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Can Developmental Changes in Inhibition and Peer Relations Explain

Why Depressive Symptoms Increase in Early Adolescence?

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**Can Developmental Changes in Inhibition and Peer Relations
Explain Why Depressive Symptoms Increase in Early
Adolescence?**

by

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Can Developmental Changes in Inhibition and Peer Relations Explain Why Depressive Symptoms Increase in Early Adolescence?

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The University of Texas at Austin, 2010

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Early adolescence is a period marked by increases in internalizing problems, particularly depression. In childhood, the rates of depressive symptomatology are between .6% and 1.7%, but by adolescence, rates rise to 8.0%. Two key correlates of adolescent depression are behavioral inhibition and poor peer relations. Yet, it is unclear whether these factors simply co-occur with depressive symptoms or are instrumental across development in regulating them. In this study, using data from the NICHD Study of Early Child Care, we examine whether increases in inhibition in late childhood may undermine peer relationships in predicting increases in adolescent depressive symptoms. Specifically, we test whether inhibition promotes depressive symptoms by undermining two aspects of peer relationships – popularity and friendship quality. Findings revealed that increases in inhibition from childhood to adolescence lead to increases in adolescent depressive symptoms. Decreases in popularity mediated the relation of inhibition, friendship quality and increases in adolescent depressive symptoms.

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Chapter 1

Introduction

Early adolescence is a period marked by increases in internalizing problems, particularly depression (Moffit, 1993; Roberts, Andrews, Lewinsohn, & Hops, 1990). In childhood, the rates of depressive symptomatology are between 0.6% and 1.7%, but by adolescence rates rise to 8.0% (Cicchetti & Toth, 1998). Depression is the most common psychiatric problem during adolescence and is associated with suicide, academic failure, relationship disturbances, and substance use (e.g., Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993). Behavioral inhibition is one of the primary components of adolescent depression (Muris, Merckelbach, Schmidt, Gadet, Bogie, 2001; Turner, Beidel, & Wolff, 1996; Kasch, Rottenberg, Arnow, & Gotlib, 2002; Depue & Collins, 1999; Gladstone & Parker, 2006; Johnson, Turner, & Iwata, 2003; Muris, Meesters, & Spinder, 2003).

Adolescents who are behaviorally inhibited experience socio-emotional problems that undermine their peer relationships (Coplan, Wilson, Frohlick, & Zelenski, 2006). Given the increasing importance of peer relationships during adolescence (Jacobs & Johnston, 2005), socio-emotional problems caused by inhibition may be a principal reason why adolescents develop increases in depressive symptomatology. In this study, we examine whether increases in behavioral inhibition in late childhood (i.e., 12 years old in this study) may undermine peer relationships in predicting increases in adolescent depressive symptoms (i.e., age 15 in this study). Specifically, we will test how inhibition can promote depressive symptoms by undermining two aspects of peer relationships – popularity and friendship quality.

Depression and its Consequences

Some reasons why depression increases during the transition to adolescence are pubertal hormonal changes (Ge, Conger, & Elder, 2001a, 2001b), increased capacity to think abstractly, self-reflect, ruminate (Nolen-Hoeksema, 1994), and changes in relationships with parents and peers (Hankin, Mermelstein, & Roesch, 2007). Adolescent depression is linked to both immediate and long term physical and mental health problems in adulthood. For example, women with a history of depression in adolescence show impairments in interpersonal relationships and in overall functioning in early adulthood (Reinherz, Giaconia, Hauf, Wasserman, & Silverman, 1999). Those who have been depressed in mid-adolescence are at increased risk for psychiatric disorders, nicotine and alcohol dependence, and suicidal behavior when they reach their twenties (Fergusson and Woodward, 2002). When compared to nondepressed adolescents, depressed adolescents are more likely to fail in school, less likely to pursue higher education, and more likely to be unemployed.

Clinical depression (i.e., Major Depressive Disorder, Dysthymic disorder) is defined by the American Psychiatric Association based on the presence, duration, and severity of specific symptoms (e.g., feelings of worthlessness, fatigue; Petersen, Compas, Brooks-Gunn, Stemmler, Ey, & Grant, 1993). We examine instead depressive symptomatology during the transition from childhood to adolescence. Depressive symptomatology consists of a group of behaviors and emotions that are characteristic of clinical depression, but without regard to their severity or duration (Petersen et al., 1993). Depressive symptoms include feelings of loneliness, worthlessness, sadness, crying, and

feeling unloved (Achenbach, 1991a, 1991 b). To date, however, research findings reveal comparable processes involved in the onset and increases of depressive symptoms and clinical depression (Hammen, 2009; Hammen, Brennan, Keenan-Miller, & Herr, 2008).

Behavioral Inhibition in Adolescent Depressive Symptoms

Behavioral inhibition refers to a temperament characterized by emotional reactivity and sensitivity to punishment or unfamiliarity (Cloninger, 1987; Davidson, Ekman, Saron, Senulis, & Friesen, 1990; Kagan, 1989; Kagan & Snidman, 1991). It is evident by withdrawal-oriented or avoidant behavior, negative emotional states, and negative verbal and non-verbal expression (Gray, 1972; Kagan, Reznick, Clarke, Snidman, & Garcia-Coll, 1984). There is evidence that adolescents who are behaviorally inhibited are at risk for having depressive symptoms (Muris, Merckelbach, Wessel, & Van de Ven, 1999; Muris et al., 2001; Muris et al., 2003; Gladstone, & Parker, 2006; Caspi, Moffitt, Newman, & Silva, 1996; Reznick, Kagan, Snidman, Gersten, Baak, & Rosenberg 1986; Rubin & Mills, 1991; Kasch et al., 2002). Furthermore, inhibited children are more likely to develop depression as adults (Jaffee, Moffitt, Caspi, Fombonne, Poulton, & Martin, 2002).

Increases in inhibition during early adolescence may be a risk factor for the emergence of depression during this period (Joiner, 2002). Researchers have found a link between behavioral inhibition and depressive symptoms, but most of these studies are not longitudinal (e.g., Muris et al., 1999) or have not been in adolescence (e.g., Gladstone & Parker, 2006; Johnson et al., 2003). Without longitudinal data, one cannot determine whether behavioral inhibition is a developmental precursor and potential cause of

depression, or simply a correlate and consequence (e.g., Coplan et al., 2006; Muris et al., 2001). Thus, to this date, research designs have not permitted examination of factors that can account for increases in depression from childhood to adolescence (e.g., Muris et al., 1999; Coplan et al., 2006).

Some studies with adults have used longitudinal data to examine behavioral inhibition as a predictor of later depressive symptoms (Jaffee et al., 2002; Johnson et al., 2003; Kasch et al., 2002; Caspi et al., 1996). One study with adults found that early neuroticism, closely related to behavioral inhibition, predicts subsequent increases in depressive symptoms (Brown, 2007). Because inhibition was not isolated from overall neuroticism, however, it is impossible to determine whether inhibition specifically independently was responsible for increases in depressive symptoms. Furthermore, a clinical sample was used, so the findings may not reflect factors that regulate depressive symptoms during the transition to adolescence in the general population (Brown, 2007). Only two longitudinal studies examined inhibition and depression in community samples of adolescents (Jaffee et al., 2002; Allen, Insabella, Porter, Smith, Land, & Phillips, 2006). Jaffee et al. (2002), however, did not control for levels of early depression, so developmental increases in depression during adolescence were not examined (Jaffee et al., 2002). The one study that controlled for early depression and predicted increases in depression (Allen et al., 2006) failed to control for later inhibition. As a result, it is unclear whether early inhibition contributed to later depression or whether both are only associated and stable over time. Furthermore, Allen et al.'s (2006) focus was on

withdrawal within one particular peer relationship (i.e., best friendship), rather than behavioral inhibition as a general temperamental trait.

Peer Relationships and Adolescent Depression

A great deal of literature has empirically demonstrated that problems in peer relationships (e.g., low popularity, poor friendship quality) are linked to depressive symptoms in adolescence (Galambos, Leadbeater & Barker, 2004; Harter & Whitesell, 1996; Henrich, Blatt, Kuperminc, Zohar, & Leadbeater, 2001; Nolan Flynn, & Garber, 2003; Prinstein & Aikins, 2004; Lewinsohn, Roberts, Seeley, & Rohde, 1994; Sheeber, Hops, Albert, Davis, & Andrews, 1997; Slavin & Rainer, 1990; Windle, 1992). For example, Oldehinkel and colleagues (2007) demonstrated that being disliked by one's peers predicts depressive symptoms concurrently. Lacking close friendships in middle childhood has also been related to depression in early adolescence (Pedersen, Vitaro, Barker, & Borge, 2007). Lacking friendships or low peer acceptance may be linked to depression because they undermine the adolescent's self-esteem and invoke feelings of loneliness (Asher & Wheeler, 1985; O'Brian & Bierman, 1988). Others have postulated that problems in peer relationships lead to depressive symptoms because they lead to poor coping skills, poor emotional regulation, and negative self-concept (Sontag, Graber, Brooks-Gunn, & Warren, 2008; O'Brien & Bierman, 1988).

Inhibition's influence on peer relationships. During early adolescence, increases in behavioral inhibition may be related to increases in depressive symptoms because of their impact on peer relationships. Several researchers argue that behavioral inhibition may be a risk factor for depression only when it is coupled with difficult peer

relationships (Gladstone & Parker, 2006; Craske, 1997; Ollendick & Hirshfeld-Becker, 2002). There is some evidence to support inhibition's link to problems in peer relationships (e.g., Booth-LaForce & Oxford, 2008). Behavioral inhibition predicts withdrawal from peers and low involvement in group play in five year olds (Reznick et al., 1986; Kochanska & Radke-Yarrow, 1992). Children and adolescents with high behavioral inhibition have socio-emotional difficulties and psychosocial maladjustment (Coplan et al., 2006). While many studies of children find relations between inhibition and poor peer relationships (e.g., Booth-LaForce & Oxford, 2008), much of the research has not been longitudinal (e.g., Coplan et al., 2006). This makes it impossible to determine whether increases in inhibition undermine peer relationships as children make the transition into adolescence. There have been two studies that examined the relation between inhibition and peer relationships in adolescence, but each failed to control for earlier depression and later inhibition. This prevents us from understanding whether increases in adolescent depression are actually due to developmental changes in inhibition and its effect on peer relationships or instead simple to the stability of depression, inhibition, and/or poor peer relationships from late childhood to early adolescence (Pedersen et al., 2007; Coplan et al., 2006).

Because peer relationships are often critical to adolescents' well being, behavioral inhibition may lead to increases in adolescent depressive symptoms because it interferes with the quality of adolescents' peer relationships. Consistent with the diathesis-stress model, some individuals enter adolescence with predispositions that make them vulnerable to negative outcomes (Sontag et al., 2008). Behavioral inhibition represents a

preexisting diathesis and interpersonal problems with peers during a critical transition reflect the stress component of the model. Adolescents spend an increasing amount of time with peers, and as a result, are more likely to experience negative interactions with peers and interpersonal problems with friends (Sontag et al., 2008). Because social stress increases during the transition to adolescence (Sontag et al., 2008), those who are inhibited may be especially likely to experience poor peer relationships (MacDonald, 1996). This may occur because their avoidant behavior is met with disapproval. Peers tend to disapprove of inhibited behavior because it contradicts age-specific norms and social expectations (Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce, & Burgess, 2006). These negative reactions may lead inhibited children to become even more isolated and fearful of engaging with peers (Gladstone & Parker, 2006). As a result, they may experience rejection from peers and difficulty maintaining close friendships, which may lead to increases in depressive symptoms during the transition to adolescence.

These studies suggest that changes in peer relationships may mediate the relation of inhibition to increasing depressive symptoms upon entering adolescence, but key questions remain. It is unclear whether developmental increases in behavioral inhibition reduce popularity and friendship quality, and whether these lead to increases in depressive symptoms upon entering adolescence. Furthermore, while prior studies are consistent with the view that peer relationships mediate relations between inhibition and increases in depressive symptomatology during adolescence, this mediational role has not been explicitly tested.

Developmental importance of peer relationships in adolescence. From a developmental psychopathology perspective, people are most vulnerable to negative psychological outcomes when they experience problematic interpersonal relationships during a critical developmental task (Cicchetti & Toth, 1998; Sroufe, 1997; Zahn-Waxler, Klimes-Dougan, & Slattery, 2000). A primary developmental task of adolescence is individuating from parents and developing close peer relationships (Kobak & Ferenz-Gillies, 1995; Kobak, Sudler, & Gamble, 1991). As children reach adolescence, their network of significant others is transformed; their relationships with peers become increasingly important and more closely related to their well-being (Harter, 1990; Criss, Pettit, Bates, Dodge, & Lapp, 2002; Young, Berenson, Cohen, & Garcia, 2005). Behavioral inhibition may be especially problematic in adolescence because it hinders one's ability to form the increasingly complex and intense peer relationships (e.g., formation of mixed-sex peer groups, dating) emerging at this time. Paradoxically, the increased importance of peer relationships is accompanied by shifts in peer groups (e.g., with the transition to new school), increases in peer stress, and decreases in social support (Sontag et al., 2008; Rudolph, 2002; Cornwell, 2003). Despite changes in peer groups, adolescents' expectations about their peers' attitudes and behaviors toward them are likely to remain stable and generalize to their new peer group (Asendorpf & van Aken, 1994). That is, behaviorally inhibited adolescents who have had poor peer relationships in childhood are likely to continue to have poor peer relationships during the transition to adolescence. Furthermore, upon entry into adolescence, there are cognitive and social changes such that adolescents are able to understand and compare group norms to their

own values and traits (O'Brien & Bierman, 1988; Petersen & Taylor, 1980). Such comparisons may affect their self-concept and self-esteem, particularly for adolescents who are behaviorally inhibited. These adolescents recognize that they differ from or are worse than their popular peers on important traits (e.g., sociable versus reticent). In summary, although inhibited children are likely to have problems in their peer relationships, these problems are likely to worsen upon entering adolescence with new demands and expectations for intimacy and social skills. Additionally, due to keener cognitive awareness, the ability to make comparisons among peers, and the close tie of peer relationships to well-being, these problems are likely to worsen and place inhibited adolescents at risk for increasing inhibition and depressive symptoms during this developmental period.

Social learning theory provides another explanation for why inhibited children may be at increased risk for depressive symptoms once they enter adolescence. Although peer relationships become increasingly important at the onset of adolescence, failure to learn effective social behavior in childhood may set the stage for problematic peer relationships in adolescence. Specifically, children who are behaviorally inhibited may miss opportunities to socialize, which limits their repertoire of behaviors necessary for forming and maintaining quality friendships (Pedersen et al., 2007). One study demonstrated that children who were socially withdrawn in childhood (i.e., 6-7 yrs) were likely to have fewer friends when assessed three years later than those who were not withdrawn (Pedersen et al., 2007). Furthermore, social learning theorists emphasize that children learn social behaviors by modeling their peers' behavior (Ardelt & Day, 2002).

Inhibited children have friends who are also likely to be inhibited (Haselager, Hartup, van Lieshout, & Riksen-Walraven, 1998; Rubin et al., 2006). Their friendships tend to be of lower quality than uninhibited children's friendships (Rubin, Coplan, & Bowker, 2009). For example, inhibited adolescents' best friendships are characterized by low helpfulness, guidance, fun, and intimate disclosure (Rubin et al., 2009). This may be in part because they model inhibited behaviors such as low eye contact and failure to respond to social cues. Therefore, by interacting with other inhibited children and missing opportunities to learn alternative social behaviors, inhibited children may fail to form high quality friendships and may not be widely accepted by peers. In summary, being behaviorally inhibited in childhood may place children on a negative trajectory such that they are at risk for poor peer relationships in adolescence, and as a result, at risk for increasing depressive symptoms.

Popularity versus friendship quality. Researchers have argued that when assessing adolescents' risk for depression, overall popularity and quality of close friendships should be distinguished (e.g., Prinstein, 2007). Some researchers have found independent contributions of popularity and friendships to feelings of loneliness and social dissatisfaction (Parker & Asher, 1993). Others have found that popularity contributes to depression through its influence on friendships, but failed to examine inhibition's role in peer relationships (Nangle, Erdley, Newman, Mason, & Carpenter, 2003). No study has examined how popularity and friendship quality may play unique roles in inhibition's link to depression. The current study will examine whether popularity and quality of close friendships mediate the relation between inhibition and increases in depressive

symptoms in adolescence (see Figure 6). This study defines popularity as teachers' sociometric ratings of the child's popularity in the classroom (T1, age 12) and as the extent to which adolescents perceive themselves to be popular (T2, age 15). Friendship quality is defined as a child's close, mutual, dyadic relationship (Newcomb, Bukowski, & Patee, 1993; Nangle et al., 2003).

Lacking a global sense of peer support or being unpopular has been directly linked to depressive symptoms (e.g., Kiesner, 2002; Oldenburg & Kerns, 1997; Reinherz et al., 1989; Nangle et al., 2003; Oldehinkel et al., 2007). Children with higher depression scores are less popular as rated by both peers and teachers (Jacobsen, Lahey, and Strauss, 1983). Low peer acceptance may be linked to depression because it undermines the adolescent's self-esteem and causes feelings of loneliness (Asher & Wheeler, 1985; O'Brien & Bierman, 1988).

Popularity is not the only aspect of peer relationships that affects depressive symptoms (Oldehinkel, et al., 2007). A number of studies have found an association between poor friendship quality and depressive symptoms (Oldenburg & Kerns, 1997; Brendgen, Wanner, Morin, & Vitaro, 2010; Allen et al., 2006; Oldehinkel et al., 2007). A few studies have also demonstrated that poor quality friendships are associated with increases in adolescent depressive symptoms over time.

While there are numerous studies linking concurrently popularity or friendship quality to depressive symptoms, few have controlled for early depressive symptoms, later popularity or friendship quality. This leaves questions unanswered as to whether it is merely the stability these variables that account for increases in adolescent depressive

symptoms (Allen et al., 2006; Brendgen et al., 2010). The one study that did control for later popularity was in childhood so it is unclear whether this relation extends into adolescence (Martin et al., 2003).

There is evidence that popularity is associated with children's ability to form close friendships (Bukowski, Pizzamiglio, Newcomb, & Hoza, 1996; Nangle et al., 2003). Acceptance from a larger peer group gives children more opportunities to form and maintain friendships (Bukowski et al., 1996; Nangle et al., 2003). Accepted children may also have better social skills, which would lead to higher quality friendships than their less-accepted counterparts (Asher, Parker, & Walker, 1996; Parker & Asher, 1993). Conversely, low-accepted children tend to have poorer quality friendships characterized by conflict and betrayal, poor conflict resolution, and lack of help and guidance, validation and caring, companionship and recreation, and intimate exchange (Parker & Asher, 1993). Stress generation hypothesis offers some insight into why poorly accepted or inhibited children have problematic friendships. The hypothesis posits that children may generate stress in their lives because they have poor interpersonal problem-solving skills. In fact, in one study, interpersonal problem-solving skills and interpersonal stress mediated the relation between early and later depressive symptoms (Davila, Hammen, Burge, Paley, & Daley, 1995). Inhibited children may be especially likely to be poorly accepted and have poor quality friendships because their withdrawn behaviors limit their social encounters and, in turn, limit their opportunities to learn important social skills necessary to maintain a close friendship.

While researchers have established strong links between inhibition, poor peer relationships, and depressive symptoms, no study has tested how specific components of peer relationships (i.e., popularity, friendship quality) may function as mediators of inhibition and increases in adolescent depressive symptomatology. There are theoretical reasons to suspect that being inhibited will put children at risk for decreasing popularity and, in turn, decreasing friendship quality upon the entry to adolescence. Poor quality friendships may then put adolescents at risk for experiencing an increase in depressive symptoms. We will use the constructs of popularity and quality of close friendships to determine the specific mechanism through which peer relationships may mediate relation between behavioral inhibition and increases in adolescent depressive symptoms. Specifically, we will test whether behavioral inhibition predicts decreases in popularity, which then predicts decreases in friendship quality. Poor friendship quality may then lead to increases in depressive symptoms in early adolescence (see Figure 4).

The Current Study

In summary, while there is some evidence that suggests that some components of poor peer relationships (e.g., victimization) may mediate relations between inhibition and depression (see Gladstone and Parker, 2006), the longitudinal relations between inhibition and peer relationships as predictors of increases in adolescent depressive symptoms remain unknown. Furthermore, to our knowledge, no study has examined inhibition's impact on peer relationships and depressive symptoms from a developmental context, namely the transition to adolescence. We will examine whether increases in behavioral inhibition predict decreases in friendship quality and popularity, and

ultimately lead to increases in depressive symptomatology. By testing poor peer relationships (i.e., popularity, friendship quality) as mediators, we will examine whether poor peer relationships are responsible for behavioral inhibition's relation with depressive symptomatology. The current study will expand on previous research that has explored the impact of popularity and friendship quality on depression, by determining whether developmental decreases in them lead to increases in depressive symptoms during the transition to adolescence. We will test whether popularity mediates the relation between behavioral inhibition and increases in depressive symptoms (see Figure 1, path b). Additionally, we will test whether friendship quality mediates the relation between popularity and increases in adolescent depressive symptoms (see Figure 1, path c). In light of extensive research that demonstrates higher rates of depression in females than males (e.g., Sprock & Yoder, 1997), we will examine whether the pathways to depressive symptoms function similarly across gender by testing hypotheses separately for males and females.

The current study will rectify problems in previous research because it is longitudinal, which enables stronger support for proposed causal relationships among variables. By using two timepoints and controlling for depression at Time 1, changes in depression over time can be tested. Specifically, we will control for depressive symptoms in childhood (12 years old) (T1), and observe changes in depression in adolescence (15 years old) (see Figure 1, path a). We will also control for behavioral inhibition at Time 2 to determine its influence on increasing adolescent depressive symptoms (T2) (see Figure 1, path a). Specifically, do increases in inhibition from

childhood to adolescence lead to increases in adolescent depressive symptoms? We will explore whether inhibition leads to decreases in popularity, which then may lead to increasing depressive symptoms in adolescence (see Figure 1, path b). Finally, we will test whether friendship quality mediates the relation between popularity and increases in depressive symptoms during the transition to adolescence (see Figure 1, path c).

The study uses a community sample, which should represent the general population better than clinical samples. Data include multiple measures of peer relationships (i.e., FQQ, Popularity). The current study will hopefully avoid potentially biased or overestimated correlations of inhibition and depressive symptoms because of using separate informants on behavioral inhibition (i.e., parents) and depressive symptoms (i.e., children at T1, adolescents at T2).

Hypothesis 1: Increases in behavioral inhibition from childhood (T1) to adolescence (T2) will predict increases in adolescent depressive symptoms.

Hypothesis 2: Increases in behavioral inhibition from childhood to adolescence will predict increases in adolescent depressive symptoms through its influence on popularity. Specifically, increases in behavioral inhibition from childhood to adolescence will predict decreases in popularity from childhood to adolescence, which will predict increases in depressive symptomatology in adolescence.

Hypothesis 3: Friendship quality will mediate the relation between popularity and adolescent depressive symptoms. Specifically, increases in inhibition from childhood to adolescence will lead to decreases in popularity, which will predict decreases in

friendship quality. This should ultimately lead to increases in adolescent depressive symptomatology.

Chapter 2

Methods

Participants

Participants were adolescents in the NICHD Study of Early Child Care and Youth Development. The adolescents were followed from age 12 at time one through age 15 at Time 2. Data at Time 1 is collected from participants who were in sixth grade (approximately age 12). At Time 2, adolescents were in ninth grade (approximately 15 years old). From the original sample of 1364 in the NICHD data, there were 940 available subjects in our sample. Participants were recruited from 10 sites across the U.S. Refer to previous publications from NICHD data to obtain specific site information. Adolescents were predominantly Caucasian and divided equally between males and females. The majority of mothers was partnered, employed full time, and had at least some college level education. Participants had been excluded from the study if they or their parents who had severe mental or physical illness. Average family income was approximately \$80,000 (refer to sample details in NICHD ECCRN, 2001).

Measures

To ensure independent assessment of behavioral inhibition, peer relationships, and adolescent depressive symptoms, we examined items in each measure to check for overlap in the items tapping these different constructs.

Behavioral Inhibition

Child Behavior Checklist (CBCL). (Achenbach, 1991a). This measure is used to assess children's social competence and problem behavior. We used only items that

measured behavioral inhibition. Mother's answered questions about their child's general tendency to be withdrawn when interacting in social situations at age 12 and 15. Eight items related to inhibited behavior were rated on a 3 point scale from 0 ("not true of my child") to 2 ("very true of my child"). Sample items include, "Would rather be alone than with others" and "withdrawn, doesn't get involved with others." Scores were averaged such that a higher score indicated high inhibition. Although behavioral inhibition constitutes social withdrawal, it is not assessed in a way that implies that the individual is disliked by others or lacks close friendships. In other words, the CBCL measures inhibition, not popularity or friendship quality. To ensure no overlap with measurement of depressive symptoms, we omitted one item indicating sadness or feeling depressed. Reliability was assessed once the item was removed and was comparable to the original measure's reliability (at T1, new Chronbach's alpha = .70, original alpha = .73; at T2, new Chronbach's alpha = .78, original alpha = .74).

Peer Relationships

Friendship Quality Questionnaire. (Parker & Asher, 1993). Administered to children and adolescents at ages 12 and 15, this questionnaire assesses the child's perceptions of their closest friendship. The 21 item questionnaire uses a 5- point response scale ranging from 1 = ("not at all true") to 5 = ("really true") to measure six aspects of the relationship with his or her best friend: Validation and Caring, Conflict Resolution, Conflict and Betrayal, Help and Guidance, Companionship and Recreation, and Intimate Exchange. Sample items include, "This friend and I make each other feel important and special," and "This friend and I tell each other private things a lot." The

Friendship Quality Total Score is computed as a weighted average of responses with possible scores ranging from 1 to 5, with higher values indicating more positive friendship behaviors from and with the best friend. There was high internal reliability for the Friendship Quality Total Score for T1 (Cronbach's alpha = .93) and T2 (Cronbach's alpha = .92).

Popularity. (Ladd, 1983). The study child's popularity was assessed both at Time 1 and Time 2. At Time 1, teachers ranked the child's popularity relative to all children in their classroom of the same sex. Scores were the sum of the total number of same-sex children plus 1, minus the child's popularity ranking, divided by the total number of same-sex children. For example, if a teacher rated a female student as 15th on popularity out of 15 female students in the class, she would be the most popular female in that class.

At time 2, adolescents answered an eight-item questionnaire about their perceptions of their popularity. Sample items included, "How many people in your grade like you?" and "How many people in your grade think you are popular?" Participants are asked to circle a number from 1= ("Almost no one") to 7= ("Almost everyone"). Higher scores reflect greater popularity in school and with peers. Internal reliability for this measure was .76 (Cronbach's alpha).

Childhood and Adolescent Depressive Symptoms

Children's Depression Inventory (CDI) Short Form. (Kovacs, 1992). This is a 10-item questionnaire that was administered to children (T1) and adolescents (T2). Items consisted of three statements children or adolescents selected the one that best described

the way they felt over the last two weeks. The items asked, for example, about the study child's mood, lack of pleasure, and self-esteem. The Child Depression Score is the sum of all items and ranges from 0 to 24, with higher scores indicating more depressive symptomatology. Two items were eliminated because they overlapped with items assessing peer relationships. Reliability was assessed once these items were removed and was comparable to original reliability scores (i.e., T1 new Chronbach's alpha = .73, T1 original Chronbach's alpha = .76; T2 new Chronbach's alpha = .78, T2 original T2 Chronbach's alpha = .81).

Demographic Variables. Mothers' marital status, whether fathers lived in the home, whether mothers received public assistance, maternal and paternal education level, maternal and paternal employment, income to needs ratio, maternal depression, child's ethnicity, and child's gender were used as control variables.

Chapter 3

Results

Preliminary Analyses

Descriptive statistics are presented for each measure in Table 1. Compared to other studies with a large normative samples of children (N = 630, grade 6, Cole, Hoffman, Tram, & Maxwell, 2000; N = 1,777, age 12, Craighead, Smucker, Craighead, & Illardi, 1998), our sample was slightly more depressed (our study M = 9.1, SD = 1.8, other studies M = 6.67, SD = 7.26, Cole et al., 2000; M = 8.78, SD = 7.04, Craighead et al., 1998). When compared to other studies with similar normative samples of adolescents, the mean was, for the most part, comparable (our study M = 9.6, SD = 2.2; other study M = 9.6, SD = 6.39, Craighead et al., 1998; other study M = 10.1, SD = 6.9; Ivarsson, Svalander, & Litlere, 2006).

Path analysis was used to test direct and indirect relations among variables. Data were not normally distributed and maximum likelihood robust (MLR) was used to correct for this. It allows for pathways to be tested while not requiring data to be normally distributed. Full Information Maximum Likelihood (FIML) was used to handle missing data. From the full sample (N = 1364) of NICHD data, 424 subjects were missing, and FIML was used to estimate data for missing subjects. Analyses were run using the full model with FIML and again with the full model excluding missing cases (i.e., with a flagged variable). This was done to determine whether results would differ significantly when missing subjects at T2 were disregarded. In other words, only subjects who had data for the outcome variable were used. Results indicated that there were no significant

differences in the analyses when data were estimated for missing subjects versus when subjects who were missing at T2 were left out of the analysis. Although results did not differ significantly between models, due to the significant amount of missing data, we decided to use the conservative estimates, in which only subjects with actual scores on the outcome variable were used.

To determine whether any pathways differed significantly depending on gender, we used a gender grouping variable in the full model. No significant differences emerged for the pathways to depressive symptoms for males versus females. Gender differences were only found for control variables. This precluded the need to have two separate models for each gender. Control variables were mothers' marital status, maternal and paternal education, maternal and paternal employment, income to needs ratio, whether mothers received public assistance, maternal depression, whether fathers lived in the home, child ethnicity, and child sex. These variables were controlled for on all principal predictor variables (i.e., behavioral inhibition, popularity, friendship quality).

Control variables

In line with previous findings (e.g., Brendgen et al., 2005; Costello et al., 2002), gender was significantly related to adolescent depressive symptoms such that females were more likely to experience depressive symptoms than males (male mean 9.2, female mean 10.0). Maternal depression predicted concurrently adolescent depressive symptoms. Those who had mothers who reported being depressed were more likely to experience depressive symptoms themselves. No other control variables were significantly related to adolescent depressive symptoms. (See Table 2).

Correlations among principal variables

For the most part, correlations among principal variables were expected (see Table 3). All main variables were related to themselves over time (e.g., depression T1 significantly related to depression T2). Childhood behavioral inhibition was related significantly and positively to childhood and adolescent depressive symptoms. Adolescent behavioral inhibition was related significantly and positively to adolescent depressive symptoms. Childhood behavioral inhibition was related significantly and negatively to both childhood and adolescent friendship quality and popularity. Adolescent behavioral inhibition was significantly and negatively related to adolescent friendship quality and popularity. Friendship quality was related significantly and positively to popularity at each timepoint. Popularity was related significantly and negatively to depressive symptoms at each timepoint. Childhood friendship quality was related to childhood depressive symptoms but, contrary to our expectations, was not related to adolescent depressive symptoms. Also contrary to our expectations, adolescent friendship quality was not related significantly to adolescent depressive symptoms.

Behavioral Inhibition and Adolescent Depressive Symptoms

In Model 1, we were interested in testing Hypotheses 1, that increases in behavioral inhibition predict increases in depressive symptoms from childhood to adolescence. Path analysis was used to determine the autoregressive paths and the relation between behavioral inhibition and adolescent depressive symptoms (Figure 2). Auto-regressive paths demonstrated that behavioral inhibition and depressive symptoms were both related to themselves over time. Behavioral inhibition was related

concurrently to depressive symptoms at each timepoint. Behavioral inhibition in childhood was did not independently predict adolescent depressive symptoms. Instead, the results indicate that adolescents who had increasing levels of inhibition from childhood to adolescence were likely to experience increases in depressive symptoms. Behavioral inhibition in childhood was also related indirectly to adolescent depressive symptoms through inhibition's relation to depressive symptoms in childhood. Fit indices indicated that this was an excellent model as evidenced by McDonald and Ringo Ho's (2002) criteria (CFI .976, TLI .949, RMSEA .023, SRMR .020, AIC 47498.161). Proportion of variance explained in adolescent depressive symptoms was 16.1 % and in adolescent behavioral inhibition was 31.2%.

Peer relationships Mediating Behavioral Inhibition and Depression

In Model 2, we tested Hypothesis 2 by extending Model 1 to include popularity. In this model, we were interested in determining whether decreases in popularity from childhood to adolescence predict increases in adolescent depressive symptoms. We also tested whether popularity mediated the relation between increases in inhibition and increases in depressive symptoms. Results confirmed that decreases in popularity were significant predictors of increases in adolescent depressive symptoms (Figure 3). Specifically, when popularity decreased from childhood to adolescence, participants were likely to experience increases in depressive symptoms in adolescence. Popularity also mediated the relation between behavioral inhibition and adolescent depressive symptoms; as inhibition increased from childhood to adolescence, popularity decreased and subsequently predicted an increase in depressive symptoms. The effect size of the

mediated path was 4.31 (Sobel's Test Statistic; S.E. .02, $p < .001$). The fit indices for this model were satisfactory (CFI .937, TLI .826, RMSEA .044, SRMR .025, AIC 49585.424). Percent of variance accounted for was 23% for adolescent depressive symptoms, 31.2% for adolescent inhibition, and 15.3% for adolescent popularity. Although fit indices were slightly better for Model 1 than Model 2, a greater proportion of variance was explained in adolescent depressive symptoms when using popularity to predict increases in depressive symptoms (i.e., 6.9% increase from Model 1 to Model 2). Fit indices were also adequate for both Models, which supports Hypotheses 1 and 2.

In Model 3, we extended Model 2 to include friendship quality. In this model, we examined whether decreases in friendship quality mediated the relation between behavioral inhibition, popularity, and increases in adolescent depressive symptoms. In other words, we wanted to determine whether being inhibited decreased one's popularity, which then decreased friendship quality, and in turn, led to increases in adolescent depressive symptoms. This Model attempted to answer the research question in Hypothesis 3. First, auto-regressive paths were run to determine how popularity and friendship quality related to themselves over time. Paths revealed that both popularity and friendship quality increased from childhood to adolescence. Decreases in popularity significantly predicted decreases in friendship quality, but decreases in friendship quality did not predict increases in adolescent depressive symptoms. There was no indirect path from popularity to depressive symptoms through friendship quality. In other words, friendship quality did not mediate the relation between behavioral inhibition, popularity and adolescent depressive symptoms (Figure 4). Fit indices indicate that this was a

slightly worse fitting model than Models 1 and 2 (CFI .908, TLI .755, RMSEA .051, SRMR .033, AIC 52454.524). Furthermore, the proportion of variance accounted for in adolescent depressive symptoms did not increase when friendship quality was added to the model; percent of variance accounted for in this model was 23% for adolescent depressive symptoms, 31.2% for adolescent inhibition, 24.5% for adolescent friendship quality, and 15.6% for adolescent popularity;

Alternative Models Tested

Alternative models were run because friendship quality was not a significant mediator as expected and to determine whether additional pathways among our principal variables could better account for increases in depressive symptoms upon entering adolescence. One model tested whether decreases in popularity mediated the relation between decreases in friendship quality and increases in adolescent depressive symptoms (Figure 5). Two paths indicated that decreases in popularity did mediate the relation between decreases in friendship quality and increases in adolescent depressive symptoms. The first path revealed that decreases in friendship quality from childhood to adolescence predicted decreases in popularity in adolescence, which in turn, predicted increases in adolescent depressive symptoms. The second path demonstrated increases in depressive symptoms during the transition to adolescence because poor friendship quality in childhood predicted decreases in popularity from childhood to adolescence. The effect size for the mediated path was 5.64 (Sobel's Test Statistic; S.E. .06, $p < .001$). Fit indices indicate that this was an excellent model (CFI .956, TLI .882, RMSEA .035, SRMR .027, AIC 52434.475). Proportion of variance explained in this model for adolescent

depressive symptoms was 23.1%, in adolescent behavioral inhibition was 31%, in adolescent friendship quality was 22.2%, and in adolescent popularity was 22.6%. Fit indices were better for this model than Model 2 (i.e., popularity as the sole peer variable), and proportion of variance accounted for in adolescent depressive symptoms was slightly higher. Therefore, although support was found for Models 1 and 2, this model was the best and most comprehensive in explaining our data.

Another alternative model tested whether depressive symptoms predicted behavioral inhibition rather than the reverse (Figure 6). Fit indices suggest that this model fit well (CFI .989, TLI .966, RMSEA .018, SRMR .012, AIC 54200.927). The percent of variance accounted for, however, was only 16.2% for adolescent depressive symptoms. Furthermore, because we were interested primarily in predicting adolescent depressive symptoms, this model was of less interest. The model suggests, however, that inhibition and depressive symptoms may reciprocally influence one another.

In summary, increases in behavioral inhibition were related to increases in adolescent depressive symptoms during the transition to adolescence because they influence adolescent peer relationships. Decreases in popularity mediated the relation between increases in behavioral inhibition and increases in adolescent depressive symptoms. The pathway by which peer relationships linked inhibition to adolescent depressive symptoms, however, was contrary to what was expected. Instead of friendship quality mediating the relation between popularity and adolescent depressive symptoms, popularity was the principal mediator. In addition, we found that depressive

symptoms predicted inhibition, suggesting that there may be a bidirectional relationship between them.

Chapter 4

Discussion

This study is the first to examine how developmental changes in inhibition, popularity, and friendship quality predict increases in depressive symptoms during the transition to adolescence. Previous studies have found that early inhibition and peer relationships (e.g., popularity, friendship quality) are related to later depression (e.g., Caspi et al., 1996; Booth-LaForce & Oxford, 2008; Brendgen et al., 2010; Nangle et al., 2003), but have not examined how developmental changes in them contribute to increases in depressive symptoms. The findings reveal that these three variables are instrumental across development in regulating changes in depressive symptoms. First, we found that increasing in behavioral inhibition from childhood to adolescence is a risk factor for increases in depressive symptoms in adolescence. Second, increases in inhibition were associated with decreases in popularity, which then predicted increases in depressive symptoms. Third, popularity mediated the relation between changes in friendship quality and developmental increases in depressive symptoms. Specifically, decreases in friendship quality from childhood to adolescence predicted decreases in popularity from childhood to adolescence; this, in turn, was associated with increases in depressive symptoms during the transition to adolescence.

Behavioral Inhibition and Adolescent Depressive Symptoms

Why might increases in inhibition account for increases in depressive symptoms across the transition to adolescence over and above numerous control and peer variables? Although popularity mediated the relation of inhibition and increases in depressive

symptoms, inhibition still had significant independent effects on increases in adolescent depressive symptoms. The relation may be explained in part by age-related changes in children's home environment. The transition to adolescence presents a number of challenges, including individuating from parents while establishing one's identity and autonomy (Kobak & Ferenz-Gillies, 1995; Kobak, Sudler, & Gamble, 1991). For some children, this transition is accompanied with a home environment that alters for the worse. For example, parents may become more punitive or inconsistent when trying to cope with young adolescents who feel entitled to more autonomy (Martin & Waite, 1994; McFarlane, Bellissimo, & Norman, 1995; Patton, Coffey, Posterino, Carlin, & Wolfe, 2001; Kraaij et al., 2003; all in Betts, Gullone, & Allen, 2009). When struggling to establish one's identity and forced to deal with parents who are consistently angry and unresponsive, inhibited children may internalize negative emotionally laden cognitions such as low self-worth (e.g., "I'm no good"), the inability to change their environment, and lack of love (e.g., "no one loves me"; Dix and Buck, in press). These thoughts and emotions may affect inhibited children as they transition to adolescence by leading them to experience an increase in depressive symptoms.

Inhibition may also predict depression because of a common genetic basis for these characteristics. There is ample evidence that the short allele of the serotonin transporter linked polymorphic region (5-HTTLPR) is involved in the development of depression (e.g., Baune, Hohoff, Mortensen, Deckert, Arolt, & Domschke, 2008; Willeit, Praschak-Rieder, Neumeister, Zill, Leisch, Stastny, et al., 2003). There is also evidence that the same allele plays a role in the expression of behavioral inhibition (Fox,

Henderson, Marshall, Nichols, & Ghera, 2005); those who carry the allele tend to be inhibited and experience negative affective states that resemble similar negative affective states (e.g., low self-worth) found in depression. Given this research, it might be that this allele, in part, explains why inhibited children are often also depressed because of the underlying physiological effects it has on people's affect.

As with many genetically based characteristics, the degree to which these genetic predispositions are expressed often depends on the environment. Some children who have the short allele of the gene for serotonin transporter (5-HTTLPR) exhibit behavioral inhibition only when coupled with mothers who offer low social support (Fox et al., 2005). Those who have this short allele are likely to have depressive symptoms only when they also experience stressful events (Caspi, Sugden, Moffitt, Taylor, Craig, Harrington, et al., 2003). In some cases, it may be that inhibited children elicit stressful environments because their behavior is met with disapproval (Rubin et al., 2006); if unsuccessful interactions become a regular occurrence for these children and if they fail to learn alternative ways to behave pro-socially, a depressogenic cycle may result. Furthermore, depending on children's genetic predispositions, the transition to adolescence may affect children differently. It presents a number of challenges including the partly biological and physical changes associated with puberty. Hormonal and physical changes associated with the onset of puberty have been linked to adolescent depression (e.g., DeRose, Wright, & Brooks-Gunn, 2006). Those who enter puberty before or after their peers may experience challenges (e.g., increased self-consciousness, anxiety) that exceed those who mature "on-time." For example, early timing exacerbates

preexisting individual vulnerabilities (e.g., introversion; Caspi & Moffitt, 1991; Forbes & Dahl, 2010). These vulnerabilities are likely to emerge in social contexts because early-maturing children are forced to deal with novelty (e.g., increased interest in romantic relationships) that their peers have not yet encountered (Caspi & Moffitt, 1991; Forbes & Dahl, 2010). Closely related to introversion, inhibition, may represent a preexisting vulnerability that makes those who experience puberty before their peers more likely to experience an increase in depression. Inhibited children already tend to have difficulties in their peer relationships (Rubin et al., 2009), but if they also must face the challenges associated with puberty before their peers, these peer problems may worsen and make their depressive symptoms increase.

Peer Relationships and Adolescent Depressive Symptoms

Popularity mediates inhibition and depressive symptoms. One reason that increases in inhibition were related to increases in depressive symptoms during the transition to adolescence was because they were related to popularity. It is well-documented that inhibited children tend to have unsuccessful social interaction (e.g., Kochanska, & Radke-Yarrow, 1992; Reznick et al., 1986) and are actively rejected by their peers (Rubin et al., 2009). What often goes unrecognized in the literature is that these social consequences may be a result of cultural expectations or social norms. Research on Chinese children has demonstrated that inhibition is related to positive social outcomes rather than adolescent psychopathology (Chen, Chen, Li, & Wang, 2009). Research on European Americans, however, often documents a relation between extraversion and social acceptance (e.g., Adams, Perry, Workman, Furdella, & Egan,

2002). American culture values personality traits, or temperaments, that are contrary to behavioral inhibition (e.g., Schimack, Radhakrishnan, Oishi, Dzokoto, & Ahadi, 2002; Diener & Lucas, 1999). As children develop and are influenced by societal norms in which extraversion and assertiveness are valued, they may reject those who lack these characteristics. With increasing cognitive abilities to introspect (Levy & Farber, 1986), adolescent egocentrism (Elkind, 1967; Bell, & Bromnick, 2003), and the increasing importance of peers, the high value given to extroversion and assertiveness may deter adolescents from associating with inhibited adolescents. In other words, increases in inhibition during this developmental period may lead to rejection to an even greater extent during adolescence because peers do not want to be associated with those who do not conform to the ideal adolescent (i.e., sociable).

Popularity mediates friendship quality and depressive symptoms. Findings indicated that popularity mediates the relation between friendship quality and adolescent depressive symptoms. One reason that inhibited children's poor quality friendships undermine their popularity may be the types of friendships they have. Inhibited children are likely to have friends who are also inhibited (Haselager et al., 1998; Rubin et al., 2006). These friendships tend to be of lower quality than accepted children's friendships (Rubin et al., 2009). For example, withdrawn adolescents' best friendships lack helpfulness, guidance, fun, and intimate disclosure (Rubin et al., 2009). By missing opportunities to practice and improve critical skills (e.g., conflict resolution, validation) needed in friendship and in interacting with peers in general, it is understandable that it would be unlikely for inhibited children to be popular or widely accepted by peers.

Popularity may also mediate the relation between friendship quality and adolescent depressive symptoms because being accepted by one's peers becomes closely related to one's sense of well-being in adolescence. As children reach adolescence, their relationships with peers become increasingly important and related to their mental health (Harter, 1990; Criss et al., 2002; Young, Berenson, Cohen, & Garcia, 2005).

Given prior theory (e.g., Bukowski et al., 1993) and research (Nangle et al., 2003), it seemed plausible that friendship quality would mediate the relation between developmental decreases in popularity and increases in depressive symptoms. Contrary to this expectation, friendship quality did not mediate popularity and adolescent depressive symptoms. Instead, friendship quality was indirectly related to increases in adolescent depressive symptoms through its influence on popularity. When taking a closer look at our findings, there may be good reason for this alternative pathway. First, the one prior study to observe friendship quality as a mediator of popularity and depressive symptoms examined elementary school-aged children. At these early ages, popularity within the peer group may not be as closely related to children's sense of well-being. It is well-known that peers become increasingly associated with well-being as children reach adolescence, which may mean that being accepted by peers, in general, is a better determinant of whether an adolescent experience increasing depressive symptoms than one's friendship quality. Second, the Nangle et al. (2003) data were collected over a two week period, which made it impossible to understand developmental changes within the peer group during the transition to adolescence. So again, it may be that for children, friendship quality predicts whether they experience depressive symptoms, but for

adolescents, being accepted by one's peer group may be a better predictor of depressive symptoms.

Although findings indicated that *changes* in popularity from childhood to adolescence mediated friendship quality and adolescent depressive symptoms, a note of caution is warranted. It is clear that adolescents' negative perception of their popularity is related to depressive symptoms; because of change in measurement from childhood (i.e., teacher ratings) to adolescence (i.e., adolescent ratings), however, it is difficult to conclude with certainty that it is an actual decrease in popularity that mediates the relation of friendship quality and adolescent depressive symptoms. Although teachers' ratings of children's popularity (T1) are correlated with adolescents' ratings of their popularity (T2), the different informants may reflect somewhat different perspectives of popularity.

Interventions

Findings that developmental changes in inhibition and popularity predict increases in depressive symptoms have implications for intervention. To reduce inhibition and increase popularity, psychologists might create an environment that gives inhibited children the opportunity to work on improving specific social skills that are valued within our culture (e.g., self assertion) in a non-judgmental environment. Considering the increasing importance of popularity as children reach adolescence, this could be implemented when children are still in elementary school so that when they reach adolescence, they are prepared and have acquired key social skills necessary to function in their demanding peer environment. There is some evidence in young girls

(e.g., 6 and 12 years) that improvement of social skills are possible when adults facilitate small groups that focus on increasing culturally-valued traits such as self-assertion and prosocial behavior in a supportive environments (Houck & Stember, 2002). Another way to decrease the rates of depressive symptoms in adolescents might be to have a psychologist focus on targeting children who are inhibited and improving their general relationship skills (e.g., conflict management, help and guidance) so that they are able to form and maintain friendships of good quality. This might translate into greater acceptance by their larger group of peers once they reach adolescence. This, in turn, may reduce the likelihood of increasing depressive symptoms during the transition to adolescence.

Limitations

Like all studies, the current study is not without limitations. Despite longitudinal data, this was not a true experiment, so causal conclusions are not possible. It is possible that instead of a one-way directional relation from behavioral inhibition to depressive symptoms, the relation between the two variables is transactional. In fact, tests of an alternative model offered support for a pathway from concurrent depressive symptoms to inhibition; therefore, it remains possible that the two influence one another. Because we used a community sample, our findings may not apply to more severe clinical populations. It may be that inhibition predicts depression to an even greater extent because inhibition in this population is characterized by more extreme negative reactivity to social interaction. It is also possible that clinical depression is the result of pathways alternative to the ones we tested. For example, genetic factors may be the primary

predictors of clinical depression during early adolescence; while environmental factors (e.g., problems in peer relations), on the other hand, predict primarily less severe forms of depressive symptoms. Additionally, our sample consisted of families with above average income. This limits generalizability to low-income populations. Children living in poverty may be more likely to experience increases in depression because of harsh environmental conditions (e.g., lack of food, clothes) that trump the importance of popularity and inhibition. In fact, research has demonstrated that conditions associated with poverty such as poor-quality housing, few resources, and unsafe conditions predict depression over and above personal or family factors (Cutrona, Wallace, & Wesner, 2006).

Conclusion

The current study's findings highlight the importance of increasing behavioral inhibition during a developmental period when relatively simple childhood peer relations transform into complex and challenging peer relations during adolescence. The data suggest that, as children move into adolescence, the developmental increases in inhibition for many children play a role in the increasing depressive symptoms at this time in part because inhibition is associated with low popularity. The findings help pinpoint pathways responsible for increases in depression that occur in early adolescence. Findings suggest that we need to understand why children are becoming more inhibited as they enter adolescence. Relatively little is known about genetic contributions to increasing depressive symptoms during this developmental period. Additionally, while we know that parent insensitivity and harshness are associated with depression, it is still

unclear how these relations may function longitudinally during the transition to adolescence. Furthermore, findings suggest that we need to examine the mechanisms responsible for the relation between increasing inhibition, decreasing popularity, and increasing depressive symptoms. While extraversion is a culturally valued trait and peer acceptance becomes more important during adolescence, these variables were not explicitly tested in our analyses. Therefore, future research may focus on the salience of peer group norms and values that may better explain why popularity mediates inhibition and increasing depressive symptoms.

Table 1

Descriptive Statistics for Behavioral Inhibition, Peer Relationships, and Adolescent Depressive Symptoms

Measure	Scale	Mean	SD
<i>Behavioral Inhibition T1</i>	(0-2)	1.21	1.58
<i>Behavioral Inhibition T2</i>	(0-2)	1.32	1.67
<i>Popularity T1*</i>		.61	.24
<i>Popularity T2</i>	(1-7)	5.67	.87
<i>Close Friendship T1</i>	(1-5)	4.16	.56
<i>Close Friendship T2</i>	(1-5)	4.16	.56
<i>Depressive Symptoms T1</i>	(0-2)	9.11	1.80
<i>Depressive Symptoms T2</i>	(0-2)	9.60	2.16

* *Popularity T1* was on a scale where children were ranked by teacher according to their popularity compared with other same sex children in their class

Table 2

Descriptive Statistics for Demographic Variables

Measure	Scale	Mean	SD
Mothers' marital status	(1-6)	1.55	1.18
Father Lives in Home	(0-1)	.68	.467
Public Assistance	(0-1)	.07	.254
Mother Education	(1-10)	4.27	1.94
Father Education	(1-11)	5.73	3.31
Income-to-Needs Ratio	(.11-39.59)	4.54	4.15
Gender	(1-2)	1.48	.500
Ethnicity	(1-5)	3.87	.508
Father Employment	(0-1)	.93	.259
Mother Employment	(0-1)	.76	.429
Mothers' Depression T1	(.00-56)	8.96	8.82
Mothers' Depression T2	(.00-54)	10.48	9.83

Table 3

Bivariate Correlations Among Principal Variables

Measure	1.	2.	3.	4.	5.	6.	7.	8.
1. Friendship T1		.368**	.145**	.175**	-.148**	-.037	-.140**	-.069*
2. Friendship T2			.096**	.326**	-.106**	-.062	-.113**	.133**
3. Popular T1				.297**	-.099**	-.093*	-.186**	-.161**
4. Popularity T2					-.244**	-.369**	-.138**	-.235**
5. Depression T1						.314**	.231**	.161**
6. Depression T2							.088**	.176**
7. Inhibition T1								.541**
8. Inhibition T2								

* = $p < .05$.

** = $p < .01$.

*** = $p < .001$.

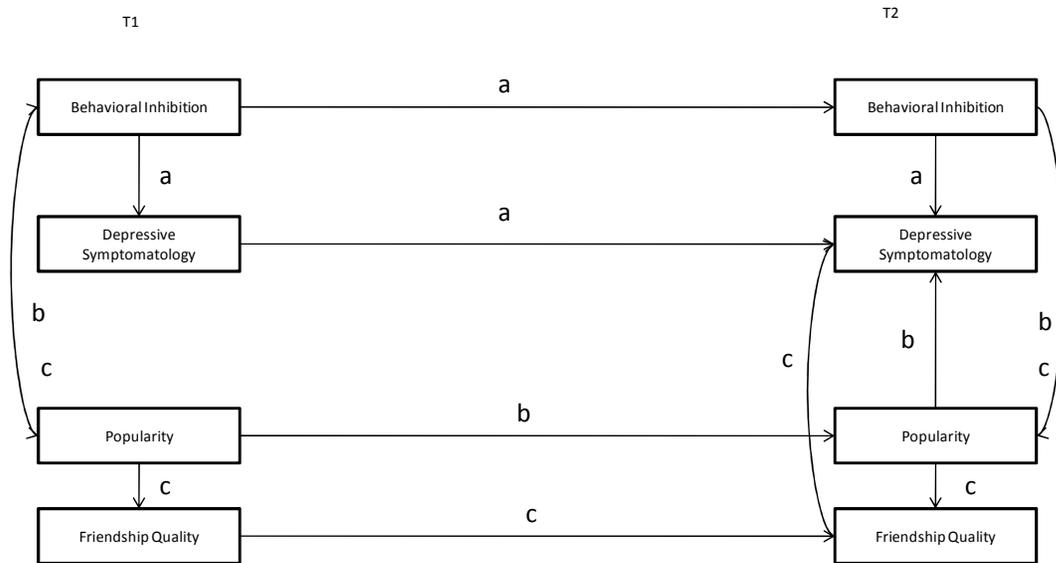
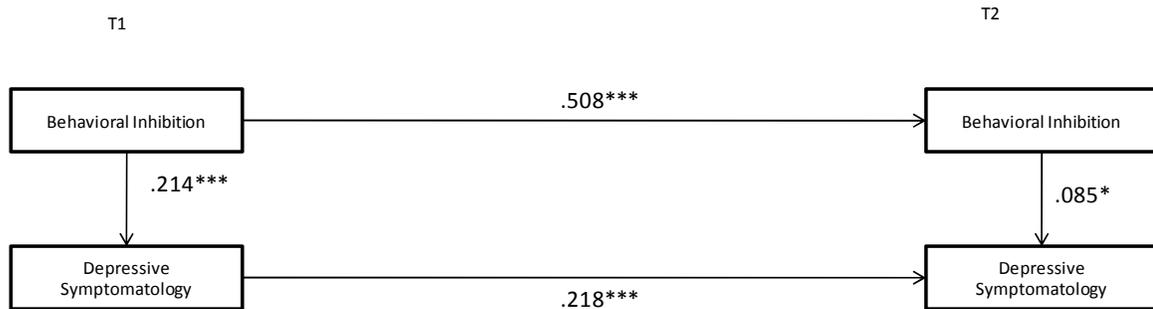
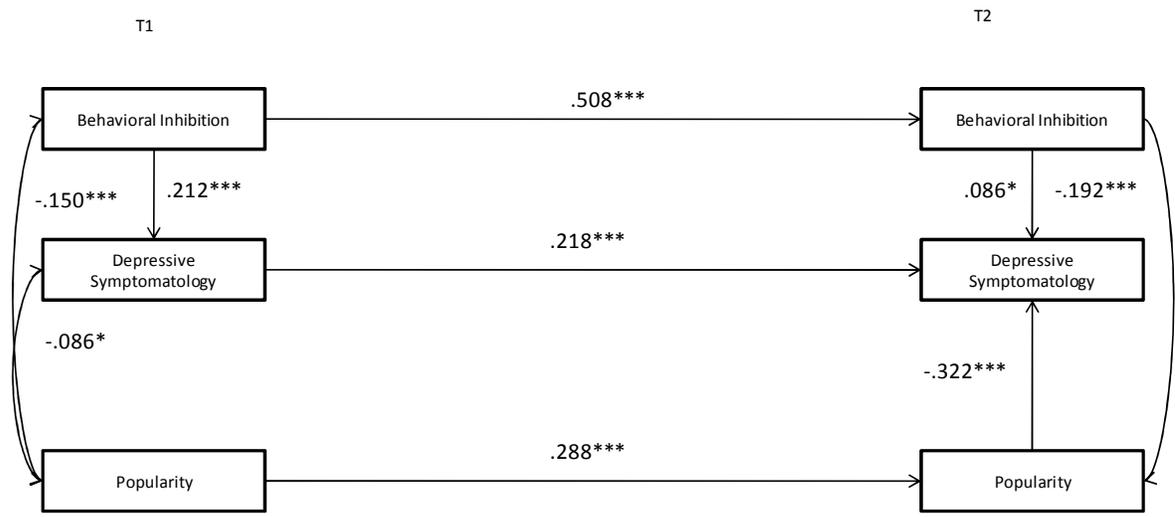


Figure 1. Conceptual model. “A” paths represent hypothesis 1. “B” paths represent hypothesis 2. “C” paths represent hypothesis 3.



* = $p < .05$
 ** = $p < .01$
 *** = $p < .001$

Figure 2. Behavioral Inhibition and Adolescent Depression. Longitudinal relation of behavioral inhibition and adolescent depressive symptoms controlling for adolescent behavioral inhibition and childhood depressive symptoms. (CFI .976, TLI .949, RMSEA .023, SRMR .020, AIC 47498.161).



* = $p < .05$
 ** = $p < .01$
 *** = $p < .001$

Figure 3. Inhibition, Popularity, and Adolescent Depression. Examination of the relations between behavioral inhibition, popularity, and adolescent depressive symptomatology. Single headed arrows represent standardized path coefficients. Double headed arrows represent correlation coefficients. (CFI .937, TLI .826, RMSEA .044, SRMR .025, AIC 49585.424). 3.792*** is the path coefficient for the indirect relation of behavioral inhibition to adolescent depressive symptoms through popularity.

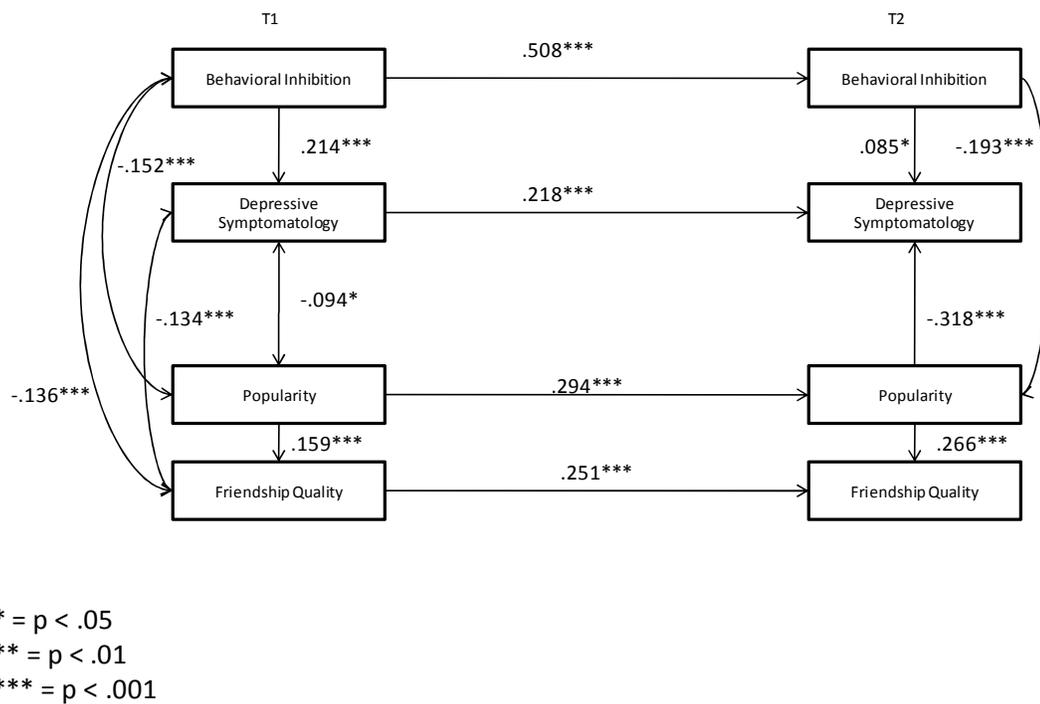


Figure 4. Test of Friendship Quality as Mediator. Examination of friendship quality mediating popularity and adolescent depressive symptomatology. Single headed arrows represent standardized path coefficients. Double headed arrows represent correlation coefficients. (CFI .908, TLI .755, RMSEA .051, SRMR .033, AIC 52454.524).

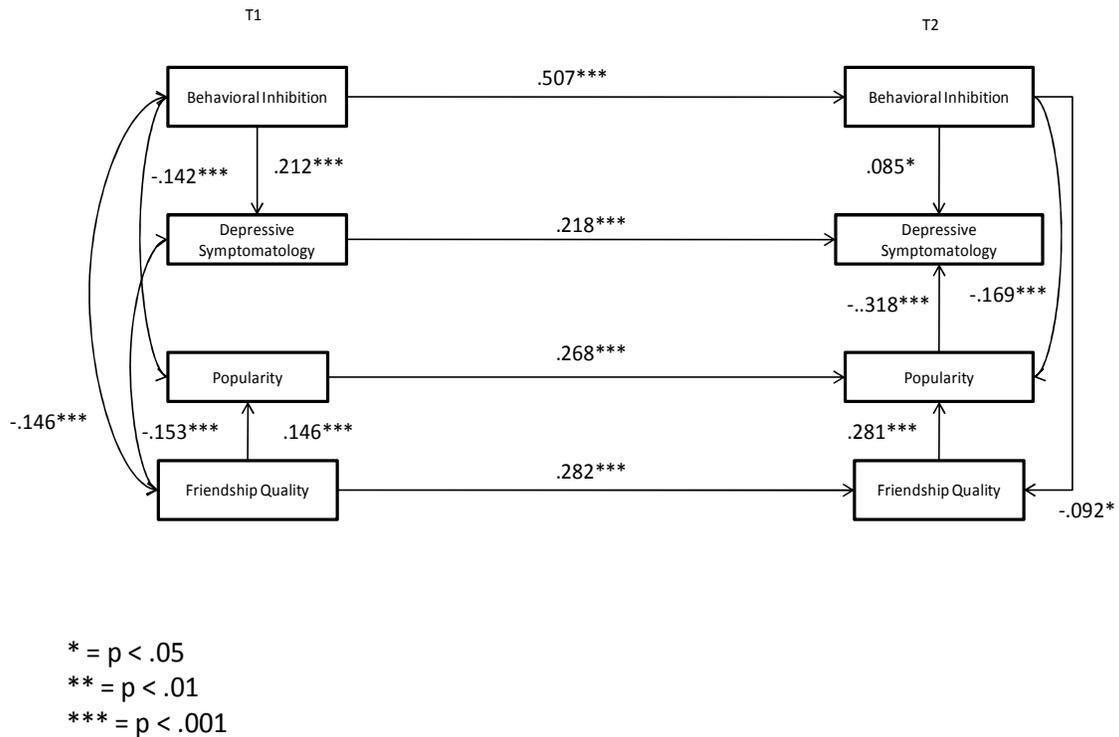
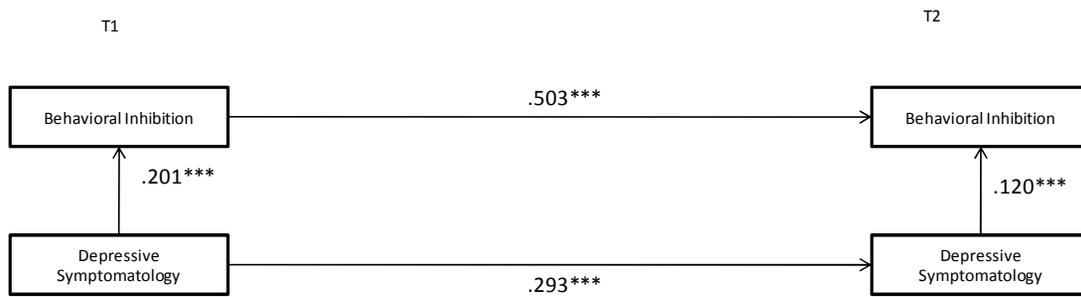


Figure 5. Test of Popularity as Mediator. Examination of popularity mediating friendship quality and adolescent depressive symptoms . Single headed arrows represent standardized path coefficients. Double headed arrows represent correlation coefficients. (CFI .956, TLI .882, RMSEA .035, SRMR .027, AIC 52434.475). -3.22^{***} is the path coefficient for the indirect relation from friendship quality to adolescent depressive symptoms through childhood popularity. -4.521^{***} is the path coefficient for the indirect relation from friendship quality to adolescent depressive symptoms through adolescent popularity.



* = $p < .05$
 ** = $p < .01$
 *** = $p < .001$

Figure 6. Depression as Predictor of Inhibition. Examining depressive symptoms as predictors of behavioral inhibition. (CFI .989, TLI .966, RMSEA .018, SRMR .012, AIC 54200.927).

References

- Achenbach, T. M. (1991a). *Manual for the Child Behavior Checklist/4-18 and Profile*. Burlington, VT: University of Vermont, Department of Psychiatry.
- Achenbach, T. M. (1991b). *Integrative guide for the 1991 CBCL/4-18, YSR, and TRF Profiles*. Burlington: University of Vermont, Department of Psychiatry.
- Adams, R., Perry, D. G., Workman, K. A., Furdella, J. Q., & Egan, S. K. (2002). Agreeableness, extraversion, and peer relations in early adolescence: Winning friends and deflecting aggression. *Journal of Research in Personality, 36*, 224-251.
- Allen, J. P., Insabella, G., Porter, M. R., Smith, F. D., Land, D., & Phillips, N. (2006). A social-interactional model of the development of depressive symptoms in adolescence. *Journal of Consulting and Clinical Psychology, 74*, 55-65.
- Ardelt, M., & Day, L. (2002). Parents, siblings, and peers: Close social relationships and adolescent deviance. *The Journal of Early Adolescence, 22*, 310-349.
- Asendorpf, J. B., & van Aken, M. A. G. (1994). Traits and relationship status: Stranger versus peer group inhibition and test intelligence versus peer group competence as early predictors of later self-esteem. *Child Development, 65*, 1786-1798.
- Asher, S. R., Parker, J. G., & Walker, D. L. (1996). Distinguishing friendship from acceptance:
Implications for intervention and assessment. In W. M., Bukowski, A. F., Newcomb, & W. W. Hartup (Eds.), *The Company they keep: Friendship in*

- Childhood and Adolescence* (pp. 366-405). Cambridge, England: Cambridge University Press.
- Asher, S. R., & Wheeler, V. A. (1985). Children's loneliness: a comparison of rejected and neglected peer status. *Journal of Consulting and Clinical Psychology, 53*, 500-505.
- Baune, B. T., Hohoff, C., Mortensen, L. S., Deckert, J., Arolt, V., & Domschke, K. (2008). Serotonin transporter polymorphism (5-HTTLPR) association with melancholic depression: A female specific effect? *Depression and Anxiety, 25*, 920-925.
- Bell, H. J., & Bromnick, R. D. (2003). The social reality of the imaginary audience: A grounded theory approach. *Adolescence, 38*, 205-219.
- Betts, J., Gullone, E., & Allen, J. S. (2009). An examination of emotion regulation, temperament, and parenting style as potential predictors of adolescent depression risk status: A correlational study. *British Journal of Developmental Psychology, 27*, 473-485.
- Booth-LaForce, C., & Oxford, M. L. (2008). Trajectories of social withdrawal from grades 1 to 6: Prediction from early parenting, attachment, and temperament. *Developmental Psychology, 44*, 1298-1313.
- Brendgen, M., Lamarche, V., Wanner, B., & Vitaro, F. (2010). Links between friendship relations and early adolescents' trajectories of depressed mood. *Developmental Psychology, 46*, 491-501.

- Brendgen, M., Wanner, B., Morin, A. J. S., & Vitaro, F. (2005). Relations with parents and with peers, temperament, and trajectories of depressed mood during early adolescence. *Journal of Abnormal Child Psychology*, *33*, 579-594.
- Brown, T. A. (2007). Temporal course and structural relationships among dimensions of temperament and *DSM-IV* anxiety and mood disorder constructs. *Journal of Abnormal Psychology*, *116*, 313-328.
- Bukowski, W. M., Hoza, B., & Boivin, M. (1993). Popularity, friendship, and emotional adjustment during early adolescence. In B. Laursen (Ed.). *Close Friendships in Adolescence* (pp. 23-37). San Francisco: Jossey-Bass Publishers.
- Bukowski, W. M., Pizzamiglio, M. T., Newcomb, A. F., & Hoza, B. (1996). Popularity as an affordance for friendship: The link between group and dyadic experience. *Social Development*, *5*, 1996.
- Caspi, A., & Moffitt, T. E. (1991). Individual differences are accentuated during period of social change: The sample case of girls at puberty. *Journal of Personality and Social Psychology*, *61*, 157-168.
- Caspi, A., Moffitt, T. E., Newman, D. L., Silva, P. A., (1996). Behavioral observations at age 3 years predict adult psychiatric disorders. *Archives of General Psychology*, *53*, 1033-1039.
- Caspi A, Sugden K, Moffitt TE, Taylor A, Craig, I. W, Harrington H, et al. (2003). Influence of life stress on depression: Moderation by a polymorphism in the 5-HTT gene. *Science* 301:386 –389.

- Chen, X., Chen, H., Li, D., & Wang, L. (2009). Early childhood behavioral inhibition and social and school adjustment in Chinese children: A 5-year longitudinal study. *Child Development, 80*, 1692-1704.
- Cicchetti, D., & Toth, S. L. (1998). The development of depression in children and adolescents. *American Psychologist, 53*, 221-241.
- Cloninger, C. R. (1987). A systematic method for clinical description and classification of personality variants. *Archives of General Psychiatry, 44*, 573-588.
- Cole, D. A., Hoffman, K. B., Tram, J. M., & Maxwell, S. E. (2000). Structural differences in parent and child reports of children's symptoms of depression and anxiety. *Psychological Assessment, 12*, 174-185.
- Coplan, R. J., Wilson, J., Frohlick, S. L., & Zelenski, J. (2006). A person-oriented analysis of behavioral inhibition and behavioral activation in children. *Personality and Individual Differences, 41*, 917-927.
- Cornwell, B. (2003). The dynamic properties of social support: Decay, growth, and staticity, and their effects on adolescent depression. *Social Forces, 81*, 956-982.
- Costello, E., Pine, D., Hammen, C., March, J., Plotsky, P., Weissman, M., et al. (2002). Development and natural history of mood disorders. *Biological Psychiatry, 52*, 529-542.
- Craighead, W. E., Smucker, M. R., Craighead, L. W., & Illardi, S. S. (1998). Factor analysis of the Children's Depression Inventory in a community sample. *Psychological Assessment, 10*, 156-162.
- Craske, M. G. (1997). Fear and anxiety in children and adolescents. *Bulletin Menninger*

- Clinicians*, 61, 4-36 (Suppl A).
- Criss, M., Pettit, G., Bates, J., Dodge, K., & Lapp, A. (2002). Family adversity, positive peer relationships, and children's externalizing behavior: A longitudinal perspective on risk and resilience. *Child Development*, 73, 1220-1237.
- Cutrona, C. E., Wallace, G., & Wesner, K. A. (2006). Neighborhood characteristics and depression. *Current Directions in Psychological Science*, 15, 188-192.
- Davidson, R. J., Ekman, P., Saron, C. D., Senulis, J. A., & Friesen, W. V. (1990). Approach-withdrawal and cerebral asymmetry: Emotional expression and brain physiology. *Journal of Personality and Social Psychology*, 58, 330-341.
- Davila, J., Hammen, C., Burge, D., Paley, B., & Daley, S. E. (1995). Poor interpersonal problem solving as a mechanism of stress generation in depression among adolescent women. *Journal of Abnormal Psychology*, 104, 592-600.
- Depue, R. A., & Collins, P. F. (1999). Neurobiology of the structure of personality: Dopamine, facilitation of incentive motivation, and extraversion. *Behavioral and Brain Sciences*, 22, 491-569.
- DeRose, L. M., Wright, A. J., & Brooks-Gunn, J. (2006). Does puberty account for the gender differential in depression? In C. L. M. Keyes & S. H. Goodman (Eds.), *Women and Depression: A Handbook for the Social, Behavioral, and Biomedical Sciences* (pp. 89-128). New York: Cambridge University Press.
- Diener, E., & Lucas, R. E. (1999). Personality and subjective well-being. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 213-229). New York: Russell Sage Foundation.

- Dix, T., & Buck, K. A. (in press). The Emergence of Social Approach and Avoidance Motivation in Early Parent-Child Relationships. In L. Campbell & T. Loving (Eds.). *Close relationships: An integrative perspective*. Washington, DC: American Psychological Association.
- Elkind, D. (1967). Egocentrism in adolescence. *Child Development, 38*, 1025-1034.
- Fergusson, D. M., & Woodward, L. J. (2002). Mental health, educational, and social role outcomes of adolescents with depression. *Archives of General Psychiatry, 59*, 225–231.
- Forbes, E. E., Dahl, R. E. (2010). Pubertal development and behavior: Hormonal activation of social and motivational tendencies. *Brain and Cognition, 72*, 66-72.
- Fox, N. A., Henderson, H. A., Marshall, P. J., Nichols, K. E., & Ghera, M. (2005). Behavioral inhibition: Linking biology and behavior within a developmental framework. *Annual Review of Psychology, 56*, 235-262.
- Galambos, N. L., Leadbeater, B. J., & Barker, E. T. (2004). Gender differences in and risk factors for depression in adolescence: A 4-year longitudinal study. *International Journal of Behavioral Development, 28*, 16-25.
- Ge, X., Conger, R., & Elder, G. (2001a). Pubertal transition, stressful life events, and the emergence of gender differences in adolescent depressive symptoms. *Developmental Psychology, 37*, 404-417.
- Ge, X., Conger, R., & Elder, G. (2001b). The relation between puberty and psychological distress in adolescent boys. *Journal of Research on Adolescence, 11*, 49-70.

- Gladstone, G. L., & Parker, G. B. (2006). Is behavioral inhibition a risk factor for depression? *Journal of Affective Disorders, 95*, 85-94.
- Gray, J. A. (1972). The psychophysiological nature of introversion-extraversion: A modification of Eysenck's Theory. In V. D. Nebylitsyn & J. A. Gray (Eds.), *Biological bases of individual behaviour*. New York and London: Academic Press.
- Hammen, C. (2009). Adolescent depression: Stressful interpersonal contexts and risk for recurrence. *Current Directions in Psychological Science, 18*, 200-204.
- Hammen, C., Brennan, P.A., Keenan-Miller, D., & Herr, N. R. (2008). Early onset recurrent subtypes of adolescent depression: Clinical and psychosocial correlates.
- Hankin, B., Mermelstein, R., & Roesch, L. (2007). Sex differences in adolescent depression: Stress exposure and reactivity models. *Child Development, 78*, 279-295.
- Harter, S. (1990). Causes, correlates, and the functional role of global self-worth: A life-span perspective. In J. Kolligan & R. Sternberg (Eds.), *Perceptions of competence and incompetence across the lifespan* (pp. 67-98). New Haven, CT: Yale University Press.
- Harter, S., & Whitesell, N. R. (1996). Multiple pathways to self-reported depression and psychological adjustment among adolescents. *Development and Psychopathology, 8*, 761-777.

- Haselager, G. J. T., Hartup, W. H., van Lieshout, C. F. M., Riksen-Walraven, J. M. A. (1998). Similarities between friends and nonfriends in middle childhood. *Child Development, 69*(4), 1198-1208.
- Henrich, C. C., Blatt, S. J., Kuperminc, G. P., Zohar, A., & Leadbeater, B. J. (2001). Levels of interpersonal concerns and social functioning in early adolescent boys and girls. *Journal of Personality Assessment, 76*, 48-67.
- Houck, G. M., & Stember, K. (2002). Small group experience for socially withdrawn girls. *The Journal of School Nursing, 18*, 206-211.
- Ivarsson, T., Svalander, P., Litlere, O. (2006). The Children's Depression Inventory (CDI) as a measure of depression in Swedish adolescents. A normative study. *Nordic Journal of Psychiatry, 3*, 220-226.
- Jacobs, J. E., & Johnston, K. E. (2005). " 'Everyone else is doing it': Relations between bias in base-rate estimates and involvement in deviant behaviors." In J. E Jacobs & P. A. Klaczynski (Eds.) *The development of judgment and decision making in children and adolescents*, pp. 157-179. Mahwah, NJ: Lawrence Erlbaum Associates.
- Jabobsen, R. H., Lahey, B. B., & Strauss, C. C. (1983). Correlates of depressed mood in normal children. *Journal of Abnormal Child Psychology, 11*, 29-40.
- Jaffee, S. R., Moffitt, T. E., Caspi, A., Fombonne, E., Poulton, R., Martin, J. (2002). Differences in early childhood risk factors for juvenile-onset and adolescent-onset depression. *Archives of General Psychiatry, 58*, 215-222.

- Johnson, S. L., Turner, R. J., & Iwata, N. (2003). BIS/BAS levels and psychiatric disorder: An epidemiological study. *Journal of Psychopathology and Behavioral Assessment, 25*, 25-35.
- Joiner, T. E. (2002). Depression in its interpersonal context. In I. H., Gotlib & C. L. Hammen (Eds.), *Handbook of Depression*, (pp. 295-313). New York, NY: Guilford Press.
- Kagan, J. (1989). Temperamental contributions to social behavior. *American Psychologist, 44*, 668-674.
- Kagan, J., Reznick, J. S., Clarke, C., Snidman, N., Garcia-Coll, C. (1984). Behavioral inhibition to the unfamiliar. *Child Development, 55*, 2212-2225.
- Kagan, J., & Snidman, N. (1991). Temperamental factors in human development. *American Psychologist, 46*, 856-862.
- Kasch, K. L., Rottenberg, J., Arnow, B. A., & Gotlib, I. H. (2002). Behavioral activation and inhibition systems and the severity and course of depression. *Journal of Abnormal Psychology, 111*, 589-597.
- Kiesner, J. (2002). Depressive symptoms in early adolescence: Their relations with classroom problem behavior and peer status. *Journal of Research on Adolescence, 12*, 463-478.
- Kobak, R. R., & Ferenz-Gillies, R. (1995). Emotion regulation and depressive symptoms during adolescence: A functionalist perspective. *Development and Psychopathology, 7*, 183-192.

- Kobak, R. R., Sudler, N., & Gamble, W. (1991). Attachment and depressive symptoms during adolescence: A developmental pathways analysis. *Development and Psychopathology, 3*, 461-474.
- Kochanska, G., & Radke-Yarrow, M. (1992). Inhibition in toddlerhood and the dynamic of the child's interaction with an unfamiliar peer at age five. *Child Development, 63*, 325-335.
- Kovacs, M. (1992). Children's Depression Inventory- Short Form. North Tonawanda, NY: Multi-Health Systems.
- Ladd, G. W. (1983). Social networks of popular, average, and rejected children in school settings. *Merrill-Palmer Quarterly, 29*, 283-307.
- Levy, B. S., & Farber B. A. (1986). Clinical implications of adolescent introspection. *Psychotherapy, 23*, 570-577.
- Lewinsohn, P. M., Hops, H., Roberts, R. E., Seeley, J. R., & Andrews, J. A. (1993). Adolescent psychopathology: I. Prevalence and incidence of depression and other DSM-III-R disorders in high school students. *Journal of Abnormal Psychology, 102*, 133-144.
- Lewinsohn, P. M., Roberts, R. E., Seeley, J. R., & Rohde, P. (1994). Adolescent psychopathology: II. Psychosocial risk factors for depression. *Journal of Abnormal Psychology, 103*, 302-315.
- MacDonald, K. (1996). What do children want? A conceptualisation of evolutionary influences on children's motivation in the peer group. *International Journal of Behavioral Development, 19*, 53-73.

- McDonald, R. P., & Ringo Ho, M.-H. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods, 7*, 64-82.
- Martin, J. M., Cole, D. A., Clausen, A., Logan, J., & Strosher, H. L. W. (2003). Moderators of the relation between popularity and depressive symptoms in children: Processing strength and friendship value. *Journal of Abnormal Child Psychology, 31*, 471-483.
- Mastropieri, M. A., & Scruggs, T. E. (1985). Early intervention for socially withdrawn children. *The Journal of Special Education, 19*, 429-441.
- Moffitt, T. E. (1993). Adolescence-limited and life-course persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 100*, 674-701.
- Muris, P., Meesters, C., & Spinder, M. (2003). Relationships between child- and parent-reported behavioural inhibition and symptoms of anxiety and depression in normal adolescents. *Personality and Individual Differences, 34*, 759-771.
- Muris, P., Merckelbach, H., Wessel, I., & Van de Ven, M. (1999). Psychopathological correlates of self-reported behavioral inhibition in normal children. *Behavior Research and Therapy, 37*, 575-584.
- Muris, P., Merckelbach, H., Schmidt, B., Gadet, B., & Bogie, N. (2001). Anxiety and depression as correlates of self-reported behavioural inhibition in normal adolescents. *Behaviour Research and Therapy, 39*, 1051-1061.
- Nangle, D. W., Erdley, C. A., Newman, J. E., Mason, C. A., & Carpenter, E. M. (2003).

- Popularity, friendship quantity, and friendship quality: Interactive influences on children's loneliness and depression. *Journal of Clinical Child and Adolescent Psychology*, 32, 546-555.
- National Institute of Child Health and Human Development Early Child Care Research Network. (2001). Nonmaternal care and family factors in early development: An overview of the NICHD Study of Early Child Care. *Journal of Applied Developmental Psychology*, 22, 457-492.
- Newcomb, A. R., Bukowski, W. M., & Pattee, L. (1993). Children's peer relations: A meta-analytic review of popular, rejected, neglected, controversial, and average sociometric status. *Psychological Bulletin*, 113, 99-128.
- Nolan, S. A., Flynn, C., & Garber, J. (2003). Prospective relations between rejection and depression in young adolescents. *Journal of Personality and Social Psychology*, 85, 745-755.
- Nolen-Hoeksema, S. (1994). An interactive model for the emergence of gender differences in depression in adolescents. *Journal of Research on Adolescence*, 4, 519-534.
- O'Brien, S. F., & Bierman, K. L. (1988). Conceptions and perceived influence of peer groups: Interview with preadolescents and adolescents. *Child Development*, 59, 99-128.
- Oldehinkel, A. J., Rosmalen, J. G. M., Veenstra, R., Dijkstra, J. K., & Ormel, J. (2007). Being admired or being liked: Classroom social status and depressive problems

- in early adolescent girls and boys. *Journal of Abnormal Child Psychology*, 35, 417-427.
- Oldenburg, C. M., & Kerns, K. A. (1997). Associations between peer relationships and depressive symptoms: Testing moderator effects of gender and age. *The Journal of Early Adolescence*, 17, 319-337.
- Ollendick, T. H., & Hirshfeld-Becker. (2002). The developmental psychopathology of social anxiety disorder. *Biological Psychiatry*, 51, 44-48.
- Parker, J. G., & Asher, S. R. (1993). Friendship and friendship quality in middle childhood: Links with peer group acceptance and feelings of loneliness and social dissatisfaction. *Developmental Psychology*, 29, 611-621.
- Pedersen, S., Vitaro, F., Barker, E. D., & Borge, A. I. H. (2007). The timing of middle-childhood peer rejection and friendship: Linking early behavior to early-adolescent adjustment. *Child Development*, 78, 1037-1051.
- Petersen, A. C., Compas, B. E., Brooks-Gunn, J., Stemmler, M., Ey, S., & Grant, K. E. (1993). Depression in Adolescence. *American Psychologist*, 48, 155-168.
- Petersen, A., & Taylor, B. (1980). The biological approach to adolescence: Biological change and psychological adaptation. In J. Adelson (Ed.), *Handbook of adolescent psychology* (pp. 117-155). New York: Wiley.
- Prinstein, M. J. (2007). Moderators of peer contagion: a longitudinal examination of depression socialization between adolescents and their best friends. *Journal of Clinical Child and Adolescent Psychology*, 36, 159-170.

- Prinstein, M. J., & Aikins, J. W. (2004). Cognitive moderators of the longitudinal association between peer rejection and adolescent depressive symptoms. *Journal of Abnormal Child Psychology*, *32*, 147-158.
- Reinherz, H. Z., Giaconia, R. M., Hauf, A. M. C., Wasserman, M. S., & Silverman, A. B. (1999). Major depression in the transition to adulthood: Risk and impairments. *Journal of Abnormal Psychology*, *108*, 500–510.
- Reinherz, H. Z., Stewart-Berghauer, G., Pakiz, B., Frost, A. K., et al. (1989). The relationship of early risk and current mediators to depressive symptomatology in adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry*, *28*, 942-947.
- Reznick, J. S., Kagan, J., Snidman, N., Gersten, M., Baak, K., & Rosenberg, A. (1986). Inhibited and uninhibited children: A follow-up study. *Child Development*, *57*, 660-680.
- Roberts, R. E., Andrews, J.A., Lewinsohn, P. M., & Hops, H. (1990). Assessment of depression in adolescents using the Center for Epidemiologic Studies of Depression Scale. *Psychological Assessment*, *2*, 122-128.
- Rubin, K. H., Coplan, R. J., & Bowker, J. C. (2009). Social withdrawal in childhood. *Annual Review of Psychology*, *60*, 141-171.
- Rubin, K. H., & Mills, R. S. L. (1991). Conceptualising developmental pathways to internalizing disorders in childhood. *Canadian Journal of Behavioral Science*, *23*, 3000-3317.

- Rubin, K. H., Wojslawowicz, J. C., Rose-Krasnor, L., Booth-LaForce, C. L., & Burgess, K. B. (2006). The best friendships of shy/withdrawn children: Prevalence, stability, and relationship quality. *Journal of Abnormal Child Psychology, 34*, 139-153.
- Rudolph, K. D. (2002). Gender differences in emotional responses to interpersonal stress during adolescence. *Journal of Adolescent Health, 30*, 3-13.
- Schmimack, U., Radhakrishnan, P., Oishi, S., Dzokoto, V., & Ahadi, S. (2002). Culture, personality, and subjective well-being: Integrating process models of life satisfaction. *Journal of Personality and Social Psychology, 82*, 582-593.
- Sheeber, L., Hops, H., Alpert, A., Davis, B., & Andrews, J. (1997). Family support and conflict: Prospective relations to adolescent depression. *Journal of Abnormal Child Psychopathology, 25*, 333-344.
- Slavin, L. A., & Rainer, K. (1990). Gender differences in emotional support and depressive symptoms among adolescents: A prospective analysis. *American Journal of Community Psychology, 18*, 407-421.
- Sontag, L. M., Graber, J. A., Brooks-Gunn, J., & Warren, M. P. (2008). Coping with social stress: Implications for psychopathology in young adolescent girls. *Journal of Abnormal Child Psychology, 36*, 1159-1174.
- Sprock, J. & Yoder, C. Y. (1997). Women and depression: An update on the report of the APA Task Force. *Sex Roles, 36*, 269-303.
- Sroufe, L. A. (1997). Psychopathology as an outcome of development. *Development and Psychopathology, 9*, 251-268.

- Turner, S. M., Beidel, D. C., & Wolff, P. L. (1996). Is behavioural inhibition related to the anxiety disorders? *Clinical Psychology Review, 16*, 157-172.
- Willeit, M., Praschak-Rieder, N., Neumeister, A., Zill, P., Leisch, F., Stastny, J., et al. (2003). A polymorphism (5-HTTLPR) in the serotonin transporter promoter gene is associated with DSM-IV depression subtypes in seasonal affective disorder. *Molecular Psychiatry, 8*, 942-946.
- Windle, M. (1992). A longitudinal study of stress buffering for adolescent problem behaviors. *Developmental Psychology, 28*, 522-530.
- Young, J. F., Berenson, K., Cohen, P., & Garcia, J. (2005). The role of parent and peer support in predicting adolescent depression: A longitudinal community study. *Journal of Research on Adolescence, 15*, 407-423.
- Zahn-Waxler, C., Klimes-Dougan, B., & Slattery, M. J. (2000). Internalizing problems of childhood and adolescence: Prospects, pitfalls, and progress in understanding the development of anxiety and depression. *Development and Psychopathology, 12*, 443-466.

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