Sex differences in interpretation bias and interpersonal difficulties in adolescence and young adulthood.

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ABSTRACT

Females are more likely to become depressed and experience social anxiety than are males, and this sex difference emerges during adolescence. A difference in interpretation of ambiguous social scenarios has been posited as a potential causal factor of the sex differences in mood disorders. Females are also thought to place a higher value on social relationships than are males, which may cause them to view interpersonal relationships as more difficult, further affecting their interpretations of ambiguous social events. To test these hypotheses, differences in interpretation of ambiguous events and perception of interpersonal difficulty were measured using the AIBQ in adolescents (aged 12-15) and young adults (22-25). The participants also rated the level of perceived difficulty of different interpersonal relationships using the QIDA, such as romantic, peer, family, etc. Results showed that females were more likely than males to have negative explanations come to mind for ambiguous social and nonsocial scenarios, and had more negative beliefs than males about ambiguous social scenarios. Adolescents were more negative in belief for social events than for nonsocial events, and were more negative in belief for social scenarios than were adults. All participants had more positive interpretations for nonsocial scenarios than social. No sex or age differences in positive interpretations or interpersonal difficulties were found. Future studies could track the changes as adolescents age and transition into young adulthood.
INTRODUCTION

Women are twice as likely as men to develop depression over the course of their lifetimes (Bromet et al., 2011). This female preponderance is a well-documented epidemiological phenomenon: it has been consistently reported across many countries and has remained constant over the previous decades (Weissman & Klerman, 1977; Weissman et al., 1996; Wade, Cairney, & Pevalin, 2002). Prior to puberty this gender disparity is not found. In fact, the depression rate for boys equals or even outnumbers that of girls (Finch, Saylor, & Edwards, 1985; Hankin, 2009). By mid to late puberty, however, the rate of depressed girls surpasses that of boys, and remains greater throughout adulthood (Kessler et al., 1994). Thus, females appear to become more susceptible to depression immediately before and during puberty, marking adolescence as an important time in the etiology of depression (Nolen-Hoeksema & Girgus, 1994).

Many different theories attempt to explain the gender difference in depression rates that arises during puberty, including hormone changes (Brooks-Gunn & Warren, 1989; Angold & Worthman, 1993), transitioning social roles (Cyranowski, Frank, Young, & Shear, 2000), frequency of negative life events (Hankin & Abramson, 2001) and cognitive styles (Abramson, Metalsky, & Alloy, 1989; Clark & Wells, 1995; Mathews & MacLeod, 1994). The general cognitive vulnerability-stress model (Hankin & Abramson, 2001) suggests that hormones, transitioning social roles, and cognitive styles act as general and cognitive vulnerabilities that predispose individuals to depression when negative life events occur. Various researchers have expanded upon the cognitive vulnerability-stress model to account for new findings in the depression literature. Most recently, Hyde and colleagues (2008) integrate different depression models in the “ABCs of Depression,” which states that Affective, Biological, and
Cognitive factors confer vulnerability, especially in females, to depression in the face of stressful life events. The following sections review evidence in support of the ABC model, and then explore how negative interpretation biases may act as a cognitive vulnerability exposing female adolescents to greater rates of depression.

**Affective and Biological Vulnerabilities**

Negative affectivity refers to the tendency to experience negative emotions more often and more strongly. Logically, adolescents exhibiting high negative affectivity may be more likely than adolescents with low negative affectivity to experience stronger negative emotions when confronted with difficult situations (Hyde, Mezulis, & Abramson, 2008). Mezulis and colleagues (2006) found that children with high negative affectivity also experienced more negative life events and had more negative cognitive styles, both of which confer further vulnerability to depression. Though there do not appear to be any gender differences in negative affectivity in adolescence (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006) there may be a greater variance in negative affectivity in girls, putting a slightly larger number of girls than boys in the highest range of negative affectivity. In this way, there may actually be a larger number of girls than boys at risk for developing depression due to a negative affectivity vulnerability, even though mean affectivity scores are equal (Hyde et al, 2008).

An additional pathway whereby negative affectivity may act is by enhancing the effects of hormone changes in adolescence. During puberty, hormones levels involved in both sexual maturation and stress reactivity change dramatically (Angold & Worthman, 1993). Thus, these changes in hormones may increase negative affectivity in adolescence, amplifying already present vulnerability to depression (Spear, 2000). Previous research has found that pubertal status of adolescent females is positively
correlated to depression, and that as girls progress through puberty the probability that they will become depressed increases (Angold, Costello, & Worthman, 1998). Other studies investigating hormone levels in particular have found that elevations in estrogen levels correlate positively with elevations in negative affect in adolescent females, and that estrogen’s effects on negative affect are amplified when combined with negative life events or social stressors (Brooks-Gunn & Warren, 1989). Together, these studies suggest that hormone levels may influence the development of depression in girls.

In addition, girls exhibit a greater affiliative need to establish intimate relationships with others (Feingold, 1994), and report more negative life events (Compas & Wagner, 1991) than do boys. Cyranowski and colleagues (2000) suggest that the combination of latent affiliative differences, changes in hormone levels, social relationships, and the experience of negative life events together predispose girls to develop depression in greater rates than boys. However, cognitive style, or the way in which individuals think about life events, is not included in Cyranowski and colleague’s (2000) model, yet may confer a cognitive vulnerability that interacts with negative affect and hormones to predispose female adolescents to depression (Hankin & Abramson, 2001; Hyde et al., 2008).

**Cognitive Vulnerabilities**

Theories that explore cognitive styles and vulnerabilities posit that the way in which individuals process information influences the development and maintenance of mood disorders (Mathews & MacLeod, 1994; Clark & Wells, 1995; Rapee & Heimberg, 1997). Hankin and Abramson’s elaborated cognitive vulnerability-transactional stress theory (Hankin & Abramson, 2001) states that, in addition to the hormonal and social
changes that occur during adolescence, generic cognitive vulnerability factors predispose adolescents to depression when they are confronted with negative life events. Mathews and MacLeod (1994) divide cognitive vulnerabilities into four main information-processing biases: attention, memory, judgment, and interpretation. Hankin and Abramson (2001) also cite rumination responses, dysfunctional attitudes, and Abramson’s negative inferential style (Abramson et al., 1989) as additional generic cognitive vulnerabilities. Overall, these cognitive vulnerabilities—information-processing biases, rumination responses, dysfunctional attitudes, and Abramson’s negative inferential style—predispose individuals to draw negative inferences and experience events in a more negative way (Clark & Wells, 1995; Cyranowski et al., 2000; Hankin & Abramson, 2001). The next two sections focus on two particular cognitive vulnerabilities, negative inferential style and negative interpretation bias, and review the relevant literature.

**Cognitive Vulnerabilities: Negative Inferential Style**

One of the cognitive vulnerabilities in Hankin and Abramson’s (2001) elaborated cognitive vulnerability-transactional stress theory is negative inferential style. Negative inferential style is the tendency to assign stable or unstable, global or specific causes to one’s experiences. In a questionnaire of inferential style (Adolescent Cognitive Style Questionnaire, ACSQ; Hankin & Abramson, 2002), participants imagine themselves in ambiguous scenarios, write potential explanations for the situations, and then rate on a 7-point Likert scale to what extent the situation’s explanation is internal (caused by the participant), stable (constant and unchangeable), and global (applies to other situations). An example ambiguous scenario is “an acquaintance fails to wave hello to you.” A possible explanation could be because the acquaintance does not like you
(internal), could never like you (stable), and many other people will not like you, either (global).

In a study with adolescents (ages 11-17) using the ACSQ, symptoms of depression and anxiety were found to positively correlate with cognitive vulnerabilities, as measured by negative inferential style (Hankin, 2009). In addition, girls overall had a more negative inferential style than did boys. Girls also reported more stressors and depressive symptoms. This study provides tentative support for the Hankin and Abramson's (2001) elaborated cognitive vulnerability-transaction stress theory of depression by showing a positive correlation between cognitive vulnerability and depression/anxiety symptoms, and also showed that both were higher in girls compared to boys. However, the theory postulates that cognitive vulnerabilities come before major depression, acting as a negative affect enhancer when negative life events occur. To test which comes first (cognitive vulnerability or depression), or whether they emerge simultaneously, the trajectory across age groups must be examined through a longitudinal study. The study by (Hankin, 2009) provided a snapshot in time of adolescent depression, and thus could not support the temporal hypothesis that cognitive vulnerabilities and stressors precede depression.

Mezulis, Funasaki, Charbonneau, & Hyde (2009) investigated the timeline of depression and cognitive vulnerability emergence by following adolescents over the course of five years (11, 13, and 15 years of age), taking indices of depression, social stressors, and negative inferences scores (as measured by the Children's Cognitive Style Questionnaire, CCSQ). In this study, depression symptoms in girls increased significantly over time: an equal number of boys and girls were depressed at age 11, but by 13 and 15 significantly more girls than boys were depressed. Girls also experienced a greater increase in negative inferential style and number of social stressors. However,
girls’ negative cognitive style did not increase significantly compared to boys until age 15, after the gender differences in depressive symptoms were noted. Mezulis and colleagues (2009) showed that gender differences in depressive symptoms (age 13 girls more depressed) precede the gender differences in cognitive style (age 15 girls more negative in cognitive style), contradicting the hypothesized direction of influence (i.e. negative inferences causing depression). Results from this study suggest gender differences in cognitive vulnerability do not emerge until middle to late adolescence, after the rise of depression and negative affect, and thus is a result of depression rather than a mediating variable in its development.

Results from another longitudinal study on the timeline of negative inferences and depressive symptoms in adolescents by Calvete (2010) contradict those found by Mezulis and colleagues (2009). Calvete (2010) found a reversed order of appearance in adolescents aged 14 to 17 years, where sex differences in depressive symptoms followed the emergence of a sex difference in cognitive style. Initial levels of negative inferences, as measured by the Adolescent Cognitive Style Questionnaire (ACSQ, complementary to the CCSQ), mediated the association between gender and differences in the manifestation of depressive symptoms six months later. This correlation between negative inferences and subsequent depressive symptoms was stronger for girls than for boys, suggesting that girls who demonstrated a negative inferential style were more vulnerable than are boys with negative inferential styles. Both Mezulis et al. (2009) and Calvete (2010) had relatively large sample sizes (336 and 853 participants, respectively), and so the contradictory results may be attributable to the slight differences in age range (Calvete 2010) and length of time over which the studies were conducted. Whereas Mezulis and colleagues (2009) interviewed early to mid adolescents (aged 11-15 years) three times in two-year intervals, Calvete (2010)
interviewed mid to late adolescents (14-17) twice, sixth months apart. If sex differences in depression rates are initially triggered by factors other than cognitive vulnerabilities, and then the emergence of cognitive vulnerabilities in mid to late adolescence continue to drive the sex differences even farther apart, then the apparent contradiction in results between the two studies may be resolved. To clarify the timeline of the emergence of depression and cognitive vulnerability in adolescents, more longitudinal studies must be conducted over a greater range of ages.

**Cognitive Vulnerabilities: Negative Interpretation Bias**

As stated, current models suggest that the more social stressors individuals experience, in combination with what inferences about the self they make in response to those social stressors, may predispose individuals to depression. The way in which an individual resolves ambiguous situations—positively or negatively—may increase the number of negative events an individual perceives as having experienced. Thus, a tendency to interpret ambiguous events in a negative way (i.e. negative interpretation bias) may also predispose individuals to depression. For example, the scenario “an acquaintance fails to say hello” is ambiguous. However, if an individual immediately interprets this scenario negatively (i.e. he/she did not want to say hi), then the individual will assign either a negative, positive, or neutral inference to explain why (negative- he/she does not like me; positive- he/she likes me but did not have time to talk; neutral-he/she just didn’t feel like saying hi). The individual’s initial interpretation of the ambiguous scenario could mediate whether or not the individual then infers a negative internal cause. Though there have been contradictory reports on the amount of stressful life events experienced by either sex (Calvete, 2010; Mezulis et al., 2009), it is possible that females may increase the number of negative events by interpreting
everyday, ambiguous events in a more negative manner, thereby making an otherwise neutral experience more stressful. Thus, in addition to understanding the role of negative inferences in depression, it is also important to explore initial interpretations of ambiguous events as well.

Given that social issues are a major source of anxiety in adolescents (Gullone & King, 1993; Westenberg, Gullone, Bokhorst, Heyne, & King, 2007), it is possible that interpretations of ambiguous social events are especially important in the maintenance and development of depression for adolescents. Like depression, social anxiety increases in prevalence in early adolescence (Beesdo, 2007), and affects females in disproportionate rates (14% for females, 8% for males); (Beesdo, 2007). Comorbidity surveys show that social anxiety and its clinical form social phobia are positively correlated with levels of depression in adolescents (Angold, Costello, Erkanli, & Worthman, 1999). In fact, some authors suggest that depression in adolescence starts as social anxiety and proliferates (Kessler, Pfister, & Lieb, 2000). Given the importance of social issues in adolescence, and the strong correlation between social anxiety and depression, it is possible that a bias toward making negative inferences and interpretations is specific to social scenarios, yet the difference between social and nonsocial scenarios is not noted in either of the cognitive styles questionnaires (ACSQ or CCSQ).

Amir and colleagues (1998) investigated social interpretation bias in adults using The Interpretation Questionnaire (Amir, Foa, & Coles, 1998) by asking participants to consider various self-relevant, ambiguous social and nonsocial scenarios, and then to rate the likelihood that positive, negative, and neutral explanations would come to mind during that situation. The study found that individuals with social phobia rate negative interpretations of social events as more
likely to come to mind, and positive interpretations of social events as less likely to come to mind than those with no anxiety or generalized anxiety. Those with social phobia also rated negative interpretations of ambiguous social scenarios as more likely to occur to them than for ambiguous nonsocial scenarios. By contrast, non-anxious and generalized anxiety controls actually rated positive interpretations of ambiguous social events as more likely to occur to them than for ambiguous non-social events. These results show a significant negative social interpretation bias in adults with social phobia, a result replicated by other studies (Brendle & Wenzel, 2004; Constans, Penn, Ihen, & Hope, 1999; Stopa & Clark, 2000; Hirsch & Mathews, 2000). Gender differences in interpretation bias among adults were not found (Amir et al. 1998; Constans, Penn, Ihen, & Hope, 1999), or were not investigated (Brendle & Wenzel, 2004; Stopa & Clark, 2000; Hirsch & Mathews, 2000).

While it is generally accepted that individuals with depression and social anxiety have more negative interpretations of ambiguous events than individuals without mood disorders, the exact nature of positive and negative biases in depressed and anxious adults remains unclear. Huppert and colleagues (2003) controlled for the effects of negative affect and/or state anxiety, and found that negative interpretation bias of ambiguous social events was predicted only by levels of social anxiety, but not by depression or generalized anxiety. However, a later study by Franklin and colleagues (2005) found that both social anxiety and depression positively correlated with negative interpretations of social events. Additionally, while some studies have found that social anxiety is characterized not by the lack of a positive bias but by the existence of a negative bias (Dickson and MacLeod 2004; Luebbe, Bell, Allwood, Swenson, & Early, 2010), other studies have found the reverse to be true (i.e., lack of positive bias, Hirsch
& Mathews, 2000; Constans et al., 1999) or even that social anxiety is characterised by discounting of positive social events (Vassilopoulous & Banerjee, 2010).

Extending the research into younger populations with children and adolescents, most studies have also found evidence of a negative interpretation bias of ambiguous events in subjects with social anxiety and depression. Studies have found that children and adolescents with anxiety disorders interpret ambiguous events more negatively than those without anxiety disorders (e.g.: Bögels & Zigterman, 2000; Bögels, Snieder, & Kindt, 2003; Chorpita, Albano, & Barlow, 1996; P. Muris, Merckelbach, & Damsma, 2000; Peter Muris, Rapee, Meesters, Schouten, & Geers, 2003; Creswell & O'Connor, 2011). Furthermore, other studies have found evidence that the content of the ambiguous scenario and the kind of anxiety the participant has influence the valence of interpretation, i.e. positive or negative (Bögels et al., 2003). For example, socially anxious children and adolescents make more negative interpretations of ambiguous social events than for ambiguous nonsocial events (Muris et al., 2000).

One study in particular by Vassilopoulos and Banerjee (2008) investigated differences in interpretation in participants (ages 11-13) with no anxiety, social anxiety, and depression. The study measured the subjects’ tendency to discount positive social events and catastrophize negative social events using the Positive Social Events Discounting Questionnaire and the Negative Social Events Catastrophization Questionnaire (PSEDQ and NSECQ; Vassilopoulous & Banerjee 2008). The results of this study found that participants with social anxiety endorsed more negative interpretations of ambiguous social events and rejected more positive interpretations than those without social anxiety. This negative interpretation bias remained even after including depressive symptoms as a possible mediating factor, suggesting that negative interpretation bias of ambiguous social scenarios is specific to social anxiety, a result
confirmed by an earlier study (Voncken, Bögels, & Peeters, 2007). Though Vassilopoulos & Banerjee (2008) found that socially anxious adolescents make more negative interpretations of mildly negative and positive ambiguous social events, the study did not report whether the relationship between interpretation bias and anxiety/depression varied between the sexes.

A later study by Miers, Blote, Bogels, & Westenberg (2008) specifically investigated sex differences in interpretations of social and nonsocial scenarios. To measure interpretation bias, the researchers developed the Adolescent Interpretation Bias Questionnaire (AIBQ), which presents five social and five nonsocial ambiguous, hypothetical, and self-relevant events to participants. A limitation of most previous versions of ambiguous scenarios tests (e.g., the Interpretation Questionnaire, Amir et al., 1998) is that they force the participant to choose one dominant answer or to rank the positive, negative, and neutral explanations against each other, but not against an absolute scale. This prevents the participant from assigning the same probability that the thought would occur to them to more than one explanation. Therefore, answers for any one individual become an averaged score as opposed to a more nuanced rating that may show the existence of both positive and negative biases. Because other studies have shown that anxiety is associated with an increase in negative explanations in comparison to controls, but that anxious individuals do not differ from controls when it comes to generating positive explanations, it is important to distinguish between positive and negative bias (Dickson and MacLeod 2004).

Most of the previous interpretation questionnaires also do not ask the participants to decide which explanation is most believable, preventing the participant from reflecting on the explanations and making a judgment about the situation’s cause. Though individuals may initially interpret an event negatively, the extent to which he or
she ultimately believes the interpretation becomes a determinant in how he or she views the meaning of the event (Clark et al. 1997). If the individual ultimately rejects the negative interpretation and instead believes the positive interpretation, then the Interpretation Questionnaire, which does not take into consideration the believability aspect, may falsely assign a negative interpretation bias to someone who actually is positive in his or her beliefs. The AIBQ corrects for both limitations (1. ranking of interpretations and 2. lack of belief question) by including separate Likert-rating scales for the positive, negative, and neutral explanations for each of the five social and five nonsocial ambiguous events, as well as a follow-up question asking which of the three explanations is most believable for each event. By including the additional belief question, the AIBQ also partially accounts for judgment bias—or an overestimation of the likelihood of a particular negative event (Foa, Franklin, Perry, & Herbert, 1996).

In a study using the AIBQ (Miers et al., 2008; 73 subjects, ages 12-16), participants with high social anxiety scored negative interpretations as more likely to come to mind and positive interpretations as less likely for ambiguous social situations than did participants with low levels of social anxiety. Highly anxious adolescents were also more negative in their beliefs than were non-anxious adolescents. The study found that females were significantly more negative and less positive in their interpretations than boys were, and also had more negative beliefs. However, these effects of sex disappeared once levels of social anxiety were taken into account. Thus, the difference in negative interpretations and beliefs was possibly due to the fact that there were more girls than boys with high levels of social anxiety.

Miers et al. (2008) did not compare social interpretation scores to nonsocial interpretation scores, so inferences about differences between scenario types cannot be made. Furthermore, a broad age range was included in the study. A later study
conducted by Lynn and colleagues (2012; 47 participants) sought to replicate the findings of Miers et al (2008) in a smaller age range (ages 12 to 14), and made an additional comparison of scenario type by gender. Lynn and colleagues (2012) found that girls were more negative in their interpretations for both social and nonsocial scenarios. In contrast to Miers et al. (2008), the sexes did not differ in scores for positive interpretations or mean beliefs. Lynn et al. (2012) also found that both sexes were more positive in their interpretations of non-social scenarios than social, and were more likely to believe the positive interpretations for non-social scenarios. Although girls were more likely to have negative interpretations occur to them as explanations for either scenario, social phobia scores were positively correlated with negative interpretations in boys only. This seems to suggest that girls generally interpret all events more negatively than boys regardless of levels of social anxiety, whereas boys exhibit a negative interpretation bias of social events only if they have underlying social anxiety.

Though the data is not yet conclusive, it appears that biases in interpretation differ for social and nonsocial ambiguous scenarios, with a more negative style associated with social scenarios. Adolescent females also appear to exhibit a more negative interpretation style than males, interpreting both social and nonsocial scenarios more negatively than males regardless of social anxiety. However, Lynn et al. (2012) is the only study to date that has investigated adolescent sex differences in interpretation of ambiguous social and nonsocial scenarios, and the results of the study merit replication. Furthermore, it is not known whether these sex differences in interpretation bias persist into young adulthood, or if the negative interpretation bias diminishes as female adolescents enter young adulthood. While researchers have
focused on sex differences in interpretation bias in adolescents and adults separately, no studies have measured the differences between the two age groups.

**Relationships, Social Skills, and Mood Disorders**

Adolescence is marked by a significant increase in the importance of interpersonal relationships (Ingles, Hidalgo, & Méndez, 2005). Family relationships are overshadowed as peer acceptance and romantic relationships take a central role (Furman & Buhrmester, 1992). Unfortunately, those with social anxiety and/or depression tend to be rejected more often by peers, and rejection only reinforces mood disorders (Segrin, 1992). In comorbidity surveys, non-clinical social anxiety, as well as its clinical form, social phobia, are positively correlated with levels of depression in adolescents (Angold, Costello, Erkanli, & Worthman, 1999). In fact, anxiety is known to precede and predict depression, and nearly 50% of individuals with social phobia will later be diagnosed with depression (Beesdo et al., 2007). Therefore, anything that prevents normal social development in peer and romantic relationships during adolescence is a potential contributor to depression (Starr & Davila, 2008).

A variety of dysfunctional social behaviors are linked to depression and anxiety, and the direction of the cause/effect has been found to be bidirectional (Banerjee, Watling, & Caputi, 2011; Davila, Karney, Hall, & Bradbury, 2003). In particular, passivity in social relationships, such as not expressing emotion and over-dependence on others, has been associated with interpersonal stress (Davila & Beck, 2002). Over-dependence on others manifests itself in excessive reassurance seeking, which then increases the likelihood of rejection by one’s peers (Joiner, Metalsky, Katz, & Beach, 1999). Thus, better understanding the cause and nature of social impairment is crucial in alleviating the stress and anxiety felt by afflicted adolescents.
Social problems in adolescence may be exacerbated by negative interpretation of ambiguous social scenarios. In particular, a negative social interpretation bias may interfere with normal social development by increasing the perceived difficulty of social relationships. If an adolescent tends to interpret ambiguous social scenarios more negatively, then he or she may feel that social relationships are more difficult than do other adolescents. Difficulty with social relationships may lead individuals to avoid social situations, which may then prevent those individuals from developing appropriate social skills (Starr & Davila, 2008). Poor social skills correlate with poorer quality relationships (Sanderson, DiNardo, Rapee, & Barlow, 1990), increasing perceived difficulty in social relationships. Thus, a negative interpretation bias of ambiguous social scenarios may create a vicious cycle where social relationships are difficult → social situations are avoided → social skills do not develop → thereby making relationships more difficult.

Ingles and colleagues (2005) created a questionnaire for adolescents aged 12-18 years, in order to measure levels of perceived difficulty in interpersonal relationships. The Questionnaire about Interpersonal Difficulties for Adolescents (QIDA; Ingles et al., 2005) presents scenarios relating to assertiveness, romantic relationships, public speaking, family relationships, and close friendships, and provides a Likert scale to measure the perceived difficulty of each scenario, from 0 (no difficulty) to 3 (maximum difficulty). For example, “complaining to a waiter when you are served bad food or drinks” might receive a mark of 3 (maximum difficulty), showing that the participant has tremendous difficulty asserting him or herself.

The more difficult a person perceives social relationships and situations to be, the more anxiety about social relationships that person would be expected to feel. In fact, Ingles and colleagues (2005) found that mean QIDA scores (averaged across
assertiveness, romantic relationships, public speaking, family relationships, and close friendships) differ significantly between participants with and without social anxiety as measured by the Social Phobia subscale of the Social Phobia and Anxiety Inventory (ages 12-18): a strong positive and statistically significant relationship was found between the QIDA total score and the Social Phobia subscale score from the Social Phobia and Anxiety Inventory. Adolescents with clinical social phobia also have statistically higher mean QIDA scores than do non-anxious adolescents (Ingles et al., 2005). Therefore, a negative interpretation bias of ambiguous social scenarios, combined with the subsequent increase in perceived difficulty of social relationships, may contribute to the development of social anxiety and depression.

To date, no research exists that examines the relationship between negative interpretation bias and perceived difficulty of social relationships. Gender differences in interpersonal difficulties as measured by the QIDA also have not been investigated, but due to apparent sex differences in social anxiety rates, such investigation is warranted. As adolescents transition to young adulthood, the level of difficulty associated with interpersonal relationships may change, so interpersonal difficulties in young adults also deserves research attention. More research is needed to better understand the interpersonal relationships and how they are perceived, and whether or not sex and age differences exist.

**Negative Interpretation Bias, Interpersonal Difficulty, and Mood Disorders:**

The purpose of the present study is to investigate the relationships between sex, age, mood disorder symptomology, negative social interpretation bias, and perceived interpersonal difficulties in adolescents and young adults. To investigate the sex differences in interpretations and beliefs of ambiguous events, we took measures of the
AIBQ in a British adolescent population. Given that sex differences in mood disorders appear in early to mid-adolescence (Kessler et al., 1994), we chose to limit our population to adolescents aged approximately 12-14. Because we do not know how sex differences in interpretation bias change from adolescence to adulthood, we included a young-adult cohort in the study as a comparison group (ages 22-25).

The adolescent cohort is hypothesized to exhibit the same gender patterns as found in the studies by Miers et al. (2008) and Lynn et al. (2012), with females exhibiting a greater negative social interpretation bias than their male counterparts. In particular, we expect that the female adolescents will have more negative and less positive interpretations come to mind for ambiguous social events, and that female adolescents will be more negative on average in their beliefs than will male adolescents. Given that neither (Amir et al., 1998) nor (Constans, Penn, Ihen, & Hope, 1999) found sex differences in interpretation bias of social scenarios (albeit using a different ambiguous scenarios questionnaire), we do not expect to find a sex difference in interpretation in the adult population. In addition, to investigate both sex and age differences in perceived level of interpersonal difficulty, we also included the Questionnaire about Interpersonal Difficulties for Adolescents (QIDA; Ingles et al. 2005). We also would like to see if a tendency to negatively interpret ambiguous social events positively correlates with higher levels of interpersonal difficulty.

Because levels of depression and anxiety can affect the way in which ambiguous scenarios are interpreted and interpersonal difficulties perceived, the Revised Children's Anxiety and Depression Scales (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) and the Depression, Anxiety, and Stress Scales (DASS; Lovibond & Lovibond 1995) were included in the study to control for mood in the adolescents and adults respectively. Females tend to have higher verbal fluency than males of the same
age (Hyde & Linn, 1988), and so to make sure that differences in responses were not due to impairments in understanding, we included a measure of receptive vocabulary for adolescents (British Picture Vocabulary Scale, BPVS; Dunn, Dunn, & Whetton, 1997) and adults (National Adult Reading Test, NART; Nelson, 1982). We anticipate a correlation between negative interpretation bias and levels of social anxiety, depression in adolescents and depression in adults.

In summary, the predictions of the current study were: 1 a) adolescent females will be more negative and b) less positive than adolescent males in their interpretations of ambiguous social events; 2) adolescent females will have a more negative mean belief score than males; 3) adults will show no sex differences in interpretation; 4 a) adolescents will be more negative and b) less positive than adults in social interpretations, and c) will have more negative social beliefs; 5 a) adolescents will have more interpersonal difficulties than adults, b) female adolescents will have more interpersonal difficulties than male adolescents, and c) adults will have no sex differences, 6) negative interpretations of ambiguous social scenarios will positively correlate with perceived difficulty in interpersonal relationships, and 7) social phobia scores in adolescents will correlate positively with a) perceived level of interpersonal difficulty, b) negative social interpretation scores, but not c) negative non-social interpretation scores, and that d) symptoms of depression may affect the correlations.

**METHOD**

**Participants and Recruitment**

All participants were self-selected volunteers. The adolescent cohort was recruited from the local Fife County, UK population, and the adult cohort was recruited through the postgraduate community at the University of St Andrews. Advertisements
for participant recruitment were placed in local community centres, sports centres, theatre groups, youth groups, supermarkets, St Andrews department bulletin boards, staff and student memos, and also in a community centre in Cupar, Scotland.

A total of 20 adolescents participated, with 9 females (M = 14.0, SD = 1.0, range = 12.2 – 15.2 years old) and 11 males (M = 13.3, SD = 0.3, range = 12.2 – 15.5 years old). A total of 20 adults participated, with 10 females (M = 24.0, SD = 0.7, range = 22.9 – 25.1 years old) and 10 males (M = 23.8, SD = 1.0, range = 22.8 – 25.5 years old). Nine adolescent participants in total were recruited from Madras College. Eleven adolescent participants and twenty adult participants were recruited from outside school through the various advertisements specified. The small number of adolescents who volunteered for participation was not expected; previous research projects involving adolescents from the St Andrews area successfully recruited larger numbers. However, all adolescent participants were of British nationality from Fife County, Scotland, and so no differences in language, culture, or nationality are expected. By contrast, the adult cohort is of various languages, cultures, and nationalities, and therefore data must be considered with these differences in mind.

**Procedure**

Madras students were tested in a private room at Madras campus during the school day, and were seen individually during a 50-minute class period. Staff children and all adult participants were interviewed in a private room allocated in the School of Psychology building at the University of St Andrews, and were reimbursed £5 for their time. A parent or guardian gave written consent for all adolescents, and verbal assent was obtained from each adolescent prior to the testing session. All adults provided written consent.
Using an online random number generator (www.randomizer.org/form.htm), forty 4-digit numbers were generated and assigned to each participant. This number was printed in grey ink at the bottom-left corner of each questionnaire sheet, and was also printed on the debrief sheet to provide participants the opportunity to withdraw from the study after completion. The order of the questionnaires was uniformly maintained for each participant. Adolescents completed the Adolescent Interpretation Bias Questionnaire (AIBQ), Questionnaire on Interpersonal Difficulties for Adolescents (QIDA), Revised Child Anxiety and Depression Scales (RCADS), sex and age sheet, and British Picture Vocabulary Scale (BPVS) in succession. Adults completed the AIBQ, QIDA, Depression, Anxiety, and Stress Scales (DASS), sex and age sheet, and the National Adult Reading Test (NART). The AIBQ was completed first by all participants in order to avoid priming an interpretation bias. To avoid influencing participant responses, the researcher answered all participant questions about the study carefully, and all participants were fully debriefed upon completion. Testing sessions took between 35 and 45 minutes to complete.

**Measures**

1. *British Vocabulary Picture Scale-III (BPVS; Dunn, Dunn, & Whetton, 1997)*: The BPVS measures receptive vocabulary age in English-speaking children and adolescents ages 3-16 years. The participant is shown a series of four pictures and must decide which picture best represents a given word. The experimenter begins with the appropriate level for the participant’s age, and progresses through each set of twelve words until the participant gets eight or more words wrong or has completed the last level. Receptive vocabulary age is then
calculated in years and months for each participant. The test has high validity, and has exhibited good Cronbach’s alpha scores (Dunn et al., 1997).

2. **National Adult Reading Test (NART; Nelson, 1982; Appendix A):** The NART estimates verbal intelligence in adult English speakers. The test comprises 50 English words with an irregular pronunciation (e.g., *depot*). The participant reads the words aloud one by one, and is graded on accuracy of pronunciation. A score of 1 indicates a correct pronunciation and a score of 0 indicates an incorrect pronunciation. At the end of the test, the scores are summed to give a raw score out of 50. The NART has high reliability and is a good verbal predictor of IQ in the general population (Crawford, 1989).

3. **Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000; Appendix B):** The RCADS is a measure of separation anxiety, generalized anxiety, panic, social phobia, obsessions/compulsions, and depression in children and adolescents aged 6 - 18. The questionnaire is presented in a fixed random order, and has 47 items in which the participant must state how often the item (e.g., “I get scared when I have to take a test”) applies to them on a four-point Likert scale (0 = never, 1 = sometimes, 2 = often, and 3 = always). A raw score for each dimension is calculated by summing participant responses. The individual scales are also compiled into a total anxiety score and a total anxiety and depression score. The scale is not meant to be used as a clinical diagnostic tool, but rather is used to assess symptomology. Test-retest validity as well as internal validity is good, with high Cronbach’s alpha scores (Chorpita et al., 2000).
4. *Depression Anxiety and Stress Scales (DASS; Lovibond & Lovibond 1995; Appendix C)*: The DASS is a self-report questionnaire designed to measure levels of stress, anxiety, and depression in adults over the period of one week. There are 14 questions each about stress, anxiety, and depression, with 42 questions overall. Participants are asked to consider on a 4-point Likert scale how often he or she experienced a particular symptom over the course of one week, with 0 being “did not apply to me at all” to 3 “applied to me very much, or most of the time.” Summing the scores across each subscale gives the respective depression, anxiety, and stress score. Internal consistencies for each scale of the DASS were good (Lovibond & Lovibond, 1995).

5. *Adolescent’s Interpretation and Belief Questionnaire (AIBQ; Miers, Blote, Bogels, & Westenberg, 2008; Appendix D)*: The purpose of the AIBQ is to measure interpretation bias in children and adolescents ages 12-18. In particular, the questionnaire gauges an individual’s tendency to interpret ambiguous social and non-social situations in positive, negative, or neutral ways. The AIBQ presents ten ambiguous, ordinary situations, five social and five non-social, and asks the participant to imagine him- or herself in that situation. The example scenario is “A few weeks after the beginning of the new school year, your teacher (mentor) asks to speak to you. Why does he or she want to speak to you?” For each scenario, three different potential explanations are provided, one positive (He or she wants to tell me that they are very satisfied with my work), negative (He or she expected much better work from me and thinks that I need to work harder), and neutral (He or she might want to ask me something). The participant is asked to
rate how likely it is that each explanation would occur to them on a 5-point Likert scale, with 1 = does not pop up in my mind, 3 = might pop up in my mind, and 5 = definitely pops up in my mind. The participant is then asked to mark the explanation that, upon further reflection, he or she believes is the most likely explanation. Social and non-social events are presented in a fixed random order, and participants are not told that there are two different types of scenarios in consideration, so as to not influence the participant responses. Mean interpretation scores are calculated by summing the ratings given for positive, negative, and neutral explanations for social and nonsocial events separately and then dividing by five. This yields a total of six interpretation scores (one positive, one negative, and one neutral for social and nonsocial scenarios each) with a range of possible scores from 1 to 5 for each. Belief scores are calculated by assigning a value to the marked explanation, with negative = 1, neutral = 2, and positive = 3. Social and non-social scenarios were summed separately and then divided by five to give a Mean belief score for the two dimensions. In total, six interpretation scores and two belief scores results in a total of eight scores per participant.

6. *Questionnaire about Interpersonal Difficulties in Adolescents (QIDA; Inglés, Méndez, & Hidalgo, 2000; Appendix E):* The QIDA is a self-report measure validated for use in children and adolescents ages 12-18, and assesses the participant’s perceived difficulty with interpersonal relationships. The QIDA presents 36 scenarios in a fixed, random order relating to assertiveness, romantic relationships, public speaking, family relationships, and close friendships. The participant is asked to consider each scenario and rank the
difficulty on a 5-point Likert scale, from 0 = no difficulty to 4 = maximum difficulty. The original QIDA has separate forms for boys and girls to allow the romantic relationship situations to be heterosexually relevant. For example, the scenario “starting a conversation with a girl your own age you don’t know at the bus stop” was used for boys, and the word “girl” was replaced with “boy” on the girl version. To avoid problems with participant sexuality, the same version of the QIDA was used for all participants by changing the above scenario and all other similar scenarios to: “starting a conversation with a person your age you don’t know but may fancy at the bus stop.” Average scores were calculated across the five dimensions (Assertiveness, Romantic Relationships, Public Speaking, Family Relationships, Close Relationships) as well as a sixth average total QIDA score found by summing the five dimension scores and dividing by 5. Excellent internal consistency, acceptable test-retest reliability, and good validity have been found for this measure (Bogdan, Szentagotai, Dobrean, and David, 2012).

**Ethical Approval and Timeline**

Various committees and organisations gave approval to conduct the research project. To work with underage children, membership to the Protecting Vulnerable Groups scheme was obtained from Disclosure Scotland. The application was submitted on 4/11/2011, and membership was issued on 22/11/2011. Ethical approval to conduct the project from the University of St. Andrews, School of Psychology Ethical Committee was applied for on 28/11/2011 and was granted 19/1/2012, Ethics Reference Number: PS8341. On 21/12/2011, the researcher met with an educational psychologist to discuss working with children in schools. Approval to conduct the
research from the Local Education Authority of Fife County, Scotland was applied for on 26/1/2012 and was granted 16/2/2012. Amendments to the project were approved by the School of Psychology Ethics Committee 29/5/2012 and 2/6/2012.

Statistical Analyses

All data was analysed using SPSS19, with an alpha level of $\alpha = .05$. Sidak’s adjustment of power was used for post-hoc pairwise comparisons of significant results in the ANOVAs. Partial eta squared values were used to estimate effect sizes. Values of .01, .06, .14 were interpreted as being small, medium, and large respectively.

1) Age, receptive vocabulary, and anxiety/depression scales.

For the adolescent and young adult participants, independent samples t-tests were used to examine whether males and females differed in mean age within each age group. Independent samples t-tests were also used to examine whether males and females differed in receptive vocabulary within each age group (BPVS and NART data).

A MANOVA was run on the adolescents with depression, generalized anxiety, and social anxiety scores from the RCADS as variables and sex as a between-subjects variable. A separate MANOVA was run on the adults with depression, anxiety, and stress scores from the DASS as variables and sex as a between-subjects variable.

For the rest of the general analysis, the adult and adolescents were considered as one population. Neutral interpretation scores from the AIBQ were excluded from analysis, following the analysis method used by Miers et al. 2008 and Lynn et al. 2012.

2) AIBQ: Mean Negative Interpretations
To test Hypotheses 1a, 3, and 4a, the first AIBQ mean interpretations analysis compares negative interpretation scores between scenario types, sexes, and age groups. Social and nonsocial negative interpretation scores were analysed using a Repeated Measures ANOVA, with scenario (social and nonsocial) run as a within-subject variable and sex and age group run as between-subject variables. Post-hoc simple effects tests with Sidak’s adjustments were run to explore pairwise comparisons. Unfortunately, as different scales were used to measure depression and anxiety the adolescent and adult populations, depression and anxiety could not be controlled for as covariates. Instead, bivariate correlations were run (as described in section 6) in the adolescent cohort to test for correlations between social phobia, interpersonal difficulties, and interpretation scores. As adolescents were our main focus of investigation, and to increase the power of our tests, we chose to examine the relationships in adolescents only.

3) AIBQ: Mean Positive Interpretations

Mean positive interpretation scores were compared between scenario types, sexes, and age groups to test Hypotheses 1b, 3, and 4b. Interpretation scores were analysed using a Repeated Measures ANOVA, with scenario (social and nonsocial) and valence (positive and negative) run as within-subject variables and sex and age group run as between-subject variables. Simple effects tests with Sidak’s adjustments were run to explore pairwise comparisons.

4) AIBQ: Mean Beliefs

To test Hypotheses 2, 3, and 4c, mean belief scores were compared between scenario types, sexes, and age groups using a Repeated Measure ANOVA. Scenario
(social and nonsocial) was run as a within-subject variable, and sex and age group were run as between-subjects variables.

5) QIDA scores

Mean QIDA scores for the five factors (assertiveness, romantic relationships, public speaking, family relationships, and close friendships) were analysed to test Hypotheses 5a, b, and c, by using a repeated measures ANOVA, with mean QIDA scores as within-subject variables and sex and age group as between subject-variables.

6) Bivariate Correlations

Mean Negative Social Interpretations and Mean Total QIDA Score: To test Hypothesis 6, a two-tailed bivariate correlation was run on all forty participants to assess the relationship between mean negative social interpretations and mean total QIDA score.

Social Phobia and Mean Total QIDA Score: Hypothesis 7a) was tested by running a two-tailed bivariate correlation on the adolescent participants to detect correlations between social phobia scores as measured by the RCADS and interpersonal difficulty as measured by the QIDA.

Social Phobia and AIBQ Mean Interpretation Scores: To test hypotheses 7b and c, four, two-tailed bivariate correlation analyses were run on the adolescent data to assess the relationships between social phobia scores and AIBQ interpretation scores (positive and negative, social and nonsocial) in adolescents. Alpha-level was adjusted by dividing by four, such that $\alpha < .0125$ was considered significant. To test Hypothesis 7d),
correlations were re-run including depression scores as a covariate for the tests that reached significance.

RESULTS

1a) Age (Table 1)
There was not a significant difference in mean ages in the adolescent group for males (M=13.28, SD= .34) and females (M=13.98, SD= .95; t(18)=-1.45, p = .163), or in the adult group between males (M=23.83, SD=.97) and females (M=24.05, SD=.73; t(18) = -.59, p = .564).

Table 1, Mean Ages:

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescents</td>
<td>13.3 ± 1.1</td>
<td>14.0 ± .9</td>
</tr>
<tr>
<td>Adults</td>
<td>23.8 ± 1.0</td>
<td>24.1 ± .7</td>
</tr>
</tbody>
</table>

1b) Verbal Tests (Table 2)

Adolescents: BPVS
Levene's test for equality of variances was not satisfied (p = .04). Equal variances not assumed, there was not a significant difference between BPVS age equivalency scores for males (M =13.894, SD = 2.395) and females (M = 14.426, SD = 1.583); t(17.348) = -.595, p = .56.

Adults: NART
There was not a significant difference in NART scores for males (M = 37.5, SD = 8.396), and females (M = 32.3, SD = 5.293; t(18) = 1.657, p = .115).

Table 2, Verbal Tests:

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescents</td>
<td>BPVS: Receptive Vocabulary Age (Years) 13.9 ± 2.9</td>
<td>14.4 ± 1.6</td>
</tr>
<tr>
<td>Adults</td>
<td>NART: Verbal Fluency Scores 37.5 ± 8.4</td>
<td>32.3 ± 5.3</td>
</tr>
</tbody>
</table>
1c) Mood Disorder Symptom Indices (Table 3)

Adolescents: RCADS

There was a significant effect of sex in the adolescent population on social phobia, F(1,18) = 5.133, p = .036, with females scoring as more socially anxious than males. Sex differences in depression and generalized anxiety scores did not reach significance: F(1,18) = 2.132, p = .161, and F(1,18) = .045, p = .834.

Adults: DASS

There were no significant sex differences in the adult population in stress, anxiety, or depression scores: F(1,18) = .038, p = .848, F(1,18) = .222, p = .643, F(1,18) = .153, p = .700 respectively.

<table>
<thead>
<tr>
<th>Table 3, Mood Disorder Symptom Indexes:</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescents RCADS: Social Anxiety</td>
<td>11.9 ± 4.1</td>
<td>16.7 ± 5.3★</td>
</tr>
<tr>
<td>RCADS: Depression</td>
<td>9.5 ± 3.5</td>
<td>9.9 ± 5.6</td>
</tr>
<tr>
<td>RCADS: Generalized Anxiety</td>
<td>6.4 ± 3.1</td>
<td>8.6 ± 3.6</td>
</tr>
<tr>
<td>Adults DASS: Stress</td>
<td>14.2 ± 7.4</td>
<td>14.9 ± 8.7</td>
</tr>
<tr>
<td>DASS: Anxiety</td>
<td>8.3 ± 7.7</td>
<td>6.9 ± 8.3</td>
</tr>
<tr>
<td>DASS: Depression</td>
<td>10.4 ± 10.6</td>
<td>8.2 ± 10.2</td>
</tr>
</tbody>
</table>

★ indicates significant effect of sex (p < .05)

2) AIBQ: Mean Negative Interpretations (Table 4)

The first analysis compared negative interpretation scores between scenario types, sexes, and age groups. A graphical representation of the negative scores reveals that females scored negative interpretations of both social and nonsocial scenarios higher than did their male counterparts, indicating that females were more negative in their interpretations overall, regardless of scenario type or age group (Figure 1; main effect of sex: F(1,36) = 6.631, p = .014, η² = .156; main effect of scenario type: F(1,36) = .427, p = .517, η² = .012 and age group: F(1,36) = 4.124, p = .050, η² = .103). Although this difference appeared to be greater for social scenarios than for nonsocial scenarios (Figure 1a), this difference failed to reach significance in the ANOVA (no interaction between sex and scenario type: F(1,36) = 2.295, p = .139, η² = .06).
Figures 1 and 1a:

Graphing the data by age group showed that the negative interpretation scores varied by age group and scenario (Figure 2: age group by scenario interaction was significant in the ANOVA $F(1,36) = 8.147, p = .007, \eta^2_p = .185$). Pairwise comparisons of social interpretation scores showed that adolescents scored negative social interpretations as more likely to come to mind than did adults ($F(1,36) = 8.678, p =$...
Pairwise comparisons also showed that adolescents scored negative interpretations as significantly more likely to come to mind for social than for nonsocial scenarios (F(1,36) = 6.123, p = .018, \( \eta^2_p \) = .145).

Figure 2:

The main effect of age tended towards significance; F(1,36) = 4.124, p = .050, \( \eta^2_p \) = .103), indicating that adolescents may have been more negative in their interpretations overall. The three-way interaction between age group, scenario, and sex did not reach significance: F(1,36) = .006, p = .937, \( \eta^2_p \) = .000.

### Table 4: Mean Negative Interpretation Scores

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Adults</th>
<th>Adolescents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>2.6 ± .4</td>
<td>2.9 ± .6★</td>
<td>2.7 ± .5</td>
<td>2.9 ± .5</td>
</tr>
<tr>
<td>Social</td>
<td>2.6 ± .6</td>
<td>3.1 ± .8</td>
<td>2.5 ± .7</td>
<td>3.1 ± .7✚✚</td>
</tr>
<tr>
<td>Nonsocial</td>
<td>2.6 ± .5</td>
<td>2.9 ± .5</td>
<td>2.7 ± .5</td>
<td>2.8 ± .5</td>
</tr>
</tbody>
</table>

★ indicates significant effect of sex (p < .05)
✚ indicates significant effect of scenario type (p < .05)
❚ indicates significant effect of age group (p < .05)
3) AIBQ: Mean Positive Interpretations (Table 5)

The second analysis of AIBQ scores considers ratings of positive interpretations between scenario types, sexes, and age groups. When the positive ratings given for each scenario type were split by age group, adolescents appear to have a greater difference in mean ratings of social and nonsocial scenarios. Results from the ANOVA confirmed that age interacted significantly with scenario (Figure 3; F(1,36) = 9.657, p = .004, \( \eta_p^2 = .212 \)). In line with the main effect of scenario type, pairwise comparisons showed that adolescents scored positive interpretations of nonsocial events as more likely to come to mind than for social events (F(1,36) = 14.251, p = .001, \( \eta_p^2 = .284 \)). Adults did not have a significant difference in social versus nonsocial scores (F(1,36) = .374, p = .545, \( \eta_p^2 = .010 \)). Pairwise comparisons also showed that adolescents were less positive than were adults in their interpretations of social scenarios (F(1,36) = 4.615, p = .038, \( \eta_p^2 = .114 \)).

Nonsocial scenarios received higher ratings for positive interpretations than did social scenarios across all participant groups, a result substantiated by the ANOVA (main effect of scenario: F(1,36) = 5.038, p = .031, \( \eta_p^2 = .123 \)). However, by looking at the graphs you can see that this main effect is driven by the differences in adolescent scores on social and nonsocial, whereas adult scores are nearly equivalent.

A main effect of sex was not found, and sex did not interact with any other variable (main effect of sex: F(1,36) = 1.736, p = .196, \( \eta_p^2 = .046 \); scenario by sex: F(1,36) = 1.278, p = .266, \( \eta_p^2 = .034 \), sex by age group: F(1,36) = .000, p = .995, \( \eta_p^2 = .000 \)).
Table 5: Mean Positive Interpretation Scores:

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Adults</th>
<th>Adolescents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>2.9 ± .3</td>
<td>3.1 ± .5</td>
<td>3.0 ± .5</td>
<td>2.9 ± .4</td>
</tr>
<tr>
<td>Social</td>
<td>2.8 ± .6</td>
<td>2.9 ± .8</td>
<td>3.1 ± .8</td>
<td>2.6 ± .5✚</td>
</tr>
<tr>
<td>Nonsocial</td>
<td>3.0 ± .5</td>
<td>3.2 ± .4</td>
<td>3.0 ± .5</td>
<td>3.2 ± .4</td>
</tr>
</tbody>
</table>

● indicates significant effect of scenario type (p < .05)
✚ indicates significant effect of age group (p < .05)

4) AIBQ: Mean Belief Scores (Table 6)

The mean belief ratings differed between the sexes and scenarios (interaction between sex and scenario $F(1,36) = 9.911$, $p = .003$, $\eta^2_p = .216$; Figure 4). Investigating this interaction through pairwise comparisons showed that females scored social events more negatively than nonsocial events ($F(1,36) = 10.507$, $p = .003$, $\eta^2_p = .226$). Females, however, were not statistically more negative in mean belief than males (main effect of sex $F(1,36) = .000$, $p = .996$, $\eta^2_p = .000$), and no other pairwise comparisons were significant.
The age by scenario interaction also reached significance \( F(1,36) = 4.590, p = .039, \eta^2_p = .113 \); Figure 5). Pairwise comparisons showed that adolescents had significantly lower mean belief scores (i.e. more negative) for social scenarios than for nonsocial scenarios \( F(1,36) = 6.781, p = .013, \eta^2_p = .159 \), and that adolescents were more negative in their beliefs about social scenarios than were adults \( F(1,36) = 7.993, p = .008, \eta^2_p = .182 \). A significant main effect of age was also found in the ANOVA (main effect of age group: \( F(1,36) = 5.298, p = .027, \eta^2_p = .128 \)).
Together, these results confirm that adolescents had significantly more negative beliefs for social events than for nonsocial events, and that they were more negative in their beliefs for social scenarios than adults were.

Table 6, Mean Belief Scores:

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Adults</th>
<th>Adolescents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td>2.0 ± .3</td>
<td>1.9 ± .4+</td>
<td>2.1 ± .3</td>
<td>1.8 ± .4+</td>
</tr>
<tr>
<td>Nonsocial</td>
<td>2.0 ± .2</td>
<td>2.1 ± .3</td>
<td>2.1 ± .3</td>
<td>2.0 ± .2</td>
</tr>
</tbody>
</table>

*+ indicates significant effect of scenario type (p < .05)*

*■ indicates significant effect of age group (p < .05)*

5) QIDA (Table 7)

Results from the QIDA analysis show that interpersonal difficulties are not significantly different between either age group (F(1,36) = .069, p = .794, ηp² = .002) or sex (F(1,36) = 1.237, p = .273, ηp² = .033), nor was there an interaction between the two: F(1,36) = 1.186, p = .283, ηp² = .032.
Table 7, Mean QIDA Scores:

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Adults</th>
<th>Adolescents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean QIDA</td>
<td>1.4 ± .4</td>
<td>1.5 ± .5</td>
<td>1.3 ± .3</td>
<td>1.6 ± .5</td>
</tr>
</tbody>
</table>

6) Bivariate Correlations (Table 8)

The likelihood that negative explanations would occur to the participants for social events was correlated with perceived difficulty in interpersonal relationships as measured by the QIDA (Pearson correlation = .334, p = .035; Figure 6). The correlation between QIDA score and social phobia subscale score was not significant (Pearson correlation = .389, p = .090; Figure 7).

Figures 6 and 7:
Both mean negative interpretations of social scenarios and nonsocial scenarios correlated positively and strongly with social phobia scores as measured by the RCADS in adolescents: Pearson correlation = .695, p = .001 (Figure 8), Pearson correlation = .571, p = .009 (Figure 9), respectively. Neither positive interpretation scores for social nor nonsocial were correlated with social phobia scores (positive social and nonsocial respectively: Pearson correlation = -.176, p = .457; Pearson correlation = .180, p = .448). When depression is included as a covariate, negative social interpretation scores remain positively and significantly correlated with social phobia scores: Pearson correlation = .661, p = .002. However, negative nonsocial interpretation scores fail to reach significance: Pearson correlation = .554, p = .014. (Alpha-level was adjusted by dividing by four, such that α < .0125 was considered significant).

Table 8, Bivariate Correlations

<table>
<thead>
<tr>
<th>QIDA x Negative Social</th>
<th>Pearson Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>.334</strong>*</td>
<td></td>
</tr>
<tr>
<td>QIDA x Social Phobia</td>
<td>.389</td>
</tr>
<tr>
<td>----------------------</td>
<td>------</td>
</tr>
<tr>
<td>Social Phobia x AIBQ Interpretations</td>
<td>Negative Social</td>
</tr>
<tr>
<td></td>
<td>&quot; depression as covariate</td>
</tr>
<tr>
<td></td>
<td>Negative Nonsocial</td>
</tr>
<tr>
<td></td>
<td>&quot; depression as covariate</td>
</tr>
<tr>
<td></td>
<td>Positive Social</td>
</tr>
<tr>
<td></td>
<td>Positive Nonsocial</td>
</tr>
</tbody>
</table>

* indicates two-tailed significance p < .05
** indicates two-tailed significance p < .0125

Figures 8 and 9
DISCUSSION

The present study showed sex and age differences in interpretation and belief of ambiguous social and nonsocial scenarios, but found no sex or age differences in perceived difficulty of interpersonal relationships. Our first hypothesis was that a) adolescent females would be more negative and b) less positive than adolescent males in their interpretations of ambiguous social events. Hypothesis 1a) was supported by our data, which showed that in comparison to males, females were more likely to have negative interpretations occur to them during ambiguous scenarios. This was true regardless of scenario type (social or nonsocial) or age group (adolescent or adult). By finding this sex difference in the female group as a whole rather than in adolescents only, our third hypothesis—that we would not find sex differences in adult interpretation scores—was rejected. Furthermore, the sexes did not differ in their
positive interpretations, which contradicts hypothesis 1b) that adolescent females would be less positive than males.

Our second hypothesis, that females would have more negative mean belief scores than males, was also rejected by our data, as we did not find that female scores were significantly more negative than male scores. However, we did find another sex difference in mean belief scores: females were more negative in their belief scores of social scenarios than nonsocial, whereas males did not differ by scenario type. As stated above, the third hypothesis, that no sex differences in adult interpretation scores would be found, was not supported by our data, as females were more negative in their social interpretations than males.

Our fourth hypothesis was that a) adolescents would be more negative and b) less positive than adults in their social interpretation scores, and c) more negative in mean belief of social events. Hypotheses 4a) and 4b) were supported by the data: in comparison to adults, adolescents were more likely to have negative interpretations and less likely to have positive interpretations of social scenarios. Adolescents were also more likely to have negative interpretations of social scenarios than nonsocial, whereas adults did not differ in interpretations by scenario. In addition, all participants had more positive interpretations for nonsocial scenarios than for social ones. However, in contradiction to hypothesis 4c), mean belief scores for social scenarios did not differ significantly between adults and adolescents. Though adults and adolescents did not have significantly different mean belief scores, age differences in beliefs did indicate that adolescents were more likely to have negative beliefs for social scenarios than nonsocial, whereas adults did not differ in scenario beliefs.

Our fifth hypothesis, that a) adolescents would have more interpersonal difficulties than adults, b) female adolescents would have more interpersonal
difficulties than male adolescents, and c) adults would have no sex differences, was mostly rejected by our data, which found no sex or age differences in QIDA scores, supporting only part b of the hypothesis. Hypothesis 6, that negative interpretation scores of ambiguous social events would correlate with interpersonal difficulty, was supported by our data, which found a significant correlation between the two, implying that a negative appraisal of ambiguous social scenarios co-occurs with a higher perceived level of difficulty of social relationships.

Though depression and generalized anxiety were measured in all participants in the present study, different measures were used for the adult and adolescent population precluding us from controlling for depression and anxiety scores in the analysis. The present study measured social phobia in the adolescent population only, and so levels of social phobia could also not be controlled for in our analysis.

Although we were unable to control for social phobia and depression scores, we were able to conduct correlational analyses on social phobia scores and interpretation bias in adolescents. In support of hypotheses 7b and c, social phobia scores were positively and strongly correlated with negative interpretation scores in adolescents regardless of scenario type (social or nonsocial). The correlation between social phobia and negative social scenario interpretations remained significant even after controlling for the effects of depression. Negative nonsocial interpretations failed to correlate significantly with social phobia scores once depression was accounted for in the analysis. The correlations between negative interpretations and social phobia in adolescents suggest that social phobia symptoms may be a stronger predictor of negative social interpretations than negative nonsocial interpretations, and that depression symptoms may be a stronger predictor of negative nonsocial interpretations than negative social.
Consistent with our findings supporting our first hypothesis about sex differences in adolescent interpretation scores, both Lynn, Brown, & Drtischel (2012) and Miers, Blote, Bogels, & Westenberg, (2008) also found sex differences in interpretations of ambiguous social and nonsocial scenarios. Both studies found that adolescent girls were more likely than boys to have negative interpretations come to mind as possible explanations for ambiguous situations. The studies also found that girls were more likely to believe the negative interpretations of social events than nonsocial events.

Some contrasts in results were found between the current study, and previous findings from Lynn, et al., (2012), and Miers et al., (2008). While Miers and colleagues (2008) found that girls were less likely than boys to have positive interpretations come to mind for either scenario type, both Lynn and colleagues (2012) and the present study found that the sexes did not differ in positive interpretation scores. Miers and colleagues (2008) also found that girls and boys were equally likely to have negative interpretations come to mind for nonsocial situations, where our results show that females had a negative bias compared to males in nonsocial scenarios as well. Possible reasons for the slight divergence in study results may be attributable to the difference in samples used in the three studies. While both Lynn et al., (2012) and the present study used a sample of self-selected adolescents with a full range of social phobia scores, (Miers et al., 2008) used adolescents with high and low scores of social phobia only.

If the present study had differentiated between high and low socially anxious females and males, it is possible that a sex difference in positive interpretations would have been found. Though it did not reach significance in the analysis, girls in the current study rated positive explanations as more likely to come to mind than did boys.
It is possible that, given a larger sample size, a significant sex difference in positive interpretations would have emerged in our analysis, with positive interpretations as more likely to come to mind for females than for males in either social or nonsocial scenarios. If this were the case, then, given the fact that females also had more negative interpretations come to mind than males, females would have significantly higher scores than males for positive and negative, social and nonsocial scenarios. This would suggest that females have a tendency to generate many solutions, both positive and negative, to ambiguous events.

This speculation is supported by studies investigating gender differences in rumination (see Nolen-Hoeksema & Girgus, 1994 for a review), and rumination in relation to depression and anxiety (Morrow & Nolen-Hoeksema, 1990). Studies examining rumination in both adolescents and adults have found that girls as opposed to boys tend to ruminate more in response to life events (Broderick, 1998; Nolen-Hoeksema, Larson, & Grayson, 1999), and that rumination is highly correlated with depression and anxiety disorders (Hankin, 2009; Morrow & Nolen-Hoeksema, 1990; Schwartz & Koenig, 1996). Presently, rumination is considered to be hyper-focused on the negative interpretations of life events. Nevertheless, it is possible that the ruminative style exhibited by adolescent girls is indicative of a general tendency toward “over-thinking,” and in fact begins by a formulation of all possibilities, and then analysing each potential explanation. Future studies may want to investigate the exact nature of rumination, to see if positive explanations are considered and then dismissed in response to life events.

The three studies also found a main effect of scenario, with all adolescents more likely to endorse positive interpretations of nonsocial scenarios than social. Because all adolescents were less positive in interpretations of social scenarios, it is possible that
this is not a bias in interpretation but rather a reflection of the reality that social interactions in adolescence have a greater probability of being negative in nature. As (Miers, Blote, & Westenberg, 2010) note, the negative interpretation bias exhibited by socially anxious youth may actually be based on a “kernel of truth,” where previous experiences in social situations proved aversive. For instance, if an individual has been the subject of gossip among his or her peers, then the explanation for the AIBQ scenario, “two classmates, who are standing talking to each other, look at you” may, in fact, most likely be because they were talking about you. A negative interpretation may be justified in this scenario, and may not necessarily reflect a distortion in interpretation. Though a negative interpretation bias could increase the number of negative events experienced by making a neutral situation negative through a bias in interpretation, it is also possible that experiencing negative life events actually creates a negative interpretation bias. Some studies have reported that girls experience more interpersonal negative life events (Wagner & Compas, 1990), which could translate into a negative interpretation bias in social situations. Even if this were the case, however, it is not likely that at all social interactions are negative during adolescence. An interpretation bias can still significantly increase the number of negative events an individual perceives as having experienced.

The results from the present study also suggest that this interpretation bias exhibited by female adolescents persists into adulthood: the young adult female cohort was also more negative than their male counterparts in interpretation. Thus, it appears that as females mature through adolescence and into young adulthood they become less negative and more positive in their interpretations, but they remain more negative than adult males. The fact that females become less negative as they enter young adulthood implies that the gender difference in adult depression and anxiety is perhaps driven by
factors other than cognitive vulnerabilities. However, the sample of young adults in our study did not have a sex difference in depression symptoms. It is still possible that a sex difference exists in adult individuals who score more highly on depression indices.

However, caution should be taken in drawing firm conclusions from the results of this study, as a number of weaknesses are noted. First, the adult cohort may not be a good comparison group for the adolescence included in the study. The study was not longitudinal, and so could not verify the cause-effect relationship of negative interpretation bias and mood disorders. Neither the QIDA nor the AIBQ have been verified for use in adults, and therefore may not be accurate measures for the older age group. Wording on the romantic relationship scenarios in the QIDA was changed after the first seven participants, adding a possible confounding variable in the results. Lastly, the sample size was relatively small given the number of variables measured.

As stated, our adult cohort may not be the best comparison group for the adolescents included in the study. While all adolescents were British (from the local St Andrews, Fife population), the adults were recruited from an international population of graduate students attending the University of St Andrews in (Fife, Scotland). Because the adults were international, it is possible that language, culture, and nationality played a role in the differences between age groups that we found. Additionally, it is not known what proportion of the Scottish adolescent population will go on to study for a graduate level degree, and so levels of education could also not be controlled for.

The one-time study also prevents a definitive statement on whether or not negative social interpretation bias precedes and predicts social anxiety and depression, whether they are co-occurring, or if the negative bias is a result of the mood disorder. As the present study was not longitudinal, we could not track the adolescents’ changes in interpretation of a period of maturation. Two longitudinal studies to our knowledge
have followed a group of adolescents through puberty (Calvete, 2010; Mezulis, Funasaki, Charbonneau, & Hyde, 2009), which revealed potentially contradictory results about the direction of cause-effect of mood disorders and cognitive vulnerability. No studies to date have followed adolescents through the end of puberty and into young adulthood. Furthermore, most adult literature on interpretation bias focuses on the difference between high and low socially anxious adults, but our findings suggest that further investigation of gender differences in interpretation of ambiguous scenarios in adults with a range of mood disorder symptoms may be needed.

Another weakness to be considered in interpreting the adult data is that neither the AIBQ nor the QIDA have been validated for use in young adult populations, as both questionnaires have only been validated for use in individuals through the age of 18. Therefore, it is also possible that the questionnaires used in this study are not accurate measures of interpretation bias and/or interpersonal difficulty in young adults. Though the scenarios presented on the AIBQ are generally applicable to any individual who is still a student (as all the adult participants in the study were) it is still possible that adults show interpretation bias in slightly different situations than do adolescents.

In addition, the QIDA often distinguishes between peer-related and authority-related interpersonal situations (eg, telling the supermarket cashier that your change is £5 short). For a young adult, a cashier may be the same age or younger, and so may not present the same kind of interpersonal difficulty as it would for an adolescent, who is most likely younger than the cashier. Asserting oneself to others who are of the same age or younger may in fact be easier than asserting oneself to someone who is older. Another drawback of using the QIDA with adults is that, while in adolescence romantic relationships are new and romantic skills have not been developed fully, adults will have had more experience with romantic relationships. The difficulty of navigating a
new kind of relationship may be more difficult than dealing with relationships that are less novel, making romantic relationships especially difficult for adolescents compared to adults.

Additionally, the romantic relationship questions on the QIDA were modified from their original version to reflect a neutral sexual orientation. It was felt that since the study was not questioning the adolescents about their sexual orientation, and that it was not ideal to assume that the adolescents were all heterosexual, that the questions reflecting romantic relationships should be gender and orientation neutral. However, by changing the wording of the question, the romantic aspect may have been made less salient. The scenario “Asking a person to the movies” may refer to either a platonic friend or a romantic interest, and would therefore may potentially be perceived as having different levels of difficulty associated with each different interpretation. After the first seven adolescent participants had been interviewed, the researchers decided to change the sentences to read, “asking a person who you may fancy to the movies” to highlight the romantic aspect of the question. Two methodological issues arise from this change. The changes in the wording may change the validity and reliability of the questionnaire. In addition, the first few participants may not have answered the question with a romantic relationship in mind.

Lastly, the sample size was relatively small, especially given the amount of variables included in the analysis. The small sample size made it difficult to discern whether the sample followed a normal distribution, and so the data was not conclusively parametric. To correct for these methodological shortcomings, future studies might consider a few corrections. The Inventory of Interpersonal Problems (Bush et al., 2012) may be a better measure to use in future studies investigating interpersonal difficulties in adults. In comparison to the five factors in the QIDA
(assertiveness, romantic relationships, public speaking, family relationships, and close friendships), the IIP includes five factors from the spheres of adult relationships, and asks to what extent the individuals are nonassertive, detached, intrusive, self-sacrificing, and socially inhibited. Future research might also investigate the trajectory of negative cognitive styles, interpersonal difficulty and mood disorders throughout adolescence and into young adulthood.

Presently, some research groups have focused on developing cognitive behavior therapies to modify interpretation biases in depressed or anxious adolescents and adults. One study by (Watkins, Baeyens, & Read, 2009) found that a training program to reduce over-generalizations about negative events effectively reduced rumination and depressive symptoms in a dysphoric adult population. A cognitive behavior therapy for adolescents with generalized social anxiety disorder has shown that group therapy is particularly helpful in alleviated social anxiety symptoms in the long-run (Herbert et al., 2009). Results of these and other successful CBT studies provide optimism in new treatments for mood disorders.

CONCLUSION

Ultimately, the results from the present study support the consensus in the literature that females exhibit a tendency to interpret ambiguous scenarios in a negative way, and have more negative beliefs about social scenarios in comparison to nonsocial scenarios. Adolescents as a group rated more negative interpretations as likely to come to mind for social scenarios than nonsocial scenarios, and had more negative interpretations for social scenarios than did adults. For adolescents, depression symptoms seemed to account for negative interpretations of ambiguous nonsocial scenarios, whereas social phobia scores predicted negative interpretations of
social scenarios. The results also tentatively show that adults are less negatively biased than are adolescents, but more research is needed to replicate this finding. No differences in sex or age were found for perceived levels of interpersonal difficulty, and interpersonal difficulty was also not correlated to negative social interpretation scores. Preliminary evidence suggests that cognitive behavior therapies that address cognitive vulnerabilities are effectual treatments for mood disorders, highlighting the need for further research and development in cognitive vulnerability treatments.

ACKNOWLEDGEMENTS

I owe my gratitude to all the people who helped me in the planning, execution, and analysis of my Master’s research project. I am very fortunate to have had two supervisors, Dr Gillian Brown and Dr Barbara Dritschel, who always challenged me to think independently and offered indispensable guidance along the way. This dissertation would not have been possible without them. Special thanks to Mr. Hugh Watson, guidance counselor at Madras College, for his collaboration in advertising my project to his students and arranging meetings with the participants. I cannot thank Dr Verity Brown enough for her assistance and support throughout the year in matters both personal and academic. I am grateful to Dr Eric Bowman for teaching me statistical analysis procedures and how to use SPSS. Lastly, I must thank my friends at St Andrews, who helped make my year in Scotland so wonderful.
REFERENCES


Dunn, L., Dunn, D., Styles, B., Sewell, J. The British Picture Vocabulary Scale-III. Granada; NFER-Dunn


Please read aloud the following words, taking a small pause between each word.

Chord
Ache
Depot
Aisle
Bouquet
Psalm
Capon
Deny
Nausea
Debt
Courteous
Rarefy
Equivocal
Naïve
Catacomb
Gaoled
Thyme
Heir
Radix
Assignate
Hiatus
Subtle
Procreate
Gist
Gouge
Superfluous
Simile
Banal
Quadruped
Cellist
Façade
Zealot
Drachm
Aeon
Placebo
Abstemious
Détente
Idyll
Puerperal
Aver
Gauche
Topiary
Leviathan
Beatify
Prelate
Sidereal
Demesne
Syncope
Labile
Campanile
Appendix B

Name/ID: ___________________

Please put a circle around the word that shows how often each of these things happen to you. There are
no right or wrong answers.

1. I worry about things .

2. I feel sad or empty .

3. When I have a problem, I get a funny feeling in
   my stomach .

4. I worry when I think I have done poorly at
   something .

5. I would feel afraid of being on my own at home

6. Nothing is much fun anymore .

7. I feel scared when I have to take a test .

8. I feel worried when I think someone is angry
   with me .

9. I worry about being away from my parents .

10. I get bothered by bad or silly thoughts or
    pictures in my mind .

11. I have trouble sleeping .

12. I worry that I will do badly at my school work .

13. I worry that something awful will happen to
    someone in my family .

14. I suddenly feel as if I can't breathe when there is
    no reason for this .

15. I have problems with my appetite .

16. I have to keep checking that I have done things
    right (like the switch is off, or the door is
    locked) .

17. I feel scared if I have to sleep on my own .
<p>| | | | |</p>
<table>
<thead>
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</thead>
<tbody>
<tr>
<td>18. I have trouble going to school in the mornings because I feel nervous or afraid</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>19. I have no energy for things</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>20. I worry I might look foolish</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>21. I am tired a lot</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>22. I worry that bad things will happen to me</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>23. I can’t seem to get bad or silly thoughts out of my head</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>24. When I have a problem, my heart beats really fast</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>25. I cannot think clearly</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>26. I suddenly start to tremble or shake when there is no reason for this</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>27. I worry that something bad will happen to me</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>28. When I have a problem, I feel shaky</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>29. I feel worthless</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>30. I worry about making mistakes</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>31. I have to think of special thoughts (like numbers or words) to stop bad things from happening</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>32. I worry what other people think of me</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>33. I am afraid of being in crowded places (like shopping centers, the movies, buses, busy playgrounds)</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>34. All of a sudden I feel really scared for no reason at all</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>35. I worry about what is going to happen</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>36. I suddenly become dizzy or faint when there is no reason for this</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>37. I think about death</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>38. I feel afraid if I have to talk in front of my class</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>39. My heart suddenly starts to beat too quickly for no reason</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
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<td>-------------------------------------------------------------</td>
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<tr>
<td>40. I feel like I don’t want to move</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>41. I worry that I will suddenly get a scared feeling when there is nothing to be afraid of</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>42. I have to do some things over and over again (like washing my hands, cleaning or putting things in a certain order)</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>43. I feel afraid that I will make a fool of myself in front of people</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>44. I have to do some things in just the right way to stop bad things from happening</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>45. I worry when I go to bed at night</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>46. I would feel scared if I had to stay away from home overnight</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>47. I feel restless</td>
<td>Never</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
</tbody>
</table>
DASS.
Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.
The rating scale is as follows:
0  Did not apply to me at all
1  Applied to me to some degree, or some of the time
2  Applied to me to a considerable degree, or a good part of the time
3  Applied to me very much, or most of the time

1  I found myself getting upset by quite trivial things 0 1 2 3
2  I was aware of dryness of my mouth 0 1 2 3
3  I couldn't seem to experience any positive feeling at all 0 1 2 3
4  I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion) 0 1 2 3
5  I just couldn't seem to get going 0 1 2 3
6  I tended to over-react to situations 0 1 2 3
7  I had a feeling of shakiness (eg, legs going to give way) 0 1 2 3
8  I found it difficult to relax 0 1 2 3
9  I found myself in situations that made me so anxious I was most relieved when they ended 0 1 2 3
10 I felt that I had nothing to look forward to 0 1 2 3
11 I found myself getting upset rather easily 0 1 2 3
12 I felt that I was using a lot of nervous energy 0 1 2 3
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Appendix C DASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>I felt sad and depressed</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>14</td>
<td>I found myself getting impatient when I was delayed in any way (eg: lifts, traffic lights, being kept waiting)</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>15</td>
<td>I had a feeling of faintness</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>16</td>
<td>I felt that I had lost interest in just about everything</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>17</td>
<td>I felt I wasn't worth much as a person</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>18</td>
<td>I felt that I was rather touchy</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>19</td>
<td>I perspired noticeably (eg: hands sweaty) in the absence of high temperatures or physical exertion</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>20</td>
<td>I felt scared without any good reason</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>21</td>
<td>I felt that life wasn't worthwhile</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>22</td>
<td>I found it hard to wind down</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>23</td>
<td>I had difficulty in swallowing</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>24</td>
<td>I couldn't seem to get any enjoyment out of the things I did</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>25</td>
<td>I was aware of the action of my heart in the absence of physical exertion (eg: sense of heart rate increase, heart missing a beat)</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>26</td>
<td>I felt down-hearted and blue</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>27</td>
<td>I found that I was very irritable</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Appendix C DASS</td>
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<td></td>
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<tr>
<td>----------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 I felt I was close to panic</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>29 I found it hard to calm down after something upset me</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>30 I feared that I would be &quot;thrown&quot; by some trivial but unfamiliar task</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>31 I was unable to become enthusiastic about anything</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>32 I found it difficult to tolerate interruptions to what I was doing</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>33 I was in a state of nervous tension</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>34 I felt I was pretty worthless</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>35 I was intolerant of anything that kept me from getting on with what I was doing</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>36 I felt terrified</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>37 I could see nothing in the future to be hopeful about</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>38 I felt that life was meaningless</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>39 I found myself getting agitated</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>40 I was worried about situations in which I might panic and make a fool of myself</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>41 I experienced trembling (eg: in the hands)</td>
<td>0 1 2 3</td>
<td></td>
</tr>
<tr>
<td>42 I found it difficult to work up the initiative to do things</td>
<td>0 1 2 3</td>
<td></td>
</tr>
</tbody>
</table>
**Adolescents’ Interpretation and Belief Questionnaire (AIBQ)**

In this questionnaire different situations are described which you might have experienced. Written below each situation are three different things a person might think in these sorts of situations. A person will usually have a number of different thoughts as an explanation for a situation.

Imagine yourself in the following situations. Using the scale provided, indicate whether each of the three thoughts would pop up in your mind.

**AN EXAMPLE:**

A few weeks after the beginning of the new school year your teacher (mentor) asks to speak to you.

**Why does he or she want to speak to you?**

He or she wants to tell me that they are very satisfied with my work.

<table>
<thead>
<tr>
<th>Doesn’t pop up in my mind</th>
<th>Might pop up in my mind</th>
<th>Definitely pops up in my mind</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td>4</td>
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</tbody>
</table>

If you circle a 4 here, it means that the thought that the teacher was satisfied with you popped up in your mind.
A few weeks after the beginning of the new school year your teacher (mentor) asks to speak to you.

Why does he or she want to speak to you?

He or she expected much better work from me and thinks that I need to work harder.

<table>
<thead>
<tr>
<th>Doesn’t pop up in my mind</th>
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<td>3</td>
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<tr>
<td>4</td>
<td>5</td>
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</tbody>
</table>

The 3 here means that the thought that the teacher expected better work might have popped up in your mind.
In the end, you believe that one thought is more correct than the other thoughts. If, in the end, you really believe that your school teacher expected better work from you, put a cross next to that thought, as shown below:

Which thought is most believable?

- He or she might want to ask me something.
- He or she expected much better work from me and thinks that I need to work harder. X
- He or she wants to tell me that they are very satisfied with my work.

That was the example. We will now continue with the questionnaire.

1. You’ve received a new watch with a stopwatch function but you can’t get it to work.

Why can’t you get it to work?

I’ve done something wrong and now it’s broken.

<table>
<thead>
<tr>
<th>Why can’t you get it to work?</th>
<th>Doesn’t pop up in my mind</th>
<th>Might pop up in my mind</th>
<th>Definitely pops up in my mind</th>
</tr>
</thead>
<tbody>
<tr>
<td>I’ve done something wrong and now it’s broken.</td>
<td>1</td>
<td>2</td>
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</tr>
</tbody>
</table>
1. You’ve received a new watch with a stopwatch function but you can’t get it to work.

Why can’t you get it to work?

The watch is just too complicated; no-one would be able to get it to work.

<table>
<thead>
<tr>
<th>Doesn’t pop up in my mind</th>
<th>Might pop up in my mind</th>
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</tbody>
</table>
Which thought is most believable?

- The watch is just too complicated; no-one would be able to get it to work.
- I just need some more time and then I'll be able to get it to work.
- I've done something wrong and now it's broken.

2. You've invited a group of classmates to your birthday party, but a few have not yet said if they're coming.

Why haven't they said something yet?

They don't know yet if they can come or not.

<table>
<thead>
<tr>
<th>Which thought is most believable?</th>
<th>Doesn't pop up in my mind</th>
<th>Might pop up in my mind</th>
<th>Definitely pops up in my mind</th>
</tr>
</thead>
<tbody>
<tr>
<td>They don't want to come because they don't like me.</td>
<td>Doesn't pop up in my mind</td>
<td>Might pop up in my mind</td>
<td>Definitely pops up in my mind</td>
</tr>
<tr>
<td>They're definitely coming; they don't need to tell me that.</td>
<td>Doesn't pop up in my mind</td>
<td>Might pop up in my mind</td>
<td>Definitely pops up in my mind</td>
</tr>
<tr>
<td>Which thought is most believable?</td>
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</tbody>
</table>

- They don't want to come because they don't like me.
- They don't know yet if they can come or not.
- They're definitely coming; they don't need to tell me that.
3. You’ve received bad marks for your last few tests.

**Why has this happened?**

The tests were really difficult and nearly everybody got bad marks.

<table>
<thead>
<tr>
<th>Doesn’t pop up in my mind</th>
<th>Might pop up in my mind</th>
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This class is too difficult for me; I’ll have to repeat a year.

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I need to work harder and then it’ll be fine.

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**Which thought is most believable?**

- This class is too difficult for me; I’ll have to repeat a year.
- The tests were really difficult and nearly everybody got bad marks.
- I need to work harder and then it’ll be fine.

4. You’ve just given a presentation in front of your class and afterwards no-one asks a question.

**Why doesn’t anyone ask a question?**

They thought what I said was very clear, and didn’t need to ask anything.

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<thead>
<tr>
<th>Doesn’t pop up in my mind</th>
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It was nearly lunch so everybody wanted to leave.

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</table>

They didn’t think my presentation was interesting.

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</table>

**Which thought is most believable?**

- They didn’t think my presentation was interesting.
- They thought what I said was very clear, and didn’t need to ask anything.
- It was nearly lunch so everybody wanted to leave.
5. You’re going to the cinema because there’s a film you really want to see. When you get to the cinema, you see a long queue at the cashier for the film you want to see.

What’s going on?
I’ve obviously chosen a really good film, because everybody wants to see it.

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Because so many people want to see the film, it’ll be sold out before I can buy a ticket.

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</tbody>
</table>

Lots of people want to go to the cinema tonight.

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</tr>
</tbody>
</table>

Which thought is most believable?

- I’ve obviously chosen a really good film, because everybody wants to see it.
- Lots of people want to go to the cinema tonight.
- Because so many people want to see the film, it’ll be sold out before I can buy a ticket.

6. Suddenly, you feel really sick.

Why do you feel sick?
I’ve eaten too many sweets; it’s not that bad, it’ll be over in a minute.

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</tbody>
</table>

I’m really ill; I’ll have to go to the doctor.

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</tbody>
</table>

Oh, everyone feels sick sometimes.

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</tbody>
</table>

Which thought is most believable?

- I’m really ill; I’ll have to go to the doctor.
- Oh, everyone feels sick sometimes.
- I’ve eaten too many sweets; it’s not that bad, it’ll be over in a minute.
7. Two classmates, who are standing talking to each other, look at you.

Why are they looking at you?

They’re gossiping about me.

<table>
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</table>

They like me and want me to go over and join them.

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</tr>
</tbody>
</table>

They just happen to be looking in my direction.

<table>
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<th>Doesn’t pop up in my mind</th>
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</tbody>
</table>

Which thought is most believable?

- They like me and want me to go over and join them.
- They’re gossiping about me.
- They just happen to be looking in my direction.

8. You’ve locked your bike up somewhere and when you go back for it later on, you can’t find it.

Why can’t you find your bike?

It’s been stolen.

<table>
<thead>
<tr>
<th>Doesn’t pop up in my mind</th>
<th>Might pop up in my mind</th>
<th>Definitely pops up in my mind</th>
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<td>3</td>
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</tbody>
</table>

I’m looking in the wrong place but it’s definitely around here somewhere.

<table>
<thead>
<tr>
<th>Doesn’t pop up in my mind</th>
<th>Might pop up in my mind</th>
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</tbody>
</table>

There are just so many bikes here that it’s difficult to find it.

<table>
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<tr>
<th>Doesn’t pop up in my mind</th>
<th>Might pop up in my mind</th>
<th>Definitely pops up in my mind</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Which thought is most believable?

- There are just so many bikes here that it’s difficult to find it.
- I’m looking in the wrong place but it’s definitely around here somewhere.
- It’s been stolen.
9. You’re standing with a group of classmates. When you begin to talk, no-one looks at you.

Why isn’t anyone looking at you?

They don’t want me hanging around because they don’t like me.

<table>
<thead>
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<th>Might pop up in my mind</th>
<th>Definitely pops up in my mind</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

They just happen to be looking at something else, but they are interested in what I have to say.

<table>
<thead>
<tr>
<th>Doesn’t pop up in my mind</th>
<th>Might pop up in my mind</th>
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</tbody>
</table>

I should’ve waited until my classmate had finished before I began talking.

<table>
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<tr>
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<th>Definitely pops up in my mind</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Which thought is most believable?

- They don’t want me hanging around because they don’t like me.
- I should’ve waited until my classmate had finished before I began talking.
- They just happen to be looking at something else, but they are interested in what I have to say.

10. You’re standing on your own at a school party and somebody you don’t know looks at you.

Why is he or she looking at you?

I stand out like a sore thumb. He or she probably thinks I’m pathetic.

<table>
<thead>
<tr>
<th>Doesn’t pop up in my mind</th>
<th>Might pop up in my mind</th>
<th>Definitely pops up in my mind</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

He or she just happens to be looking in my direction.

<table>
<thead>
<tr>
<th>Doesn’t pop up in my mind</th>
<th>Might pop up in my mind</th>
<th>Definitely pops up in my mind</th>
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</thead>
<tbody>
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<td>1</td>
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<td>3</td>
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</table>

He or she likes me and wants to get my attention.

<table>
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<tr>
<th>Doesn’t pop up in my mind</th>
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<th>Definitely pops up in my mind</th>
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<tbody>
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<td>3</td>
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</tbody>
</table>

Which thought is most believable?

- He or she likes me and wants to get my attention.
- I stand out like a sore thumb. He or she probably thinks I’m pathetic.
- He or she just happens to look in my direction.
<table>
<thead>
<tr>
<th>No Difficulty</th>
<th>Little Difficulty</th>
<th>Medium Difficulty</th>
<th>Much Difficulty</th>
<th>Maximum Difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

1. Telling the supermarket cashier that your change is £5 short?
2. Paying a person you fancy compliments?
3. Reading out in class a work you’ve prepared?
4. Asking a waiter to serve you first because it’s your turn?
5. Giving your opinion in a students’ meeting when you don’t agree with what has been said?
6. Telling a stranger who tries to jump the cinema queue to wait his/her turn?
7. Asking the teacher in class when you don’t understand something she/he’s said?
8. Starting a conversation with a person your age you don’t know at the bus stop?
9. Giving your opinion when you don’t agree with your parents?
10. Complaining to a waiter when you are served bad food or drinks?
11. Telling a person you’ve just met that you like the way he/she dresses?
12. Thanking friends when they stand up for you?
13. Asking a stranger to put out his/her cigarette because it’s bothering you?
14. Selling flags in the street for a charity?
15. Asking the waiter for information if you have doubts about the menu?
16. Voluntarily going up to the blackboard despite having prepared for the lesson?
17. Asking a stranger for directions when lost in an unknown area?
18. Asking at the bank about opening a savings account?
19. Telling a relative (grandparents, uncles and aunts, etc.) that you don’t like their practical jokes?
20. Giving your point of view in front of your classmates?
21. Asking a person out to the cinema?
22. Thanking a friend for helping you with a school task?
<table>
<thead>
<tr>
<th></th>
<th>Do you have any difficulty in . . .?</th>
<th>No Difficulty</th>
<th>Little Difficulty</th>
<th>Medium Difficulty</th>
<th>Much Difficulty</th>
<th>Maximum Difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Standing up for yourself when your parents blame you for something you haven’t done?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Complaining to neighbors that you can’t study because of the noise they’re making?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>25</td>
<td>Standing up for yourself when your brother or sister blames you for having broken something of theirs (book, clothes, etc.)?</td>
<td>0 1 2 3 4</td>
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<td></td>
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</tr>
<tr>
<td>26</td>
<td>Going up to a person you fancy and introducing yourself?</td>
<td>0 1 2 3 4</td>
<td></td>
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<tr>
<td>27</td>
<td>Apologizing to a friend for going over the top in an argument?</td>
<td>0 1 2 3 4</td>
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</tr>
<tr>
<td>28</td>
<td>Taking back a faulty CD to the shop where it was bought?</td>
<td>0 1 2 3 4</td>
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</tr>
<tr>
<td>29</td>
<td>Saying no to a classmate you know well when he/she asks to borrow your bike?</td>
<td>0 1 2 3 4</td>
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<tr>
<td>30</td>
<td>Standing up for a friend when he/she is being criticized by others?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
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<tr>
<td>31</td>
<td>Complaining to your parents when they don’t let you go on a school trip?</td>
<td>0 1 2 3 4</td>
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</tr>
<tr>
<td>32</td>
<td>Having a conversation with a person you fancy?</td>
<td>0 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Saying no to a beggar who asks for money?</td>
<td>0 1 2 3 4</td>
<td></td>
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</table>