ATTRIBUTIONAL STYLE AND DEPRESSION: A PROSPECTIVE STUDY OF ADOLESCENT FEMALES

by

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Abstract

Negative life events (NLEs), attributional style (AS), and depression were prospectively examined with adolescent girls, with youth assessments every 6 months (grades 9 -11) and parent reports of childhood NLEs at baseline. Growth curve modeling revealed that both AS and NLEs predicted depression at baseline. With AS controlled, those with high NLEs showed a decline in depression over time, such that childhood NLEs were not linked with depression thereafter. However, with NLEs controlled, those with a depressogenic AS at baseline showed more depressive symptoms at all points throughout follow-up. At the sixth assessment, girls also completed a NLEs questionnaire for high school years. Depression was related to both baseline and 30-month AS, and high school, but not childhood, NLEs. Thus, NLEs and AS were important predictors of depression. However, the link between NLEs and depression appears to be temporal and dissipates over time, whereas AS has a consistent impact over time.

Glossary

Abbreviation/Symbol	Name
ARAA	Adolescent Reported Adolescent Adversity
ARCA	Adolescent Reported Childhood Adversity
α	Alpha
AS	Attributional Style
BDI	Beck's Depression Inventory
β	Beta
CDI	Childhood Depression Inventory
CASQ-r	Children's Attributional Style Questionnaire: Revised
CITES -II	Children's Impact of Traumatic Life Events Scale – II
r	Estimate of the Pearson Correlation Coefficient
LS	Left Study
MDD	Major Depressive Disorder
NLE	Negative Life Event
NEA	Negative Event Attribution
PEA	Positive Event Attribution
PRCA	Parent Reported Childhood Adversity
RAP	Resourceful Adolescent Program
RIS	Remained in Study
SE	Standard Error
VDI	Vanderbuilt Depression Inventory

Introduction

Major Depressive Disorder and Depressive Symptomology

Major depressive disorder (MDD) is a debilitating mental health condition, causing both short- and long-term emotional, behavioral, and interpersonal functional impairment. Major depressive disorder is defined as a mental health illness that is made up of one or more major depressive episodes (MDE) lasting a minimum of 2 weeks per episode. Symptoms of MDE, as described in the *Diagnostic and Statistics Manual-Fifth Ed*. *(DSM-5)*, include depressed mood, anhedonia, changes in sleep and or body weight, as well as feelings of worthlessness, irritability in children and adolescents and/or preoccupation with death (American Psychiatric Association, 2013). Whereas a number of elevated depression symptoms are required for a diagnosis of MDD, depressive symptomology (i.e., higher than average feelings of depressed mood or worthlessness) may also have detrimental effects on a person's wellbeing. Recent studies found that sub-threshold levels of depressive symptomology can be as damaging to an individual as suffering from MDD (Lewinsohn, Shankman, Gau, & Klein, 2004). Major Depressive Disorder tends to be recurrent, with 50% of adults and 40% of children and youth reporting subsequent episodes within 2 years of recovery (Lewinsohn, Clarke, Seeley, & Rohde, 1994). Furthermore, studies report that those who suffer their first episode of MDD prior to age 18 are significantly more likely to develop a new MDD in early adulthood (between the ages of 19 and 24) compared to both adolescents with no previous diagnosis and adolescents diagnosed with non-affective disorders (Lewinsohn et al., 2004). Indeed, MDD in adolescence has been demonstrated to significantly impair functioning in work, home, and school environments, with lasting effects that have been shown to carry on into adulthood (Geller, Zimmerman, Williams, Bolhofner, & Craney, 2001). Results such as these suggest that understanding the nature and progression of

MDD in adolescence is especially important, as identification of factors related to onset of adolescent depression may have important implications for the lifespan.

Depression is uncommon during early childhood, with an overall reported prevalence of less than 3% (Fleming & Offord, 1990). However, between the 9th and 11th years of life (i.e., at the onset of puberty), depression symptomology and diagnoses increase (Cyranowski, Frank, Young, & Shear, 2000; Lewinsohn, Clarke, Seeley, & Rhode, 1994). Incidence of depression is relatively high during adolescence. North American estimates established through the National Comorbidity Survey determined that 17% of all respondents aged 15-54 had experienced at least one MDE, with 10% experiencing a MDE within a given 12-month period (Kessler et al., 1994). The highest prevalence of MDEs occurred in participants between the ages of 15 to 24 years of age (Kessler et al., 1994). Similar results were obtained in a more recent nationwide sample of Flemish youth aged 15 to 24 years with a 12.4% prevalence rate of MDD occurring during a 1-year period (Haarasilta, Marttunen, Kaprio, & Aro, 2001).

Depression rates are slightly over represented in boys before age 9; however, the onset of puberty marks a reversal in this trend. Whereas prevalence rates of MDD in both boys and girls increase after age 9, girls are at an increased risk of suffering from MDD, with a diagnosis rate twice that of boys (Cyranowski, Frank, Young, & Shear, 2000; Masip, Amador-Campos, Gomez-Benito, & Barrio Gandara, 2010). This trend of increased prevalence of MDD in girls and women is maintained throughout the lifespan until adults are in their fifties (Cyranowski, Frank, Young, & Shear, 2000). This trend has been reported worldwide, with ratios ranging from 1.6:1 in Lebanese and Taiwanese samples to 3.5:1 in a German ample (Cyranowski et al., 2000). Studies have also suggested that MDD is more severe and of longer duration in females than males (McCauley, Myers, Mitchell, Calderon, Schloredt, & Treder, 1993).

A number of factors are thought to increase the risk of depression among adolescents, with some factors particularly relevant for teen girls. MDDs are known to have a familial component; though the mechanisms are not well understood, they include biopsychosocial factors, family stress, and modeling as potential linkages (Fleming & Offord, 1990; Garber, 1991; Kessler, Avenevoli, & Merikangas, 2001). Negative life events (NLEs), trauma, and adversity (e.g., being in an accident, being diagnosed with a fatal disease, being abused) are also risk factors for depression (Fleming & Offord, 1990; Lara & Klein, 1999), and appear to be linked to increased length of depressive episodes in both clinical (Brown, Harris, Hepworth, & Robinson, 1994) and community (Brown & Moran, 1994) samples. Cognitive style has also been linked with depression (Jackson & Cole, 1994; Muris, Schmidt, Lambricks, & Meesters, 2001; Nolen-Hoeksema, Seligman, & Girgus, 1992; Rodriguez & Pehi, 1998), particularly in the context of coping with life stressors as is consistent with the cognitive diathesis-stress theory of depression. Cognitive diathesis-stress theories of depression posit that a negative cognitive diathesis (e.g., depressogenic or pessimistic attributional style) reacts with a perceived or present NLE to predict an increase in depressive symptoms (Conley, Haines, Hilt & Metalsky, 2001). Hopelessness depression is one subtype of depression which suggests that AS may act as a key cognitive component in the diathesis-stress interaction (Abramson, Metalsky, & Alloy, 1989).

Negative Life Events

Unfortunately, recent epidemiological surveys indicate that NLEs are quite common among children and adolescents, including events considered potentially traumatic by the DSM-IV (American Psychiatric Association, 1994; Briggs-Gorman, Carter, Clark, Augustyniak, McCarthy, & Ford, 2010; Costello, Erkanli, Fairbank, & Angold, 2002). Potentially traumatic events cited by the DSM-5 (American Psychiatric Association, 2013) range from being witness

to an event that was perceived as life-threatening (e.g., witnessing a car accident or being verbally threatened) to being directly involved in a life-threatening incident (e.g., being physically assaulted or tortured). Most studies that report prevalence rates of traumatic life events in children and youth use adult or researcher identified traumatic experiences and fail to include events that could be perceived or experienced as negative to a child, such as bullying or moving homes (Finkelhorn, Ormrod, Turner, & Hamby, 2005). Thus, the amount of youth victimization and exposure to NLEs are often underestimated in the general population. Even when underestimated, the statistics suggest that exposure to traumatic events in childhood is overwhelmingly common. In the Great Smoky Mountain epidemiological study, Costello et al. (2002) identified that a quarter of children had experienced potentially traumatic events such as those identified by the DSM-IV (American Psychological Association, 1994), before the age of 18. As well, Finkelhor, Ormrod, Turner, and Hamby (1992) reported that only 29% of a large representative sample of American children aged 2-17 years had *not* encountered any direct or indirect form of victimization. Additionally, Costello et al. (2002) noted that exposure to lower magnitude stressful events (i.e., a stressful event, but not of the magnitude defined as "traumatic" by the DSM-IV; American Psychological Association, 1994) are quite common, with 25% of the 1420 adolescents involved in the Great Smoky Mountains Study indicating having experienced a low magnitude stressful event in the three months prior to the study (Costello et al., 2002). For some, low and high magnitude NLEs tend to set the stage for the onset of additional stressors, such that a number of stressors occur within a relatively short period of time (Costello et al., 2002). Less research has been conducted into the long-range predictive ability of NLEs on future NLEs, and even fewer studies have estimated the predictive ability of childhood NLEs to predict adolescent NLEs.

Many studies have demonstrated the relationship between NLEs and concurrent or subsequent depression symptomology in children, adolescents and adults. A prospective study by Robinson, Garber, and Hilsman (1995) of 381 sixth grade students demonstrated that children who indicated higher levels of daily hassles and NLEs at the end of grade 6 reliably reported higher levels of both depression and externalizing problems in the fall of grade 7 than those students who indicated low or moderate levels of stressful life events. As well, studies have reported relations between major life events and daily hassles and depression symptomology in both short term (Allgood-Merten, Lewinsohn, & Hops, 1990) and long term longitudinal studies (Ge, Lorenz, Conger, Elder, & Simons, 1994) in adolescent populations. Similarly, longitudinal studies have found evidence of a relation between NLEs and depression symptomology in children (Nolen-Hoeksema, Girgus, & Seligman, 1992) and adult studies have found support for the effect of both childhood and adult experienced NLEs in the prediction of adult depressive symptomology (Korkeila et al.,2010).

Attributional Style

As noted above, cognitive theories of depression, including diathesis-stress and subtypes of depression such as hopelessness depression, posit that depressive symptoms are closely linked with dysfunctional thought processes (Abramson, Seligman & Teasdale, 1978; Abramson, Metalsky, & Alloy, 1989). A depressogenic or pessimistic AS is defined as the tendency to attribute NLEs to causal factors that are internal (“This is my fault”), stable (“This is going to last forever”) and global (“This is going to affect everything I do”), while attributing positive events to external (“Something outside of me caused this”), specific (“This has only affected the current situation”), and unstable (“It will be different next time”) factors. On the other hand, an optimistic AS is characterized by tendencies to attribute NLEs to factors that are external (“This

occurred because of something outside of myself"), specific ("This has only affected the current event"), and unstable (It will be different next time"), and positive events to factors that are internal ("My hard work paid off"), global ("In general, most things in my life are going well"), and stable ("I look forward to having a positive future").

Mounting evidence ties AS to mental health and quality of life outcomes. Optimistic AS has been linked with lower rates of depression in adults, including community samples and individuals with diagnoses of schizophrenia and MDD (Silverman & Peterson, 1993). Pessimistic AS has also been linked through correlational studies with depression in adolescents (Rodriguez & Pehi, 1998; Muris, Schmidt, Lambricks, & Meesters, 2001) and in adult women (Bruder-Mattson & Hovanitz, 1990). Indeed, Robinson, Garber, and Hilsman (1995), in their longitudinal study following children through the transition from grades 6 to 7, determined that AS predicted depression symptoms six months following the transition independent from adolescents' reported stressful life events. These studies suggest that AS may predict depression regardless of the experience of NLEs.

Literature regarding AS in children and adolescents has relied heavily upon the Children's Attributional Style Questionnaire - Revised (CASQ-R; Thompson, Kaslow, Weiss, & Nolen-Hoeksema, 1998) to assess AS. Psychometric data for the CASQ-R supports use of a dependent variable (difference score) that includes subscales that measure internal, global and stable attributions for both positive and negative events. As well, studies have tied both the CASQ and the CASQ-R to depressive symptoms, both for the difference score (Schoenherr et al. 1992) and for the negative event attributions sub-score (Dixon & Ahrens, 1992; Hilsman & Garber, 1995). Though both the difference score and the negative event scores have been linked

with depression, it remains unclear as to which of the scores is most strongly linked with depression.

Diathesis Stress Models

As noted above, both NLEs and AS have been linked to depression and other adjustment problems in children, adolescents, and adults. Cognitive diathesis-stress theories of depression suggest that it is the interaction of these sets of variables that are truly predictive of depression (Conley, Haines, Hilt, & Metalsky, 2001). Support for the cognitive diathesis-stress model of depression in children and adolescents can be found in studies assessing AS and its interaction with NLEs in predicting increases in depression symptoms (Dixon & Ahrens, 1992; Hilsman & Garber, 1995; Schoenherr, Brown, Baldwin, & Kaslow, 1992; Shelley & Craig, 2010). Generally, these studies have used a short-term longitudinal model that assesse AS in interaction with relatively mild stressors (e.g., camp-related stress, poor grade; Dixon & Ahrens, 1992; Hilsman & Garber, 1995).

Nolen-Hoeksema, Girgus, and Seligman (1992) conducted a more lengthy longitudinal study spanning childhood up to early adolescence (i.e., grades 3 to 8). The results of this study indicate support for the diathesis-stress model of depression in older children, such that the interaction of AS and NLEs predicted depressive symptomology beginning around grade 6. Indeed, during the childhood years, NLEs (e.g., death of a grandparent, bullying), but not AS, was related to depressive symptoms. However, as children aged (around grade 8) negative AS became the stronger predictor of depression symptoms. Similarly, in their cross-sectional study of children in grades 4, 6 and 8, Turner and Cole (1994), found support for the cognitive diathesis-stress model of depression in grade 8 students, but only a weak or nonexistent effect for students in grades 4 and 6. Both of these studies suggest that as AS solidifies and becomes more

trait-like in adolescence, it begins to play a significant role in predicting depression symptoms, particularly when combined with the experience of NLEs.

Development of Attributional Style

Research has demonstrated developmental changes in AS over the course of childhood and into early adolescence. Very young children do not demonstrate consistent attributions for events, regardless of the positive or negative nature of the event (Gibb, Alloy, Walshaw, Comer, Shen, & Villari, 2006). Recent studies demonstrate that it is only around the seventh year of life that children begin to demonstrate more consistent and trait-like attributions across a variety of social and academic events as opposed to early childhood attributions that are state dependent and based on current internal or external influences (Cole, et al., 2008; Brandon et al., 2006). For example, a very young child may attribute a cause for an event based on internal or external factors such as mood, weather, hunger, or the attitudes of others. These attributions are based on the current state of the child. Contrarily, older children's attributions appear to be more trait-like in that they are more consistent over time, and do not change based on external and internal influences. Although these budding ASs begin around age 7, there is some evidence that AS does not solidify into a true trait-like feature until children are approximately 12-years-old (Gibb, Alloy, Walshaw, Comer, Shen, & Villari, 2006). Gibb et al. (2006) found moderate correlations between CASQ-R scores separated by 6 months in children in grade 4 and 5 (r = .48), while Hankin (2008) determined (through the use of hierarchical linear modeling), that negative AS did not significantly change in adolescents (ages 11-17) over four assessment points conducted within a 5-month period. Stability such as demonstrated above by Hankin (2008) is consistent with test-retest scores seen in adult populations on the same measures over relatively short

testing periods (4-months, r = .63; Campbell & Henry, 1999), as well as on similar measures over a 52-year period , r = .54; Burns & Seligman, 1989).

Mezulis, Funaskis, and Hyde (2011) longitudinally explored the trait vs. state nature of attributional style in an adolescent population between the ages of 11- and 15-years. Although initial analyses indicated a non-significant mean level change in cognitive style scores within individuals over time, further analyses identified three different trajectories: (a) a normative sample, the largest group (71%), had more positive AS that did not change over the course of the study; (b) the *increasing* sample, the second largest group (22%), whose AS became more negative over the course of the study; and (c) the decreasing group, the smallest sample (7%), whose AS, although beginning and remaining more negative than the other two groups, became less negative over time. The three groups differed in that the second group showed higher rates of NLEs over the course of the study. Thus, the study suggests that AS may have solidified for the majority of adolescents by age 11; however, AS became more depressogenic or pessimistic for those that experienced more NLEs during adolescence.

Research has only begun to determine factors contributing to the development of an AS. NLEs, and in particular chronic NLEs and traumatic events, have been linked to AS in a number of studies involving children (Bruce et al., 2006), and adolescents (Garber & Flynn, 2001; Mezulis, Funaskis, & Hyde, 2011). In their longitudinal study of children in grades 2, 4 and 6, Bruce et al. (2006) obtained child and parent reported NLEs (occurring in the prior six months) and subsequently child reported AS (negative event scores only) a month later. Bruce et al. (2006) determined that although parent reported NLEs were not significantly related to AS, child reported NLEs were positively correlated with AS in each grade. Garber and Flynn (2001) identified a similar effect in adolescents during their 3-year study of adolescents from grades 6 to

8. In this study, parent and child reports were gathered annually on measures of AS (difference score on the CASQ-R), as well as parent reports of life events occurring between each assessment point. Through hierarchical regressions, the researchers found that NLEs occurring in the previous year significantly predicted changes in AS at the beginning of grade 7, but not at subsequent assessment points when results controlled for previous AS scores. Taken together, these studies suggest that NLEs play a role in the development of depressogenic AS.

Individual differences in AS and histories of early NLEs may have important implications for the adolescent expression of depression symptomology when combined with experience of significant NLEs in the transitional life stage of adolescence. Understanding the relation between early NLEs, AS, and the development of depressive symptomology may aid clinicians and community health care workers in identifying adolescents who are particularly vulnerable in the face of stressors, as well as develop increasingly proactive approaches to intervening with adolescents at risk of developing internalizing disorders such as depression.

The Present Study

Past research highlights linkages between NLEs, depressive symptoms, and AS; however, these relationships must be considered within a developmental context. First, MDD is uncommon during childhood but becomes quite prevalent during adolescence, particularly for female adolescents. Second, NLEs appear to be a prominent predictor of depressive symptoms in children. Third, AS has been linked with depressive symptoms in late childhood but appears to be a particularly strong predictor of depression during the adolescent years. Fourth, AS stabilizes and becomes "trait-like" during early adolescence; however, NLEs during adolescence may contribute to the further development of depressogenic or pessimistic AS. Fifth, there is

evidence from short-term longitudinal studies that support the diathesis-stress theory of depression that posits an interaction between NLEs and AS in predicting depression.

Previous research by Nolen-Hoeksema, Girgus, and Seligman (1992) provides a developmental context for considering the unique roles of NLEs and AS in relation to depressive symptoms with a population of children. The present study extends this line of research to investigate the relationships among these variables using a prospective, longitudinal method with an adolescent sample. Because of significant sex differences in risk for adolescent depression and particular types of NLEs, this study was restricted to a female population. The current study allows for both a concurrent and prospective investigation of the role of past and recent NLEs and past and current AS on depressive symptomology. This methodology also allows for an investigation of the diathesis-stress model by examining the interaction effects of AS and NLEs.

Several hypotheses were generated based on the full sample. Specifically, it was hypothesized that: (a) AS would remain relatively stable across study assessment points; (b) participants who experienced greater levels of childhood NLEs would have increased depressive symptoms when they entered high school, and at each assessment point thereafter; (c) participants who experienced greater levels of childhood NLEs prior to entering high school would have a more depressogenic AS compared to youth with a history of relatively few NLEs, and at each assessment point thereafter; (d) participants with more depressogenic AS at baseline would consistently report higher levels of depressive symptomology at all assessment points; (e) at the baseline assessment, childhood NLEs would predict depressive AS and depression. Further, it was anticipated that AS would partially mediate the relationship between childhood NLEs and depression at baseline, and at subsequent assessment points. That is, although there may be a direct pathway between childhood NLEs and depressive symptoms as female

adolescents enter high school, this pathway will be partially mediated by AS, and; (f) youth with childhood histories of NLEs, and negative AS, would demonstrate higher levels of depressive symptomology at baseline and would have an escalating trajectory of depression over the course of the subsequent four assessment periods compared to participants with low or no histories of depression and/or positive AS.

Further hypotheses were gathered based on the subsample of participants who participated in the follow-up survey. For this subsample it was hypothesized that: (g) NLEs in early childhood would predict levels of NLEs that occurred over the course of the subsequent 30 months of high school and reported at the 30-month assessment by the youth. That is, low rates of childhood NLEs would predict low rates of later NLEs; high rates of childhood NLEs would predict high rates of NLEs during the study period; (h) adolescent NLEs would play a role in any change occurring between baseline and sixth assessment AS; (i) childhood *and* adolescent NLEs, as well as extant AS as assessed at the 30-month point, would each independently predict rates of depressive symptoms at the 30-month assessment and; (j) AS at baseline would function as a moderating variable for the impact of adolescent NLEs on the expression of depression symptoms. That is, those with negative AS at baseline would have a stronger relationship between adolescent NLEs and 30-month depressive symptoms, and those with more positive AS at baseline would have a weaker relationship between childhood and adolescent NLEs and 30-month depressive symptoms.

Method

Participants

The sample consisted of 807 female adolescent, between the ages of 13 and 14 upon entry into the study, who participated in an evaluation of the Resourceful Adolescent Program (RAP). Of those invited to participate, 88% consented. Adolescents were followed at 6-month intervals over the first 24-months of high school. A subsample of participants (324) completed a sixth assessment 30-months post-baseline. Participants included students from 18 Public and Catholic schools in Southwestern Ontario, Canada, as part of the grade 9 Health and Physical Education curriculum. Within each board, schools were diverse and included samples from both urban and rural geographic districts, while representing high, low and average socioeconomic areas.

Measures

Parent Background Information Form. At baseline, approximately half (51%) of participant's parents completed a background information questionnaire that was developed for the purposes of the study. Included on that form was a checklist of 18 NLEs that each parent completed regarding events that had occurred in the life of their child. Table 1 lists the percentages of participants that experienced each of the NLEs. A parent reported childhood adversity (PRCA) score was subsequently calculated. NLEs were designated points corresponding to their magnitude (either high or low) and points were summed across NLEs to obtain the PRCA. Weighting of NLE as high vs. low magnitude was based upon previous research using a similar methodology (Costello et al. 2002). Validity of these weighted scores were determined in a prior study using the present dataset; PRCA correlated with PTSD scores, $r = .39$, $p < .01$ (Smith-Mackenzie, 2010).

Children's Attributional Style Questionnaire-Revised (**CASQ-R**; Thompson, Kaslow, Weiss & Nolen-Hoeksema, 1998).The CASQ-R is a 24-item multi-choice questionnaire designed to assess child and adolescent AS. Each of 24 statements is followed by two choices designed to reflect one of three explanatory dimensions. For all statements two of the explanatory dimensions remain constant while the third is manipulated. In the following example, the globality and stability of the responses remain constant while the internality dimension is different in choice A and B. In the second example, the internality and the globality dimensions remain stable while the stability dimension is varied.

Example 1:

A good friend tells you that he or she hates you

A. My friend was in a bad mood that day.

B. I wasn't nice to my friend that day.

Example 2:

You go to a friend's party and you have fun

A. Your friend usually gives good parties.

B. Your friend gave a good party that day.

Half of the events are positive (e.g., Your parents tell you something that you make is very good) and half are negative (e.g., You break a glass). Scores are obtained for overall explanatory style for positive event attributions (PEA) as well as overall explanatory style for negative event attributions (NEA). Higher PEA scores reflect a positive AS for positive events, whereas high NEA scores reflect a negative AS for negative events. A difference score is then created by subtracting the NEA score from the PEA score. Higher difference scores reflect a more positive AS, and lower scores reflect a more depressogenic AS.

Available psychometric data suggests that although the CASQ has stronger psychometric properties than the CASQ-R (the CASQ-R is half as long as the CASQ), the CASQ-R provides a reasonable assessment of children's AS (Thompson, Kaslow, Nolen-Hoeksema, & Weiss, 1998). Thompson et al. (1998) determined that the NEA ($\alpha = .45$ *to* $.46$), PEA ($\alpha = .53$ *to* $.60$), and difference scores ($\alpha = .61$) met moderate standards for internal consistency reliability. In addition, the CASQ-R displays moderate test-retest reliability on the difference score measure ($r = .53$, $p < .001$), and on the PEA ($r = .53$, $p < .001$) score, and fair test-retest reliability on the NEA ($r = .38$, $p < .001$) score. Criterion-related validity was assessed through correlations with scores on the Vanderbilt Depression Inventory (VDI). These correlations suggested weak but significant relationships between difference scores and VDI ($r = -.40$), PEA and VDI ($r = -.31$), and NEA and VDI ($r = .35$). Research with the CASQ-R has demonstrated slightly higher construct validity than those suggested here using other measures of depression symptomology, such as the Children's Depression Inventory (CDI) and the Beck Depression Inventory (BDI). Indeed, Hankin, Abramson and Siler (2001) found a moderate correlation between NEA and BDI total scores ($r = .41$, $p < .001$), and Conley, Haines, Hilt, and Metalsky (2001) found moderate correlations between the difference score and CDI scores ($r = .51$, $p < .001$), and PEA and CDI scores ($r = .44$, $p < .001$), with a fair relationship between NEA and CDI scores ($r = .39$, $p < .001$). Robinson, Garber, and Hilsman (1995) further postulate that internal consistency of the CASQ-R may be affected by the heterogeneous nature of AS. That is, the CASQ-R measures attributions across a variety of domains and across three distinct constructs (global/specific, internal/external and stable/unstable). Thus, in order to combine these diverse but integrated concepts into one variable, internal consistency may consequently be affected.

Childhood Depression Inventory (CDI; Kovacs, 1992). The CDI is a symptom oriented questionnaire for children 7 to 17 years old, consisting of 27 choice answers. The CDI has been designed to quantitatively measure symptoms of depression, with index scores of Negative Mood (e.g., irritability, anger, and or sadness), Interpersonal Problems (e.g., difficulty making and or maintaining close relationships), Ineffectiveness (e.g., motivation to engage in and/or complete tasks), Anhedonia (i.e., loss of pleasure), and Negative Self-Esteem (i.e., belief of low capability) as well as a composite score. This measure has been found to have a high test-retest reliability (r = .81), and satisfactory internal validity (α = .82), and has been documented as being highly sensitive to effective diagnosis of depression in adolescents (Masip, Amador-Campos, Gomez-Benito, & Barrio Gandara, 2010).

Children's Impact of Traumatic Events Scale – II (**CITES-II**; Wolfe, 2004). The CITES-II was developed to measure and assess traumatic events and the psychological consequences of such events through self-report measures. Trauma and related concepts measured include: history of NLEs, PTSD symptoms, attributions about NLEs, peritraumatic response to events, perceptions of social support, and life changes related to traumatic events. Only data concerning the history of NLEs was used in the current research.

The Negative Life Events Checklist. The Negative Life Events Checklist of the CITES-II was used to determine prevalence and presence of NLEs. The checklist includes 24 events, some of which fall into the category of high-magnitude and would be considered potentially traumatic by the DSM-IV, and others categorized as low-magnitude events, that would be considered distressing but not of the magnitude of events identified by the DSM-IV (American Psychiatric Association, 1994). Students were asked to identify all NLEs listed in the checklist that had occurred in their lives, specifying those that had occurred prior to the start of the study, and those

that occurred during the past 2-years. Table 2 lists the 24 events included on the checklist, and the percentage of the participants (N = 197) who indicated the event as having occurred either in the past 2 years or prior to the start of the study. The items of the Negative Life Events checklist were similar to those completed by parents at the initial assessment, from which the baseline PRCA was derived. The Negative Life Events checklist was used to create a variable describing the overall occurrence of adversity experienced by each participant both during, and prior to, their high school years. The adolescent adversity score was calculated by summing points as designated by the experience of various high-magnitude events (two points each), and low-magnitude events (one point each). Two scores were obtained, one for all events occurring prior to the ninth grade (adolescent reported childhood adversity score; ARCA), and one score for all events occurring within the testing period (adolescent reported adolescent adversity score; ARAA).

Procedure

Data from participants were drawn from a sample of 807 female adolescents who participated in an evaluation of the Resourceful Adolescent Program (RAP). RAP is a universal delivery, primary prevention program designed to reduce depression in adolescents through whole class preventive instruction in self-esteem and coping strategies. This program was conducted through the Child and Adolescent Centre at London Health Sciences Centre over a 3-year timeframe between 2002 and 2004. The youth were followed for 2 years at 6-month intervals. The details of the study are described in Wolfe, Dozois, Fisman, and DePace (2008). Students were chosen to participate based on their class, and coin tosses determined class selection to participate in RAP or control groups. Control classrooms received regular Grade 9 Health and Physical Education (Healthy Active Living Education) delivered by Health and

Physical Education Instructors, which included similar objectives for effective coping, however lacked a designated method to reach these learning objectives. The RAP program was delivered by a doctoral level psychologist and a master's level co-therapist.

Students and their parents were asked to participate in five RAP assessments, the first occurring pre-test (approximately one to three weeks prior to the start of the program), the second occurring post treatment (approximately one to three weeks following program completion), and three follow-up assessment occurring at 6-month intervals following completion of the post-test (12-, 18-, and 24-month follow-up), ending in grade 11. Each of these assessments included nine self-report questionnaires that assessed depression, cognitive style, parent-child conflict, social supports, and self-concept. Additional parent questionnaires assessed adolescent behavioral and emotional problems and parent-child conflict at baseline. Participants received a 10 dollar gift card for each completed assessment. Assessments were conducted in group formats, either in the students' classroom (first and second assessments) or during lunch periods with lunch provided (pizza and drinks). As necessary, arrangements were made for individual assessments for those who were not available during group administrations.

A sub-sample (N = 324) participated in an additional assessment at 30-months post-test. That study was designed to assess the impact of high school NLEs, and included a number of measures related to trauma and posttraumatic stress disorder, including the Children's Impact of Traumatic Events Scale – II (CITES-II; Wolfe, 2004), as well as the original package of adolescent questionnaires assessing depression (Childhood Depression Inventory ; CDI), cognitive style (Children's Attributional Style Questionnaire Revised; CASQ-R), parent-child conflict, social supports, and self-concept. Because of the sensitive nature of this aspect of the project, research packages (i.e., parent and participant consent materials, instructions,

questionnaires) were sent to the participants' homes. For those that agreed to participate, telephone contacts were made to review the package materials and answer questions.

Statistics

To address the first research question (is AS stable over time?) a series of test-retest correlations were conducted between NEA at all assessment points, PEA at all assessment points and difference scores at all assessment points. The second research question (do female adolescents with greater levels of childhood NLEs have increased depressive symptoms at baseline and all subsequent assessment points?) was addressed by computing a series of Pearson correlations between PRCA scores and CDI scores at all assessment points. To explore the third research question (do participants with greater levels of childhood NLEs report more depressogenic AS at baseline and at all subsequent assessment points?), a series of Pearson correlations were conducted between PRCA scores and CDI scores at all assessment points. In addressing the fourth research question (do participants with more depressogenic AS at baseline report higher levels of depressive symptoms at all assessment points?) a series of stepwise regressions were conducted with baseline, 6-, 12-, 18-, 24- and 30-month CDI scores as the dependent variables and baseline NEA entered first, followed by baseline PEA. The investigation of the fifth research question (does AS partially mediate the relation between childhood NLEs and depression at baseline, and at all subsequent assessment points?) was determined through the use of the mediation analysis guidelines indicated by Baron and Kenny (1986).

To explore the sixth research question (do female adolescents' with childhood histories of NLEs and negative AS demonstrate higher levels of depressive symptoms at baseline and an escalating trajectory of depression over the subsequent four assessment points compared to participants with positive AS and low levels of childhood NLEs?) latent growth curve analysis

was employed through the use of the mixed models procedure on SPSS v.21.To address the seventh research question (do childhood NLEs predict adolescent NLEs?) Pearson correlations were employed between PRCA and ARAA, followed by ARCA and ARAA. In investigation of the eighth research question (do adolescent NLEs play a role in any change occurring in female adolescent AS?) a hierarchical linear regression was employed with 30-month AS as the dependent variable and baseline AS entered first followed by ARAA. To address the ninth research question (do childhood and adolescent NLEs as well as 30-month AS each independently predict rates of depression at the 30-month assessment?), a hierarchical linear regression was employed with 30-month CDI score as the dependent variable and PRCA entered first followed by baseline AS, then ARAA, then the sum of the difference between baseline AS and 30-month AS (AS change). Finally, to address the ninth research question (does baseline AS act as a moderating variable for the impact of adolescent NLEs on the expression of 30-month depression symptoms?) a multiple regression was computed with 30-month CDI score as the dependent variable and baseline AS, ARAA and the interaction term baseline AS X ARAA.

Results

Preliminary Analyses

Overall attrition rates for the current study were initially modest, but increased as time passed. The baseline assessment was conducted with 807 participants. Attrition of 2.7% (N = 785) occurred at the 6-month assessment, followed by 13.9% (N = 695) at the 12-month assessment, 22.9% (N = 622) at the 18-month assessment, 38.2% (N = 499) at the 24-month assessment and 59.9% (N = 324) at the 30-month assessment. As assessments took place in the same classroom within the same year, there was very little change in participation between the first and second assessments. The third, fourth, and fifth assessments occurred during the next two academic years, and so students were in new classes and some had moved or changed

schools, making it difficult for researchers to re-locate some individuals, despite strong efforts. As noted earlier, the 30-month assessment differed in that it involved additional sensitive questionnaires, parent and youth consent, and was distributed by mail for completion at home.

Analyses were conducted to determine differences in baseline scores between participants who remained in the study (RIS) and those who dropped out (LS) at each assessment point (Table 3). These analyses indicate that the participants who remained in the study until the final assessment and those who left the study at various points differed significantly by CDI scores, and CASQ-R scores (NEA, PEA and difference scores). More specifically, those who dropped out of the study before the third assessment point or later were more likely to have higher baseline CDI scores, higher NEA, lower PEA, and lower CASQ-R difference scores. A comparison between PRCA scores for LS versus RIS participants demonstrated little difference except for a significant difference after the fifth (but not the sixth) assessment where LS participants demonstrated higher PRCA scores than RIS participants.

Additional statistical analyses were employed to determine if differences existed on the key variables CDI and CASQ-R between adolescents whose parents completed the parent questionnaire and those who did not. Of the sample of 807 youth, 417 PRCA scores were obtained. To examine if there was bias in return rates with regard to the child's AS scores, t-tests were conducted between the youth with PRCA scores and those without, and compared the two groups on AS variables. A *t*-test failed to reveal a statistically reliable difference between the mean score on the CASQ-R difference score between those with (M = 4.85, SD = 3.69) and without (M = 4.34, SD = 3.87) parent information on childhood adverse events t (805) = 1.92, p = 0.055, $\alpha = 0.05$. Similarly, on additional independent t-tests, no statistically significant differences were found between participants with (NEA: M = 3.21, SD = 1.97; PEA: M = 8.05,

SD = 2.45) and without (NEA: M = 3.49, SD = 2.06, PEA: M = 7.83, SD = 2.41) parent information on childhood NLEs on composite scores of NEA: t (805) = 1.94, p = .05, α = .05 and PEA t (805) = 1.253, p = .210, α = .05.

It was, however, determined that adolescents with PRCA (Baseline: M = 12.0, SD = 9.38; 6-month: M = 10.22, SD = 9.00) and without PRCA (Baseline: M = 13.92, SD = 9.93; 6-month: M = 11.52, SD = 9.40) scores were significantly different on both baseline t (803) = -2.806, p = .005, and 6-month t (783) = -1.97, p = .049 CDI scores. These analyses demonstrate that individuals without PRCA scores demonstrated higher CDI scores compared to those with PRCA scores. This difference dropped out after the second assessment, however, with no significant difference between adolescents with and without PRCA scores on CDI measures at the 12-, 18-, 24- or 30-month assessment points.

Stability of Attributional Style over Time

It was hypothesized that in line with AS theory, AS would remain relatively stable across study years. A series of Pearson's correlations were computed to assess test-retest reliability of PEA, NEA and difference scores at each assessment, including the 30-month follow-up assessment. The results indicate that there is moderate test-retest reliability for NEA, PEA and difference scores at each assessment point (See Table 4).

Psychometric Properties of the CASQ-R

Cronbach's alpha was computed to ascertain internal consistency of related sub-scores within the CASQ-R (Thompson, Kaslow, Weiss & Nolen-Hoeksema, 1998*)*. Cronbach's alphas for the three NEA, three PEA and three difference score subscales at baseline were .498, .596, and .680, respectively.

To determine the construct validity of both the CASQ-R difference score and NEA, correlations between CDI scores at each assessment point and baseline NEA and PEA scores were conducted (Table 5). Results suggest that the difference score was more strongly related to depression symptomology than the NEA score alone as both PEA and NEA added significantly to the predictive model.

Relation between Childhood NLEs and Depression

It was anticipated that those individuals exposed to higher levels of childhood NLEs would have increased depressive symptoms when they entered high school, and at each assessment point thereafter. Pearson's correlations were computed between PRCA scores and CDI Total scores for each assessment point (see Table 6).These results indicate that there was a strong positive association between PRCA scores and CDI scores in the first two assessments; however, the correlation drops off after the second assessment, even demonstrating a negative correlation at the fourth and sixth assessment points. It should be noted that the number of participants with PRCA scores dropped from 417 to 227 over the course of the study.

Relation between Baseline CASQ-R Difference Scores and Depression

It was hypothesized that adolescents with low difference scores (indicating negative AS), high NEA and low PEA at baseline would report higher depressive symptomology (as indicated by high CDI scores) at baseline and at every assessment point thereafter. A stepwise regression was employed to test this hypothesis, with NEA entered as a step 1 predictor and PEA entered secondly. The results of this regression analysis indicate that both baseline PEA and NEA significantly contribute to the prediction of CDI scores at each assessment point. As indicated in Table 7, there was a significant negative relationship between PEA and CDI scores reported at

all assessment points. Similarly, a significant positive relationship was noted between baseline NEA scores and CDI scores at baseline and all subsequent assessment points.

Relation between PRCA and CASQ-R Difference Scores and NEA

It was hypothesized that adolescents with higher PRCA scores would have more depressogenic AS compared to those with a lower PRCA. Past research has postulated that childhood NLEs may play a role in forming a negative AS. As research has traditionally measured negative AS using either the Difference score or NEA scores, the current research examined correlations between PRCA and difference scores and PRCA and NEA scores. With Bonferroni adjusted alpha levels of .01, neither NEA nor difference scores were related to PRCA at any assessment point.

Attributional Style as a Mediating Factor Between PRCA and CDI

Baron and Kenney (1986) have suggested four steps required to establish mediation. These steps include: (1) demonstrating that the causal variable is correlated with the outcome, (2) demonstrating that the causal variable is correlated with the mediator, (3) demonstrating that the mediator affects the outcome variable, and (4) establishing that the assumed mediating variable completely or partially mediates the relationship between the causal variable and the outcome variable. Thus, in order for mediation to occur the causal variables (PRCA and AS) must be significantly associated. As there was no significant relationship between NLEs and AS, further mediation analyses were not conducted.

Growth Curve Modeling of PRCA and AS Scores as Developmental Predictors of 24-month CDI Scores

The psychometric analyses presented in the current study support the difference score as the stronger variable, as compared to NEA or PEA. As such, the following analysis uses the

difference score when considering AS. Growth Curve modeling was used to examine whether individuals with higher PRCA scores and lower difference scores would report higher levels of CDI scores compared to those with lower PRCA scores and higher CASQ-R difference scores. The mixed model routine in SPSS version 21 was used to perform these analyses (Heck, Thomas & Tabata, 2010). This method allows for individuals to be examined longitudinally in nested terms. That is, for the purpose of this study, individual scores were examined nested within participants, and participants were further nested in groups. This allows the researcher to examine individual differences in scores over time, as well as compare groups of individual scores over time. The groups used in this analysis were defined by PRCA scores and difference scores, such that each difference and each PRCA score acted as a group with all individuals sharing that score included. Only adolescents with PRCA scores were included in this analysis (N = 417) and 30-month scores were excluded from this analysis as this would diminish the sample size considerably. An unstructured diagonal model was chosen for these analyses based on the low value demonstrated by Akaike's Information Criterion (AIC; wherein model fit is determined by choosing the model with the lowest score on this criterion). Prior to performing these analyses, the difference score variable was centered to give zero a meaningful value (wherein zero signifies an average or mean score of AS). Both CDI scores and PRCA scores were not centered, as zero is a meaningful score on both scales (i.e., zero represents no depressive symptomology and an absence of target NLE's in childhood). In this multilevel analyses, the level one units were the five assessment time points (0, 1, 2, 3, 4; where the baseline assessment was coded as 0) for each adolescent (level two) so that initial status and developmental change in symptoms could be assessed. Initial exploratory analysis demonstrated that the development of trajectories over time were best accounted for using both a linear and

quadratic term for time in the model. That is, the growth of CDI scores occurred linearly for some individuals and quadratic (curved) for others, therefore including both linear and quadratic terms allows for the best approximation for all individuals. As individuals differed in their respective trajectories of depressive symptoms, the values of the change parameters (i.e., intercepts and slopes) varied across individual adolescents (random effects).

To study individual differences in the development of CDI scores over time, three random effects were included in level two, one for individual variance in intercept (i.e., differences in CDI scores at baseline), one for individual variance in the slope for time (i.e., individual differences in development in CDI scores over time), and one for the variance in slope for time. The latter makes it possible to examine whether initial status of CDI (i.e., the score of CDI at baseline) was related to change of CDI scores over time. All three random effects were significant in model two. This implies that (a) individuals varied significantly in their baseline CDI scores, (b) individuals varied in their CDI score trajectories, and (c) baseline CDI scores were related to changes in CDI scores over time.

In model three, baseline difference scores and PRCA were included as level two fixed predictors. The inclusion of these predictors improved the fit of the model to the data, as demonstrated by the relatively large and significant reduction in AIC compared to model two. The results of model three suggest a negative slope (or decrease) in CDI scores across participants over time. At baseline, both high PRCA and low CASQ-R difference scores predict high baseline CDI scores. When controlling for CASQ-R difference scores, high PRCA predicted steeper negative growth rates than average or those who reported no NLEs trajectories, with individuals with high, average and no NLE's reporting similar CDI levels at the fifth assessment. Contrarily, individuals with low CASQ-R difference scores at baseline continue to

experience greater CDI scores compared to those with average or high CASQ-R scores at all assessment points when controlling for PRCA. The results of models one through three are illustrated in Table 8, while Figure 1 demonstrates mean trajectories for scores divided into high, average, and low subgroups for PRCA and difference scores.

PRCA as a Predictor of 30-month Assessment ARAA

To determine if there existed an association between PRCA and ARAA, a correlation was performed. Results suggest that parent-reported NLEs are significantly negatively related to later adolescent reported NLEs, r (195) = -.15, $p < .05$. Subsequent analysis was conducted to determine if reporter (parent vs. adolescent) of events may have affected the above finding. A correlation between baseline ARCA and PRCA was conducted. This analysis suggests no relation between ARCA and PRCA, r (142) = -.11, p = .18.

As identity of reporter may have played a role in these findings, an additional Pearson correlation was conducted between ARCA and ARAA. The results of this analysis suggest a weak association between childhood and adolescent NLE scores, r (197) = .31, p = .01.

Role of Adolescent NLEs in Predicting Change in AS from Baseline to the 30-month Assessment

As reported earlier, test-retest correlations for the AS measures were moderate, particularly between baseline and the 30-month assessment (r = .41). To examine whether adolescent NLEs might account for changes in AS over time, a hierarchical linear regression was performed with 30-month AS (difference scores) as the dependent variable, baseline difference score entered first, followed by ARAA. Results of this hierarchical linear regression illustrate that whereas baseline difference scores predicted 30-month scores on this same measure, ARAA scores did not add significantly to the model (see Table 9).

PRCA, ARAA, and AS as Predictors of 30-month CDI Scores

To determine the predictive ability of PRCA, ARAA and AS (difference score) on the expression of depressive symptomology at the 30-month assessment, a hierarchical linear regression was performed. A conservative approach was taken in this set of analyses given that previous analysis demonstrated that difference scores were a reliable predictor of CDI scores. To begin, 30-month CDI scores were entered as the dependent variable. PRCA scores were entered as model one predictors, baseline AS was entered as model two predictor, ARAA was entered as a model three predictor and a variable created to quantify the change in AS over adolescence (AS change; created by subtracting 30-month AS from baseline AS) was entered as a model four predictor (see Table 11).The hierarchical multiple regression revealed that in model one PRCA did not contribute significantly to the regression model, F (1,127) = 3.22, p = .08. Introducing the baseline difference score explained an additional 11.5% of the variation in CDI scores and this change in R^2 was significant F(2,126) = 16.84, p < .001. The addition of the ARAA score explained an additional 3.7% of the variability in CDI score. Again this change in R^2 was significant, F (3,125) = 5.55, p < .05. Finally, the addition of AS change score explained an additional 34.7% of the change in CDI score, and this change in R^2 was also significant, F (4,124) = 90.18, p < .001. When all four independent variables were included in model four, ARAA, baseline difference score and AS change remained significant independent predictors of 30-month CDI total score. All four predictor variables accounted for approximately 52.3% of the variance in 30-month CDI total score.

The second question posed in this hypothesis is whether baseline AS acts as a moderator in the relationship between ARAA and 30-month CDI scores. An interaction term was created by multiplying baseline AS difference score and ARAA scores and a multiple regression was run

using 30-month CDI scores as the dependent variable with ARAA, baseline difference score and the interaction term as predictors. The results of this multiple regression indicated that the interaction term was a non-significant predictor of 30-month CDI scores $\beta = .048$, $t\ (180) = .96$, $p = .34$. Thus, baseline AS did not serve as a moderator between adolescent NLEs and CDI scores.

Discussion

This study investigated the role of childhood and adolescent NLEs in the development and stability of AS and depressive symptoms over the first 2 years of high school. The longitudinal, prospective nature of the study provided an opportunity to investigate the diathesis-stress theory that depressive symptoms result from an interaction between AS and NLEs.

Negative life events were assessed at two times, at baseline by parent report for childhood experiences before high school, and by youth at the 30-month assessment for both childhood and adolescent experiences. Parents reported a range of high and low-magnitude NLEs. The most common NLE reported by parents was the death of a close family member, and the least common reported NLE was their child witnessing or being victim to a serious crime, or being physically or sexually abused. Approximately one quarter of parents reported that their child did not experience any NLEs in childhood. As compared to their parents, adolescents reported fewer childhood NLEs with the most common NLE experienced being moving homes or schools or the experience of parents going through a divorce or separation and the least common indicated NLE being held captive or being kidnapped. Similar to parent reports of childhood NLEs, approximately a quarter of adolescents reported no experience of childhood NLEs. In contrast, one in 25 respondents indicated that they did not experience any NLEs during the first two and a half years of high school. Common NLEs indicated by adolescents as having occurred between grade 9 and 11 were the ending of significant relationships and the death of a close friend. The frequency that parents and adolescents reported NLEs in childhood is in keeping with current literature that suggests a high prevalence of NLEs in adolescence and childhood (Costello, Erkanli, Fairbank, & Angold, 2002).

Interestingly, little relationship was found between parent-reported and adolescent-reported childhood NLEs. A number of factors likely contributed to this difference. First, parents and adolescents did not fill out identical life events questionnaires. Although the questionnaires were similar, the adolescent forms included more low-magnitude events, and more categories of events were provided (i.e., while the parent questionnaire asked only if a natural disaster had occurred, the adolescent questionnaire further gave a choice between natural disaster, environmental disaster or fire). Additionally, adolescents reported on childhood NLEs 2 years following parents reporting of childhood NLEs. As time passes, individual's memory of events may change. Research with young adults suggest that not only do memories fade over time, but that memories of unpleasant events fade faster than memories of positive events (Walker, Vogl, & Thompson, 1997). Thus, it is likely that both parents' memories of their children's NLEs and adolescent reports of childhood NLEs may have been distorted by time. The disparity may also be explained by the difference in reporters. Parents may have been more knowledgeable about some childhood events than youth (e.g., events that occurred early in life) and adolescents might have been more knowledgeable about other events that were never shared with the parents (e.g., bullying).

As predicted, there was a small but significant positive relationship between adolescent-reported childhood NLEs and adolescent-reported adolescent NLEs. Although this result may be due to biases in adolescents who chose to participate in the voluntary 30-month assessment, these findings are also in line with previous research by Costello, Erkanli, Fairbank, and Angold (2002) who determined that experiencing a NLE increases the likelihood of subsequent negative experiences within the same time-frame. In a study following over 2000 children and youth, Finkelhor, Ormrod, Turner, and Hamby (2004) determined that among the children who

experienced at least one NLE, the average child experienced three subsequent NLEs within the same year. Thus, clinicians and support systems for younger children and even young adolescents, must take into account the knowledge that one known NLE in the child's life may be accompanied by other negative experiences.

Both parent-reported childhood NLEs and youth-reported childhood adolescent NLEs were significantly related to depression symptoms. A strong positive association was found between parent-reported childhood NLEs and depression symptoms at baseline and the 6-month assessment. Interestingly, as time progressed, NLEs began to demonstrate a negative relationship with depression symptoms, such that higher depression scores were related to lower baseline parent-reported NLEs at the 18- and 30-month assessment points. On the face of the matter, the results suggested that over time, the effects of childhood NLEs on depressive symptoms lessened. However, these findings may have been related to a differential attrition pattern for youth with higher rates of depression symptoms and NLEs, leaving a sample with a more restricted and normative range of depression scores and NLEs.

Additionally, contrary to prior research that suggested that NLEs play a role in the formation of a depressogenic AS (Brandon et al., 2006; Gibb, Alloy, Walshaw, Comer, Shen, & Villari, 2006), the current findings found no relationship between PRCA and difference or NEA scores for the baseline assessment and each subsequent assessment. The work of Brandon et al. (2006) and Gibb et al. (2006) point to specific NLEs, such as verbal victimization, as contributing to the development of a negative AS. Thus, it is possible that it is not the amount of NLEs experienced by a child but the type of negative event that influences the development of AS. Indeed, in an effort to develop a strategy to examine NLEs across a broad spectrum of youth with different experiences, scores (e.g., PRCA, ARCA, ARAA) were created to provide a

summarization of the frequency and magnitude of NLEs experienced by the participant. While the creation of these scores was in line with previous NLE and trauma research (Costello et al. 2002), it is possible that the outcome of some of the NLE findings may have been different had high and low magnitude events been examined independently, or if particular types of NLEs (e.g., maltreatment) been examined in greater detail.

Past literature has defined negative AS by either the difference score (a combination of negative and positive event attributions) or negative event attributions alone. One aim of the current study was to ascertain which score was more appropriate for describing female adolescent AS and would be the best dependent variable drawn from the CASQ-R for future research. The current findings suggest that both positive and negative event attributions contribute significantly to the prediction of depressive symptomology. Additionally, consistent with past studies, the difference score was more strongly related to depressive symptomology than negative event attributions alone (Conley, Haines, Hilt, & Metalsky, 2001; Thompson, Kaslow, Nolen-Hoeksema, & Weiss, 1998), suggesting that attributions for both positive and negative events play important roles in understanding risk for depression. Further, the difference score had slightly higher internal consistency and demonstrated relatively good test-retest reliability (given the span between assessments) for the present study. Thus, as with other studies that have examined this question, the present findings support use of the CASQ-R difference score as a dependent variable, with adequate internal consistency, test-retest reliability, and good construct validity.

Consistent with previous research, moderate stability of AS was found over the first two and a half years of high school. These results are consistent with the current literature describing adult AS as trait-like and stable over time (Burns & Seligman, 1989; Campbell & Henry, 1999).

Although previous research by Mezulis, Funaskis, and Hyde (2011) suggested that adolescent NLEs play a role in the continuing formation of AS into adolescence, the current study did not corroborate these findings, as adolescent reported NLEs did not account for change in AS from baseline to the 30-month assessment once baseline AS was controlled. Thus while some change in AS occurs over the first two and a half years of high school, the NLE scores developed for this study did not appear to be a factor contributing to the formation of, and subsequent changes in, AS.

Scores obtained from the depression measures demonstrate a fairly representative sample with individual scores ranging from zero to 50. Overall depression symptoms decreased over the course of the study; however, rates of symptom decrease were largely related to both AS and reported NLEs. Although both baseline AS and parent reported childhood NLEs were related to baseline depression scores, only baseline AS continued to be related to depression scores at the 24- and 30-month assessments. Attrition rates may have played a role in the finding that depression symptoms decreased over time, as those who held higher depression scores at baseline were much more likely to leave the study. However, recent studies have suggested that although adolescent females may suffer from greater amounts of depression in adolescence, their trajectory of change is fairly stable. This is contrary to adolescent males whose depression symptoms have been shown to be lower overall, but who demonstrate a consistent rise in depression symptoms over the course of adolescence (Leadbeater, Thompson & Gruppusa, 2012). Thus, while depression scores in the current study demonstrated a decline over the course of adolescence, other community samples of female adolescents do not demonstrate increases in symptom trajectories either.

Hierarchical linear modeling allowed for the exploration of individual trajectories of depression scores over the first two years of high school. Results of this analysis suggest that at baseline, higher depression scores are significantly related to higher NLE scores and more depressogenic AS. Although decreases were seen in depression scores across individuals, those with negative AS demonstrated a slower decrease in depression scores than individuals with positive AS. Those with positive AS and history of high childhood NLEs demonstrated rapid decrease in depression symptoms, and those with positive AS and moderate to low levels of NLEs showed a stable pattern of low depression symptoms.

The current findings did not demonstrate support for the cognitive diathesis-stress model via interaction effects (AS x NLEs) as has been demonstrated by previous child and adolescent studies (Dixon & Ahrens, 1992; Hilsman & Garber, 1995; Schoenherr, Brown, Baldwin, & Kaslow, 1992; Shelley & Craig, 2010), though both AS and NLE were predictors of depressive symptoms when NLEs were assessed proximally to assessment of depressive symptoms. Thus, with this nonclinical sample of adolescent girls, NLEs and AS were both important predictors of depression. However, the link between NLEs and depression appeared to be temporal and dissipated over time, whereas AS appeared to have a consistent impact over time.

A number of factors may have contributed to the failure to demonstrate a NLE-AS interaction at the 30-month assessment. First, the subsample used to perform the interaction analysis was much smaller than the whole sample. Attrition rate patterns revealed that adolescents with more negative AS and higher depression scores left the study prematurely, which created a more homogeneous and less representative 30-month sample. Secondly, the NLEs reported by adolescents at the 30-month assessment may have occurred at any point from the beginning of grade 9 to grade 11. The growth curve analyses with earlier assessments

(baseline through 24-months) suggested that NLEs have a temporal effect that dissipates with time. Thus, while it was possible that AS and a NLE could have interacted to predict depression symptoms directly after the event, the current study was unable to measure the interaction due to the timing of the adolescent reported NLEs. Indeed, most studies regarding the interaction effect of NLEs and AS measure the effect of this interaction at much shorter intervals (less than a month) than the timeframe reported in the current study (two and a half years).

In conclusion, the current study demonstrates that NLEs are common during both childhood and adolescence. NLEs in both childhood and adolescence are related to temporal increases in depression symptomology, but these affects dissipate over time. However, AS, regardless of history of NLEs, is related to depressive symptoms, and appears to create long-term effects. Contrary to previous research, childhood NLEs did not predict AS during early adolescence, and subsequent NLEs did not affect AS at later points in adolescence. Finally, the diathesis-stress model of depression was not fully supported in this long-term appraisal of the interaction between AS and adolescent NLEs, as the interaction between NLEs and AS did not predict depression symptomology in the final assessment.

Limitations

As noted previously, preliminary analyses identified an interesting trend in attrition and responder rates. Specifically, those who left the study any time after the second assessment tended to demonstrate higher baseline CDI scores, more negative AS, and slightly elevated PRCA levels than those who remained in the study. The pattern presented by these attrition rates is consistent with current research into adult attrition rates that suggest depressive symptomology increases the likelihood of attrition (Ahern & LeBracque, 2004; Levin, Katzen, Klein, & Llabre, 2000). Although the large sample size of the current study allows for ease of generalizability to

the greater population, some caution must be applied in generalizing the results due to these attrition patterns. However, it must further be noted that the majority of studies of adolescent depression recruit participants through voluntary means and have a much lower rate of participation as that of the present study (initial participation rate was 88%; though research participation was voluntary, participation was linked with a classroom-based program that was universally delivered). Most studies either report only moderate rates of participation from among those recruited (e.g., 59%; Hilsman & Garber, 1995) or fail to report participation rates at all. Thus it is likely that much of the literature on adolescent depression has similar or more extensive bias.

Additional limitations include the retrospective reporting of NLEs, as well as potential biases related to whether parents or adolescents reported the NLEs. Retrospective reporting of NLEs run the risk of increased inaccuracy, as the passage of time between incident and recording may result in over or underreporting of events. Similarly, the use of parent accounts of childhood NLEs may have led to inaccuracies in reported adversity as NLEs are subjective and personal events. As well, parents may have underreported NLEs due to responder bias (not wanting others to judge/question their parenting) or simply might have been unaware of some of the adversity faced by their children. Additionally, the current study looked only at combined levels of high- and low-magnitude NLEs. Further research is required with the current and future samples of adolescents to determine whether these results are robust when considering only high- or low-magnitude NLEs separately.

Implications for Future Research

The results of the current research further increases the knowledge around the development of depression in relationship to NLEs and AS in community samples of female

adolescents. Further research may delve deeper into specific NLE factors that may impact AS and depression in childhood and adolescence, such as the impact of specific forms of maltreatment (e.g., emotional abuse) or other forms of victimization (e.g., verbal abuse or verbal bullying). Methodologically, these findings suggest that longitudinal studies of depression include ongoing assessments of NLEs to further explore the diathesis-stress conceptualization, particularly in line with the current findings that NLEs may have a temporal relationship to adjustment that may not be evident over time.

Furthermore, as AS consistently predicted depression symptoms, further research may evaluate the effectiveness of using AS measures to screen adolescents at risk for depression and/or sub-threshold depressive symptoms. Screening adolescents for negative AS may prove particularly fruitful in school settings, where adolescents can most easily be targeted for interventions. Cognitive Behavior Therapy methods may be particularly effective for these youth, since these interventions target negative thought processes empirically linked with adolescent depression (Shirk, Kaplinski, & Gudmundsen, 2009).

Implications for Practice as a School Psychologist

The results of the current study are applicable to the role of the school psychologist in Canada in a number of ways. Primarily, with the rise of the Response to Intervention (RTI) model of practice (McIntosh, MacKay, Andreou, Brown, & Susanna, 2011), this study contributes to our knowledge of identification of adolescents at risk for MDD. In particular, because AS appears to be stable over time and is consistently linked with depression symptoms, AS questionnaires may be an effective screening and outcome evaluation tool. Indeed, AS questionnaires, combined with other measures including symptom counts, may provide an

efficient method of forming intervention and skill building groups, particularly in the school setting.

Secondly, the current study suggests that NLEs play a temporal role in increasing depressive symptoms, but for those with a positive AS, these depressive symptoms are likely to abate over time. These findings can be used to inform how schools and mental health counselors can assist youth who experience NLEs during their adolescent years. Past and current research suggests that while supporting children and young adolescent through NLEs may be an important role of the school psychologist, care should include consideration of ways to activate the youth's own resilience (e.g., positive AS) to address adversity. For those with known risk factors (e.g., poor AS), more careful monitoring and support may be appropriate.

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Tables

Table 1

Percentage of Parent-indicated Negative Life Events

Negative Life Event	%
Natural disaster*	19.9
Serious illness*	23
Victim of serious crime*	18.9
Victim of bullying*	25.2
Death of a close family member*	45
Sexual abuse/assault*	18.9
Witness to family violence^	26.6
Serious accident w/out injury^	20.6
Serious accident with injury*	21.8
Witness to a serious crime*	18.5
Death of a friend*	21.6
Parental seperation/divorce^	36.5
Physical abuse*	18.7
Trouble with the law^	19.4
Other ^/*	13.9
No NLEs indicated	27.2

Note. *denotes a high magnitude event, ^denotes a low magnitude event

Table 2

Percentage of Adolescent-indicated Negative Life Events Prior to and During the Current Study

Negative Life Event	% Within 2 years	% <2 years
Natural disaster*	5	10.6
Environmental disaster*	1	3.5
Fire*	6.5	6.5
War/terrorism*	10.4	9
Serious illness*	9	7
Serious accident w/out injury^	10.1	9
Serious accident with injury*	10	4.5
Death of close family member*	7.5	8
Death of close friend*	44.8	15.4
Victim of a crime*	8.5	13.6
Witness to serious accident*	9.5	6
Serious bullying*	8	12.1
Physically hurt/beaten*	5.5	3.5
Kidnapped/held captive*	1	2
Saw/heard/heard about parents physically fighting^	5	9

Sexually abused/assaulted/raped*	3.5	7
Break-up with significant other^	48.5	8
Family member arrested/In trouble with law^	11.1	5
Parents separated/divorced^	3.5	18.6
Parent lost job/significant decrease in family earnings^	10	12
Moving home/school^	18.5	22.5
Serious argument with close friend/family^	40.2	4.5
Suicide attempt by friend/family*	17.5	6
Other^ / *	7.9	1.5
No NLEs indicated	3.6	29.3

**denotes a high magnitude event*

^denotes a low magnitude event

Table 3

Descriptive Statistics and T-Tests Comparing Baseline CDI, NEA, PEA, Difference and PRCA Scores of Those Who Remained in the Study and Those Who Dropped Out

Baseline compared between RIS and LS at 6-month assessment					
-	N	Mean	SD	*Df*	*t*
(RIS) CDI Total	783	12.81	9.55		
(LS) CDI Total	22	17.32	13.48		
Independent T-Test				*21.6*	*1.56*
(RIS) CASQ-R NEA	785	3.34	2.00		
(LS) CASQ-R NEA	22	3.46	2.70		
Independent T-Test				*21.7*	*0.192*
(RIS) CASQ-R PEA	784	7.97	2.41		
(LS) CASQ-R PEA	23	7.00	3.09		
Independent T-Test				*22.8*	*-1.49*
(RIS) CASQ-R Difference	784	4.64	3.74		
(LS) CASQ-R Difference	22	3.41	5.04		
Independent T-Test				*805*	*-1.50*
(RIS) PRCA	413	5.46	7.67		
(LS) PRCA	4	6.75	10.44		
Independent T-Test				*415*	*-0.334*
Baseline compared between RIS and LS at 12-month assessment					
(RIS) CDI Total	683	12.30	9.44		

(LS) CDI Total	112	16.85	10.32		
Independent T-Test				*803*	*4.67**
(RIS) CASQ-R NEA	695	3.26	1.97		
(LS) CASQ-R NEA	112	3.91	2.20		
Independent T-Test				*805*	*3.20**
(RIS) CASQ-R PEA	695	8.09	2.36		
(LS) CASQ-R PEA	112	7.05	2.65		
Independent T-Test				*142.6*	*-3.92**
(RIS) CASQ-R Difference	695	4.85	3.66		
(LS) CASQ-R Difference	112	3.12	4.21		
Independent T-Test				*805*	*-4.55**
(RIS) PRCA	383	5.60	7.82		
(LS) PRCA	34	4.03	5.60		
Independent T-Test				*44.4*	*1.464*
Baseline compared between RIS and LS at 18-month assessment					
(RIS) CDI Total	622	12.25	9.43		
(LS) CDI Total	185	15.25	10.22		
Independent T-Test				*803*	*-3.71**
(RIS) CASQ-R NEA	622	3.20	1.94		
(LS) CASQ-R NEA	185	3.85	2.18		
Independent T-Test				*805*	*-3.93**

(RIS) CASQ-R PEA	622	8.16	2.32		
(LS) CASQ-R PEA	185	7.20	2.65		
Independent T-Test				*272.7*	*-4.440**
(RIS) CASQ-R Difference	622	4.98	3.58		
(LS) CASQ-R Difference	185	3.35	4.17		
Independent T-Test				*270*	*-4.82**
(RIS) PRCA	350	5.45	7.65		
(LS) PRCA	67	5.60	7.90		
Independent T-Test				*415*	*-0.147*
Baseline compared between RIS and LS at 24-month assessment					
(RIS) CDI Total	498	9.59	8.19		
(LS) CDI Total	307	18.35	9.51		
Independent T-Test				*575.6*	*13.38**
(RIS) CASQ-R NEA	499	3.14	1.88		
(LS) CASQ-R NEA	308	3.67	2.19		
Independent T-Test				*576.4*	*3.53**
(RIS) CASQ-R PEA	500	8.29	2.28		
(LS) CASQ-R PEA	307	7.38	2.56		
Independent T-Test				*591.7*	*-5.15**
(RIS) CASQ-R	499	5.17	3.43		

Difference					
(LS) CASQ-R Difference	308	3.70	4.14		
Independent T-Test				*560.7*	*-5.22**
(RIS) PRCA	287	3.62	5.89		
(LS) PRCA	130	9.56	9.50		
Independent T-Test				*174.7*	*-6.59**
Baseline compared between RIS and LS at 30-month assessment					
(RIS) CDI Total	317	11.49	9.04		
(LS) CDI Total	488	13.87	9.99		
Independent T-Test				*721.3*	*3.50**
(RIS) CASQ-R NEA	324	3.09	1.89		
(LS) CASQ-R NEA	483	3.52	2.08		
Independent T-Test				*736.4*	*3.03**
(RIS) CASQ-R PEA	319	8.2	2.33		
(LS) CASQ-R PEA	488	7.77	2.48		
Independent T-Test				*805*	*-2.46***
(RIS) CASQ-R Difference	317	5.12	3.49		
(LS) CASQ-R Difference	490	4.28	3.93		
Independent T-Test				*730.6*	*-3.18**
(RIS) PRCA	227	5.22	7.44		

(LS) PRCA	190	5.77	7.97		
Independent T-Test				*415*	*-0.738*

Note. RIS = participants who remained in the study, LS= participants who left the study

* $p<0.01$, ** $p<0.05$

Table 4

Summary of Correlations for CASQ-R Scores (Difference, NEA, PEA) at Each Assessment

Measure	1[a]	2[b]	3[c]	4[d]	5[e]	6[f]
1. Baseline						
Difference Score	--	.686*	.626*	.57*	.514*	.414*
Negative Event Score	--	.590*	.546*	.457*	.415*	.332*
Positive Event Score	--	.629*	.565*	.494*	.477*	.347*
2. 6 months						
Difference Score		--	.722*	.609*	.605*	.494*
Negative Event Score		--	.598*	.443*	.461*	.383*
Positive Event Score		--	.695*	.586*	.580*	.478*
3. 12 months						
Difference Score			--	.737*	.696*	.554*
Negative Event Score			--	.604*	.583*	.450*
Positive Event Score			--	.677*	.657*	.572*
4. 18 months	.					
Difference Score				--	.717*	.519*
Negative Event Score				--	.564*	.424*
Positive Event Score				--	.669*	.485*
5. 24 months						
Difference Score					--	.573*

Negative Event Score	--	.449*
Positive Event Score	--	.541*

[a]n=807. [b]n=785. [c]n=695. [d]n=622. [e]n=499. [f]n=324

Note. *$p < 0.01$

Table 5

Summary of Correlations for PRCA Scores and CDI Total Scores at Baseline, 6 -, 12-, 18-, 24- and 30-month Assessments

Measure	PRCA	N
1. PRCA	--	417
2. Baseline CDI	.652*	416
3. 6-month CDI	.452*	413
4. 12-month CDI	0.028	384
5. 18-month CDI	-.124**	352
6. 24-month CDI	-0.029	287
7. 30-month CDI	-0.25*	227

*Note. *p< .001, **p<.005*

Table 6

Summary of Stepwise Regression of Baseline NEA Score followed by Baseline PEA score on CDI scores at Each Assessment Point

	Model 1				Model 2				
Variable	B	SE	β	R^2	B	SE	β	R^2	ΔR^2
Baseline Assessment									
Baseline NEA	1.59	0.16	.33*	0.11	0.87	0.17	.18*		
Baseline PEA					- 1.35	0.14	-.34*	0.20	*0.09*
6-month Assessment									
Baseline NEA	1.35	0.16	.29*	0.09	0.78	0.17	.17*		
Baseline PEA					- 1.08	0.14	-.28*	0.15	*0.06*
12-month Assessment									
Baseline NEA	1.63	0.14	.41*	0.17	1.06	0.14	.27*		
Baseline PEA					- 1.15	0.12	-.35*	0.27	*0.10*
18-month Assessment									
Baseline NEA	1.51	0.14	0.40*	0.16	1.00	0.15	.26*		
Baseline PEA					- 1.04	0.12	-.33*	0.25	*0.09*
24-month Assessment									
Baseline NEA	1.10	0.16	0.29	0.09	0.71	0.17	.19*		
Baseline PEA					- 0.88	0.13	-.29*	0.16	*0.07*
30-month Assessment									
Baseline NEA	1.07	0.30	.20*	0.04	0.89	0.32	.16*		
Baseline PEA					- 0.43	0.27	- 0.09	0.05	*0.01*

*Note. *p< 0.01, **p<0.05*

Table 7

Summary of Correlations for Baseline CASQ-R Difference, NEA and CDI Scores at Each Assessment

Assessment	Baseline Difference	Baseline NEA	*N*
Baseline CDI	-.448*	.332*	*805*
6-month CDI	-.388*	.293*	*785*
12-month CDI	-.514*	.409*	*695*
18-month CDI	-.500*	.403*	*624*
24-month CDI	-.400*	.291*	*499*
30-month CDI	-.216*	.195*	*318*

Note. * $p < .001$

Table 8

Fixed Effects Estimates (Top) and Random Effects Estimates (Bottom) for Models of the Predictors of CDI Scores Over Time

	Model 1		Model 2	
	β	(s.e.)	β	(s.e.)
Fixed effects				
Intercept	12.99	(.34)*	7.81	(.54)*
Assessment point				
Linear	-2.60	(.22)*	-0.80	(-0.29)
Quadratic	0.30	(.05)*	0.18	(.059)*
CASQ-R Difference score			-0.95	(.083)*
PRCA			0.79	(.04)*
Assessment point x CASQ -R			0.07	(.029)*
Assessment point x PRCA			-0.27	(.014)*
Random effects				
Intercept + Assessment point				
intercepts between participants	72.40	(4.36)*	30.44	(2.89)*
random slope for time [a]	6.21	(.53)*	2.76	(.37)*
covariance intercept and slope for time [b]	-14.31	(1.28)*	-3.77	(.87)*
Model Fit				
Akaike's Information Criterion (AIC)	22788.9		11647.9	

*Note. (*s.e.) = standard error

[a] Variance in change over time. [b] Covariance of initial status and change over time

**p<0.01*

Table 9

Summary of Hierarchical Regression of Baseline CASQ-R Difference Score followed by ARAA Score on 30-month CASQ-R Difference Score

	Model 1				Model 2			
Predictor	B	St. Error	β	ΔR^2	B	St. Error	β	ΔR^2
Baseline Difference	0.533	0.073	.482*	0.233*	0.512	0.074	.463*	
ARAA					-0.11	0.08	-0.09	0.008

*Note. *p< 0.01*

Table 10

Summary of Hierarchical Regression With 30-month Assessment Depression as the Dependant Variable and PRCA, Baseline AS, ARAA and 30-month AS (AS Change) as predictor variables

	Model 1				Model 2				Model 3				Model 4			
Predictor	B	SE	β	ΔR^2	B	SE	β	ΔR^2	B	SE	β	ΔR^2	B	SE	β	ΔR^2
PRCA	-0.14	0.08	-0.16	0.03	-0.08	0.08	-0.09		-0.06	0.08	-0.07		-0.06	0.06	-0.07	
Baseline Difference					-0.76	0.19	.26*	*.115**	0.56	0.24	.20**		0.43	0.18	.15*	
ARAA									-0.67	0.19	-.31*	*.04***	-1.37	0.16	-.62*	
AS Change^													1.44	0.15	.67*	*.35**

^ The independent variable AS Change was created to isolate change occurring in AS over adolescence.

This score was created by subtracting 30-month AS from Baseline AS.

*Note. *p< 0.01, **p< 0.05*

Figures

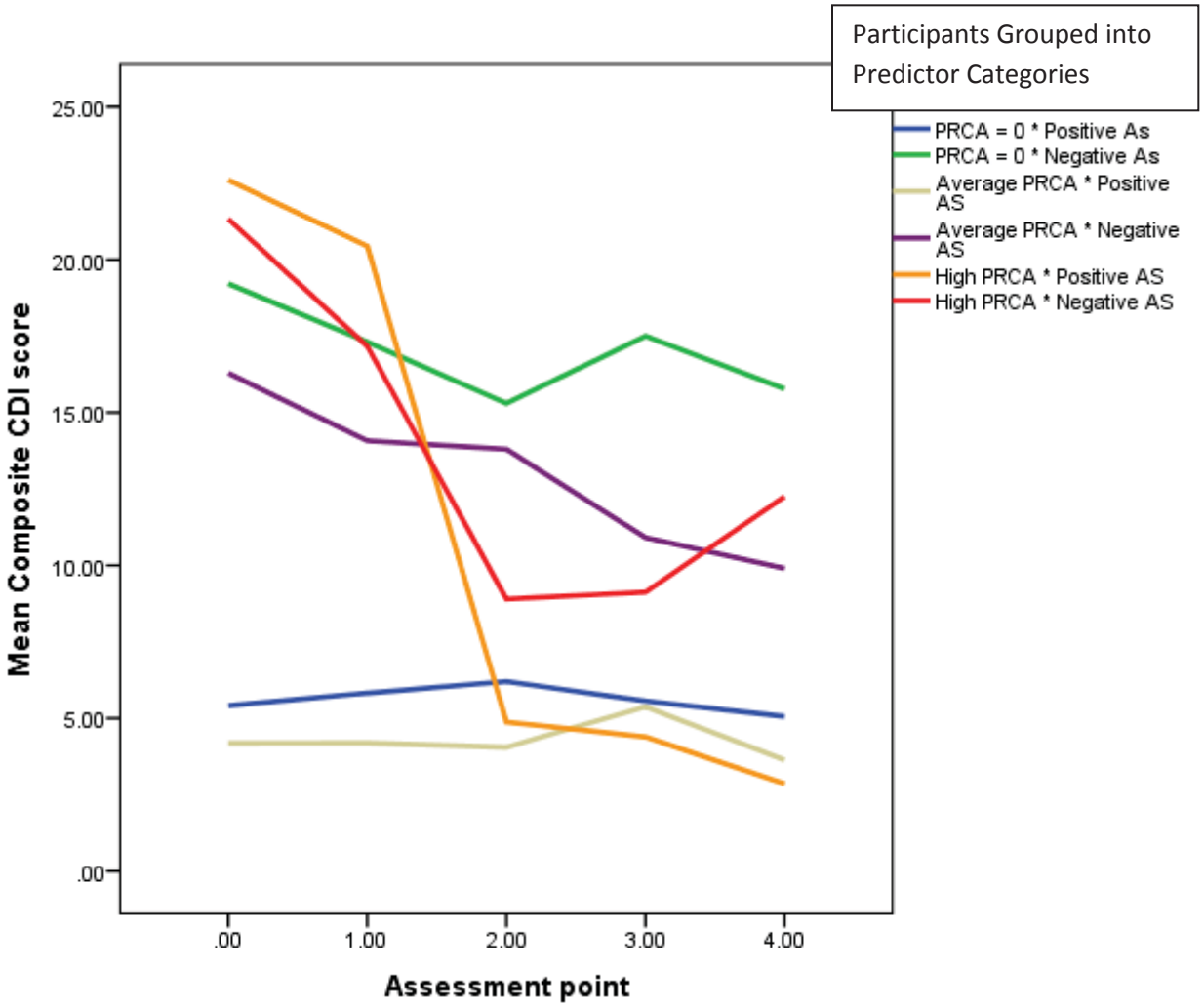

Figure 1. Mean composite CDI scores at each time point (0 = Baseline Assessment, 1 = Assessment 2, 2 = Assessment 3, 3 = Assessment 4, 4= Assessment 5) grouped into target categories representing only those with Negative or Positive AS at baseline and their corresponding (high, average, or low) levels of baseline PRCA.

Note. Negative AS was determined to be 1 standard deviation below the mean, Positive AS was determined to be 1 standard deviation above the mean. PRCA was separated with 0 NLEs experienced making up the Low NLE group, within 1standard deviation from the mean making up the Average NLE group and all those scoring 1 standard deviation above the mean making up the High NLE group.