on Posttest Victimization and Bullying Perpetration*

Victimization Model	Coefficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
Sex	-0.258	.036	-7.247	<.001	0.772	[0.720; 0.828]
Age	-0.119	.022	-5.343	<.001	0.888	[0.850; 0.927]
Ethnicity	0.201	.068	2.933	.003	1.222	[1.069; 1.397]
SES high	-0.580	.141	-4.120	<.001	0.560	[0.425; 0.738]
SES medium	-0.295	.124	-2.375	.018	0.745	[0.584; 0.950]
Intervention vs. Control	-0.226	.036	-6.235	<.001	0.798	[0.743; 0.857]
Initial victimization	1.816	.041	43.864	<.001	6.149	[5.669; 6.669]
Perpetration Model	Coefficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
Sex	-0.815	.053	-15.507	<.001	0.443	[0.399; 0.491]
Age	0.085	.033	2.604	.009	1.089	[1.021; 1.161]
Ethnicity	0.322	.094	3.427	.001	1.380	[1.148; 1.659]
SES high	-0.057	.187	-0.303	.762	0.945	[0.655; 1.363]
SES medium	-0.065	.192	-0.337	.736	0.937	[0.644; 1.365]
Intervention vs. Control	-0.121	.050	-2.403	.016	0.886	[0.803; 0.978]
Initial perpetration	2.138	.061	35.080	<.001	8.480	[7.525; 9.556]

S8. Forest Plots of Main Analyses (for whom does it work and what works)
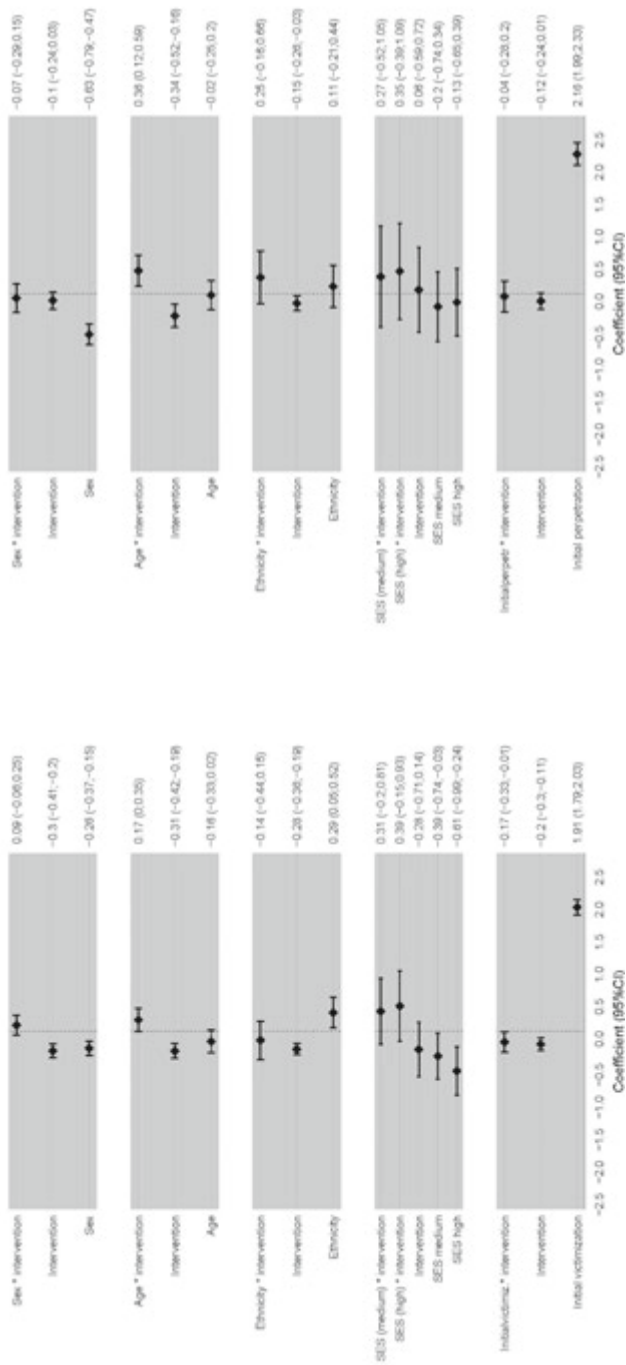
Figure 1. *Forest Plots of Interaction Effects of Subgroup × Intervention Status on Post-Intervention Victimization (left) and Perpetration (right)*
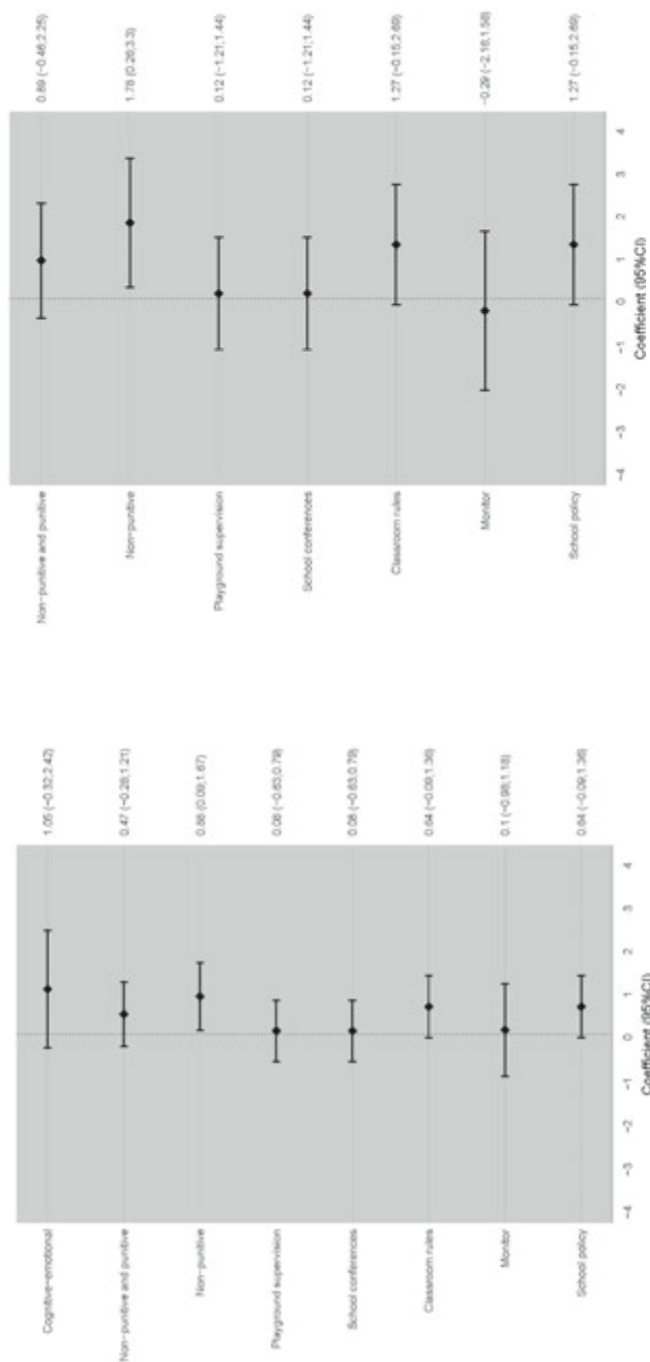
Figure 2. *Forest Plots of Main Effects of Intervention Components on Post-Intervention Victimization (left) and Perpetration (right)*

S9. Exploratory Analyses: What Works for Whom

Table 1. *Interaction Effects of Sex x Intervention Components for Post-Intervention Bullying Victimization and Perpetration*

Victimization Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
Sex	-1.008	0.436	-2.313	.021	0.365	[0.16, 0.86]		
School policy	0.302	0.395	0.765	.444	1.352	[0.62, 2.93]		
School policy * sex	0.848	0.439	1.931	.054	2.334	[0.99, 5.52]	3	.094
Sex	-0.186	0.055	-3.397	.001	0.831	[0.75, 0.92]		
Monitor	0.008	0.561	0.015	.988	1.008	[0.34, 3.03]		
Monitor * sex	0.179	0.218	0.823	.411	1.196	[0.78, 1.83]	7	.219
Sex	-1.008	0.436	-2.313	.021	0.365	[0.16, 0.86]		
Classroom rules	0.302	0.395	0.765	.444	1.352	[0.62, 2.93]		
Classroom rules * sex	0.848	0.439	1.931	.054	2.334	[0.99, 5.52]	2	.063
Sex	-0.437	0.195	-2.236	.025	0.646	[0.41, 0.95]		
School assemblies	-0.059	0.374	-0.157	.875	0.943	[0.45, 1.96]		
School assemblies * sex	0.283	0.203	1.396	.163	1.328	[0.89, 1.97]	6	.186
Sex	-0.437	0.195	-2.236	.025	0.646	[0.44, 0.95]		
Playground supervision	-0.059	0.374	-0.157	.875	0.943	[0.45, 1.96]		
Playground supervision * sex	0.283	0.203	1.396	.163	1.328	[0.89, 1.98]	5	.156
Sex	1.008	0.436	-2.315	.021	0.365	[0.16, 0.86]		
Non punitive	0.456	0.426	1.068	.285	1.577	[0.68, 3.64]		
Non punitive and punitive	0.179	0.406	0.440	.660	1.196	[0.54, 2.65]		
Non-punitive * sex	1.029	0.444	2.316	.021	2.799	[1.17, 6.69]	1	.031
Non-punitive and punitive * sex	0.740	0.441	1.679	.093	2.097	[0.88, 4.98]	4	.125
Sex	-0.311	1.025	-0.303	.762	0.733	[0.10, 5.47]		
Cognitive-emotional	0.951	0.870	1.093	.275	2.587	[0.47, 14.24]		
Cognitive-emotional * sex	0.137	1.027	0.134	.894	1.147	[0.15, 8.58]	8	.250
Perpetration Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
Sex	0.005	0.546	0.009	.992	1.005	[0.35, 2.93]		
School policy	1.593	0.779	2.045	.041	4.918	[1.07, 22.65]		
School policy * sex	-0.737	0.551	-1.337	.181	0.479	[0.16, 1.41]	4	.143

Table 1. Continued.

Sex	-0.690	0.080	-8.589	<.001	0.502	[0.43, 0.59]		
Monitor	-0.066	0.976	-0.067	.946	0.936	[0.14, 6.35]		
Monitor * sex	-0.877	0.506	-1.736	.083	0.416	[0.15, 1.12]	1	.036
Sex	0.005	0.546	0.009	.992	1.005	[0.35, 2.93]		
Classroom rules	1.593	0.779	2.045	.041	4.918	[1.07, 22.65]		
Classroom rules * sex	-0.737	0.551	-1.337	.181	0.479	[0.16, 1.41]	3	.107
Sex	-0.585	0.211	-2.770	.006	0.557	[0.37, 0.84]		
School assemblies	0.174	0.689	0.253	.800	1.191	[0.31, 4.60]		
School assemblies * sex	-0.154	0.228	-0.675	.499	0.857	[0.55, 1.34]	7	.250
Sex	-0.585	0.211	-2.770	.006	0.557	[0.37, 0.84]		
Playground supervision	0.174	0.689	0.253	.800	1.191	[0.31, 4.59]		
Playground supervision * sex	-0.154	0.228	-0.675	.499	0.857	[0.55, 1.34]	6	.214
Sex	-0.004	0.545	-0.007	.995	0.996	[0.34, 2.90]		
Non-punitive	2.040	0.826	2.469	.014	7.691	[1.52, 38.86]		
Non-punitive and punitive	1.228	0.742	1.655	.098	3.415	[0.80, 14.63]		
Non-punitive * sex	-0.541	0.562	-0.964	.335	0.582	[0.19, 1.75]	5	.179
Non-punitive and punitive * sex	-0.825	0.554	-1.488	.137	0.438	[0.15, 1.30]	2	.071

Table 2. *Interaction Effects of Age x Intervention Components for Post-Intervention Bullying Victimization and Perpetration*

Victimization Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. a
Age	-0.847	0.755	-1.122	.262	0.429	[0.10, 1.88]		
School policy	-0.055	0.659	-0.083	.934	0.947	[0.26, 3.44]		
School policy * age	0.953	0.763	1.250	.211	2.594	[0.58, 11.57]	2	.083
Age	-0.847	0.755	-1.122	.262	0.429	[0.10, 1.88]		
Classroom rules	-0.055	0.659	-0.083	.934	0.947	[0.26, 3.44]		
Classroom rules * age	0.953	0.763	1.250	.211	2.594	[0.58, 11.57]	3	.125
Age	-0.040	0.126	-0.315	.753	0.961	[0.75, 1.23]		
School assemblies	0.009	1.716	0.005	.966	1.009	[0.04, 29.17]		
School assemblies * age	-0.012	0.131	-0.093	.926	0.988	[0.76, 1.28]	6	.250
Age	0.166	0.225	0.738	.461	1.181	[0.76, 1.84]		
Playground supervision	0.095	0.438	0.217	.828	1.100	[0.47, 2.60]		
Playground supervision * age	-0.113	0.259	-0.437	.662	0.893	[0.54, 1.48]	5	.208
Age	-0.842	0.715	-1.177	.239	0.431	[0.11, 1.75]		
Non-punitive	0.181	0.679	0.267	.790	1.199	[0.32, 4.54]		
Non-punitive and punitive	-0.176	0.637	-0.276	.782	0.839	[0.24, 2.92]		
Non-punitive *age	1.163	0.751	1.548	.122	3.201	[0.73, 13.96]	1	.042
Non-punitive and punitive*age	0.880	0.727	1.211	.226	2.411	[0.58, 10.02]	4	.167
Perpetration Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. a
Age	0.471	0.235	2.001	.045	1.601	[1.01, 2.54]		
Playground supervision	0.477	0.851	0.560	.575	1.611	[0.30, 8.55]		
Playground supervision * age	-0.322	0.311	-1.034	.301	0.725	[0.39, 1.33]	1	.083
Age	0.434	0.804	0.539	.590	1.543	[0.32, 7.47]		
Non-punitive	1.597	0.793	2.012	.044	4.936	[1.04, 23.28]		
Non-punitive and punitive	0.516	0.775	0.666	.505	1.676	[0.37, 7.66]		
Non-punitive *age	0.025	0.837	0.030	.976	1.026	[0.20, 5.29]	3	.250
Non-punitive and punitive*age	-0.318	0.809	-0.393	.694	0.727	[0.15, 3.55]	2	.167

Table 3. *Interaction Effects of Ethnicity x Intervention Components for Post-Intervention Bullying Victimization and Perpetration*

Victimization Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
Ethnicity	0.147	0.423	0.348	.728	1.158	[0.51, 2.66]		
School assemblies	-0.102	0.606	-0.168	.867	0.903	[0.27, 2.97]		
School assemblies * ethnicity	0.034	0.435	0.078	.938	1.035	[0.44, 2.43]	1	.125
Ethnicity	0.147	0.423	0.348	.728	1.158	[0.51, 2.66]		
Playground supervision	-0.102	0.606	-0.168	.867	0.903	[0.28, 2.96]		
Playground superv. * ethnicity	0.034	0.435	0.078	.938	1.035	[0.44, 2.43]	2	.250
Perpetration Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
Ethnicity	0.676	0.399	1.694	.090	1.967	[0.89, 4.30]		
School assemblies	-0.042	1.016	-0.041	.967	0.959	[0.13, 7.03]		
School assemblies * ethnicity	-0.360	0.424	-0.851	.395	0.698	[0.30, 1.60]	1	.125
Ethnicity	0.676	0.399	1.694	.090	1.967	[0.90, 4.30]		
Playground superv.	-0.042	1.016	-0.041	.967	0.959	[0.13, 7.03]		
Playground superv. * ethnicity	-0.360	0.424	-0.851	.395	0.698	[0.30, 1.60]	2	.250

Table 4. *Interaction Effects of SES x Intervention Components for Post-Intervention Bullying Victimization and Perpetration*

Victimization Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
SES high	-0.392	0.280	-1.403	.161	0.675	[0.40, 1.17]		
SES medium	-0.086	0.255	-0.335	.737	0.918	[0.56, 1.51]		
Monitor	-0.034	1.150	-0.030	.976	0.966	[0.10, 9.23]		
Monitor * SES High	0.428	0.469	0.913	.361	1.535	[0.61, 3.85]	5	.208
Monitor * SES Medium	-0.007	0.379	-0.018	.986	0.993	[0.47, 2.09]	6	.250
SES high	-0.687	0.310	-2.215	.027	0.503	[0.27, 0.92]		
SES medium	-0.527	0.337	-1.563	.118	0.591	[0.31, 1.14]		
School assemblies	-0.560	0.999	-0.561	.575	0.571	[0.08, 4.05]		
School assemblies * SES High	0.862	0.478	1.802	.072	2.368	[0.93, 6.05]	1	.042
School assemblies * SES Medium	0.638	0.409	1.557	.120	1.892	[0.85, 4.22]	3	.125

Table 4. Continued.

	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. a
SES high	-0.687	0.310	-2.215	.027	0.503	[0.27, 0.92]		
SES medium	-0.527	0.337	-1.563	.118	0.591	[0.31, 1.14]		
Playground supervision	-0.560	0.999	-0.561	.575	0.571	[0.08, 4.05]		
Playground supervision * SES High	0.862	0.478	1.802	.072	2.368	[0.93, 6.05]	2	.083
Playground supervision * SES Medium	0.638	0.409	1.557	.120	1.892	[0.85, 4.22]	4	.167
Perpetration Model	Co-efficient	*SE*	*t*	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
SES high	-0.012	1.356	-0.009	.993	0.988	[0.07, 14.13]		
SES medium	-0.034	1.396	-0.024	.981	0.967	[0.06, 14.96]		
Non-punitive	0.903	1.958	0.461	.645	2.466	[0.05, 114.91]		
Non-punitive and punitive	0.121	1.942	0.062	.950	1.129	[0.03, 50.95]		
Non-punitive * SES High	0.163	1.393	0.117	.907	1.177	[0.08, 18.10]	1	.063
Non-punitive and punitive * SES High	-0.064	1.383	-0.046	.963	0.938	[0.06, 14.16]	4	.250
Non-punitive * SES Medium	-0.082	1.438	-0.057	.955	0.922	[0.06, 15.48]	3	.188
Non-punitive and punitive * SES Medium	0.101	1.410	0.072	.943	1.106	[0.07, 17.58]	2	.125

Table 5. *Interaction Effects of Initial Level of Victimization (ISV) x Intervention Components for Post-Intervention Bullying Victimization and Initial Level of Perpetration (ISP) x Intervention Components for Post-Intervention Perpetration*

Victimization Model	Co-efficient	*SE*	*t*	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
ISV	1.807	0.465	3.888	<.001	6.090	[2.45, 15.14]		
School policy	0.650	0.386	1.684	.092	1.915	[0.90, 4.08]		
School policy * ISV	-0.052	0.468	-0.111	.911	0.949	[0.38, 2.38]	8	.250
ISV	1.780	0.058	30.631	<.001	5.932	[5.29, 6.65]		
Monitor	0.212	0.554	0.383	.702	1.236	[0.42, 3.66]		
Monitor * ISV	-0.402	0.242	-1.661	.097	0.669	[0.42, 1.08]	1	.031
ISV	1.807	0.465	3.888	<.001	6.090	[2.45, 15.14]		
Classroom rules	0.650	0.386	1.684	.092	1.915	[0.90, 4.08]		
Classroom rules * ISV	-0.052	0.468	-0.111	.911	0.949	[0.38, 2.38]	7	.219
ISV	1.677	0.218	7.693	<.001	5.349	[3.49, 8.20]		
School assemblies	0.056	0.368	0.152	.879	1.057	[0.51, 2.18]		
School assemblies * ISV	0.085	0.226	0.377	.706	1.089	[0.70, 1.67]	6	.186
ISV	1.677	0.218	7.693	<.001	5.349	[3.49, 8.20]		
Playground supervision	0.056	0.368	0.152	.879	1.057	[0.51, 2.18]		

Table 5. Continued.

	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. a
Playground supervision * ISV	0.085	0.226	0.377	.706	1.089	[0.70, 1.69]	5	.156
ISV	1.810	0.464	3.897	<.001	6.110	[2.46, 15.18]		
Non-punitive	1.045	0.412	2.535	.011	2.843	[1.27, 6.38]		
Non-punitive and punitive	0.400	0.393	1.018	.309	1.491	[0.69, 3.22]		
Non-punitive * ISV	-0.425	0.472	-0.900	.368	0.654	[0.26, 1.65]	2	.063
Non-punitive and punitive * ISV	0.193	0.470	0.411	.681	1.213	[0.48, 3.05]	4	.125
ISV	2.548	1.294	1.968	.049	12.778	[1.01, 161.55]		
Cognitive-emotional	1.182	0.752	1.570	.116	3.259	[0.75, 14.24]		
Cognitive-emotional * ISV	-0.794	1.296	-0.613	.540	0.452	[0.04, 5.73]	3	.094
Perpetration Model	Co-efficient	*SE*	*t*	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]	Rank	Adj. *a*
ISP	0.358	1.069	0.335	.737	1.431	[0.18, 11.62]		
School policy	1.126	0.740	1.522	.128	3.084	[0.72, 13.16]		
School policy * ISP	1.757	1.072	1.639	.101	5.794	[0.71, 47.36]	5	.179
ISP	2.099	0.085	24.797	<.001	8.160	[6.91, 9.63]		
Monitor	-0.277	0.956	-0.290	.772	0.758	[0.12, 4.94]		
Monitor * ISP	-0.223	0.799	-0.279	.780	0.800	[0.17, 3.83]	7	.250
ISP	0.358	1.069	0.335	.737	1.431	[0.18, 11.62]		
Classroom rules	1.126	0.740	1.522	.128	3.084	[0.72, 13.16]		
Classroom rules * ISP	1.757	1.072	1.639	.101	5.794	[0.71, 47.36]	4	.143
ISP	1.105	0.230	4.800	<.001	3.019	[1.92, 4.74]		
School assemblies	-0.014	0.741	-0.019	.985	0.986	[0.23, 4.21]		
School assemblies * ISP	1.144	0.247	4.632	<.001	3.139	[1.93, 5.09]	1	.036
ISP	1.105	0.230	4.800	<.001	3.019	[1.92, 4.74]		
Playground supervision	-0.014	0.741	-0.019	.985	0.986	[0.23, 4.21]		
Playground supervision * ISP	1.144	0.247	4.632	<.001	3.139	[1.93, 5.09]	2	.071
ISP	0.373	1.068	0.349	.727	1.452	[0.18, 11.79]		
Non-punitive	1.829	0.795	2.300	.021	6.230	[1.31, 19.61]		
Non-punitive and punitive	0.663	0.705	0.940	.347	1.940	[0.49, 7.73]		
Non-punitive * ISP	1.103	1.078	1.023	.306	3.012	[0.37, 24.90]	6	.214
Non-punitive and punitive * ISP	2.115	1.073	1.971	.049	8.293	[1.01, 68.01]	3	.107

Figure 1. *Interaction Effects (Odds ratios) of Gender× Non-Punitive disciplinary methods on Post-Intervention Bullying Victimization.*
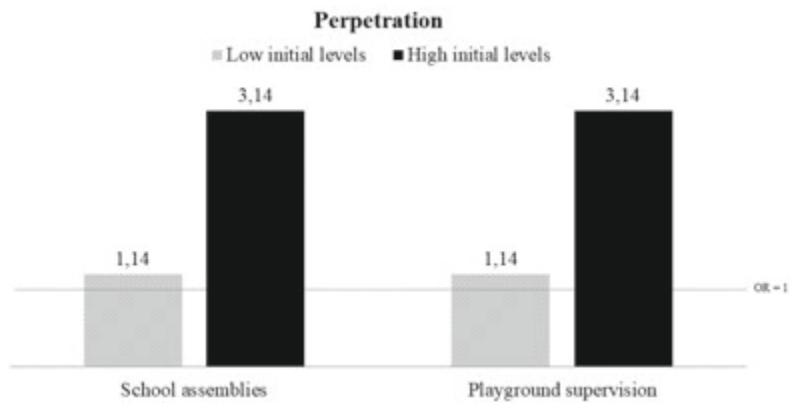
Figure 2. *Interaction Effects (Odds ratios) of Initial Perpetration Levels× School Assemblies and Playground Supervision on Post-Intervention Bullying Perpetration.*

S10. Sensitivity Analysis

Sensitivity analyses were performed for findings that were significant in the initial analyses. Analyses were performed by excluding trials from the original model one by one. In line with the data sharing agreement of this study, we do not indicate to which study the trial numbers specifically belonged.

Table 1. *Sensitivity Analyses For the Univariate Multilevel Regressions for the Entire Sample (i.e., Do Anti-Bullying Interventions Work?).*

		Coefficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.)
							[LL, UL]
All trials	Victimization	-0.261	0.040	-6.605	<.001	0.770	[0.71, 0.83]
	Perpetration	-0.126	0.055	-2.303	.021	0.881	[0.79, 0.98]
Without trial 1	Victimization	-0.293	.041	-7.115	.000	0.746	[0.69, 0.81]
	Perpetration	-0.210	.059	-3.541	.000	0.811	[0.72, 0.91]
Without trial 2	Victimization	-0.264	.040	-6.671	.000	0.768	[0.71, 0.83]
	Perpetration	-0.127	.055	-2.317	.021	0.881	[0.79, 0.98]
Without trial 3	Victimization	-0.263	.040	-6.623	.000	0.769	[0.72, 0,83]
	Perpetration	-0.124	.055	-2.256	.024	0.883	[0.79, 0.98]
Without trial 4	Victimization	-0.268	.040	-6.695	.000	0.765	[0.71, 0.83]
	Perpetration	-0.126	.055	-2.303	.021	0.881	[0.79, 0.98]
Without trial 5	Victimization	-0.217	.041	-5.277	.000	0.805	[0.74, 0.87]
	Perpetration	**-0.096**	**.057**	**-1.686**	**.092**	0.909	[0.81, 1.01]
Without trial 6	Victimization	-0.235	.045	-5.252	.000	0.790	[0.72, 0.86]
	Perpetration	-0.139	.060	-2.322	.020	0.871	[0.77, 0.98]
Without trial 7	Victimization	-0.264	.040	-6.656	.000	0.768	[0.71, 0.83]
	Perpetration	-0.114	.055	-2.053	.040	0.893	[0.80, 1.00]
Without trial 8	Victimization	-0.261	.040	-6.605	.000	0.770	[0.71, 0.83]
	Perpetration	-0.126	.055	-2.303	.021	0.881	[0.79, 0.98]
Without trial 9	Victimization	-0.270	.041	-6.588	.000	0.763	[0.70, 0.83]
	Perpetration	-0.139	.059	-2.490	.013	0.870	[0.78, 0.97]
Without trial 10	Victimization	-0.283	.048	-5.901	.000	0.754	[0.69, 0.83]
	Perpetration	**-.008**	**.063**	**-0.132**	**.985**	0.992	[0.88, 1,12]
Without trial 11	Victimization	-0.255	.044	-5.744	.000	0.775	[0.71, 0.85]
	Perpetration	-0.179	.067	-2.666	.008	0.836	[0.77, 0.95]

Note. Main effects of interventions.

Table 2. *Sensitivity Analyses for Post-Intervention Victimization Model on Interaction Effects of Subgroup × Intervention Status.*

	Victimization Model	Co-efficient	*SE*	*t*	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
All trials	Initial victimization	1.913	0.061	31.398	<.001	6.775	[6.01, 7.64]
	Intervention	-0.202	0.049	-4.145	<.001	0.817	[0.74, 0.90]
	Initialvictimiz.* intervention	-0.168	0.081	-2.065	.039	0.845	[0.72, 0.99]
Without trial 1	Initial victimization	1.972	0.065	30.401	<.001	7.188	[6.33, 8.16]
	Intervention	-0.217	0.051	-4.240	<.001	0.805	[0.73, 0.89]
	Initialvictimiz.* intervention	-.216	0.085	-2.528	.011	0.806	[0.68, 0.95]
Without trial 2	Initial victimization	1.912	0.061	31.339	<.001	6.764	[6.00, 7.65]
	Intervention	-0.205	0.049	-4.203	<.001	0.814	[0.74, 0.90]
	Initialvictimiz.* intervention	-0.168	0.082	-2.054	.040	0.846	[0.72, 0.99]
Without trial 3	Initial victimization	1.901	0.061	31.137	<.001	6.694	[5.94, 7.55]
	Intervention	-0.208	0.0	-4.258	<.001	0.812	[0.74, 0.89]
	Initialvictimiz.* intervention	**-0.155**	**0.082**	**.901**	**.057**	0.856	[0.73, 1,00]
Without trial 4	Initial victimization	1.918	0.062	31.162	<.001	6.807	[6.03, 7.68]
	Intervention	-0.206	0.049	-4.162	<.001	0.814	[0.74, 0.90]
	Initialvictimiz.* intervention	-0.178	0.082	-2.161	.031	0.837	[0.71, 0.98]
Without trial 5	Initial victimization	1.883	0.064	29.499	<.001	6.574	[5.80, 7.45]
	Intervention	-.162	0.051	-3.203	<.001	0.850	[0.77, 0.94]
	Initialvictimiz.* intervention	**-0.154**	**0.084**	**-1.827**	**.068**	0.857	[0.73, 1.01]
Without trial 6	Initial victimization	1.995	0.068	29.282	<.001	7.353	[6.34, 8.40]
	Intervention	-.225	0.054	-4.182	<.001	0.798	[0.72, 0.89]
	Initialvictimiz.* intervention	**-0.032**	**0.096**	**-.331**	**.741**	0.969	[0.80, 1.17]
Without trial 7	Initial victimization	1.916	0.061	31.396	<.001	6.792	[6.03, 7.66]
	Intervention	-0.204	0.049	-4.169	<.001	0.815	[0.74, 0.90]
	Initialvictimiz.* intervention	-0.170	0.082	-2.085	.037	0.843	[0.72, 0.99]
Without trial 8	Initial victimization	1.913	0.061	31.398	<.001	6.775	[6.01, 7.64]
	Intervention	-0.202	0.049	-4.145	<.001	0.817	[0.74, 0.90]
	Initialvictimiz.* intervention	-0.168	081	-2.065	.039	0.845	[0.72, 0.99]
Without trial 9	Initial victimization	1.931	0.063	30.605	<.001	6.897	[6.10, 7.81]

Table 2.Continued.

	Victimization Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
	Intervention	-0.213	0.051	-4.179	<.001	0.809	[0.73, 0.89]
	Initialvictimiz.* intervention	**-0.163**	**0.084**	**-1.934**	**.053**	0.850	[0.72, 1.00]
Without trial 10	Initial victimization	1.895	0.073	26.022	<.001	6.653	[5.77, 7.67]
	Intervention	-0.201	0.060	-3.358	<.001	0.818	[0.73, 0.92]
	Initialvictimiz.* intervention	-0.219	0.097	-2.261	.024	0.804	[0.67, 0.97]
Without trial 11	Initial victimization	1.795	0.068	26.376	<.001	6.021	[5.27, 6.88]
	Intervention	-0.188	0.055	-3.419	<.001	0.828	[0.74, 0.92]
	Initialvictimiz.* intervention	-0.186	0.090	-2.059	.040	0.830	[0.70, 0.99]

Table 3. *Sensitivity Analyses for Post-Intervention Perpetration Model on Interaction Effects of Subgroup × Intervention Status.*

	Perpetration Model	Coefficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
All trials	Age	-0.022	0.115	-0.191	.848	0.978	[0.78, 1.23]
	Intervention	-0.342	0.091	-3.756	<.001	0.710	[0.59, 0.85]
	Age * intervention	0.357	0.121	2.954	.003	1.429	[1.13, 1.81]
Without trial 1	Age	-0.083	0.156	-0.532	.595	0.920	[0.68, 1.25]
	Intervention	-0.435	0.100	-4.363	<.001	0.647	[-0.53, 0.78]
	Age * intervention	0.335	0.133	2.517	.012	1.398	[1.08, 1.82]
Without trial 2	Age	-0.001	0.114	-0.008	.993	0.999	[0.80, 1.25]
	Intervention	-0.343	0.091	-3.771	<.001	0.709	[0.59, 0.85]
	Age * intervention	0.358	0.121	2.962	.003	1.430	[1.13, 1.81]
Without trial 3	Age	-0.023	0.115	-0.196	.844	0.978	[0.78, 1.22]
	Intervention	-0.336	0.091	-3.678	<.001	0.715	[0.69, 0.86]
	Age * intervention	0.350	0.121	2.897	.004	1.420	[1.12, 1.80]
Without trial 4	Age	-0.022	0.115	-0.191	.848	0.978	[0.78, 1.23]
	Intervention	-0.342	0.091	-3.756	<.001	0.710	[0.59, 0.85]
	Age * intervention	0.357	0.121	2.954	.003	1.429	[1.13, 1.81]
Without trial 5	Age	-0.000	0.116	-0.000	1.000	1.000	[0.80, 1.26]
	Intervention	-0.287	0.101	-2.855	.004	0.750	[0.62, 0.91]
	Age * intervention	0.299	0.128	2.338	.019	1.349	[1.05, 1.73]
Without trial 6	Age	-0.022	0.115	-0.191	.848	0.978	[0.78, 1.23]
	Intervention	-0.342	0.091	-3.756	<.001	0.710	[0.59, 0.85]

Table 3. Continued.

	Perpetration Model	Coefficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
	Age * intervention	0.357	0.121	2.954	.003	1.429	[1.13, 1.81]
Without trial 7	Age	-0.042	0.115	-0.360	.719	0.959	[0.77, 1.20]
	Intervention	-0.342	0.091	-3.752	<.001	0.710	[0.59, 0.85]
	Age * intervention	0.390	0.122	3.206	0.001	1.478	[1.16, 1.88]
Without trial 8	Age	-0.022	0.115	-0.191	.848	0.978	[0.78, 1.23]
	Intervention	-0.342	0.091	-3.756	<.001	0.710	[0.59, 0.85]
	Age * intervention	0.357	0.121	2.954	.003	1.429	[1.13, 1.81]
Without trial 9	Age	-0.049	0.115	-0.427	.670	0.952	[0.76, 1.19]
	Intervention	-0.405	0.096	-4.203	<.001	0.667	[0.55, 0.81]
	Age * intervention	0.419	0.125	3.360	.001	1.521	[1.19, 1.94]
Without trial 10	Age	0.126	0.156	0.807	.420	1.134	[0.83, 1.54]
	Intervention	-0.161	0.138	-1.170	.242	0.851	[0.65, 1.12]
	Age * intervention	**0.225**	**0.161**	**1.404**	**.160**	1.254	[0.91, 1.72]
Without trial 11	Age	-0.048	0.128	-0.376	.707	0.953	[0.74, 1.23]
	Intervention	-0.339	0.091	-3.741	<.001	0.713	[0.59, 0.85]
	Age * intervention	0.430	0.171	2.514	.012	1.537	[1.10, 2.15]

Table 4. *Sensitivity Analyses for Main Effects of Intervention Components on Post-Intervention Bullying Victimization*

	Victimization Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
All trials	Disciplinary methods						
	Non-punitive [=2]	0.879	0.402	2.187	.029	2.408	[1.10, 5.29]
	Non-punitive and punitive [=3]	0.466	0.381	1.223	.221	1.594	[0.76, 3.37]
Without trial 1	Disciplinary methods						
	Non-punitive	**0.649**	**0.410**	**1.584**	**0.11**	1.913	[0.86, 4.27]
	Non-punitive and punitive	0.469	0.359	1.308	0.19	1.599	[0.79, 3.23]
Without trial 2	Disciplinary methods						
	Non-punitive	**0.703**	**0.452**	**1.555**	**0.12**	2.021	[0.83, 4.90]
	Non-punitive and punitive	0.291	0.433	0.671	0.50	1.338	[0.57, 3.13]
Without trial 3	Disciplinary methods						
	Non-punitive	1.125	0.447	2.518	0.01	3.080	[1.28, 7.39]
	Non-punitive and punitive	0.712	0.429	1.661	0.097	2.039	[0.88, 4.72]

Table 4. Continued.

	Victimization Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
Without trial 4	Disciplinary methods						
	Non-punitive	1.077	0.420	2.567	0.010	2.937	[1.29, 6.69]
	Non-punitive and punitive	0.468	0.370	1.266	0.206	1.597	[0.77, 3.30]
Without trial 5	Disciplinary methods						
	Non-punitive	0.877	0.424	2.069	0.039	2.405	[1.05, 5.52]
	Non-punitive and punitive	0.521	0.421	1.239	0.216	1.684	[0.74, 3.85]
Without trial 6	Disciplinary methods						
	Non-punitive	**0.880**	**0.476**	**1.846**	**0.065**	2.310	[0.95, 6.13]
	Non-punitive and punitive	0.446	0.411	1.084	0.278	1.562	[0.70, 3.50]
Without trial 7	Disciplinary methods						
	Non-punitive	**0.784**	**0.508**	**1.543**	**0.123**	2.190	[0.81, 5.98]
	Non-punitive and punitive	0.372	0.490	0.759	0.448	1.451	[0.55, 3.79]
Without trial 8	Disciplinary methods						
	Non-punitive	0.879	0.402	2.187	0.029	2.404	[1.10, 5.29]
	Non-punitive and punitive	0.466	0.381	1.223	0.221	1.594	[0.75, 3.37]
Without trial 9	Disciplinary methods						
	Non-punitive	0.870	0.429	2.027	0.043	2.386	[1.03, 5.53]
	Non-punitive and punitive	0.423	0.426	0.991	0.322	1.526	[0.66, 3.53]
Without trial 10	Disciplinary methods						
	Non-punitive	0.902	0.360	2.506	0.012	2.464	[1.22, 4.99]
	Non-punitive and punitive	0.301	0.358	0.840	0.401	1.351	[0.67, 2.73]
Without trial 11	Disciplinary methods						
	Non-punitive	0.911	0.374	2.434	0.015	2.487	[1.19, 5.18]
	Non-punitive and punitive	0.639	0.372	1.714	0.087	1.894	[0.91, 3.93]

Table 5. *Sensitivity Analyses for Main Effects of Intervention Components on Post-Intervention Bullying Perpetration*

	Perpetration Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
All trials	Disciplinary methods						
	Non-punitive	1.782	0.776	2.297	.022	5.940	[1.30, 27.16]
	Non-punitive and punitive	0.894	0.690	1.296	.195	2.444	[0.63, 9.44]

Table 5. Continued.

	Perpetration Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
Without trial 1	Disciplinary methods						
	Non-punitive	**0.491**	**0.345**	**1.424**	**0.154**	1.635	[0.38, 3.22]
	Non-punitive and punitive	0.407	0.309	1.317	0.188	1.503	[0.82, 2.76]
Without trial 2	Disciplinary methods						
	Non-punitive	**1.203**	**0.695**	**1.731**	**0.083**	3.311	[0.85, 13.01]
	Non-punitive and punitive	0.320	0.632	0.506	0.613	1.377	[0.40, 4.75]
Without trial 3	Disciplinary methods						
	Non-punitive	**1.493**	**0.765**	**1.952**	**0.051**	4.449	[0.99, 19.92]
	Non-punitive and punitive	0.606	0.689	0.880	0.379	1.833	[0.48, 7.07]
Without trial 4	Disciplinary methods						
	Non-punitive	-	-		-		
	Non-punitive and punitive	-	-		-		
Without trial 5	Disciplinary methods						
	Non-punitive	1.918	0.919	2.086	0.037	6.804	[1.12, 41.25]
	Non-punitive and punitive	1.037	0.850	1.220	0.222	2.821	[0.54, 14.92]
Without trial 6	Disciplinary methods						
	Non-punitive	1.484	0.242	6.140	0.000	4.410	[2.85, 7.08]
	Non-punitive and punitive	0.201	0.218	0.923	0.356	1.223	[0.80, 1.88]
Without trial 7	Disciplinary methods						
	Non-punitive	**15.173**	**479.924**	**0.032**	**0.976**	1612743.028	0
	Non-punitive and punitive	14.293	479.924		0.975	3887090.922	0
Without trial 8	Disciplinary methods						
	Non-punitive	-	-		-		
	Non-punitive and punitive	-	-	-	-		
Without trial 9	Disciplinary methods						
	Non-punitive	1.897	0.897	2.115	0.034	6.664	[1.15, 38.65]
	Non-punitive and punitive	1.091	0.829	1.316	0.188	2.977	[0.59, 15.11]
Without trial 10	Disciplinary methods						

Table 5. Continued.

	Perpetration Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
	Non-punitive	1.941	0.924	2.101	0.036	6.964	[1.14, 42.56]
	Non-punitive and punitive	1.007	0.855	1.178	0.239	2.727	[0.51, 14.62]
Without trial 11	Disciplinary methods						
	Non-punitive	1.964	0.917	2.142	0.032	7.125	[1.18, 42.97]
	Non-punitive and punitive	0.964	0.849	1.136	0.256	2.623	[0.50, 13.84]

Table 6. *Sensitivity Analyses for the Victimization Model on Interaction Effects of Sex x Intervention Components for Post-Intervention Bullying Victimization*

	Victimization Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
All trials	Sex	1.008	0.436	-2.315	.021	0.365	[0.16, 0.86]
	Non punitive	0.456	0.426	1.068	.285	1.577	[0.68, 3.64]
	Non punitive and punitive	0.179	0.406	0.440	.660	1.196	[0.54, 2.65]
	Non-punitive * sex	1.029	0.444	2.316	.021	2.799	[1.17, 6.69]
	Non-punitive and punitive * sex	0.740	0.441	1.679	.093	2.097	[0.88, 4.98]
Without trial 1	Sex	-1.010	.436	-2.318	.020	0.364	[0.15, 0.86]
	Non-punitive	0.199	.434	.457	.648	1.220	[0.52, 2.86]
	Non-punitive and punitive	0.182	.385	0.471	.638	1.199	[0.56, 2.55]
	Non-punitive * sex	1.085	.446	2.433	.015	2.959	[1.24, 7.09]
	Non-punitive and punitive * sex	0.742	.441	1.683	.092	2.100	[0.86, 4.98]
Without trial 2	Sex	-1.144	.492	-2.326	.020	0.319	[0.12, 0.84]
	Non-punitive	0.267	.477	0.559	.576	1.305	[0.51, 3.32]
	Non-punitive and punitive	-0.010	.457	-0.022	.982	0.990	[0.40, 2.43]
	Non-punitive * sex	1.165	.499	2.332	.020	3.205	[1.20, 8.53]
	Non-punitive and punitive * sex	0.876	.496	1.764	.078	2.401	[0.91, 6.35]
Without trial 3	Sex	-1.297	.528	-2.455	.014	0.273	[0.10, 0.77]
	Non-punitive	0.610	.471	1.295	.195	1.841	[0.73, 4.64]
	Non-punitive and punitive	0.333	.453	.736	.462	1.396	[0.57, 3.39]
	Non-punitive * sex	1.317	.535	2.461	.014	3.734	[1.31, 10.66]

Table 6.*Continued.*

	Victimization Model	Co-efficient	*SE*	*t*	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
	Non-punitive and punitive * sex	1.029	.532	1.932	.052	2.797	[0.99, 7.94]
Without trial 4	Sex	-1.009	.436	-2.316	.021	0.365	[0.15, 0.86]
	Non-punitive	.646	.443	1.458	.145	1.908	[0.80, 4.55]
	Non-punitive and punitive	.181	.392	.458	.647	1.198	[0.55, 2.60]
	Non-punitive * sex	1.046	.445	.351	.019	2.947	[1.19, 6.81]
	Non-punitive and punitive * sex	0.741	.441	1.680	.093	2.097	[0.88, 4.98]
Without trial 5	Sex	-1.007	.436	-2.312	.021	0.365	[0.15, 0.86]
	Non-punitive	.454	.447	1.017	.309	1.575	[0.66, 3.78]
	Non-punitive and punitive	.239	.443	.540	.589	1.270	[0.54, 3.03]
	Non-punitive * sex	1.028	.444	2.313	.021	2.795	[1.17, 6.68]
	Non-punitive and punitive * sex	.0731	.441	1.657	.098	2.077	[0.88, 4.93]
Without trial 6	Sex	-1.020	.438	-2.326	.020	0.361	[0.15, 0.85]
	Non-punitive	.591	.503	1.174	.240	1.805	[0.67, 4.84]
	Non-punitive and punitive	.151	.434	.347	.729	1.163	[0.50, 2.72]
	Non-punitive * sex	**.757**	**.476**	**1.589**	**.112**	2.131	[0.84, 5.42]
	Non-punitive and punitive * sex	.765	.444	1.705	.088	2.131	[0.89, 5.08]
Without trial 7	Sex	-.273	.641	-.425	.671	0.761	[0.22, 2.67]
	Non-punitive	.632	.592	1.066	.286	1.881	[0.59, 6.01]
	Non-punitive and punitive	.355	.576	.616	.538	1.426	[0.46, 4.42]
	Non-punitive * sex	**.293**	**.647**	**.454**	**.650**	1.341	[0.38, 4.76]
	Non-punitive and punitive * sex	.004	.644	.007	.995	1.004	[0.28, 3.55]
Without trial 9	Sex	-1.009	.436	-2.313	.021	0.365	[0.15, 0.86]
	Non-punitive	.446	.452	.986	.324	1.561	[0.64, 3.79]
	Non-punitive and punitive	.147	.448	.328	.743	1.158	[0.48, 2.79]
	Non-punitive * sex	1.030	.445	2.317	.021	2.802	[1.17, 6.70]
	Non-punitive and punitive * sex	.711	.442	1.610	.107	2.037	[0.86, 4.84]
Without trial 10	Sex	-1.006	.435	-2.315	.021	0.366	[0.16, 0.86]
	Non-punitive	.483	.386	1.251	.211	1.621	[0.76, 3.45]

Table 6.*Continued.*

	Victimization Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
	Non-punitive and punitive	.062	.384	.161	.872	1.064	[0.50, 2.26]
	Non-punitive * sex	1.025	.443	2.312	.021	2.787	[1.17, 6.65]
	Non-punitive and punitive * sex	.627	.445	1.410	.159	1.873	[0.78, 4.48]
Without trial 11	Sex	-1.003	.434	-2.311	.021	0.367	[0.16, 0.86]
	Non-punitive	.492	.399	1.233	.218	1.636	[0.75, 3.58]
	Non-punitive and punitive	.295	.397	.744	.457	1.344	[0.62, 2.93]
	Non-punitive * sex	1.020	.443	2.303	.021	2.773	[1.16, 6.61]
	Non-punitive and punitive * sex	.864	.442	1.956	.050	2.373	[1.00, 5.64]

Table 7. *Sensitivity Analyses in Perpetration Model for Interaction Effects of Initial Level of Perpetration (ISP) x Intervention Components for Post-Intervention Perpetration.*

	Perpetration Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
All trials	ISP	1.105	0.230	4.800	<.001	3.019	[1.92, 4.74]
	School assemblies	-0.014	0.741	-0.019	.985	0.986	[0.23, 4.21]
	School assemblies * ISP	1.144	0.247	4.632	<.001	3.139	[1.93, 5.09]
	ISP	1.105	0.230	4.800	<.001	3.019	[1.92, 4.74]
	Playground supervision	-0.014	0.741	-0.019	.985	0.986	[0.23, 4.21]
	Playground supervision * ISP	1.144	0.247	4.632	<.001	3.139	[1.93, 5.09]
Without trial 1	ISP	0.352	0.986	0.357	0.721	1.422	[0.21, 9.82]
	School assemblies	0.099	0.225	0.443	0.658	1.105	[0.71, 1.72]
	School assemblies * ISP	**1.588**	**0.989**	**1.606**	**0.108**	4.896	[0.70, 34.03]
	ISP	0.352	0.986	0.357	0.721	1.422	[0.21, 9.82]
	Playground supervision	0.099	0.225	0.443	0.658	1.105	[0.71, 1.72]
	Playground supervision * ISP	**1.588**	**0.989**	**1.606**	**0.108**	4.896	[0.70, 34.03]
Without trial 2	ISP	1.113	0.230	4.838	0.000	3.044	[1.94, 4.78]
	School assemblies	-0.720	0.524	-1.372	0.170	0.487	[0.17, 1.36]
	School assemblies * ISP	1.136	0.247	4.606	0.000	3.116	[1.92, 5.05]
	ISP	1.113	0.230	4.838	0.000	3.044	[1.94, 4.78]
	Playground supervision	-0.720	0.524	-1.372	0.170	0.487	[0.17, 1.36]
	Playground supervision * ISP	1.136	0.247	4.606	0.000	3.116	[1.92, 5.05]
Without trial 3	ISP	1.102	0.230	4.795	0.000	3.012	[1.92, 4.73]
	School assemblies	-0.445	0.665	-0.668	0.504	0.641	[0.17, 2.36]
	School assemblies * ISP	1.146	0.247	4.648	0.000	3.147	[1.94, 5.10]

Table 7. Continued.

	Perpetration Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
	ISP	1.102	0.230	4.795	0.000	3.012	[1.92, 4.73]
	Playground supervision	-0.445	0.665	-0.668	0.504	0.641	[0.17, 2.36]
	Playground supervision * ISP	1.146	0.247	4.648	0.000	3.147	[1.94, 5.10]
Without trial 4	ISP	-	-		-		
	School assemblies	-	-		-		
	School assemblies * ISP	-	-		-		
	ISP	-	-		-		
	Playground supervision	-	-		-		
	Playground supervision * ISP	-	-		-		
Without trial 5	ISP	1.100	0.230	4.777	0.000	3.004	[1.91, 4.72]
	School assemblies	0.106	0.899	0.117	0.906	1.111	[0.19, 6.47]
	School assemblies * ISP	1.159	0.248	4.673	0.000	3.185	[1.96, 5.18]
	ISP	1.100	0.230	4.777	0.000	3.004	[1.91, 4.72]
	Playground supervision	0.106	0.899	0.117	0.906	1.111	[0.19, 6.47]
	Playground supervision * ISP	1.159	0.248	4.673	0.000	3.185	[1.96, 5.18]
Without trial 6	ISP	1.100	0.230	4.777	0.000	3.005	[1.91, 4.72]
	School assemblies	0.012	0.899	0.014	0.989	1.012	[0.17, 5.89]
	School assemblies * ISP	1.388	0.253	5.492	0.000	4.008	[2.44, 6.58]
	ISP	1.100	0.230	4.777	0.000	3.005	[1.91, 4.72]
	Playground supervision	0.012	0.899	0.014	0.989	1.012	[0.17, 5.89]
	Playground supervision * ISP	1.388	0.253	5.492	0.000	4.008	[2.44, 6.58]
Without trial 7	ISP	1.158	0.240	4.826	0.000	3.182	[1.99, 5.09]
	School assemblies	0.290	0.989	0.293	0.769	1.336	[0.19, 9.29]
	School assemblies * ISP	1.091	0.256	4.264	0.000	2.978	[1.80, 4.92]
	ISP	1.158	0.240	4.826	0.000	3.182	[1.99, 5.09]
	Playground supervision	0.290	0.989	0.293	0.769	1.336	[0.19, 9.29]
	Playground supervision * ISP	1.091	0.256	4.264	0.000	2.978	[1.80, 4.92]
Without trial 8	ISP	-	-		-		
	School assemblies	-	-		-		
	School assemblies * ISP	-	-		-		
	ISP	-	-		-		
	Playground supervision	-	-		-		
	Playground supervision * ISP	-	-		-		
Without trial 9	ISP	1.100	0.230	4.778	0.000	3.005	[1.91, 4.72]
	School assemblies	0.148	0.889	0.167	0.868	1.160	[0.20, 6.63]
	School assemblies * ISP	1.154	0.247	4.667	0.000	3.169	[1.95, 5.15]

Table 7. Continued.

	Perpetration Model	Co-efficient	SE	t	Sig.	Exp (Coefficient)	95% CI (coef.) [LL, UL]
	ISP	1.100	0.230	4.778	0.000	3.005	[1.91, 4.72]
	Playground supervision	0.148	0.889	0.167	0.868	1.160	[0.20, 6.63]
	Playground supervision * ISP	1.154	0.247	4.667	0.000	3.169	[1.95, 5.15]
Without trial 10	ISP	1.100	0.230	4.776	0.000	3.003	[1.91, 4.72]
	School assemblies	0.101	0.902	0.112	0.911	1.106	[0.19, 6.49]
	School assemblies * ISP	1.068	0.252	4.247	0.000	2.910	[1.79, 4.77]
	ISP	1.100	0.230	4.776	0.000	3.003	[1.91, 4.72]
	Playground supervision	0.101	0.902	0.112	0.911	1.106	[0.19, 6.49]
	Playground supervision * ISP	1.068	0.252	4.247	0.000	2.910	[1.79, 4.77]
Without trial 11	ISP	1.100	0.230	4.776	0.000	3.003	[1.91, 4.72]
	School assemblies	0.103	0.901	0.114	0.909	1.108	[0.19, 6.48]
	School assemblies * ISP	0.934	0.259	3.606	0.000	2.545	[1.53, 4.23]
	ISP	1.100	0.230	4.776	0.000	3.003	[1.91, 4.72]
	Playground supervision	0.103	0.901	0.114	0.909	1.108	[0.19, 6.48]
	Playground supervision * ISP	0.934	0.259	3.606	0.000	2.545	[1.53, 4.23]

Summary

In the Name of Status:
Adolescent Harmful Social Behavior as Strategic Self-Regulation

Adolescent harmful social behavior is behavior that benefits the person that exhibits it but that could harm (the interest of) another. Harmful social behavior can be aggressive, risky, or selfish in nature. The traditional predominant perspective on adolescent harmful social behavior is that it is what happens when something goes wrong in the developmental process, classifying such behaviors as a self-regulation failure (e.g., Smokowski & Kopasz, 2005; Walden & Beran, 2010). Yet, theories that draw from evolution theory underscore the adaptiveness of harmful social behavior and argue that such behavior can be enacted as a means to gain important resources for survival and reproduction, namely gaining a position of power (e.g., Hawley, 1999; Volk et al., 2012; Volk, Dane et al., 2022). Adaptive self-regulation would entail that adolescents can shift flexibly between cooperative and coercive behaviors to gain status in hierarchical settings (Leary, 1957; Paulhus & Martin, 1987; 1988). Which behavior leads to the attainment of status depends on the norms of the group, which can be conveyed descriptively (by what others do) or injunctively (by how others evaluate behaviors; Cialdini, 1988). Adolescents might be especially susceptible to the influence of status-related peer norms, as they have a heightened desire for gaining status (Blakemore, 2012; Steinberg & Morris, 2001). This could possibly explain why many harmful social behaviors have their onset in adolescence (Arnett, 1999).

Dissertation Aims
This dissertation aims to examine whether adolescent harmful social behavior can indeed be a form of strategic self-regulation, and formulated two questions: Can adolescent harmful social behavior be seen as strategic attempts to obtain social status? And how can we incorporate this status-pursuit perspective more into current interventions that aim to reduce harmful social behavior? To answer these questions, I divided this dissertation into three sections. In <u>section 1</u>, I first assessed in **Chapter 2** whether previous studies can explain adolescent harmful social behavior from a self-regulation perspective, by conducting a meta-review including 136 reviews and meta-analyses on the development and socialization of self-regulation from infancy to adolescence (0–18 years).

In <u>section 2</u>, I conducted three empirical studies testing the status-pursuit mechanism of adolescent harmful social behavior. In **Chapter 3**, I assessed the social goals (i.e., communion and agency) and social gains (i.e., likeability and popularity) of adolescent bullying and aggression. Here, I meta-analyzed data of 164,143 adolescents (age range: 8–20 years), from 148 independent samples, with Meta-Analytic Structural Equation Modeling (MASEM). In **Chapter 4**, I conducted a preregistered between-subjects experimental study ($N = 519$, $M = 13.47$ years, $SD = 1.35$, 46% girls) assessing whether adolescents are likely to engage in selfish behavior when peer norms award such behavior with status gain (instead of loss), and whether this is stronger for adolescents with higher

levels of agentic goals and narcissism. Finally, in **Chapter 5**, I conducted a preregistered between-subjects experimental study ($N = 285$, $M = 12.99$, $SD = 1.02$, 41.8% girls) assessing whether adolescents are likely to adjust their COVID-19-related attitudes and behavior to influential vloggers who comply or do not comply with COVID-19 regulations online, and whether this adjustment to vloggers is stronger when adolescents see that other viewers approve (instead of disapprove) of their behavior.

To link my findings to practice, <u>section 3</u> assessed current intervention practices regarding one particular form of harmful social behavior: bullying. **Chapter 6** contained a large-scale Individual Participant Data Meta-Analysis (IPDMA) using data from 39,793 children and adolescents aged five to 20 years ($M_{age} = 12.58$, SD $= 2.34$). I assessed what works for whom in school-based anti-bullying intervention programs worldwide with the aim to understand better how my dissertation findings could be integrated into practice.

Section 1: How can the Different Aspects Involved in Self-Regulation Explain Harmful Social Behavior in Adolescence?

The meta-review in **Chapter 2** indicated that self-regulation development is driven by the interplay between abilities, goals, and motivation, which are all distinctively shaped by social agents. On the one hand, adolescent harmful social behavior can originate from the strong tendency to approach appetitive, rewarding situations that cannot yet be suppressed sufficiently by their deliberate cognitive control system. On the other hand, adolescents perceive that engaging in certain behavior is associated with having a certain image (e.g., smokers are cool), and adolescents are likely to deliberately engage in behaviors that will gain them their desired images. Although some harmful social behavior can develop from inadequate self-regulation due to an underdeveloped cognitive control system, in some cases harmful social behavior may also develop from adequate self-regulation. This may happen when engaging in particular behavior leads to the acquisition of important peer-status-related goals (such as gaining a popular or cool image). Such status driven behavior may be considered skillful and self-regulated, as adolescents need to actively align their behaviors to information they deduct from their social environments regarding how they can achieve personally relevant goals.

Section 2: Do Adolescents Adjust Their Behavior to Descriptive and Injunctive Norms that Provide Information on how they can gain Status?

Chapter 3 indicated that adolescents who desire popularity and dominance (agency) engage in more bullying and aggression, which was linked with peer evaluations of higher popularity (but lower likeability). This suggests that adolescent bullying and aggression can indeed be both goal-directed (elicited by agentic goals) and adaptive (linked with popularity). **Chapter 4** showed that adolescents engaged in selfish behavior (i.e., distributing resources unequally) when they could gain peer status by it from other students from their school. This mechanism was especially pronounced in adolescents with higher levels of narcissism, but not in adolescents with agentic goals. This suggests that the prospect of status motivated adolescents to engage in selfishness, harming the

interest of someone else. **Chapter 5** indicated that when adolescents witnessed COVID-19-related behavior of influential people online (vloggers), regardless of whether it was approved or disapproved of by anonymous peer viewers, this impacted adolescents' COVID-19-related attitudes and behaviors of adolescents who identified with vloggers strongly. This suggested that descriptive norms set by vloggers on YouTube impacted adolescents with higher levels of identification in the way that when adolescents saw a non-compliant vlogger, they were more likely to adopt more non-compliant attitudes and behaviors. Altogether, these chapters provide compelling evidence for the proposition that adolescents may skillfully and strategically adjust their behavior to descriptive and injunctive peer norms that provide information on how they can gain status or approval in their peer context—even when this means they have to engage in behavior that harms (the interest of) someone else.

Section 3: Are Current Intervention Practices Effectively Reducing (Subgroups of) Youths' Harmful Social Behavior, are There Interventions with Certain Components that are Differentially Effective?

Chapter 6 provided four insights. First, anti-bullying intervention programs to date effectively reduce bullying perpetration although effect sizes are small. Second, school assemblies and playground supervision had iatrogenic effects on bullying perpetration for youth who bullied regularly to daily at baseline. Third, anti-bullying intervention programs are less effective in reducing bullying perpetration for adolescents compared with children. Fourth, there was only one intervention that included a component specifically related to peers, indicating that this is a missing piece thus far in interventions aiming to reduce bullying perpetration. Moreover, all but one intervention focused on cognitive or emotional skill-building, which contrasts with our earlier findings that—especially adolescent—harmful social behavior might not be deficient but skillful behavior. Implications of these findings are that anti-bullying interventions could be more effective, especially for adolescent populations whose motivation to bully might be linked more to prospective status gains than children who engage in bullying (Volk et al., 2012).

Conclusion and Discussion

Altogether the findings of this dissertation underscore that the prospect of status affordances can motivate adolescents to engage in harmful social behavior, and that descriptive and injunctive peer norms can convey such status prospects effectively. In peer contexts where adolescent harmful social behavior leads to important social resources, adolescents strategically and skillfully use harmful social behavior as a means to acquire these resources, such as status. Importantly, consistent with the operationalization of self-regulation, adolescent harmful social behavior can be classified as skillful self-regulation in instances where such behavior leads to the acquisition of status goals (Kopetz & Orehek, 2015; Moilanen, 2007). This complements evolutionary theories that point to the adaptivity of harmful social behavior in social hierarchical settings (Hawley, 1999; Volk et al., 2012; Volk, Dane et al., 2022).

Crucially, evolutionary theories also emphasize that cooperation and collectivism are important routes to survival and reproduction too (De Waal, 2010; Hawley, 1999). As such, evolutionary theories do not only justify the selfish side of human nature but also emphasize our empathetic and cooperative human tendencies (de Waal, 2010). The current dissertation adds that we can reach more adolescent cooperation and collectivism than we are currently promoting via interventions in two ways. One, teach adolescents how they can achieve status by behaving prosocially. And two, change peer norms that reward harmful social behavior with popularity into peer norms that reward prosocial behavior with popularity. When we attune to adolescents' normative status goals and treat real-life and online peer norms as crucial targets for interventions, we can more effectively trigger adolescents' innate cooperative and collectivistic tendencies in their attempts to control social resources. We can encourage them to behave prosocially, *in the name of status.*

Samenvatting
Nederlands

In Naam van Status:
Schadelijk Sociaal Gedrag als Strategische Zelfregulatie in de Adolescentie

Schadelijk sociaal gedrag is gedrag dat voordelig is voor degene die het uitvoert, maar schadelijk kan zijn voor anderen. Schadelijk sociaal gedrag kan agressief, risicovol of egoïstisch van aard zijn. De traditionele verklaring van zulk schadelijk sociaal gedrag is dat het optreedt wanneer er iets misgaat in de ontwikkeling, waarbij dergelijk gedrag wordt geclassificeerd als een tekort aan zelfregulering (Smokowski & Kopasz, 2005; Walden & Beran, 2010). Theorieën die gebaseerd zijn op de evolutionaire theorie benadrukken echter dat schadelijk sociaal gedrag adaptief kan zijn en betogen dat dergelijk gedrag een middel kan zijn om een belangrijke hulpbron te verkrijgen die bijdraagt aan overleving en voortplanting, namelijk het verkrijgen van een machtspositie (Hawley, 1999; Volk et al., 2012; Volk, Dane et al., 2022). Adaptieve en bekwame zelfregulering zou dan inhouden dat adolescenten flexibel kunnen schakelen tussen coöperatief *en* dwingend gedrag om status te verkrijgen in hiërarchische omgevingen (Leary, 1957; Paulhus & Martin, 1987; 1988). Welk gedrag leidt tot het bereiken van status hangt af van de normen van de groep, die descriptief kunnen worden overgebracht (door wat anderen doen) of voorschrijvend (door hoe anderen gedrag beoordelen; Cialdini, 1988). Adolescenten zijn mogelijk bijzonder vatbaar voor de invloed van statusgerelateerde groepsnormen, omdat ze een versterkte behoefte hebben om status te verkrijgen (Blakemore, 2012; Steinberg & Morris, 2001). Dit kan mogelijk verklaren waarom veel vormen van schadelijk sociaal gedrag hun oorsprong hebben in de adolescentie (Arnett, 1999).

Doelen van dit Proefschrift

Dit proefschrift heeft het doel om de stelling dat schadelijk sociaal gedrag van adolescenten soms een strategische vorm van zelfregulering kan zijn te onderzoeken en beoogt twee vragen te beantwoorden: Kan schadelijk sociaal gedrag bij adolescenten een strategische poging zijn om sociale status te verkrijgen? En hoe kunnen we dit perspectief (beter) integreren in interventies die beogen schadelijk sociaal gedrag te verminderen? Om deze vragen te beantwoorden, heb ik dit proefschrift onderverdeeld in drie secties. In sectie 1 heb ik in **Hoofdstuk 2** eerst onderzocht of eerdere studies schadelijk sociaal gedrag van adolescenten kunnen verklaren vanuit een zelfregulatie perspectief, door middel van een meta-review waarin 136 reviews en meta-analyses werden opgenomen omtrent de ontwikkeling en socialisatie van zelfregulering vanaf de babytijd tot de adolescentie (0–18 jaar).

In sectie 2 heb ik drie empirische studies uitgevoerd om het mechanisme van het verwerven van status door middel van schadelijk sociaal gedrag bij adolescenten te toetsen. In **Hoofdstuk 3** heb ik de sociale doelen en sociale winsten (aardig gevonden worden en

populariteit) van pesten en agressie bij adolescenten in kaart gebracht. Hiervoor heb ik gegevens van 164.143 adolescenten (leeftijdsbereik: 8–20 jaar), uit 148 onafhankelijke steekproeven geanalyseerd met Meta-Analytische Structurele Vergelijkingsmodellen (MASEM). In **Hoofdstuk 4** heb ik een vooraf geregistreerde experimentele studie uitgevoerd ($N = 519$, $M = 13,47$, $SD = 1,35$, 46% meisjes) om te beoordelen of adolescenten geneigd zijn om egoïstisch gedrag te vertonen wanneer groepsnormen dergelijk gedrag belonen met statuswinst (in plaats van verlies), en of dit sterker is bij adolescenten met hogere niveaus van agentische doelen en narcisme. In **Hoofdstuk 5** heb ik een vooraf geregistreerde experimentele studie uitgevoerd ($N = 285$, $M = 12,99$, $SD = 1,02$, 41,8% meisjes) om te beoordelen of adolescenten geneigd zijn hun houding en gedrag met betrekking tot COVID-19 aan te passen op basis van of ze populaire vloggers online zich wel of niet zien houden aan de COVID-19 regelgeving, en of deze aanpassing sterker is wanneer ze zien dat andere kijkers het gedrag van de vloggers goedkeuren (in plaats van afkeuren).

Om mijn bevindingen te koppelen aan de praktijk, heb ik in sectie 3 de huidige interventiepraktijken met betrekking tot een specifieke vorm van schadelijk sociaal gedrag, namelijk pesten, in kaart gebracht. **Hoofdstuk 6** bevatte een grootschalige meta-analyse van gegevens van individuele deelnemers: 39.793 kinderen en adolescenten in de leeftijd van vijf tot 20 jaar ($M_{age} = 12,58$, $SD = 2,34$). Ik heb onderzocht wat voor wie werkt in anti-pestinterventieprogramma's op scholen wereldwijd, met als doel beter te begrijpen hoe mijn bevindingen van dit proefschrift (beter) kunnen worden geïntegreerd in de praktijk.

Sectie 1: Hoe Kunnen de Verschillende Aspecten van Zelfregulatie het Schadelijk Sociaal Gedrag van Adolescenten Verklaren?

De meta-review in **Hoofdstuk 2** liet zien dat de ontwikkeling van zelfregulering wordt bepaald door de wisselwerking tussen vaardigheden, doelen en motivatie, die allemaal op verschillende manieren worden beïnvloed door sociale actoren. Enerzijds kan schadelijk sociaal gedrag van adolescenten voortkomen uit de sterke neiging om belonende situaties op te zoeken welke nog niet voldoende kan worden onderdrukt door hun onderontwikkelde bewuste cognitieve controle. Anderzijds ervaren adolescenten dat het deelnemen aan bepaald gedrag geassocieerd wordt met het hebben van een bepaald imago (bijvoorbeeld, rokers zijn cool), en adolescenten hebben de neiging om doelgericht gedrag aan te nemen dat leidt tot hun gewenste imago. Hoewel sommige vormen van schadelijk sociaal gedrag dus kunnen voortkomen uit inadequate zelfregulering als gevolg van een onderontwikkeld cognitief controlesysteem, kan ander schadelijk sociaal gedrag juist een uiting zijn van adequate en strategische zelfregulering, wanneer het gedrag leidt tot het verwerven van belangrijke status-doelen (zoals het verkrijgen van een populair of cool imago) onder leeftijdsgenoten. Adolescenten moeten in sommige situaties actief en strategisch hun gedrag afstemmen op de informatie die ze halen uit hun sociale omgeving omtrent hoe ze persoonlijk relevante doelen kunnen bereiken, wat adequate zelfregulering vereist.

Sectie 2: Passen Adolescenten hun Gedrag aan aan Beschrijvende en Voorschrijvende Normen die Informatie Geven over hoe ze Status Kunnen Verkrijgen?

De meta-analyse in **Hoofdstuk 3** liet zien dat adolescenten die populariteit en dominantie (agency) nastreven, meer pesten en agressie vertonen, wat werd gekoppeld aan een hogere populariteit (maar ook aan minder aardig gevonden worden) gerapporteerd door leeftijdsgenoten. Dit suggereert dat pesten en agressie in de adolescentie inderdaad zowel doelgericht (op basis van doelen gericht op eigenbelang) als adaptief (gekoppeld aan populariteit) kunnen zijn. De experimentele studie in **Hoofdstuk 4** toonde aan dat adolescenten zich egoïstisch gedroegen (het oneerlijk verdelen van middelen) wanneer medestudenten van hun school dit gedrag beloonden met status, en dat dit nog sterker gold voor adolescenten met hogere niveaus van narcisme, maar niet voor adolescenten met agentische doelen. Dit suggereert dat het vooruitzicht op het verwerven van status adolescenten motiveerde om egoïsme te vertonen, waarbij het belang van een ander werd geschaad. **Hoofdstuk 5** gaf aan dat wanneer adolescenten het COVID-19-gerelateerde gedrag van invloedrijke leeftijdsgenoten online (vloggers) zagen, ongeacht of dat werd goedgekeurd of afgekeurd door andere anonieme kijkers, dit van invloed was op de houding en het gedrag van adolescenten die zich sterk identificeerden met de vloggers. Dit suggereerde dat beschrijvende normen die werden gesteld door populaire vloggers van invloed waren op adolescenten met een hoger niveau van identificatie: wanneer adolescenten een vlogger zagen die zich niet aan de COVID-19 regels hield, waren ze eerder geneigd om attitudes en gedragingen aan te nemen die tegen de COVID-19 regels ingingen. Al met al leveren deze hoofdstukken overtuigend bewijs voor de stelling dat adolescenten hun gedrag strategisch en kundig kunnen aanpassen aan beschrijvende en voorschrijvende normen van leeftijdsgenoten, die informatie bieden over hoe ze status kunnen verkrijgen.

Sectie 3: Wat Werkt voor Wie in Anti-Pestinterventies op Scholen Wereldwijd?

De IPD meta-analyse in **Hoofdstuk 6** verschafte vier inzichten. Ten eerste, anti-pestinterventies waren over het algemeen effectief in het verminderen van pesten op scholen, hoewel de effectgroottes klein waren. Ten tweede, interventies waarin schoolbijeenkomsten werden gegeven of waarin de supervisie op de speelpleinen werd opgeschroefd, zorgden ervoor dat kinderen en jongeren die veel pesten bij aanvang van de interventies meer in plaats van minder gingen pesten. Ten derde, anti-pestinterventies waren minder succesvol in het verminderen van pesten bij adolescenten dan bij kinderen. Ten vierde, er was maar één interventie die een onderdeel bevatte dat specifiek gericht was op de invloed van leeftijdsgenoten, waaruit bleek dat dit een missend onderdeel is in huidige interventies die pesten beogen te verminderen. Daarnaast bevatte er maar één interventie geen onderdeel specifiek gericht op het verbeteren van cognitieve of emotionele vaardigheden. Dit contrasteert met onze eerdere bevindingen dat schadelijk sociaal gedrag in de adolescentie niet alleen voortkomt uit inadequate zelfregulatie, maar soms juist ook uit competente zelfregulatie. De implicaties van deze bevindingen zijn dat

de effecten van anti-pestinterventies kunnen verbeteren, met name voor adolescenten wiens motivatie om te pesten meer gelinkt kan zijn aan hun behoefte aan status dan de motivatie van kinderen die deelnemen aan pesten (Volk et al., 2012).

Conclusie en Discussie

De bevindingen van dit proefschrift benadrukken dat het vooruitzicht op statusmogelijkheden adolescenten kan motiveren om schadelijk sociaal gedrag te vertonen, en dat beschrijvende of voorschrijvende peer-normen dergelijke statusmogelijkheden effectief kunnen overbrengen. In situaties waarin schadelijk sociaal gedrag van adolescenten leidt tot belangrijke sociale hulpbronnen gebruiken adolescenten strategisch en bekwaam schadelijk sociaal gedrag als een middel om deze hulpbronnen, zoals status, te verkrijgen. Schadelijk sociaal gedrag van adolescenten kan, in overeenstemming met de operationalisatie van zelfregulatie, in deze gevallen worden geclassificeerd als bekwaam zelfregulerend gedrag, strategisch ingezet en bijdragend aan het bereiken van statusdoelen (Kopetz & Orehek, 2015; Moilanen, 2007). Dit sluit aan bij evolutionaire theorieën die wijzen op de adaptieve functie van schadelijk sociaal gedrag in sociale hiërarchische contexten (Hawley, 1999; Volk et al., 2012; Volk, Dane et al., 2022).

Belangrijk is dat evolutionaire theorieën ook benadrukken dat samenwerking en collectivisme ook belangrijke routes zijn naar overleving en voortplanting (De Waal, 2010; Hawley, 1999). Evolutionaire theorieën rechtvaardigen dus niet alleen de egoïstische kant van de menselijke aard, maar benadrukken ook onze empathische en coöperatieve neigingen (de Waal, 2010). Dit proefschrift voegt daaraan toe dat we meer coöperatie en collectivisme kunnen bereiken in adolescenten dan we momenteel bevorderen via interventies op twee manieren. Ten eerste, leer adolescenten hoe ze status kunnen bereiken door prosociaal gedrag te vertonen. En ten tweede, verander peer normen die schadelijk sociaal gedrag belonen met populariteit in peer normen die prosociaal gedrag belonen met populariteit. Wanneer we afstemmen op de normatieve statusdoelen van adolescenten en (online) peer normen behandelen als cruciale onderdelen voor interventies, kunnen we adolescenten stimuleren om hun aangeboren coöperatieve en collectivistische neigingen in te zetten om sociale hulpbronnen te beheersen. We kunnen hen aanmoedigen om prosociaal gedrag te vertonen, *in naam van status*.

PUBLICATIONS AND CONTRIBUTIONS OF AUTHORS

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All shared last authors were involved in initiating this interdisciplinary collaborative study. Hereafter, everyone contributed to the design of the study. CW, RE, MH*, EW, MZ, and JPCS conducted the literature search. CW, RE, MH*, EW, and MZ coded the studies and conducted the review synthesis. CW, RE, MH*, EW, and MZ wrote the manuscript and HL, GO, and HMH provided additional consultation during the writing of the manuscript. All authors contributed to and have approved the final manuscript.
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MH, EB, HL, WvdB, and GO designed the study. MH conducted the literature searches, coded the studies, and conducted the statistical analyses. All authors contributed to and have approved the final manuscript.

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MH, WvdB, GO, and HL designed the study. MH set up data collection for the content analysis and supervised students who coded YouTube vlogs. MH coordinated and supervised students to collect data for the experimental study. MH performed the statistical analyses. MH wrote the manuscript in close collaboration with HL. All authors contributed to and have approved the final manuscript.

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MH, BdM, MF, and GO designed the study. SK conducted literature searches, and SK, MH, BdM, and MF coded the studies. MH and BdM coded intervention manuals. SK contacted the original PI's of the studies that were eligible to be included, arranged data-sharing agreements, and merged and harmonized the data. MH conducted the statistical analyses. MH wrote the manuscript, in close collaboration with BdM, MF, and GO. Members of BIRC* contributed their data and provided feedback on the manuscript. All authors contributed to and have approved the final manuscript.

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ABOUT THE AUTHOR

Photo: Mieke Brand

Maud Hensums (Zeewolde, 1993) conducted her Bachelor's degree in Pedagogics at the University of Applied Sciences in Utrecht (2011–2015, Cum Laude). During this time, she did several internships as a pedagogical worker in daycare, primary school, and at Carehouse, an organization that works with children and adolescents with developmental disadvantages. Hereafter, Maud entered the premaster Orthopedagogics at the University of Amsterdam (2015–2016), after which she was admitted to the Research Master of Child Development and Education at the University of Amsterdam (2016–2018). Maud wrote her first master thesis on the effects of a mindfulness technique (self-kindness) on mental and physical health, an experimental study that was conducted in Nemo Science Live. Her second master thesis focused on sexual double standards in Dutch adolescents. During this time, Maud worked at the University of Amsterdam as a student assistant for the tutorials of the Bachelor Pedagogical Sciences, and as a research assistant in the department of Preventive Youth Care. In September 2018, she started her Ph.D. project at the Research Institute for Child Development and Education (RICDE), department of Preventive Youth Care, and the Research Priority Area Yield. Maud attended several (inter)national conferences, among which meetings of the European Association for Research on Adolescence (EARA; Ghent, 2018; Porto/Online, 2020; Dublin, 2022), the Society for Research in Child Development (SRCD; Baltimore, 2019; Online, 2021; Salt Lake City, 2023), the Society for Research on Adolescence (SRA; New Orleans/ Online; 2021), the European Association for Developmental Psychology (EADP; Turku/ Online, 2021), and the Vereniging van Nederlandse Ontwikkelingspsychologie (VNOP; Online, 2021; Utrecht, 2022). During these conferences, Maud was rewarded with a conference award by EARA (2020), and a flash talk award by VNOP (2022). As part of her Ph.D., she was admitted and received grants to join the EADP winter school in Florence, Italy (2019), and the EADP/ SRA/ SRCD summer school in Dublin, Ireland (2022). She also joined the Summer school on 'Peer relations and interactions in childhood and adolescence' in Nijmegen, the Netherlands (2019). Lastly, Maud participated in science communication, by writing a popular blog post for the Center for the Developing Adolescent, being interviewed for the 'week against bullying' by NPO Radio 1, being part of the episode 'Wat werkt tegen pesten' of the Podcast 'Over Onderwijs en Opvoeding' hosted by the University of Amsterdam, and by participating in outreach for the University of Amsterdam (i.e., providing mini-lectures and hosting research assignments for secondary school students). Maud is currently working as a postdoctoral researcher at the University of Amsterdam, department of Preventive Youth Care. In this project, she brings her dissertation work back into practice and aims to decrease bullying in schools by embracing the adaptive nature of such harmful social behavior.