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Stability of Self-Referent Encoding Task performance and associations with change in depressive symptoms from early to middle childhood

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Abstract

Depressed individuals exhibit memory biases on the self-referent encoding task (SRET), such that those with depression exhibit poorer recall of positive, and enhanced recall of negative, trait adjectives (referred to as positive and negative processing biases). However, it is unclear when SRET biases emerge, whether they are stable, and if biases predict, or are predicted by, depressive symptoms. To address this, a community sample of 434 children completed the SRET and a depressive symptoms measure at ages 6 and 9. Negative and positive processing exhibited low, but significant, stability. At ages 6 and 9, depressive symptoms correlated with higher negative, and lower positive, SRET processing. Importantly, lower positive processing at age 6 predicted increased symptoms at age 9. However, negative processing at age 6 did not predict depressive symptoms at age 9, and depressive symptoms at age 6 did not predict SRET processing scores at age 9. This suggests that less positive processing may reflect vulnerability for future depressive symptoms.

Depressive cognitive biases are thought to play an important role in the etiology and course of depression (Beck, 1967), with the most well-established biases pertaining to memory (Gotlib & Joormann, 2010). A popular paradigm for assessing such biases is the Self-Referent Encoding Task (SRET; Kuiper & Derry, 1982), in which individuals typically indicate whether a series of negative and positive adjectives describe themselves, and self-relevant memory biases are assessed by later asking participants to recall those words[1]. The conceptual basis for the SRET is that when individuals consider whether adjectives are self-descriptive, they are more likely to recall words that are consistent with their own self-views than words that are not. Importantly, it is only when individuals are asked to judge whether the words are self-descriptive that positive and negative biases emerge in those with depression (e.g. Kuiper & Derry, 1982). Thus, the SRET is thought to be an implicit test of self-schema, and has been used to assess the negative self-schema hypothesized to lead to

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[1]Studies differ in how they administer the SRET, and how they calculate and report SRET processing scores. The SRET is typically scored by dividing the number of recalled and endorsed (i.e., self-referent) adjectives by the number of endorsed words of the same valence (e.g. Derry & Kuiper, 1981) or by the total number of endorsed words (e.g. Prieto, Cole, & Tageson, 1992), but a number of other approaches have also been used (e.g., Alloy et al., 2012; Gençöz, Voelz, Gençöz, Pettit, & Joiner, 2001). In the present review, we consider studies of youth that included some measure of adjective recall, regardless of how the recall measure was calculated.

depression (Beck, 1967). Importantly, the SRET has been linked to cognitive vulnerabilities for depression such as rumination, dysfunctional attitudes, and maladaptive attributional style (Alloy, Abramson, Murray, Whitehouse, & Hogan, 1997; Hayden, Klein, Durbin, & Olino, 2006; Joormann, Dkane, & Gotlib, 2006).

Depressed adults endorse and recall more negative than positive adjectives on the SRET, and when compared to healthy controls, depressed adults recall more negative and fewer positive self-relevant words (Derry & Kuiper, 1981; Dobson & Shaw, 1987; Matt, Vázquez, & Campbell, 1992; Moulds, Kandris, & Williams, 2007). Additionally, a number of cross-sectional studies have compared depressed and non-depressed youth on the SRET. While some studies found that depressive symptoms were associated with both diminished recall of positive, and enhanced recall of negative self-referent adjectives (e.g. Prieto et al., 1992; Timbremont & Braet, 2004; Zupan, Hammen, & Jaenicke, 1987), others report that the effects are limited to reduced positive recall (e.g., Gençöz et al., 2001; Hammen & Zupan, 1984).

Self-referent memory biases on the SRET may be trait-like and reflect vulnerability to depression. Several studies have shown that adults in remission from depression (Fritzsche et al., 2010; Kircanski, Mazur, & Gotlib, 2013) also exhibit increased negative and decreased positive recall compared to healthy controls. In addition, Timbremont and Braet 2004) found that children and adolescents who had remitted from depression recalled fewer positive words, but did not differ on negative words, compared to never depressed youth. Furthermore, a study of the offspring of depressed parents found that at-risk youth exhibit reduced positive recall compared to offspring of healthy parents (Jaenicke et al., 1987). However, a second study found that at-risk offspring exhibited greater negative recall, but not greater positive recall (Taylor & Ingram, 1999).

In order to better understand when self-referent memory biases develop and their role in the pathogenesis of depression, it is important to assess performance on the SRET in community samples of youth, using longitudinal and other developmentally informative designs. Unfortunately, such data are limited. We are aware of only two studies addressing the development of self-referent memory biases in depression. Using a cross-sectional cohort design as an indirect method of examining age-related effects, Cole and Jordan (1995) found that, when controlling for endorsement of positive words, 4^{th}, 6^{th} and 8^{th} grade children (ages 9–15) who scored high on the Childhood Depression Inventory (CDI) were less likely to recall positive words than students who scored lower on the CDI. Interestingly, when controlling for endorsement of negative words, 4^{th} graders in the high CDI group did not recall more negative words than less symptomatic 4^{th} graders, but 6^{th} graders in the high CDI group recalled more negative words at a trend level, and 8^{th} graders in the high CDI group recalled significantly more negative words than their less symptomatic peers. In a longitudinal study of a large community sample of 7-year olds, Hayden, Olino, Mackrell, et al. (2013) reported that positive, but not negative, processing was significantly associated with self-reported depression in 7-year-old children. However, in 1- and 2-year follow-ups (at ages 8 and 9) both positive and negative processing scores were correlated with depressive symptoms. These studies suggest that the associations of positive and negative memory biases related to depression may follow different developmental trajectories, with associations between depression and decreased memory for positive traits emerging at an earlier age than associations with increased negative trait recall.

In addition to the paucity of studies on the development of self-referent memory biases in depression, little is known about the stability of the SRET. While other cognitive vulnerabilities for depression, such as negative explanatory style, have been shown to be stable in childhood (e.g. Cole & Turner Jr, 1993; Hankin, 2008), few studies have addressed whether SRET processing scores are stable over time. In the prospective study by Hayden, Olino, Mackrell, et al. (2013) discussed above, one-year test-retest stabilities for positive processing were .26 from ages 7–8 and .39 from ages 8–9; however, the two-year stability coefficient was .13. For negative processing scores, the one-year stability coefficients were $r = .25$ and .26, and two-year stability was $r = .22$. However, another study of 100 adolescents that only included negative adjectives found that the 6-month stability coefficient was $r = .16$ for negative processing, which was not significant (Black & Pössel, 2013).

Finally, and most importantly, the direction of the associations between SRET performance and depressive symptoms over time has not been clearly established. Cognitive theories of depression (e.g., Beck, 1967) posit that memory biases play an etiological role in the subsequent development of depressive symptoms. Unfortunately, few studies have examined whether SRET scores predict increases in depressive symptoms in youth. Hayden and colleagues (2013) found that positive processing at age 7 was associated with depressive symptoms at ages 8 and 9, whereas negative processing at age 7 was not associated depressive symptoms at ages 8 or 9. Black and Pössel (2013) also reported that negative processing was not associated with depressive symptoms at a 6 month follow-up, but did not examine positive processing. Conversely, depression may also influence cognitive vulnerabilities (Stewart et al., 2004). Hayden and colleagues (2013) found that depressive symptoms at age 7 were associated with negative, but not positive processing two years later; however, they also reported that depressive symptoms at ages 7 and 8 were not related to negative or positive processing assessed one year later. Similarly, Black and Pössel (2013) found that depressive symptoms were not associated with negative processing assessed 6 months later.

Although interpretation of this literature is complicated by the fact that studies differ in how depression/depressive symptoms were assessed, the use of mood inductions[2], and how SRET scores are calculated and reported, several tentative conclusions can be drawn. First, the literature indicates that negative and positive processing are both associated with current depressive symptoms in youth; however, this link is more robust and may develop earlier for biased recall of positive material (Cole & Jordan, 1995; Hayden, Olino, Mackrell, et al. 2013). Second, there is some evidence supporting the stability of SRET processing scores in youth, although stability is modest at best (Black & Pössel, 2013; Hayden, Olino, Mackrell, et al., 2013). Third, several studies suggest that positive, but not negative, processing may

[2]Although data suggest a mood induction may be a crucial component in activating negative cognitive schemas relevant to depression (Evraire, Dozois, & Hayden, in press), studies vary in whether or not they used a negative mood induction procedure (MIP). In the current review, the following SRET studies that did use a MIP include: Black & Pössel, 2013; Fritzsche et al., 2010; Hayden, Olino, Mackrell, et al., 2013; Kircanski, Mazur, & Gotlib, 2013; Moulds, Kandris, & Williams, 2007; Timbremont & Braet, 2004; Taylor & Ingram, 1999.

predict later depressive symptoms in children (Black & Pössel, 2013; Hayden, Olino, Mackrell, et al., 2013). Finally, there is little evidence that, at least in community samples, depressive symptoms are associated with subsequent SRET processing (Black & Pössel, 2013; Hayden, Olino, Mackrell, et al., 2013).

In this study, we sought to add to the literature on self-referent memory biases in children in several ways. First, using a large community sample of 6-year-old children, we examined whether self-referent memory biases predicted an increase in depressive symptoms three years later. Second, we explored the direction of the relationship by determining whether depressive symptoms also predicted subsequent positive and negative processing. Third, we assessed the 3-year stability of SRET performance. Finally, the youngest children included in published studies of the SRET were 7 years old, and most studies had average ages well above that. Hence, we extended the literature by examining whether associations between depressive symptoms and recall for positive and negative self-referent information are evident as early as age 6.

Method

Participants

This paper is based on data from the Stony Brook Temperament Study, a longitudinal study of risk for internalizing psychopathology in a large community sample of 3-year-old-children in Long Island, New York (Hayden, Olino, Bufferd, et al., 2013; Olino et al., 2010). 559 children entered the study at age 3; an additional 50 children were recruited at age 6 in order to increase racial and ethnic diversity. One child from each family participated. This paper is based on assessments conducted when children were aged 6 and 9. A total of 492 children completed the measures described below for the age 6 visit, 459 children completed the measures at age 9, and 434 children completed both the age 6 and 9 assessments (25 children who participated at age 9 did not participate at age 6). At the time of the age 6 assessment, children were a mean 6.08 years old ($SD = 0.42$). At the time of the age 9 assessment, children were a mean 9.19 years of age ($SD = 0.34$). The study procedures were approved by the Committees on Research Involving Human Subjects at Stony Brook University.

Demographic information for those who completed both assessments and those who completed only the age 6 assessment are shown in Table 1. Chi square tests showed that children who completed both assessments were significantly more likely to be Caucasian/non-Hispanic, χ^2 (1, $N = 492$) = 6.76, $p < .05$, and were more likely to come from a home where at least one parent holds a four year college degree, χ^2 (1, $N = 492$) = 3.62, $p < .05$. Additionally, independent samples *t*-tests showed that children who failed to complete the age 9 assessment tended to have higher depression symptoms on the CDI at age 6 than those who completed both assessments, t (490) = 1.97, $p = .05$.

Measures

Child depression—At both the age 6 and age 9 assessments, children completed the Child Depression Inventory (CDI; Kovacs, 1992), a well-established self-report measure of depression symptomatology that was designed for youth ages 7–17, but also has predictive validity for 5-year-olds (Ialongo, Edelsohn, & Kellam, 2001). Children completed the CDI with the aid of a researcher who read the items to them. Since some of the children had not yet started first grade by the time of the age 6 assessment, the two items specific to school were excluded; at the age 9 assessment the full CDI was given. Cronbach's α was 0.75 and 0.74 at the age 6 and age 9 assessments, respectively.

Verbal ability—At age 6, children were administered the Peabody Picture Vocabulary Test-III (PPVT; Dunn & Dunn, 1997), a widely-used measure of receptive vocabulary with established reliability and validity. The PPVT was included as a covariate in analyses to control for individual variation in cognitive ability and verbal comprehension.

Mood induction procedure—Before administration of the SRET, children watched a sad video clip, which was followed by sad music. A film clip was used since a meta-analysis identified clips and stories as the most effective mood induction procedures (Westermann, Spies, Stahl, & Hesse, 1996); further, this procedure has been shown to lead to coded and self-reported reductions in children's moods in several other studies (Hayden, Olino, Bufferd, et al., 2013; Hayden, Olino, Mackrell, et al., 2013).

The film clip at age 6 depicted a funeral scene from the film *My Girl* (Zieff, 1991). The clip at age 9 was a scene from *The Dead Poets Society* where a young boy was told about a friend passing away (Weir, 1989). Both clips lasted less than 3 minutes and were of comparable duration. After the clip *Adagio for Strings* (Barber, 1936), which has been shown to evoke sad emotion (Siemer, 2005), was played on a 10 minute loop until the end of the recall test. As a manipulation check, before and after the clips the children were asked to indicate how they were feeling on a 1-item scale with the following words: very sad, sad, OK, happy, or very happy, which was accompanied by an illustration of the corresponding facial expression for each word. Responses were scored on a 5-point ordinal scale, with very sad coded as 1 and very happy as 5. At both assessments, paired *t*-tests showed that the induction significantly reduced positive mood, (age 6: t [429] =18.79, $p < .001$; age 9: t [431] = 36.93, $p < .001$; mood scores were missing for 4 subjects at age 6 and for 2 subjects at age 9).

Self-referent encoding task (SRET)—At ages 6 and 9, the SRET was used to assess delayed recall of self-descriptive negative and positive adjectives. Children were shown words printed on 5 × 7 note cards while the experimenter read the words aloud. After each word, the child was asked if the word described them. First, children were shown cards that said "boy" and "girl" to determine that they understood the self-descriptive nature of the task. For the actual task, 14 positive and 14 negative words were presented randomly. Two neutral words used as buffers at the beginning and end of the task, to reduce primacy and recency effects, were not considered in analyses. The words were selected and matched for frequency and grade 3 readability (Carroll, Davies, & Richman, 1971; Hayden et al., 2006). After a short delay, subjects were asked to recall as many words as possible and were given three minutes to do so. The same adjectives were used at age 6 and at age 9. After the task, children received a small prize.

As noted previously, studies using the SRET have used a variety of approaches for calculating memory biases; however, the most common approach is to take the number of positive or negative words recalled and endorsed as the numerator and the total number of both positive and negative words endorsed as the denominator (e.g., Prieto et al., 1992; Zupan, et al., 1987). We used this method as it has become the standard in the adult SRET literature, and is preferable because it controls for overall endorsement rates, which have been shown to vary by groups and arbitrarily shift processing scores (Prieto et al., 1992).

Results

Bivariate correlations for the CDI and positive and negative processing scores are shown in Table 2. The magnitude of the correlations was small, but negative and positive processing and depressive symptoms each exhibited significant stability over the three-year follow-up period (respectively, r = .10, .24, and .22, $p < .05$). Examination of cross-sectional associations indicated that at age 6, depressive symptoms were correlated with negative processing (r = .14, $p < .005$), and inversely associated with positive processing ($r = -.12$, $p < .05$). Similarly, at age 9 depressive symptoms were correlated with negative processing (r = .24, $p < .001$), and inversely associated with positive processing ($r = -.16$, $p < .005$).

We conducted 3 multiple linear regression analyses to examine the longitudinal relationships between age 6 SRET positive and negative processing and age 9 CDI scores, as well as between age 6 CDI scores and age 9 positive and negative processing. First, we regressed age 9 CDI on child sex, race/ethnicity, standardized scores from the Peabody Picture Vocabulary Test-III , age 6 CDI, and age 6 SRET positive and negative processing (see Table 3). Racial/ethnic minority status and age 6 CDI predicted greater CDI scores at age 9, and there was a marginally significant effect for child gender (p = .05), with boys having lower CDI scores at age 9 than girls. Importantly, lower positive processing at age 6 significantly predicted higher CDI scores at age 9 over and above the effects of age 6 negative processing and other covariates ($\beta = -.11$, t (427) = −2.30, $p < .05$). However, negative processing at age 6 did not predict CDI scores at age 9 (β = .01, t (427) = .17, $p > .05$).

In the next two models, we examined whether depressive symptoms at age 6 predicted positive and negative processing at age 9 after controlling for child gender, race/ethnicity, PPVT score, and the corresponding age 6 SRET processing score. Thus, age 9 positive processing was regressed on child gender, race/ethnicity, standardized scores from the Peabody Picture Vocabulary Test-III, positive processing, and age 6 CDI score (Table 4). Positive processing at age 6 (β = .24, t (428) = 5.04, $p < .001$) and being male ($\beta = -.10$, t (428) = −2.02, $p < .05$) predicted positive processing at age 9. However, age 6 CDI did not predict positive processing at age 9, $\beta = -.04$, t (428) = −0.82, $p > .05$.

In the final model, age 9 negative processing was regressed on child gender race/ethnicity, and age 6 PPVT, negative processing, and age 6 CDI score (Table 5). Negative processing at age 6 predicted negative processing at age 9 at a trend level ($p < .10$), but racial minority status, standardized scores from the Peabody Picture Vocabulary Test-III, and gender were not associated with age 9 negative processing. Additionally, age 6 CDI did not predict negative processing at age 9, $\beta = 0.07$, $t\,(428) = 1.47$, $p > .05$.[3]

Discussion

This is one of few studies to explore the stability of SRET processing scores and the prospective relationships between the SRET and depressive symptoms in children, and the first study to examine the association of SRET processing and depression in children as young as 6 years of age. SRET negative and positive processing showed some evidence of stability over 3 years, although the effect sizes were quite small. Interestingly, the stability coefficients in our study were nearly identical to the 2-year stability coefficients found in another sample of slightly older children (Hayden, Olino, Mackrell, et al., 2013). These results are consistent with the sparse literature on the stability of other laboratory tests that index cognitive vulnerabilities for depression, such as the Autobiographical Memory Task, which also report relatively small long-term stability coefficients (e.g. Sumner et al., 2014) and the dot-probe, a commonly used laboratory test for attentional biases, possess poor stability using bivariate correlations (e.g. Staugaard, 2009).

We observed significant cross-sectional associations of higher negative and lower positive processing with the CDI at both ages 6 and 9. The magnitude of the association at age 6 was small, but increased somewhat at age 9. The relationship between positive processing and depression was consistent with previous studies (2012; Gençöz et al., 2001; Hammen & Zupan, 1984; Hayden, Olino, Mackrell, et al., 2013; Prieto et al., 1992; Timbremont & Braet, 2004; Zupan, Hammen, & Jaenicke, 1987). However, the literature on negative processing and depression in youth is less consistent, with some studies (Prieto et al., 1992; Timbremont & Braet, 2004; Zupan, Hammen, & Jaenicke, 1987), but not others (e.g., Alloy et al., 2012; Black & Pössel, 2013; Gençöz et al., 2001; Hammen & Zupan, 1984) reporting a significant association. In some cases, non-significant findings may be due to sample sizes too small to detect small-to-medium effects and to methodological differences, such as the lack of a sad mood induction prior to the SRET, which is important for detecting associations between SRET performance and depressive vulnerabilities (Evraire et al., in press). While several studies have suggested that the relationship between depression and processing biases emerges earlier for positive than negative material (Cole & Jordan, 1995; Hayden, Olino, Mackrell, et al. 2013), we found evidence of significant associations for *both* positive and negative processing and depressive symptoms as early as age 6.

We also investigated the direction of the associations between SRET processing and depressive symptoms over time. To do this, we regressed age 9 depression scores on gender, race/ethnicity, and age 6 verbal ability, processing scores, and depression symptoms. We found that lower positive, but not negative, processing at age 6 predicted increased depressive symptoms at age 9.

[3]None of the regression models were moderated by an interaction between CDI scores and sex; therefore, the interaction term was not included in the above analyses.

Similar to our results, Hayden and colleagues (2013) found that positive, but not negative, processing at age 7 predicted depressive symptoms at 8 and 9 years of age. Moreover, Black and Pössel (2013) found that negative processing did not predict depressive symptoms in a 6-month follow-up of an adolescent sample. However, Hayden, Olino, Mackrell, et al. (2013) did observe an association between negative processing at age 8 and depression at age 9. Overall, our results are congruent with other longitudinal findings in children suggesting that vulnerability for depression is more closely related to positive, than negative processing biases. Future research should explore whether positive processing biases are associated with atypical development of positive affectivity in children at risk for depressive disorders (Kovacs & Lopez-Duran, 2010; Olino et al., 2011).

In contrast, regression analyses indicated that depressive symptoms at age 6 did not predict an increase in negative or positive processing at age 9. Our results are similar to those of Hayden and colleagues (2013) and Black and Pössel (2013), who found that over 6–12 month intervals, depression was not associated with future negative processing. However, Hayden and colleagues (2013) did find that depression predicted negative processing two years later.

The small effect observed between positive processing and future depression does not detract from its clinical relevance since there are likely many pathways of limited magnitude that lead to depression in youth (multifinality) (Klein, Kujawa, Black, & Pennock, 2013). Thus, positive processing might be considered as one target in a multi-faceted early intervention/prevention package. Additionally, we did not examine whether associations between SRET and depressive symptoms were moderated by stress, as predicted by diathesis-stress models of cognitive vulnerability to depression (Beck, 2008). According to these theories, the occurrence of stressful life events potentiates the link between cognitive vulnerability and depression; thus, weaker associations between cognitive risk and depressive symptoms would be expected when the impact of stress is not considered.

Overall, our data suggest that positive and negative processing are concurrently associated with depression as early as age 6, and has very modest but significant stability over 3 years. In addition, positive, but not negative, processing predicts an increase in depressive symptoms, but SRET scores do not predict changes in depressive symptoms. To the best of our knowledge, this study used the largest sample and the longest prospective design in the youth SRET literature. However, our study also had some limitations. Not surprisingly, since this is a young community sample, levels of depressive symptomatology were low and our findings may not generalize to clinical levels of depression. While the long follow-up interval is a stringent test of stability, it could be a limitation for studying reciprocal relationships with depressive symptoms since effects of SRET processing scores on depression may unfold rapidly, prior to follow-up, and are therefore not captured by this later wave of data collection. In addition, the sample was predominantly middle class and Caucasian, so it is important to replicate these results in more diverse samples. Lastly, children who completed the first assessment, but did not return for follow up were more likely to be minorities, from families with less education, and reported greater levels of depression at age 6. This also reduces the generalizability of our results; however, since those who did not complete the follow-up reported greater depression scores at the age 6 visit, it is possible that our results underestimate the true effect size.

Future research should seek to extend these findings in several ways. First, studies should examine whether memory biases on the SRET in early childhood continue to predict depressive symptoms into adolescence and adulthood, and whether this includes the prediction of clinically significant forms of depression. Second, it will be important to continue to examine developmental changes in the stability of the SRET and its relation to depressive symptoms, especially throughout later childhood and early adolescence. Third, future work should incorporate measures of stress exposure in testing links between SRET performance and depressive symptoms. Finally, since both our study and reports by others suggest that positive processing may be a vulnerability marker for depression, it would be important to determine whether the SRET meets criteria for an endophenotype (Goldstein & Klein, 2014), and to examine associations between the SRET and other vulnerability markers in order to elucidate the converging and diverging pathways to developing depression.

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Table 1

Demographic and descriptive statistics

	Participants who completed both waves (*N* = 434)	**Participants who completed baseline only (*N* = 58)**
Age at year 6 visit, M yrs; (SD)	6.10 (0.40)	5.98 (0.57)*
Age at year 9 visit, M yrs; (SD)	9.19 (0.34)	N/A
Gender (Male/Female)	235/199	32/26
Non-white (%)and ethnicity (Caucasian/ or Minority (racial or ethnic)	19.6%	34.5%*
Parental Education (% of children who have at least 1 parent with a 4 year degree)	67.7%	55.2%*
Age 6 standardized PPVT, M (SD)	108.16 (10.51)	109.03 (11.81)
Age 6 CDI, M (SD)	7.39 (5.34)	8.90 (6.33)*
Age 6 Negative Processing, M (SD)	.02 (0.04)	.03 (0.05)
Age 6 Positive Processing, M (SD)	.15 (0.13)	.13 (0.13))
Age 9 CDI, M (SD)	4.83 (4.13)	N/A
Age 9 Negative Processing, M (SD)	.03 (0.06)	N/A
Age 9 Positive Processing, M (SD)	.34 (0.14)	N/A

* indicates significant difference

Table 2

Depressive symptoms and SRET correlations

	1	**2**	**3**	**4**	**5**
1. Negative Processing age 6	-				
2. Positive Processing age 6	−.09*	-			
3. CDI age 6	.14**	−.12*	-		
4. Negative Processing age 9	.10*	−.10*	.10*	-	
5. Positive Processing age 9	−.09	.24***	−.06	−.24***	-
6. CDI age 9	.04	−.13**	.22***	.24***	−.16***

* $p < .05$,

** $p < .01$,

*** $p < .001$

Table 3

Multiple Regression examining association of positive processing at age 6 with CDI at age 9

	B	SE	β	95% CI band B		t	p
				Lower	Upper		
Child's gender*	−.75	.39	−.09	−1.51	.02	−1.93	.06
Hispanics and minorities vs. White non-Hispanic[2]	1.09	.50	.11	.11	2.07	2.18	.03
PPVT	−.00	.02	−.00	−.04	.04	−.04	.97
Age 6 CDI	.14	.04	.18	.07	.21	3.73	.00
Age 6 negative processing	.87	5.13	.01	−9.21	10.95	.17	.87
Age 6 positive processing	−3.54	1.55	−.11	−6.57	−.48	−2.30	.02
Adjusted R^2 = .07							

*Gender is coded so that Male = 0 and Female = 1.

[2]Ethnicity and race is coded so that White non-Hispanic = 0 and Hispanic and other minorities = 1.

Table 4

Multiple Regression examining association of CDI at age 6 with positive processing at age 9

	B	SE	β	95% CI band B		t	p
				Lower	Upper		
Child's gender*	−.03	.01	−.10	−.05	−.00	−2.02	.04
Hispanics and minorities vs. White non-Hispanic[2]	−.01	.02	−.02	−.04	.03	−.32	.75
PPVT	.00	.00	.01	−.00	.00	.28	.78
Age 6 CDI	−.00	.00	−.04	−.00	.00	−.82	.41
Age 6 positive processing	.26	.05	.24	.16	.36	5.04	.00
Adjusted R^2 = .06							

*Gender is coded so that Male = 0 and Female = 1.

[2]Ethnicity and race is coded so that White non-Hispanic = 0 and Hispanic and other minorities = 1.

Table 5

Multiple Regression examining association of CDI at age 6 with negative processing at age 9

	B	SE	*β*	95% CI band B		*t*	*p*
				Lower	Upper		
Child's gender*	−.00	.01	−.03	−.02	.01	−.54	.59
Hispanics and minorities vs. White non-Hispanic[2]	.01	.01	.06	−.01	.03	1.24	.21
PPVT	.00	.00	.01	.00	.00	.25	.80
Age 6 CDI	.00	.00	.07	.00	.00	1.47	.14
Age 6 negative processing	.14	.08	.09	−.01	.30	1.80	.07
Adjusted R^2 = .01							

*Gender is coded so that Male = 0 and Female = 1.

[2]Ethnicity and race is coded so that White non-Hispanic = 0 and Hispanic and other minorities = 1.