

Social Exclusion Predicts Impaired Self-Regulation: A 2-Year Longitudinal Panel Study  
Including the Transition from Preschool to School

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## Abstract

**Objective:** The need-to-belong theory stipulates that social exclusion (e.g., being rejected by peers) impairs the ability to self-regulate and experimental studies with adults support this contention, at least on a short-term basis. Few studies have investigated whether social exclusion affects the development of self-regulation on children in a more enduring manner.

**Method:** By using data from a community sample of 762 children, we investigated reciprocal relations between social exclusion and self-regulation from age four to age six. Social exclusion was reported by teachers, whereas self-regulation was reported by parents.

**Results:** Autoregressive latent cross-lagged analyses showed that social exclusion predicted impaired development of dispositional self-regulation, and reciprocally, that poor self-regulation predicted enhanced social exclusion.

**Conclusions:** Social exclusion and self-regulation reciprocally affect one another over time. Social exclusion undermines children's development of self-regulation, whereas poor self-regulation increases the likelihood of exclusion. Results illuminate the applied relevance of the need-to belong theory.

*Keywords:* need-to-belong theory, social exclusion, self-control, victimization, reciprocal

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The *need to belong*—defined as humans’ innate tendency to gain acceptance and to avoid rejection—is regarded as a basic psychological need (Baumeister & Leary, 1995; DeWall, Deckman, Pond, & Bonser, 2011; Lavigne, Vallerand, & Crevier-Braud, 2011). According to the need-to-belong theory (Baumeister, DeWall, Ciarocco, & Twenge, 2005; Baumeister & Leary, 1995), optimal psychological functioning is compromised if and when someone experiences deprivation in belongingness (Deci & Ryan, 2000). “Social exclusion” is the term used to characterize such thwarting of the need to belong (Baumeister et al., 2005), and includes being rejected, disliked, and shunned by others (e.g., Leary, 2001; Smart, Richman & Leary, 2009).

The need-to-belong theory has mostly been developed and tested with respect to adults, but being a general theory of human interaction there are grounds for expecting it to apply to children, too. By defining social exclusion as a lack of needs fulfillment, the term may apply to several forms of social marginalization among children, such as *peer rejection* (Asher & Coie, 1990), and non-physical forms of peer maltreatment, including *relational victimization* (Crick, Casas, & Nelson, 2002). However, to our knowledge, the need-to belong theory has not been tested explicitly, 1) among children, 2) in real world contexts, and/or 3) longitudinally. Therefore, we evaluated the theory by examining longitudinal relations between social exclusion, as reported by teachers, and self-regulation, as reported by parents, in a large community sample of young children, with both measured in preschool and 2 years later, in first grade.

**The Need-to-Belong Theory: Self-Regulation is Affected by Social Functioning**

Findings from experimental tests of the need-to-belong theory appear quite unequivocal: Social exclusion undermines self-regulation (Baumeister et al., 2005;

Baumeister, Twenge, & Nuss, 2002), at least in the short term. Self-regulation is often defined as the ability to suppress instant or impulsive urges and primary biological impulses in favor of deferred and higher-arching goals (Baumeister, Heatherton, & Tice, 1994; Carver & Scheier, 1981; Posner & Rothbart, 2000). However, self-regulation may also relate to executive functions, such as goal-oriented behavior (Tangney, Baumeister, & Boone, 2004), attentional control (Carver & Scheier, 1981; Rueda, Posner, & Rothbart, 2005), and emotion regulation (Eisenberg, Spinrad, & Eggum, 2010). Attention-deficit hyperactivity disorder (ADHD), for example, is typically described as a condition involving both poor inhibitory control and deficiencies in executive functions (Barkley, 1997). Hence, self-regulation includes both the control over immediate impulses, such as the inhibition of anger (e.g., when being bullied), as well as the allocation of cognitive resources, such as sustaining attentional focus (e.g., in the service of completing a school task).

Although some authors have suggested that inhibition of behavior is fundamentally different from attentional focusing and goal-oriented behavior (Geng, Hu, Wang, & Chen, 2011), the inhibition of behavior and attentional abilities typically displays substantial empirical overlap, at least among young children (Barkley, 1997; Rothbart, Ahadi, Hershey, & Fisher, 2003; Rueda et al., 2005). Therefore, several authors contend that both inhibitory and executive efforts are different aspects of a more general phenomenon, which is *self-regulation* (Liew, 2012; Raffaelli, Crockett, & Shen, 2005; Rueda et al., 2005).

Importantly, research documents some plasticity in the development of self-regulation. Evidence indicates, for example, that it is shaped by attachment security early in life (Kochanska, Philibert, & Barry, 2009) and parenting styles in adolescence (Belsky & Beaver, 2011). Meanwhile, consideration of sex differences indicates that girls generally exhibit more self-regulation throughout childhood than boys (Jones, Rothbart, & Posner, 2003; Kochanska, Coy, & Murray, 2001).

As indicated earlier, empirical testing of the need-to-belong theory has mostly involved experimental approaches in which adults' social exclusion experience is systematically manipulated. Because peer rejection and non-physical forms of victimization also reflect social exclusion (Smart et al., 2009)—in the sense that being the target of rejection and relational victimization may provoke situational deprivation in *belongingness*—field studies on children represent another way of evaluating theoretical predictions of need-to-belong theory. Before considering the results of such work, we briefly summarize findings from illustrative experimental studies on social exclusion and self-regulation involving adults and children.

### **Experimental Studies of Social Exclusion**

Baumeister and coworkers (2005) found that participants manipulated to feel socially excluded showed impairments in attention regulation, being less able than others to maintain concentration on a frustrating task; they were also less resistant to temptations. In three other studies, Baumeister and associates (2002) experimentally induced social exclusion, thereby engendering reduced cognitive capacity as measured by performance on intelligence tests, recall tests, and assessments of logic and reasoning ability. Of special relevance a study by Nesdale and Lambert (2008) examining the effect of peer rejection on risk-taking behavior in children aged eight and 10. These investigators found that children who were excluded by peers in a group task, compared to those who were accepted, were willing to take greater risks when playing a game similar to casino gambling following exclusion than before. This effect was more pronounced among eight than 10 year olds. Though this latter study did not directly address self-regulation, it illustrates that experimentally induced exclusion among children resembles effects detected in adults, and that younger children may be especially vulnerable to social exclusion's adverse effects.

The adverse effect of social exclusion on self-regulation just documented is thought to be the result of 1) the person ruminating over his or her social problems (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007); 2) recurring thoughts about how to compensate for poor relations (Williams, 2002); and/or 3) the allocation of cognitive capacity to suppress negative emotions (Gross, 2002). With regard to the latter, less capacity to regulate one's behavior is thought to occur when one is occupied with one's social defeats, the suppression of negative emotions, or the search and deployment of strategies to re-establish social inclusion (Baumeister, Bratslavsky, Muraven, & Tice, 1998).

Despite being causally compelling, given the experimental design of the abovementioned studies, the current body of research on the need-to-belong theory lacks generalizability to real life contexts beyond the laboratory. Also unknown is the duration of the effects detected in experimental work. When children become the focus of attention, this raises the question as to whether experiences of peer rejection, victimization, and other sorts of social exclusion have long-term adverse consequences for dispositional self-regulation.

### **Observational Studies of Social Exclusion in Childhood**

Observational research on peer rejection chronicles predictive linkages with undercontrolled behavior (Pope, Bierman, & Mumma, 1991). Perren, Ettekal, and Ladd (2013) followed children from fifth to seventh grade, finding that peer victimization predicted *increases* in externalizing problems over time. Similarly, Arseneault et al. (2006) observed that parent-reported episodes of victimization at the age of five years predicted increases in adjustment problems by age seven, especially in terms of school satisfaction. Moreover, Arseneault and associates' (2010) recent review of research on victimization<sup>1</sup> concluded that negative peer interactions in childhood may have long-term adverse impact on psychological functioning, including on social participation (Hodges & Perry, 1999) and self-regard and assertiveness (Egan & Perry, 1998).

Even if empirical evidence directly and indirectly indicates that social exclusion causally—or just correlationally—undermines self-regulation, there are reasons to wonder whether the process is reciprocal, with poor self-regulatory skills promoting social exclusion. In a longitudinal study of behavior problems and peer victimization among preadolescents, Schwartz, McFadyen-Ketchum, Dodge, Pettit, and Bates (1999) found that early behavior problems (five to six years) predicted peer nominations of victimization 3 years later. Relatedly, Reijntjes et al. (2011) concluded that externalizing problems may function as both antecedents and consequences of peer victimization in their extensive review of research examining the longitudinal interplay of victimization and externalizing problems. Their suggestion of a reciprocal relationship constitutes the conceptual backdrop for the present research because self-regulation typically is acknowledged as underlying externalizing problems (e.g., Kochanska & Knaack, 2004). Nevertheless, there remains limited evidence of reciprocal links between social exclusion and self-regulatory processes.

### **The Present Study**

Using a two-wave longitudinal design, including a large community sample of young children, we tested the need-to-belong theory (Baumeister et al., 2005; Baumeister & Leary, 1995) by focusing on the development of dispositional self-regulation. Specifically, we investigated whether social exclusion in the preschool setting, as reported by teachers, had a negative long-term impact on the children's self-regulatory capabilities as observed by parents following the transition to school. Given the *need-to-belong* theoretical foundations of the current work, these capabilities were operationalized broadly and included measures of both inhibitory and executive facets of self-regulation. Furthermore, based on previous work indicating that poor self-regulation may cause social exclusion (Reijntjes et al., 2011; Schwartz et al., 1999), we also tested whether there existed a reciprocal relationship between social exclusion and the development of self-regulation. Finally, based on findings that

indicate that girls possess more self-regulation resources than boys in early childhood (Jones et al., 2003; Kochanska et al., 2001), we tested whether boys are more vulnerable to the hypothesized adverse effect of social exclusion on the development of self-regulation.

## Methods

### Participants

The Trondheim Early Secure Study (Solheim, Wichstrøm, Belsky, & Berg-Nielsen; Wichstrøm et al., 2012) comprises participants from two birth cohorts (born 2003 or 2004) of children with their parents, living in the city of Trondheim, Norway. Of the 1,250 children invited to participate in the first wave of the study, 936 were included in the total sample (74.9%). Drop-out rate did not vary by behavioral functioning (as measured using the Strengths and Difficulty Questionnaire; Goodman, 1997),  $\chi^2 = 5.70$ ,  $df = 3$ ,  $p = .13$ , or gender,  $\chi^2 = 0.23$ ,  $df = 1$ ,  $p = .63$ . A total of 762 children (50.5% boys) participated in follow-up assessments 2 years later (T2), which accords to a participation rate of 81.4%. Response rates among teachers were 90.6% at T1 and 92.2% at T2.

### Procedure

Parents and children were invited to participate in the study when attending obligatory health checkup for four-year olds at their local well-child clinic. The health nurse at the clinic informed parents that the study was longitudinal and focused on mental health among children. Written consent was obtained according to procedures approved by the Regional Committee for Medical and Health Research Ethics. Parents and children were invited to the University for further testing, usually within two weeks. Parental data were collected by means of interviews and questionnaires. Interviews were conducted by trained interviewers with relevant formal education. Teacher-data were collected by means of questionnaires sent to day-care centers at T1 and to primary schools at T2 (together with information about the study), requesting that the teacher who knew the child best filled out the forms. Teachers

could rate children at T2 independently of the child's participation in the second wave, but were of course excluded from the longitudinal analyses. Preschool teachers had known the child for an average of 13 months, whereas school teachers had known the child for an average of six months.

### Measures

**Social exclusion.** The Teacher-report Form (TRF) from the Achenbach System of Empirically Based Assessment (Achenbach & Rescorla, 2000) was used to assess social exclusion as defined by Baumeister and Leary (1995). Toward this end, the authors sampled items that were in accordance with the need-oriented definition and explored them by means of factor analysis and reliability analyses. Three items were picked according to criteria of theoretical validity and statistical reliability: "Not liked by other children/pupils," "Doesn't get along with other children/pupils," and "Gets teased a lot." Teachers rated each item for each child using a 3-point scale ranging from 0 (*not true*), through 1 (*somewhat or sometimes true*), to 2 (*very true or often true*). A one-factor solution using the maximum likelihood estimator explained 65.37 % of the variance at T1, with all factor loadings above .56. The same one-factor solution explained 61.66 % of the variance at T2, with all loadings above .44. Cronbach's alphas for the construct were .73 on T1 and .68 on T2. The scale correlated moderately high ( $r = .58, p < .001$ ) with the Revised Olweus Victimization Scale (Kyriakides, Kaloyirou, & Lindsay, 2006) at T2, which is a self-report measure. This significant overlap supported the validity of the social exclusion measure.

**Self-regulation.** In line with the propositions incorporated in the need-to-belong theory (Baumeister et al., 2005; Baumeister & Leary, 1995), self-regulation was operationalized broadly, including measures of symptoms of pathological deficiencies in regulation from the Preschool Age Psychiatric Assessment (PAPA; Egger et al., 2006), as well as measures of temperamental regulation capacities included in the Children's Behavior

Questionnaire (CBQ; Rothbart et al., 2003). The PAPA is a semi-structured diagnostic interview developed to assess *DSM-IV* diagnoses in children ages two to six. The preschool version of the interview applies a semi-structured protocol with parents as informants. Questions developed to clinically assess symptoms of ADHD were used to measure self-regulation. Mean values were computed for frequencies of symptoms of *inattentiveness*, *hyperactivity*, and *impulsivity* (9, 6, and 3, respectively). Also, the facets Inhibitory Control (IC) and Attentional Focusing (AF) from the CBQ were used to measure regulation. Sample items are “Can lower his/her voice when asked to do so” (IC), and “When picking up toys or other jobs, usually keeps at the task until it’s done” (AF). Cronbach’s alphas for the facets were: IC = .72, AF = .69 at T1, and IC = .79, AF = .75 at T2. The CBQ variables were reversed before entering the structural equation analyses in order to concur with the direction of the PAPA-scores (see Results).

### **Statistics**

The hypotheses were tested by means of auto-regressive cross-lagged analyses, applying structural equation modeling (SEM) using Mplus (Muthén & Muthén, 2007). When performing cross-lagged analyses, every outcome variable is regressed on its auto-regressor and cross-lagged on other variables from previous measurements. This strategy is broadly accepted in the analysis of reciprocal effects and has several advantages compared to other research designs (Burkholder & Harlow, 2003; Farrell, 1994).

The full information maximum likelihood estimation was used to handle missing values. All models were tested using maximum likelihood estimation with robust standard errors. For nested model comparisons, we used the corrected chi-square difference test (Satorra & Bentler, 2001). Judgment of model fit were based on criteria suggested by Hu and Bentler (1999; see also Marsh, Hau, & Wen, 2004). In their guidelines, values of the comparative fit index (CFI) and the Tucker-Lewis Index (TLI) close to .95, and values of the

root mean squared error of approximation (RMSEA) and the standardized root mean squared residual (SRMR) less than .06 and .08, respectively, are regarded as reasonable fit of a model.

The proposed model was tested using a two-step modeling approach (Kline, 2005). The latent constructs in the present model included social exclusion and self-regulation at T1 and T2 (inattentiveness, hyperactivity, impulsivity, inhibitory control, attentional focusing). The latent constructs were allowed to correlate at each measure point. The full structural model was built including every possible causal path corresponding to when measurements were conducted.

### Results

First, Pearson correlations were computed to analyze bivariate associations between study variables. Table 1 displays means, standard deviations, and zero-order correlations. Most notably, greater social exclusion at T1 predicted greater social exclusion at T2, but only moderately. Furthermore, greater social exclusion at T1 and T2 were related cross-sectionally, as well as from T1 to T2, with greater social exclusion related to greater inattentiveness, hyperactivity, and impulsivity and less inhibitory control and attentional focusing.

Second, model fit indices of the measurement model showed that the latent model had acceptable fit with the data:  $\chi^2 = 215.47$ ,  $df = 95$ ,  $p < .001$ , CFI = .93, TLI = .92, RMSEA = .036, SRMR = .04. This indicated that the ad-hoc measurement of social exclusion and the multifaceted operationalization of self-regulation used in the present study yielded substantial statistical coherence (Hoyle, 2000).

Third, the full model, including the hypothesized paths, had acceptable model fit indices:  $\chi^2 = 214.09$ ,  $p < .001$ ,  $df = 95$ , CFI = .95, TLI = .94, RMSEA = .035, SRMR = .04. Inspection of Figure 1 indicates that higher levels of social exclusion and lower levels of self-regulation co-occurred, at both T1 and T2. Additionally, both social exclusion and self-

regulation were significantly stable across the transition to school. Most importantly, greater social exclusion at T2 predicted *decreased* self-regulation at T2, given that this prediction emerged after taking into account the initial level of self-regulation. Additionally, poorer self-regulation at T1 predicted *increased* social exclusion at T2. When the model depicted in Figure 1 was run separately for boys and girls, results showed that the effect of social exclusion on self-regulation was more pronounced among boys ( $\beta = -.18, p = .018$ ), but not to such extent that the difference proved statistically significant,  $\Delta \chi^2(1) = 0.12, p = .81$ . Likewise, the effect of self-regulation on social exclusion was not significantly different for boys and girls,  $\Delta \chi^2(1) = 0.54, p = .60$ .

Finally, the model was constrained in order to conduct a more direct test of the reciprocal effects. To begin with, the path from social exclusion at T1 towards self-regulation at T2 was fixed to zero. This constriction led to a significantly poorer model fit,  $\Delta \chi^2(1) = 8.01, p = .005$ . Then, the path from self-regulation at T1 towards social exclusion at T2 was fixed to zero. This constriction also led to significant poorer fit of the model,  $\Delta \chi^2(1) = 12.79, p < .001$ . Because both unidirectional models had a significant worse fit to the data than the reciprocal model, results chronicle a reciprocal relationship between social exclusion and self-regulation across the transition to school, a period when most children are dramatically changing their peer groups.

### Discussion

Here we evaluated the propositions that social exclusion would impair the development of dispositional self-regulation (Baumeister et al., 2005; Baumeister & Leary, 1995) and, reciprocally, that poor self-regulation would promote social exclusion (Reijntjes et al., 2011; Schwartz et al., 1999). Gender differences were also investigated.

The two core hypotheses involved in the reciprocal-effects prediction received empirical support. First and foremost, social exclusion predicted impaired development of

dispositional self-regulation from age four to age six, indicating that children socially excluded in preschool exhibit poorer development of self-regulation capacities compared to non-excluded children. No gender differences were found. This result accords well with the need-to-belong theory (Baumeister et al., 2005; Baumeister & Leary, 1995), stipulating that social exclusion leads to decreased ability to regulate one's behavior. Moreover, our research extends results of experimental studies of adults by showing that a similar process occurs in young children across a 2-year period associated with substantial changes in children's social world, and this counts for both girls and boys.

Second, it was also the case, as hypothesized, that poor self-regulation in preschool predicted increased social exclusion 2 years later. Thus, preschool children who exhibited poor self-regulation were at increased risk of experiencing social exclusion in school compared to peers with better self-regulation. This finding is consistent with the results of Reijntjes et al.'s (2011) recent meta-analysis of victimization and externalizing behavior showing that such problem behavior can cause and result from peer victimization.

A third finding involved the stability of social exclusion, which proved to be fairly high from age four to age six—even though the children encountered new peers as they moved from preschool to primary school. Quite conceivably, the transition to primary school offers previously excluded children the possibility of forming new and more supportive peer relations. Not only, metaphorically, is the deck of (peer) cards reshuffled when children enter school, but the number of children in each class and at each school is typically greater than it was in preschool, offering children a wider network of potential friends, allies and non-victimizing peers. However, the stability of social exclusion across the transition to school makes it clear that, to some extent at least, children construct their own social world rather than being passive recipients of it. Indeed, one might conclude that social exclusion for some children is “inherited” across social settings.

## Implications

There are several implications of the present study. Foremost, results provide support for the need-to-belong theory (Baumeister & Leary, 1995). The findings are compatible with the core idea of the theory, namely that social exclusion is detrimental to self-regulation. Additionally, the present study extends support for the theory in at least three ways, by providing evidence that, 1) social exclusion may influence self-regulation among *children* 2) in *real world contexts*, and that 3) the effect of social exclusion is evident across a substantial and ecologically important period of time in young children's lives. In other words, the results comply with the view that children's regulating capabilities are formed by social experiences in their peer settings. This highlights the importance of creating inclusive and nurturing social environments as well as involving effective interventions targeting social exclusion, also in the preschool and early school years (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Wilson & Lipsey, 2007).

The present findings are also relevant to understanding the development of self-regulation as a temperamental characteristic (Posner & Rothbart, 2000; Rothbart, Ahadi, & Evans, 2000). In recent years, Kochanska and her research team (Kochanska & Knaack, 2004; Kochanska, Murray, & Harlan, 2000) have extensively investigated the development of self-regulation, such as effortful control, defined as "the ability to suppress a dominant response to perform a subdominant response" (Kochanska, Coy, & Murray, 2001), from toddlerhood through the preschool age. In general, effortful control emerges between six and 12 months of age, but from approximately age four onward, effortful control is regarded as highly stable at the level of individual differences (Kochanska et al., 2000). Although our study represents a broader approach to regulatory capacities, the present results confirm that general regulatory capacities among children—relative to their peers—are quite stable from age four to age six, but still remain subject to environmental influence. Accordingly, the

present study accentuates the limitations of a narrowly trait-based model of self-regulation (Rothbart et al., 2003) and invites instead a more dynamic, interactive, and reciprocal view in which self-regulative dispositions might both influence and be influenced by social experiences.

Results reported herein are also in accord with previous work on peer victimization and behavioral problems (Reijntjes et al., 2011; Schwartz et al., 1999). We have extended this work by focusing on self-regulation. Because self-regulation is foundational to a range of psychological concepts and behavioral expressions, such as learning in school settings (Schunk & Zimmerman, 1994), social skills (Eisenberg et al., 1993), and aggression (DeWall, Baumeister, Stillman, & Gailliot, 2007), the present findings may be relevant to a range of developmental issues.

The results also spur new questions related to the putative mechanisms involved when it comes to the behavioral sequel of social exclusion. Some mediating factors, such as rumination and emotion suppression, may be an important part of the influence process, as noted in the introduction. Moreover, such mediating factors are likely to vary between individuals, which illustrates that the effect of social exclusion on self-regulation is not a straightforward one. There also exists some uncertainty regarding whether such complex underlying mechanisms are pertinent among children. To date, however, such factors have been sparsely investigated.

### **Limitations**

The present study has some limitations. First, results might have been stronger if dedicated measures of the social exclusion and self-regulation constructs were used. There are several approaches to the measurement of children's social functioning, such as the peer nomination method (Crick, Casas, & Mosher, 1997; Perren & Alsaker, 2006), which implies that researchers interview children and/or teachers in order to identify socially excluded and

rejected children. However, we believe that social exclusion is best understood as a continuum and not dichotomous, in the sense that a child *is* or *is not* excluded. Also, our broad operationalization of self-regulation may be criticized for being over-inclusive, but at the same time, the construct was statistically coherent and relates to self-regulation as defined in the need-to-belong theory. Second, we only measured social exclusion in preschool and at school. Many children no doubt have social experiences with peers beyond the confines of these settings. These may also influence children's sense of belonging and thus merit attention in future work. Third, although the present study was based on a large community sample, the findings may or may not prove generalizable beyond the Norwegian context.

In sum, the present study may be the first to explicitly test the need-to-belong theory in three ways: 1) on children, 2) in real world contexts, and 3) longitudinally. The findings provided support for the hypothesis that social exclusion leads to impaired self-regulation. Additionally, the present study shows that social exclusion and self-regulation exists in a reciprocal relationship.

The present study highlights the importance of promoting environments in schools and preschools that encourage peer acceptance, friendliness, and pro-sociality (Olweus, 1994; 2006). Some children may be especially vulnerable to being socially marginalized (Belsky & Pluess, 2009), and our study indicates that the impact may be long-lasting and wide-ranging.

## References

- Achenbach, T. M., & Rescorla, L. A. (2000). *ASEBA preschool forms & profiles: An integrated system of multi-informant assessment*. Burlington, VT: Achenbach System of Empirically Based Assessment.
- Arseneault, L., Bowes, L., & Shakoor, S. (2010). Bullying victimization in youths and mental health problems: 'Much ado about nothing'. *Psychological Medicine, 40*(5), 717-729  
doi:10.1017/S0033291709991383
- Arseneault, L., Walsh, E., Trzesniewski, K., Newcombe, R., Caspi, A., & Moffitt, T. E. (2006). Bullying victimization uniquely contributes to adjustment problems in young children: A nationally representative cohort study. *Pediatrics, 118*, 130-138.  
doi:10.1542/peds.2005-2388
- Asher, S. R., & Coie, J. D. (1990). *Peer rejection in childhood (Cambridge studies in social and emotional development)*. Cambridge, United Kingdom: Cambridge University Press.
- Barkley, R. A. (1997). Behavioral inhibition, sustained attention, and executive functions: constructing a unifying theory of ADHD. *Psychological Bulletin, 121*, 65-94.  
doi:10.1037/0033-2909.121.1.65
- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*, 1252-1265. doi:10.1037/0022-3514.74.5.1252
- Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Twenge, J. M. (2005). Social exclusion impairs self-regulation. *Journal of Personality and Social Psychology, 88*, 589-604.  
doi:10.1037/0022-3514.88.4.589
- Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*: Academic Press.

- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*, 497-529. doi:10.1037/0033-2909.117.3.497
- Baumeister, R. F., Twenge, J. M., & Nuss, C. K. (2002). Effects of social exclusion on cognitive processes: Anticipated aloneness reduces intelligent thought. *Journal of Personality and Social Psychology*, *83*, 817-827. doi:10.1037/0022-3514.83.4.817
- Belsky, J., & Beaver, K. M. (2011). Cumulative-genetic plasticity, parenting and adolescent self-regulation. *Journal of Child Psychology and Psychiatry*, *52*, 619-626. doi:10.1111/j.1469-7610.2010.02327.x
- Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin*, *135*, 885-908. doi:10.1037/a0017376
- Burkholder, G. J., & Harlow, L. L. (2003). An illustration of a longitudinal cross-lagged design for larger structural equation models. *Structural Equation Modeling*, *10*, 465-486. doi:10.1207/S15328007SEM1003\_8
- Carver, C. S., & Scheier, M. (1981). *Attention and self-regulation: A control-theory approach to human behavior*. New York, NY: Springer-Verlag.
- Crick, N. R., Casas, J. F., & Mosher, M. (1997). Relational and overt aggression in preschool. *Developmental Psychology*, *33*, 579-587. doi:10.1037/0012-1649.33.4.579
- Crick, N. R., Casas, J. F., & Nelson, D. A. (2002). Toward a more comprehensive understanding of peer maltreatment: Studies of relational victimization. *Current Directions in Psychological Science*, *11*, 98-101. doi:10.1111/1467-8721.00177
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227-268. doi:10.1207/S15327965PLI1104\_01

- DeWall, C. N., Baumeister, R. F., Stillman, T. F., & Gailliot, M. T. (2007). Violence restrained: Effects of self-regulation and its depletion on aggression. *Journal of Experimental Social Psychology, 43*, 62-76. doi:10.1016/j.jesp.2005.12.005
- DeWall, C. N., Deckman, T., Pond, R. S., & Bonser, I. (2011). Belongingness as a core personality trait: How social exclusion influences social functioning and personality expression. *Journal of Personality, 79*, 1281-1314. doi:10.1111/j.1467-6494.2010.00695.x
- Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82*, 405-432. doi:10.1111/j.1467-8624.2010.01564.x
- Egan, S. K., & Perry, D. G. (1998). Does low self-regard invite victimization? *Developmental Psychology, 34*(2), 299-309. doi: 10.1037/0012-1649.34.2.299.
- Egger, H. L., Erkanli, A., Keeler, G., Potts, E., Walter, B. K., & Angold, A. (2006). Test-retest reliability of the preschool age psychiatric assessment (PAPA). *Journal of American Academy of Child and Adolescent Psychiatry, 45*(5), 538-549. doi: 10.1097/01.chi.0000205705.71194.b8.
- Eisenberg, N., Fabes, R. A., Bernzweig, J., Karbon, M., Poulin, R., & Hanish, L. (1993). The relations of emotionality and regulation to preschoolers' social skills and sociometric status. *Child Development, 64*, 1418-1438. doi:10.1111/j.1467-8624.1993.tb02961.x
- Eisenberg, N., Spinrad, T. L., & Eggum, N. D. (2010). Emotion-related self-regulation and its relation to children's maladjustment. *Annual Review of Clinical Psychology, 6*, 495-525. doi:10.1146/annurev.clinpsy.121208.131208

- Farrell, A. D. (1994). Structural equation modeling with longitudinal data: strategies for examining group differences and reciprocal relationships. *Journal of Consulting and Clinical Psychology, 62*, 477-487. doi:10.1037/0022-006X.62.3.477
- Geng, F., Hu, Y., Wang, Y., & Chen, F. (2011). Two types of behavioral inhibition: Relations to effortful control and attention in school children. *Journal of Research in Personality, 45*(6), 662-669. doi:10.1016/j.jrp.2011.09.005.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38*, 581-586. doi:10.1111/j.1469-7610.1997.tb01545.x
- Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology, 39*, 281-291. doi:10.1017/S0048577201393198
- Hodges, E. V. E., & Perry, D. G. (1999). Personal and interpersonal antecedents and consequences of victimization by peers. *Journal of Personality and Social Psychology, 76*(4), 677-685. doi: 10.1037/0022-3514.76.4.677.
- Hoyle, R. H. (2000). Confirmatory factor analysis. In H. A. E. Tinsley & S. Brown (Eds.), *Handbook of applied multivariate statistics and mathematical modeling* (pp. 465-497). New York, NY: Academic Press.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*, 1-55. doi:10.1080/10705519909540118
- Jones, L. B., Rothbart, M. K., & Posner, M. I. (2003). Development of executive attention in preschool children. *Developmental Science, 6*(5), 498-504. doi: 10.1111/1467-7687.00307.
- Kline, R. B. (2010). Principles and practice of structural equation modeling: Guilford press.

- Kochanska, G., Coy, K. C., & Murray, K. T. (2001). The development of self-regulation in the first four years of life. *Child Development, 72*, 1091-1111. doi:10.1111/1467-8624.00336
- Kochanska, G., & Knaack, A. (2004). Effortful control as a personality characteristic of young children: Antecedents, correlates, and consequences. *Journal of Personality, 71*, 1087-1112. doi:10.1111/1467-6494.7106008
- Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. *Developmental Psychology, 36*, 220-232. doi:10.1037//0012-1649.36.2.220
- Kochanska, G., Philibert, R. A., & Barry, R. A. (2009). Interplay of genes and early mother-child relationship in the development of self-regulation from toddler to preschool age. *Journal of Child Psychology and Psychiatry, 50*, 1331-1338. doi:10.1111/j.1469-7610.2008.02050.x
- Kyriakides, L., Kaloyirou, C., & Lindsay, G. (2006). An analysis of the Revised Olweus Bully/Victim Questionnaire using the Rasch measurement model. *British Journal of Educational Psychology, 76*(4), 781-801. doi: 10.1348/000709905X53499.
- Lavigne, G. L., Vallerand, R. J., & Crevier-Braud, L. (2011). The fundamental need to belong on the distinction between growth and deficit-reduction orientations. *Personality and Social Psychology Bulletin, 37*, 1185-1201. doi:10.1177/0146167211405995
- Leary, M. R. (Ed.). (2001). *Interpersonal rejection*. New York, NY: Oxford University Press.
- Liew, J. (2012). Effortful control, executive functions, and education: Bringing self-regulatory and social-emotional competencies to the table. *Child Development Perspectives, 6*, 105-111. doi:10.1111/j.1750-8606.2011.00196.x

- Marsh, H. W., Hau, K.-T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling, 11*(3), 320-341. doi: 10.1207/s15328007sem1103\_2.
- Muthén, L. K., & Muthén, B. (2007). *Mplus: User's guide* (Version 5). Los Angeles, CA: Muthén & Muthén.
- Nesdale, D., & Lambert, A. (2008). Effects of experimentally induced peer-group rejection on children's risk-taking behaviour. *European Journal of Developmental Psychology, 5*, 19-38. doi:10.1080/17405620600717581
- Olweus, D. (1994). Bullying at school: Basic facts and effects of a school based intervention program. *Journal of Child Psychology and Psychiatry, 35*, 1171-1190. doi:10.1111/j.1469-7610.1994.tb01229.x
- Olweus, D. (2006). Bullying at school: knowledge base and an effective intervention programa. *Annals of the New York Academy of Sciences, 794*, 265-276. doi:10.1111/j.1749-6632.1996.tb32527.x
- Perren, S., & Alsaker, F. D. (2006). Social behavior and peer relationships of victims, bully-victims, and bullies in kindergarten. *Journal of Child Psychology and Psychiatry, 47*, 45-57. doi:10.1111/j.1469-7610.2005.01445.x
- Perren, S., Ettekal, I., & Ladd, G. (2013). The impact of peer victimization on later maladjustment: Mediating and moderating effects of hostile and self-blaming attributions. *Journal of Child Psychology and Psychiatry, 54*, 46-55. doi:10.1111/j.1469-7610.2012.02618.x
- Pope, A. W., Bierman, K. L., & Mumma, G. H. (1991). Aggression, hyperactivity, and inattention-immaturity: Behavior dimensions associated with peer rejection in

- elementary school boys. *Developmental Psychology*, 27, 663-671. doi:10.1037//0012-1649.27.4.663
- Posner, M. I., & Rothbart, M. K. (2000). Developing mechanisms of self-regulation. *Development and Psychopathology*, 12, 427-441. doi:10.1017/S0954579400003096
- Raffaelli, M., Crockett, L. J., & Shen, Y.-L. (2005). Developmental stability and change in self-regulation from childhood to adolescence. *Journal of Genetic Psychology*, 166, 54-76. doi:10.3200/GNTP.166.1.54-76
- Reijntjes, A., Kamphuis, J. H., Prinzie, P., Boelen, P. A., van der Schoot, M., & Telch, M. J. (2011). Prospective linkages between peer victimization and externalizing problems in children: A meta-analysis. *Aggressive Behavior*, 37, 215-222. doi:10.1002/ab.20374
- Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000). Temperament and personality: Origins and outcomes. *Journal of Personality and Social Psychology*, 78, 122-135. doi:10.1037//0022-3514.78.1.122
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2003). Investigations of temperament at three to seven years: The Children's Behavior Questionnaire. *Child Development*, 72, 1394-1408. doi:10.1111/1467-8624.00355
- Rueda, M. R., Posner, M. I., & Rothbart, M. K. (2005). The development of executive attention: Contributions to the emergence of self-regulation. *Developmental Neuropsychology*, 28, 573-594. doi:10.1207/s15326942dn2802\_2
- Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, 66, 507-514. doi:10.1007/BF02296192
- Schunk, D. H., & Zimmerman, B. J. (1994). *Self-regulation of learning and performance: Issues and educational applications*. Mahwah, NJ: Erlbaum.

Schwartz, D., McFadyen-Ketchum, S., Dodge, K. A., Pettit, G. S., & Bates, J. E. (1999).

Early behavior problems as a predictor of later peer group victimization: Moderators and mediators in the pathways of social risk. *Journal of Abnormal Child Psychology*, 27, 191-201. doi:10.1023/A:1021948206165

Smart Richman, L., & Leary, M. R. (2009). Reactions to discrimination, stigmatization, ostracism, and other forms of interpersonal rejection: A multimotive model.

*Psychological Review*, 116, 365-383. doi:10.1037/a0015250

Solheim, E., Wichstrøm, L., Belsky, J., & Berg-Nielsen, T. S. (2013). Do time in child care and peer group exposure predict poor socioemotional adjustment in Norway? *Child Development*, 84, 1701-1715. doi:10.1111/cdev.12071

*Development*, 84, 1701-1715. doi:10.1111/cdev.12071

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, 72, 271-324. doi:10.1111/j.0022-3506.2004.00263.x

*Personality*, 72, 271-324. doi:10.1111/j.0022-3506.2004.00263.x

Twenge, J. M., Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Bartels, J. M. (2007).

Social exclusion decreases prosocial behavior. *Journal of Personality and Social Psychology*, 92, 56-66. doi:10.1037/0022-3514.92.1.56

*Psychology*, 92, 56-66. doi:10.1037/0022-3514.92.1.56

Wichstrøm, L., Berg-Nielsen, T. S., Angold, A., Egger, H. L., Solheim, E., & Sveen, T. H.

(2012). Prevalence of psychiatric disorders in preschoolers. *Journal of Child Psychology and Psychiatry*, 53, 695-705. doi:10.1111/j.1469-7610.2011.02514.x

*Psychology and Psychiatry*, 53, 695-705. doi:10.1111/j.1469-7610.2011.02514.x

Williams, K. D. (2002). *Ostracism: The power of silence*. New York, NY: Guilford.

Wilson, S. J. & Lipsey, M. W. (2007). School-based interventions for aggressive and

disruptive behavior: Update of a meta-analysis. *American Journal of Preventive Medicine*, 33, 130-143. doi:10.1016/j.amepre.2007.04.011

*Medicine*, 33, 130-143. doi:10.1016/j.amepre.2007.04.011

## Footnote

<sup>1</sup> The abovementioned publications do not differentiate between relational and aggressive forms of victimization (Crick et al., 2002). Nevertheless, these two forms of victimizations are typically highly or moderately highly correlated among young children (Crick, Ostrov, & Werner, 2006), which indicates that these general findings are applicable to social exclusion as defined herein.

Table 1

*Means, Standard Deviations, and Zero-Order Correlations Between Study Variables*

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11
1. Social exclusion, T1	1.08	0.24											
2. Social exclusion, T2	1.10	0.23	.30**										
3. Inattentiveness, T1	0.58	1.16	.18**	.17**									
4. Inattentiveness, T2	0.80	1.50	.20**	.25**	.44**								
5. Hyperactivity, T1	0.43	1.14	.16**	.11**	.56**	.24**							
6. Hyperactivity, T2	0.44	1.07	.19**	.19**	.35**	.50**	.33**						
7. Impulsivity, T1	0.48	0.71	.13**	.14**	.34**	.15**	.39**	.19**					
8. Impulsivity, T2	0.41	0.71	.15**	.18**	.28**	.44**	.23**	.40**	.27**				
9. Inhibitory control, T1	4.99	0.67	-.20**	-.22**	-.35**	-.35**	-.33**	-.33**	-.28**	-.33**			
10. Inhibitory control, T2	5.13	0.70	-.15**	-.25**	-.25**	-.38**	-.16**	-.27**	-.18*	-.26**	.48**		
11. Attentional focusing, T1	4.67	0.77	-.11**	-.15**	-.41**	-.31**	-.31**	-.25**	-.18**	-.21**	.45**	.31**	
12. Attentional focusing, T2	4.97	0.82	-.11**	-.19**	-.35**	-.46**	-.23**	-.37**	-.15**	-.26**	.37**	.43**	.52**

\* $p < .05$ . \*\* $p < .01$ .

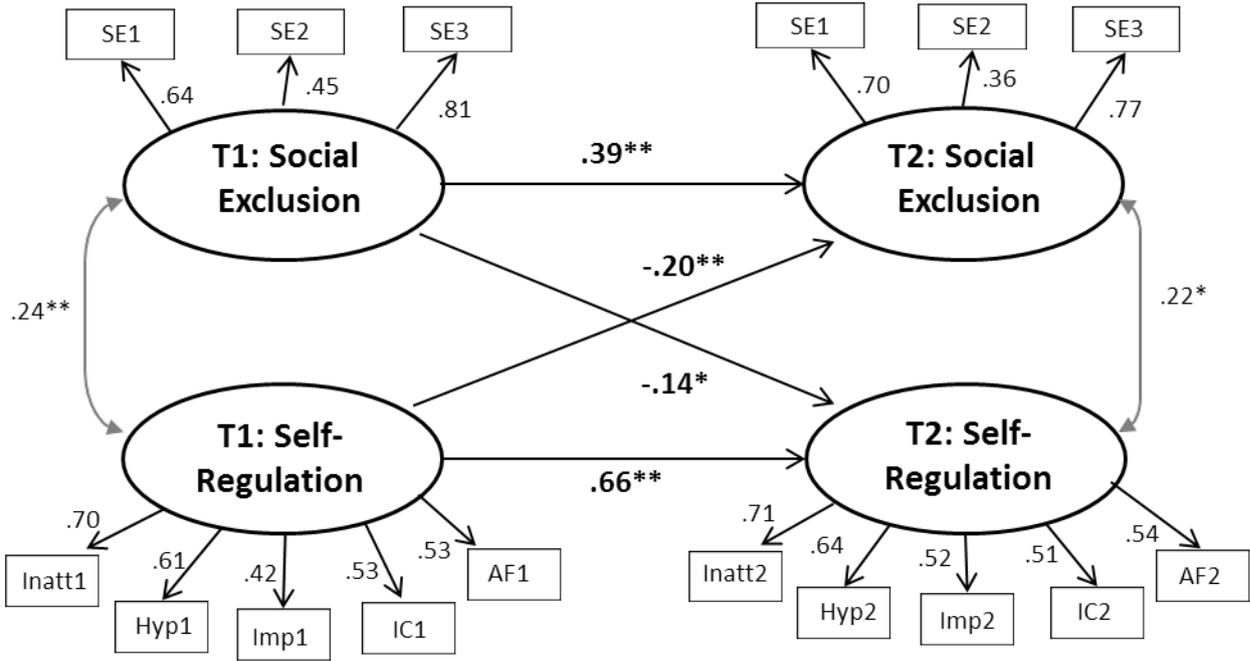


Figure 1. Structural equation model for the reciprocal relationship between social exclusion and self-regulation. \* $p < .05$ , \*\* $p < .01$ .