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CHANGES IN EMOTIONAL HEALTH

Changes in Emotional Health Symptoms in Adolescents with Specific Language
Impairment

[Wadman, R., Botting, N., Durkin, K. and Conti-Ramsden, G. \(2011\), Changes in emotional health symptoms in adolescents with specific language impairment. International Journal of Language & Communication Disorders, 46: 641–656. doi: 10.1111/j.1460-6984.2011.00033.x](#)

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Abstract

Background: Adolescents and young adults with specific language impairment (SLI) are at risk of experiencing emotional health symptoms, in particular depression and anxiety disorder. However, there is a dearth of research examining issues of stability versus change in symptomatology across time. *Aims:* To examine depressive and anxiety symptoms reported by adolescents with and without a history of SLI at 16 years, and a year later. *Method & Procedures:* Depressive and anxiety symptoms were examined in 90 adolescents with SLI and 91 adolescents with typical development (TD group) initially at 16 years and again at 17 years. *Outcomes & Results:* Participants with SLI experienced significantly more depressive and anxiety symptoms than participants with TD at 16 years, and continued to experience significantly more anxiety symptoms at 17 years. Females, regardless of language status (SLI vs. TD), were more vulnerable than males. The group with SLI evidenced a significant drop in depressive symptoms over the year. A similar change in anxiety symptoms was not apparent. Regression analyses revealed that behavioural factors at 16 predicted concurrent depressive symptoms for both groups, but made less of a contribution to depressive symptoms at 17 for individuals with SLI. Language ability and nonverbal IQ did not predict depressive symptoms. Adolescents who experienced more bullying at 16 were more likely to become, or remain, at risk for depression at 17. *Conclusions & Implications:* Anxiety symptoms appear to be a consistent feature of some individuals with SLI in young adulthood whilst depressive symptoms can diminish.

Keywords: specific language impairment (SLI), emotional health, adolescence.

Abbreviations: SLI: specific language impairment

What this paper adds

Adolescents and young adults with a history of specific language impairment (SLI) or concurrent SLI are vulnerable to developing depression and anxiety disorder. Factors associated with higher risk are beginning to be identified. However, little is known regarding the developmental stability of emotional health symptomatology.

In the present study we replicate the findings of increased risk of emotional health symptoms in adolescents with SLI, this time at 17 years of age. We also provide further evidence that females are more vulnerable than males to emotional health symptoms. In addition, we identify different patterns of stability for depressive versus anxiety symptoms in SLI. In this study, risk for anxiety disorder appears to be a consistent feature of approximately 12% of individuals with SLI in young adulthood (as compared to 1-2% in the typically developing young people examined). In contrast, symptoms of depression appear to diminish for a significant proportion of individuals in young adulthood, from 40% at 16 years to 20% at 17 years.

Factors negatively influencing the course of depressive symptoms include behaviour problems but in particular experience of bullying. This investigation identifies areas that are likely to require therapeutic support in order to foster emotional wellbeing in young adults with a history of SLI.

Changes in Emotional Health Symptoms in Adolescents with Specific Language Impairment

Specific language impairment (SLI) is a developmental disorder involving significant language difficulties in the absence of hearing loss, clear neurological impairment and low cognitive functioning (Bishop, 1997; Leonard, 1998). The prevalence of SLI in young children has been estimated as 7% (Tomblin, et al., 1997). It is thought that 40% of children identified with language impairments have persistent language difficulties (Law, Boyle, Harris, Harkness, & Nye, 2000), and some individuals continue to have language difficulties in adulthood (Clegg, Hollis, Mawhood, & Rutter, 2005; Howlin, Mawhood, & Rutter, 2000). In addition to language and communication problems, children and young people with SLI can experience academic difficulties (Conti-Ramsden, Durkin, Simkin, & Knox, 2009; Dockrell, Lindsay, Palikara, & Cullen, 2007), behavioural difficulties (Beitchman et al., 2001; Lindsay, Dockrell, & Strand, 2007) and social difficulties (Durkin & Conti-Ramsden, 2007; Snowling, Bishop, Stothard, Chipchase, & Kaplan, 2006). It is important to note, however, that this group demonstrates considerable heterogeneity in profiles of strengths and difficulties.

This study examines the emotional health symptoms experienced by adolescents with SLI, specifically depressive and anxiety symptoms. Young people with specific language impairment (SLI) are known to be at increased risk of experiencing emotional health symptoms in comparison to their peers (Conti-Ramsden & Botting, 2008). We compare symptoms reported by these individuals at 16 years and a year later at 17 years. Do emotional health problems continue a year on after young people with SLI have left compulsory secondary education? Information relating to the wellbeing of young people with SLI in this transition period may be

particularly useful to professionals who provide or arrange for support for young people (including speech and language therapists and teachers), and also the parents of these individuals who have concerns regarding their offspring's futures (Conti-Ramsden, Botting, & Durkin, 2008).

Depressive and Anxiety Symptoms in Adolescence

Emotional health in adolescents generally is an important area of concern amongst both health and teaching professionals. A study of parent-report mental health symptoms in 15- and 16-year-olds in the UK found that emotional problems among adolescents increased between 1986 and 1999 for both males and females (Collishaw, Maughan, Goodman, & Pickles, 2004). Recent national surveys suggest that 4-5% of young people aged between 5 and 16 years in Great Britain have depression or anxiety disorder (Green, McGinnity, Meltzer, Ford, & Goodman, 2005; Meltzer, Gatward, Goodman, & Ford, 2000). Depression and anxiety symptoms are known to increase in adolescence (Angold & Rutter, 1992; Green, et al., 2005; Meltzer, et al., 2000), but the trajectory of emotional health symptoms in this period may not be stable (Natsuaki, Biehl, & Ge, 2009). There is, nonetheless, evidence of continuity in depression symptoms from late adolescence into early adulthood (e.g. Lewinsohn, Rohde, Klein, & Seeley, 1999; Rao, Hammen, & Daley, 1999), emphasizing the importance of identification and support at earlier developmental periods.

Research evidence suggests there is a gender difference in emotional health problems, with females being more likely to manifest depression and anxiety disorders than males (Lewinsohn, Gotlib, Lewinsohn, Seeley, & Allen, 1998; Piccinelli & Wilkinson, 2000). The increased vulnerability in females to depression is apparent from early adolescence to young adulthood (Natsuaki, et al., 2009).

Therefore, gender appears to be an important factor when investigating emotional health symptoms in adolescence.

Emotional Health Symptoms and SLI

Individuals with special educational needs are more likely to experience emotional health symptoms than their peers (e.g. Emerson & Hatton, 2007; Green, et al., 2005; Maag & Reid, 2006; Meltzer, et al., 2000) and SLI is no exception. Beitchman et al. (2001) found that 27% of participating young adults (aged 19) with a history of language impairment had some form of anxiety disorder (compared to 8% of adults with no language difficulties). In addition, the prevalence of affective disorder (including major depression, dysthymia and bipolar disorder) in the group with language impairments was 13% (prevalence in the adults with no language difficulties was 9%). In a small study, Clegg et al. (2005) examined seventeen men with receptive language impairments who had been followed from early childhood into their thirties. These men reported more social anxiety symptoms compared to peers and siblings in adulthood, and four of the seventeen (24%) were classified as being at risk of depression (prevalence in typical peers was 10%). Not all studies, however, report an increased incidence of emotional health problems in young people with SLI. Snowling et al. (2006) found rates of psychiatric disorder (including anxiety disorders) in a sample of 15-year-olds with a history of language impairment ($N = 71$) to be low and comparable to an age-matched control group.

There is, then, some evidence of a higher prevalence of psychiatric disorders and emotional health problems in individuals with SLI. Interestingly, it appears that the converse is also true. The incidence of language disorders among psychiatric populations is also higher than expected. For example, Cohen et al (1998) found a 40% prevalence rate of undiagnosed language impairment in a sample of children (7-

to 14-year-olds) referred for psychiatric difficulties (Cohen, Barwick, Horodezky, Vallance, & Im, 1998). In their review, Toppelberg and Shapiro (2000) concluded that language impairment is a risk factor for psychiatric disorder.

Previous research examining emotional health symptoms in The Manchester Language Study found that at 16 years, adolescents with a history of SLI were at increased risk for experiencing symptoms of depression and anxiety compared to TD peers, according to both self- and parent-report measures (Conti-Ramsden & Botting, 2008). These emotional health symptoms were not directly associated with level of language ability, suggesting that the markedly higher rate of emotional health symptoms in adolescents with SLI was not related to the severity of these individuals' language limitations in a simple way. The present study extends the findings of Conti-Ramsden and Botting (2008) by comparing depressive and anxiety symptomatology from 16 to 17 years, when the majority of the participants in the Manchester Language Study completed self-report measures of depressive and anxiety symptoms for a second time. This study also examines other possible associates of emotional health symptoms beyond language ability.

Correlates of Emotional Health Symptoms: Educational Achievement, Difficult Behaviour and Bullying

As emotional health symptoms do not appear to be directly associated with language ability, we were interested in examining whether educational, behavioural or social difficulties (experience of bullying) are associated with emotional health symptoms in adolescents with and without a history of SLI. Young people with SLI have been found to have poorer educational achievement compared to typically developing peers in studies looking at examinations taken at the end of compulsory secondary education (Conti-Ramsden et al., 2009; Dockrell et al., 2007). We expected

that poor achievement, within the context of the last year of compulsory education where there is a clear focus on exams, would contribute to emotional health symptoms of depression and anxiety in adolescents. We were also interested to examine whether the relationship between academic achievement and emotional health symptoms continued or changed at 17 years, a year after compulsory education.

Compared to typically developing children, children with SLI display more behavior problems (Beitchman et al., 1996; Lindsay et al., 2007), particularly internalizing problems (Fujiki, Brinton, Isaacson, & Summers, 2001; Redmond & Rice, 1998), and less prosocial behavior (Fujiki, Brinton, Morgan, & Hart, 1999). Behavioural and emotional problems in childhood and adolescence have been found to predict mood and anxiety disorders in adulthood (Roza, Hofstra, van der Ende, & Verhulst, 2003). Behaviour problems, as measured by the Strengths and Difficulties Questionnaire (SDQ, used in this study), were found to discriminate adequately between a sample of young people attending a mental health clinic and a community sample (Goodman, Meltzer, & Bailey, 1998) and have also been found to predict child psychiatric disorders (Goodman, Ford, Simmons, Gatward, & Meltzer, 2000). We therefore expected to find an association between behavioural problems and emotional health symptoms.

Both children (aged 11 years) and adolescents (aged 16 years) with SLI have been found to report experiencing more bullying compared to typically developing peers (Knox & Conti-Ramsden, 2003, 2007). However, a study of 12-year-olds with a history of specific speech and language difficulties found this group had similar prevalence rates of victimization compared to typically developing children and children with other special educational needs (Lindsay, Dockrell, & Mackie, 2008). Experience of bullying and other social difficulties have been found to predict self-

report symptoms of depression and anxiety in childhood and adolescence (Bond, Carlin, Thomas, Rubin, & Patton, 2001; Hawker & Boulton, 2000). From this evidence base, we also expected to find a relationship between emotional health symptoms and experience of bullying.

The Present Study

This study examined self-report depressive and anxiety symptoms in a group of adolescents with a history of SLI and a group of adolescents with no history of language difficulties at two time points: end of compulsory education (16 years, reported in Conti-Ramsden and Botting, 2008) and a year later (17 years). This study also examined the contribution of gender, educational achievement, behavioural problems and experience of bullying to the emotional health symptoms. Specifically, this investigation aimed to address the following questions:

1. Do adolescents with SLI experience more depressive and anxiety symptoms than typically developing peers at 17 years?
2. Is gender associated with emotional health vulnerability in adolescents with and without SLI?
3. What is the pattern of stability for depression versus anxiety symptoms from 16 to 17 years?
4. Are a) educational achievement b) behavioural difficulties (namely conduct problems, hyperactivity and peer problems) and/or c) experience of bullying associated with the developmental course of depressive symptoms from 16 to 17 years?

Method

Participants

Young people with a history of SLI (SLI group).

The participants in the SLI group were initially recruited at age 7 as part of the Manchester Language Study, a nationwide longitudinal study of SLI (Conti-Ramsden & Botting, 1999; Conti-Ramsden, Crutchley, & Botting, 1997). The original cohort of 242 children represented a random sample of 50% of all children attending key stage 1 language units in England. Children were excluded if they were reported by their teachers as having frank neurological difficulties, a diagnosis of autism, hearing impairment or a general learning disability. The participants in the Manchester Language Study have been followed longitudinally and previously assessed at 8 years ($n = 234$), 11 years ($n = 200$), 14 years ($n = 130$) and 16 years ($n = 139$). Although there has been some participant attrition from childhood to adolescence, the main influence on sample size has been the levels of funding in the adolescent phases of the study.

Of the 139 adolescents who participated at 16 years, 102 were invited to take part at 17 years (the number of adolescents approached was related to available funding). Of these, 90 adolescents in the Manchester Language sample volunteered to participate at age 17 (and had also completed the assessments at age 16), and 12 were unable to take part. The scores of the SLI group examined in the present study (the 17-year-old phase, $n = 90$) on measures of language ability, cognition and behaviour difficulties are comparable to those of the larger SLI group who were examined at 16 years in the 2008 Conti-Ramsden and Botting study ($n = 139$).

A total of 90 young people with a history of SLI completed the assessments relevant to this investigation in their final year of compulsory education (age range 15;2 to 16;9, mean age 15;10) and approximately a year later (age range 16;2 to 18;2, mean age 17;1). The age range is wider at the 17-year-old phase as data collection

took place over a longer period of time. There were 62 males and 28 females in the group.

Young people with typical language abilities (TD group).

A comparison group of 91 young people with no history of language difficulties also took part in the study; 54 males; 37 females. These typically developing (TD) participants were recruited at 16 years as part of the Manchester Language Study ($n = 124$). In the first wave of recruitment, the comparison participants were recruited from the same schools as the participating adolescents with SLI. A second recruitment wave targeted schools in selected demographic areas, with the aim of recruiting a comparison group that was representative of households in England in terms of household income and maternal education level. Census data from the General Household Survey were consulted (Office of National Statistics, 2001-2002). Of the 124 typically developing adolescents recruited at 16 years, 107 were invited to take part (number related to available funding). Of these, 91 volunteered for the 17-year-old phase and 16 were unable to take part. The TD group examined in this study ($n = 91$) had language, cognition and behaviour scores that were comparable to the scores of the larger TD group who were examined in the 2008 Conti-Ramsden and Botting study ($n = 124$).

No significant differences were found between the SLI group and the TD group in this study on the two indicators of socioeconomic status: maternal education level, $\chi^2(2, N = 172) = 4.43, p = .109$; household income band, $\chi^2(3, N = 174) = 3.58, p = .311$. The participants in the TD comparison group had no history of special educational needs or speech and language therapy provision. There was no significant difference in the proportion of females/males in the SLI and TD groups, $\chi^2(1, N = 181) = 1.79, p = .181$.

The age range of the TD group when assessed in the final year of compulsory education was 15;2 to 16;7, with a mean age of 15;11. The age range of this group assessed approximately a year later was 15;11 to 17;10, with a mean age of 16;10.

Language and IQ Profiles

Language ability and performance IQ.

Language ability was assessed with the Clinical Evaluation of Language Fundamentals-Revised, CELF-R (Semel, Wiig, & Secord, 1987): receptive language was assessed using the Word Classes subtest and expressive language was assessed using the Recalling Sentences subtest. Sixty four of the participants with SLI (71%) completed these measures at 14 years and the remaining 26 at 16 years. This was related to the number of participants in each of the two phases, the aims of each of the studies in those phases coupled with the desirability not to formally assess language abilities twice in mid-adolescence. All the TD group participants completed the language subtests at age 16. These subtests have been found to be good indicators of receptive and expressive language ability in previous studies involving children with language difficulties (Gillion & Dodd, 1994; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998), and recalling sentences is a good clinical marker of language impairment (Conti-Ramsden, Botting, & Faragher, 2001). Performance IQ (PIQ) was assessed using the Wechsler Intelligence Scale for Children, WISC-III (Wechsler, 1992).

The mean standard scores obtained by the SLI and TD groups on the language and PIQ assessments are presented in Table 1. The TD adolescents had expressive and receptive language scores within the expected range. The SLI group participants had significantly lower expressive and receptive language scores that fell below the expected range (< 85). The adolescents with SLI had significantly lower mean PIQ

scores than the TD adolescents at 16 years. Groups of individuals with SLI are often found to have lower nonverbal IQ than comparison groups in research (Leonard, 1998).

Measures

Depressive and anxiety symptoms at 16 and 17.

Short-form Moods and Feelings Questionnaire, MFQ (Costello & Angold, 1988): The self-report version of this measure was used to assess depressive symptoms. This 13-item questionnaire was designed for use with young people aged between 8 and 18 years. For each item, the respondent indicates whether the statement about his/her feelings was “definitely true”, “somewhat true” or “not true” of him/her over the past 3 months. Example items are “I didn’t enjoy anything at all” and “I cried a lot”. Higher scores indicate a higher level of depressive symptoms. A cut-off of 8 or more is recommended, indicating risk for depression (Angold, et al., 1995). The scale had good internal consistency (Cronbach’s $\alpha = .85$) in a sample of 8- to 16-year-olds (Angold, et al., 1995), and in the present sample at 16 ($\alpha = .87$) and 17 years ($\alpha = .85$).

Child Manifest Anxiety Scale, CMAS-R (Reynolds & Richman, 1978): The self-report version of this scale was used to measure anxiety symptoms. The 28-item questionnaire was designed for use with children (ages 6 to 19). The respondent indicates whether each statement is “true” or “not true” of him/her over the past 3 months. Example items are “I worry a lot of the time” and “I am afraid of a lot of things”. Higher scores indicate a higher level of anxiety. A cut-off of 19 or more is recommended to identify individuals at risk for anxiety disorder (this was more than one standard deviation above the mean anxiety score in this study). The scale had good internal consistency (K-R 20 = .85) in a sample of children aged between 7 and

17 years (Reynolds & Richman, 1978). The internal consistency with the present sample was good at 16 ($\alpha = .87$) and 17 years ($\alpha = .88$).

Educational achievement, difficult behaviour and experience of bullying.

GCSE/GNVQ points: Key Stage 4 (KS4) examination results were available for the participants in their last year of compulsory education (around 16 years). Largely, these results are for General Certificate of Secondary Education (GCSE) examinations, but also include vocational qualifications such as General National Vocational Qualifications (GNVQ). A numeric score was calculated from the KS4 results using the following point system: GCSE (A* = 58, A = 52, B = 46, C = 40, D = 34, E = 28, F = 22, G = 16, Unclassified/absent = 0); GNVQ Full Intermediate (Distinction = 220, Merit = 184, Pass = 160), Full Foundation (Distinction = 136, Merit = 112, Pass = 76), Part One Intermediate (Distinction = 110, Merit = 92, Pass = 80), Part One Foundation (Distinction = 68, Merit = 56, Pass = 38); not entered = 0.

Strengths and Difficulties Questionnaire, SDQ (Goodman, et al., 1998): The self-report version of the SDQ was designed for 11- to 16-year-olds and consists of 25 items describing behaviours, emotions and relationships. The respondent indicates on a three-point scale whether each item is “certainly true”, “somewhat true” or “not true” of him/her. The 25 items are divided into five subscales (conduct problems, emotional symptoms, hyperactivity, peer problems, and prosocial) with five questions per subscale. We used the scores on the conduct problems, hyperactivity, and peer problems subscales at 16 years in this study (emotion subscale questions were excluded due to overlap with questions on the anxiety scale, e.g. “I worry a lot”).

Bullying: At 16 years, participants were asked about the bullying they currently experience “How much do you get teased or bullied now?” The participants’

responses were coded as 0 = “No more than other kids”, 1 = “A bit more than other kids”, 2 = “Often teased or bullied”, 3 = “Teased or bullied all the time”.

Procedure

Participants were assessed at school or college, or at home. The measures detailed above were given as part of a wider battery of assessments. The questions on the self-report measures (MFQ, CMAS-R and SDQ) were read aloud to all participants in addition to being presented in written form. As the group with SLI had poor receptive language ability particular care was taken to ensure the participants understood the scale items. The response options were carefully explained and presented with visual aids for clarification. Further explanations and examples of questions and responses were given when needed, although this was rarely required. Ethical approval for the study was gained from the University of Manchester and informed written consent was gained from both the young person and his/her parent(s).

Results

Depressive Symptoms at 16 and 17

The mean depressive symptom scores at 16 and 17 for males and females in the SLI group and TD group are given in Table 2 (depressive symptom scores at 17 were not available for one SLI group participant and one TD group participant). These data were submitted to a 2 (group: SLI vs. TD) x 2 (gender: male vs. female) x 2 (age: 16 years vs. 17 years) three-way mixed ANOVA, with repeated measures on the latter factor.

This analysis yielded a significant main effect of group $F(1,175) = 7.09, p = .008, \eta^2 = .04$. The group with SLI had higher depression scores ($M = 5.82, SD = 4.39$) than the TD group ($M = 4.21, SD = 3.62$) (pooled across age). The main effect of age

on depression scores was non-significant, $F(1,175) = 3.07, p = .082$. However, these effects were qualified by a significant age x group interaction, $F(1,175) = 5.80, p = .017, \eta^2 = .03$, suggesting the effect of age on depression scores was not the same for the SLI group and TD group. This interaction is illustrated in Figure 1. Tests of simple effects, using Bonferroni adjusted alpha levels of .025, confirmed that the SLI group showed a significant reduction in depression scores at 17 years compared to their scores at 16 years, $F(1,88) = 5.20, p = .025, \eta^2 = .06$, whereas the TD group scores did not change significantly, $F(1,89) = 0.27, p = .604$. At 17 years, the mean depression scores of the SLI and TD were quite similar (Table 2). We compared the depression scores for the SLI and TD group at 17 years and found no significant difference, $F(1,177) = 2.05, p = .154$.

This analysis also yielded a significant main effect of gender, $F(1,175) = 6.55, p = .011, \eta^2 = .04$; females had a higher depression score than males (females $M = 5.92, SD = 4.59$; males $M = 4.49, SD = 3.69$). Gender did not interact significantly with age $F(1,175) = 0.66, p = .419$, or group $F(1,175) = 0.43, p = .515$. The three-way interaction of age, group and gender was non-significant, $F(1,175) = 1.18, p = .279$.

Anxiety Symptoms at 16 and 17

The mean anxiety symptom scores at 16 and 17 for male and females in the SLI group and TD group are also given in Table 2 (an anxiety symptom score at 17 was not available for one participant in the SLI group). Anxiety scores were analysed using the same group x gender x age three-way mixed ANOVA design. The main effect of group (pooled across age) was significant, $F(1,176) = 13.64, p < .001, \eta^2 = .07$; the adolescents with SLI had higher anxiety scores ($M = 9.93, SD = 5.95$) compared to the TD group ($M = 6.97, SD = 4.53$). The main effect of age was non-significant, $F(1,176) = 0.02, p = .876$. The interaction between age and group was not

significant, $F(1,176) = 2.67, p = .104$. There was a significant main effect of gender, $F(1,176) = 6.50, p = .012, \eta^2 = .04$. Females had a higher anxiety score than males (females $M = 9.58, SD = 5.82$; males $M = 7.78, SD = 5.18$). There was no significant interaction between gender and group $F(1,176) = 0.43, p = .513$, or between gender and age $F(1,176) = 3.11, p = .080$. The three-way interaction between age, group and gender was also non-significant, $F(1,176) = 0.55, p = .461$. At 17 years, the SLI group had a higher mean anxiety score than the TD group (Table 2). This group difference was significant, $F(1,178) = 7.99, p = .005, \eta^2 = .04$.

Clinical Cut-offs for Risk of Depression and Anxiety Disorder

The percentages of participants in the SLI group and TD group classified as at high risk for depression (i.e., scores exceeded clinical cut-off), at 16 and 17 years, are given in Table 3. Further examination found that 49 adolescents with SLI did not reach the at risk cut-off at either age point. Twenty-two adolescents with SLI who were at risk for depression at 16 were no longer in the at risk category at 17 years. Twelve of the adolescents with SLI had scores above the cut-off at both 16 and 17 years of age. In addition, six participants exceeded the cut-off at 17 who had not done so at 16. By comparison, 69 TD adolescents did not reach the at risk cut-off at either age point. Five TD adolescents who were at risk for depression at 16 were no longer in the at risk category at 17. Eight of the TD adolescents were classified as at risk for depression at both 16 and 17 years. Eight were classified as at risk for depression at 17 who did not exceed the cut-off at 16. The percentages of SLI and TD participants in each category (not at risk at 16/17, no longer at risk at 17, remained at risk at 17, became at risk at 17) are given in Figure 2.

The percentages of participants in the SLI and TD groups classified as at risk for anxiety disorder (i.e., scores exceeded clinical cut-off) at 16 and 17 years are also

given in Table 3. Fewer adolescents were classified as at risk for anxiety disorder, compared to the number classified as at risk for depression. At both 16 and 17 years of age, all but two of the young people with high anxiety symptom scores also had high depressive symptom scores. Thus, the remainder of the analyses uses the depressive symptom scores only.

Correlates of Depressive Symptoms

Table 1 compares the SLI group and TD groups mean scores for GSCE/GNVQ points, difficult behaviour subtests and experience of bullying. The SLI group obtained significantly lower GCSE/GNVQ points compared to the TD group. In terms of behaviour scores, the SLI group had significantly higher scores than the TD group on the conduct problems, hyperactivity and peer problems subscales. Regarding experience of bullying, the SLI group scores were higher than the TD group scores suggesting the SLI group reported experiencing more bullying. However, the majority of the adolescents reported that they were not bullied more than other young people (SLI group 82.2%; TD group 92.3%).

The Pearson's correlation coefficients between depressive symptoms at 16 and 17 years and potential associates (language ability, PIQ, GCSE/GNVQ points, conduct problems, hyperactivity, peer problems and bullying) are given in Table 4. The correlations of depressive symptoms at 16 with language ability and PIQ have been presented previously (Conti-Ramsden & Botting, 2008), but are given here for comparison purposes. The Williams *T*₂ statistic indicates whether the correlations at the two age points differ significantly. Overall, there were few differences between the correlations at 16 years and the correlations at 17 years.

In the SLI group, depressive symptoms at 16 were positively correlated with receptive language ability ($p = .047$), but this was not the case for depressive

symptoms at 17. Expressive language ability and performance IQ were not significantly correlated with depressive symptoms at 16 or 17. In the TD group, depressive symptoms at 16 were correlated with PIQ. Thus, emotional health symptoms showed little association with language ability or cognition. In both the SLI group and TD group, there was a small but significant negative correlation between GCSE/GNVQ points and depressive symptoms at 16. There were no significant correlations between GCSE/GNVQ points and depressive symptoms at 17 in either group.

Hyperactivity at 16 was positively and significantly associated with depressive symptoms at both 16 and 17, in adolescents with SLI (small associations) and in adolescents with TD (medium association at 16 and small association at 17). Conduct problem scores were significantly and positively correlated with depressive symptoms at 16 (small association) for both groups. There was no significant association between conduct problems and depressive symptoms at 17 in the SLI group or the TD group. In the SLI group, peer problem scores were significantly correlated with depressive symptoms at 16 (medium association) and at 17 (small association). Depressive symptoms at 16 and 17 were not associated with peer problems in the group with TD. Experience of bullying was positively and significantly associated with depressive symptoms at 16 and 17 for the adolescents with SLI only (small association).

In addition to the main correlations reported in Table 4, correlations among other variables were not of particular note. In the SLI group, there were no significant correlations between the PIQ and the behavioural variables (conduct problems, hyperactivity, peer problems). The correlations between these behavioural variables and expressive language ability and receptive language ability were also non-

significant. In the TD group, PIQ was significantly correlated with conduct problems ($r = -.36, p < .001$) and hyperactivity ($r = -.25, p = .017$). There were no significant correlations between language ability (receptive, expressive) and the behavioural variables (conduct problems, hyperactivity, peer problems).

Predicting Depressive Symptoms in Adolescents with and without SLI

Regression analyses examined the possible concurrent predictors of depressive symptoms at 16 years for the SLI and TD groups separately (Table 5). The psycholinguistic, educational and social behavioural variables were entered into a hierarchical regression in separate steps (step 1 - PIQ; step 2 – GCSE/GNVQ points; step 3 – conduct problems, hyperactivity, peer problems and bullying). These were variables that showed some association with depressive symptoms at 16 years (Table 4). Choice of order of entry of variables was guided as follows. Given the variation in PIQ abilities, the first step was to control for the potential influence of this variable. We then wanted to examine which factors (beyond language ability) contribute to emotional health symptoms. To this end, educational achievement (GCSE/GNVQ points) was included in the second step, and the behavioural and bullying variables were added in the third step. Thus, with this order, we could interpret the contribution of educational achievement (controlling for PIQ) and the contribution of social behavioural variables (controlling for PIQ and GCSE/GNVQ points). In order to examine the potential additional contribution of receptive language (small correlation found at 16 years for SLI group only), we repeated the analysis adding this variable in a fourth step. Receptive language was not a significant predictor in any of the models. In addition, the percentage of variance accounted for remained unchanged when receptive language was added to the model.

The regression model was significant at the final step for the SLI group, $F(6, 80) = 5.33, p < .001$, and for the TD group, $F(6, 83) = 5.73, p < .001$. This model is presented in Table 5. Percentage of explained variance is based on the adjusted R^2 values obtained and the effect sizes are given by the f^2 values. In the model for the SLI group, PIQ was not a significant predictor in any step. When added in step 2, GCSE/GNVQ points was a significant predictor (small effect size). In step 3, the only significant factor in the model was peer problems and the effect size attributable to the addition of the social behavioural variables was medium. The final model accounted for 23% of the variance in depressive symptoms.

In the model for the TD group, PIQ was a significant predictor in step 1. Neither GCSE/GNVQ points nor PIQ contributed to the model in step 2. When the behavioural variables were included in step 3, hyperactivity was the only significant predictor. The effect size attributable to the addition of the variables in step 3 was medium. The final model accounted for 24% of the variance in depressive symptoms.

A regression model predicting depressive symptoms at 17 was then carried out (Table 6) and included the same potential predictors (step 1 - PIQ; step 2 – GCSE/GNVQ points; step 3 – conduct problems, hyperactivity, peer problems and bullying). There were no significant predictors of depressive symptoms at 17 in the SLI group model. For the TD group, hyperactivity and GCSE/GNVQ points were significant predictors in step 3 (medium effect size). The final model accounted for 12% of the variance in depressive symptoms. Compared to the models at 16, the models predicting depressive symptoms at 17 had smaller effect sizes, fewer significant predictors and accounted for a smaller amount of the variance.

Predicting Depression Outcome at 17 (At Risk vs. No Longer At Risk)

Earlier we examined how many participants were classified as at risk of depression at 16 and 17 years (see Table 3). We also noted how many remained at risk at 17, became at risk at 17, or were no longer at risk for depression at 17 (see Figure 2). In this part of the analysis we focus on the SLI and TD group adolescents who were classified as at risk for depression at 16 and/or 17 years. The adolescents who were not classified as at risk at either age point ($n = 118$, plus data missing from two participants) are not included in this analysis.

Thirty-four adolescents (18 SLI, 16 TD) either remained or became classified as at risk for depression at 17 years of age. Twenty seven adolescents who were classified as at risk for depression at 16 years were no longer at risk at 17 years (22 SLI, 5 TD). A logistic regression was carried out to examine the potential predictors of depression outcome at 17 years in these 61 adolescents (SLI $n = 40$; TD $n = 21$).

Depression outcome at 17 was coded as 1 (at risk for depression) and 0 (no longer at risk of depression). Predictors included the same variables which had been entered in the hierarchical regressions, except receptive language which was found not to contribute to any of the models. Thus, PIQ, GCSE/GNVQ points, conduct problems, hyperactivity, peer problems and experience of bullying were included in the model in one step. Significance levels for entry were set at $p = .05$.

Level of bullying experienced at 16 was a significant predictor of depression outcome at 17; that is, remaining or becoming at risk for depression at 17 was associated with more experience of being bullied at 16 (odds ratio $\exp b = 2.65$, 95% CI = 1.03 – 6.78, $p = .043$). The odds of remaining or becoming at risk for depression increases by a factor of around 2.65 for every point increase in bullying reported. PIQ, GSCE/GNVQ points, conduct problems, hyperactivity and peer problems were

not significant predictors. The model was significant (Nagelkerke $R^2 = .36$, model $\chi^2(6) = 19.29$, $p = .004$).

Discussion

This investigation extends the findings of an increased risk of anxiety symptoms in SLI (Conti-Ramsden & Botting, 2008) to older, 17-year-old, adolescents. At 17 years, we found evidence of significantly more anxiety symptoms in adolescents with SLI than in their typically developing peers. However, the adolescents with SLI and typically developing adolescents did not differ significantly in depressive symptoms at 17. In addition, as per previous literature with TD individuals (Piccinelli & Wilkinson, 2000), we found that females, regardless of language status (SLI vs. TD) are more vulnerable to depressive and anxiety symptoms in late adolescence than are their male counterparts.

Stability and Change in Emotional Health Symptoms

The young people with a history of SLI in this study showed a significant drop in depressive symptoms between 16 and 17 years of age. A similar change in depressive symptoms was not apparent in the TD group. At 16, the mean depressive symptom score of the SLI group was higher than the score of the TD group, but the groups' scores at 17 were similar. The reduction in depressive symptoms for adolescents with SLI is further demonstrated when we examine percentages classified as at risk for depression. Almost 40% of the adolescents with SLI were at risk for depression at 16 years (compared to 14% of the TD adolescents). At 17 years, this number was almost halved to 20% of adolescents with SLI being at risk for depression, which was a similar proportion to the TD adolescents (18%). The prevalence of depression risk in the participants with a history of SLI at 17 is similar to the prevalence of depression risk (24%) found among adults in their thirties with

receptive language impairments (Clegg et al., 2005). However, Beitchman et al. (2001) found a prevalence rate for affective disorders (including depression) of only 13% among 19-year-olds with a history of language impairment. This disparity may in part be due to different methods used to assess depression/risk of depression: the present study and the study by Clegg and colleagues used self-report questionnaires whereas Beitchman et al used psychiatric interviews.

Anxiety symptoms were also examined in the present study, and interestingly a change in anxiety scores from 16 to 17 years was not found. The adolescents with SLI reported more anxiety symptoms than the TD adolescents at 16 and 17 years. At 16 years, 13% of the adolescents with SLI were at risk for anxiety disorder (i.e. scores exceeded the clinical cut-off) compared to only 2% of TD adolescents. At 17 years, a similar number (11%) of the adolescents with SLI were at risk for anxiety disorder (vs. 1% TD). Thus, the adolescents with a history SLI experienced a similar level of anxiety symptoms at both 16 and 17 years. This stability in anxiety symptoms in the adolescents with SLI compared to TD peers is consistent with previous research conducted with young adults with SLI (Beitchman et al., 2001; Clegg et al., 2005). Beitchman et al did report a higher rate of anxiety disorders (27%) in their participants with language impairments; however, this number also included those with simple phobia, agoraphobia and panic disorder. Taken together, these findings suggest that some young people with SLI experience consistent feelings of anxiety in their teens and young adulthood, but also emphasise the importance of longitudinal examination of the same issues over the life span.

Predictors of Depressive Symptoms and Depression Outcome

The reduction in depressive symptoms between 16 and 17 years observed in the SLI group is an encouraging finding. We examined GCSE/GNVQ points as an

indicator of educational achievement in the last year of compulsory education and investigated its relationship to depressive symptoms. Lower GCSE/GNVQ points were associated with more depressive symptoms at 16 for the participants with SLI and the typically developing adolescents. Lower educational achievement was also a significant predictor of concurrent depressive symptoms in the group with SLI (but no longer had an effect when behavioural factors were taken into account). So, educational achievement at 16 showed some association with concurrent depressive symptoms. Interestingly, no significant relationships were found between educational achievement at 16 and depressive symptoms a year later at 17 in this group. It appears, therefore, that the end of compulsory education is associated with a reduction in depressive symptoms in adolescents with SLI, but this reduction does not vary systematically with level of educational achievement. This suggests that depressive symptoms that were associated with academic achievement during compulsory education are no longer related a year later.

There has been a suggestion that educational expectations may contribute (in part) to the increase in the prevalence of emotional health problems observed amongst 15- and 16-year-olds generally (Collishaw, et al., 2004; West & Sweeting, 2003). In this study, it appears that educational expectations (as indexed by examination achievement) are a contributing factor to depression symptoms in individuals with SLI at 16 years. Recent research also suggests that, for teenagers with language impairments, post compulsory secondary education transitions can be associated with an increase in self-esteem and largely positive experiences (Lindsay, Dockrell, & Palikara, 2010; Palikara, Lindsay, & Dockrell, 2009). In this study, we find that level of academic achievement is no longer a predictive factor in depression symptoms in individuals with SLI after compulsory education. In contrast, for the TD group,

academic achievement was a significant predictor of depression symptoms post compulsory education, at 17 years. It appears therefore that the end of compulsory education itself marks a change in individuals with SLI, and this is associated with a reduction of depression symptoms in SLI.

Contributing factors in terms of post-16 education/employment are likely to shed further light on transition factors involved in the reduction of depression symptoms after individuals finish compulsory education. Our study, however, is not ideally suited to investigate these. The majority of our sample at 17 years continued in education (approximately 90%), usually attending college courses. The types and level of courses they were attending were predictable from their GCSE/GNVQ achievements (Durkin, Simkin, Knox, & Conti-Ramsden, 2009). Further research could usefully investigate in more detail what aspects of post-16 transitions and experiences may have a positive effect on emotional health symptoms.

Regarding behavioural factors, hyperactivity was associated with more depressive symptoms at 16 and 17 in both groups of adolescents. There were also some interesting differences in the associations for each group. Having more peer problems was associated with more depressive symptoms at 16 and 17 in the adolescents with SLI, but these associations were not apparent in the typically developing adolescents. Experience of bullying was positively associated with depressive symptoms among the adolescents with SLI only. Regression analyses found peer problems (reported at 16) predicted depressive symptom scores at 16 in the adolescents with SLI; having more problems was related to higher depressive symptom scores. Behavioural factors did not however predict depressive symptoms at 17 in this group. In contrast, hyperactivity was a significant predictor of depressive symptoms at 16 and 17 in the TD group.

Botting and Conti-Ramsden (2008) found few associations between language ability and emotional health symptoms in the Manchester Language Sample at 16 years. Similarly, associations between emotional health symptoms at 17 and language ability, and PIQ, were not apparent in the present study. Language ability and non-verbal IQ did not predict depressive symptom scores at either time point, or for either group, when the educational and behavioural factors were accounted for. Thus, language ability and nonverbal ability do not appear to be directly associated with depressive symptoms concurrently, or a year later.

The regression models predicting depressive symptoms at 16 accounted for 23% of the variance in the SLI group and 24% of the variance in the TD group. The model predicting depression symptoms at 17 years in the SLI group (using the same potential predictors) did not identify any significant predictors, and the model predicting depression symptoms at 17 years in the TD group accounted for 12% of the variance. Thus, behavioural factors appear to make less of a contribution to depressive symptoms later in adolescence and symptoms are generally more difficult to predict using the types of measures employed here. Other potential influences on emotional health in adolescents and young adults with SLI are discussed further below.

In addition to depressive symptom scores, we also examined predictors of depression outcome at 17 years; in particular, those individuals who were no longer at risk for depression versus those who remained or became at risk for depression. Level of bullying experienced at 16 years predicted poor depression outcome at 17 years. Adolescents who reported a higher level of victimisation at 16 were almost three times as likely to become or remain at risk for depression a year later. This supports previous findings that bullying experience predicts depressive symptoms in children and adolescents (Bond, et al., 2001; Hawker & Boulton, 2000. Future research is

needed to further explore the link between bullying experience and emotional health symptoms in young people with SLI, e.g., duration of bullying, type of bullying.

Language ability was not a strong predictor of emotional health symptoms in this study, yet group status was important: participants with SLI were at greater risk of depressive and anxiety symptoms. Thus, we cannot conclude that the severity of language difficulty directly predicts emotional outcomes but we can conclude that having SLI puts an individual at greater risk. It is very likely that other factors contribute to the development or mitigation of mental health symptoms and that the causal pathways are complex. For example, individuals with language impairments suffer concomitant difficulties in initiating and sustaining successful peer relations and romantic partners (Brinton & Fujiki, 2002; Clegg et al., 2005; Durkin & Conti-Ramsden, 2007; Fujiki et al., 1999, 2001); this may lead to reduced opportunities to develop social skills and/or an exacerbation of interpersonal difficulties, which in turn could increase vulnerability to peer victimization and bullying. On this account, negative experiences such as bullying would be identifiable as the proximal factors leading to negative affect, but language impairment places the individual at risk of falling into such a sequence in the first place. Protective factors - not investigated here but possibly including parental and peer support, service provision, social skills training - may also influence the process and may moderate the effects of impairment severity. For example, individuals with greater language difficulties may receive more one-to-one provision, directed towards communication but incidentally providing greater nurturance, which in turn provides a buffer against some aspects of adversity in the peer environment. While this interpretation is consistent with the present findings of group differences but no effect of impairment severity, a direct test awaits future research.

In summary, behavioural factors predicted depressive symptoms at 16 years, and level of bullying experienced predicted depression outcome at 17 years.

Emotional and behavioural problems in childhood have been found to predict mood and anxiety disorders in adulthood (Roza, et al., 2003), and this appears to be the case for individuals with SLI in late adolescence.

Limitation

Samples of participants with SLI often have lower PIQ scores than their typically developing peers (Leonard, 1998), and the group with SLI examined in this study is no exception (indeed the mean PIQ of the SLI group was more than one standard deviation lower than the typically developing group mean). The potential effect of the group difference in PIQ on the observed differences in, and associates of, emotional health symptoms should be considered when interpreting the findings of this study. We found that PIQ actually had few significant associations with depressive and anxiety symptoms and the behavioural variables (and we controlled for the effect of PIQ in the regression analyses). Nonetheless, PIQ may influence emotional health experiences in ways not accounted for in the present study.

Implications

This study has implications for speech and language therapists and other professionals who work with young people with SLI. It appears that approximately one in ten adolescents with SLI experience high levels of anxiety in adolescence. Thus, some teenagers with SLI are likely to require specific support to manage their anxiety. Recent research suggests that high levels of anxiety can interfere with the learning experiences of adolescents with SLI, including the use of educational technology (Conti-Ramsden, Durkin, & Walker, 2010). Thus, identification of and provision of support for anxiety in SLI is likely to foster not only emotional wellbeing

but also more positive learning experiences.

In terms of depressive symptoms, two key factors were identified that affect vulnerability and therefore inform need for intervention and support. Our findings suggest that adolescents with SLI who also have behaviour problems (namely peer problems) are more likely to experience concurrent feelings of depression than those who do not. Our results also indicate that adolescents who have experienced bullying are almost three times as likely to remain or become at risk for depression in later adolescence. In conclusion, the present investigation alerts professionals to the emotional vulnerabilities of young people with SLI and to the fact that there are a number of factors that affect the emotional wellbeing of these young people.

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Table 1

Performance IQ, ^aStandardised Language Scores, GCSE/GNVQ Points, Behaviour Scores and Bullying Scores at 16 (Means, Standard Deviations and Group Comparisons)

	SLI group	TD group	<i>F</i>	η^2
	<i>M (SD)</i>	<i>M (SD)</i>		
Performance IQ (PIQ)	85.97 (19.27)	102.40(15.03)	40.62**	.19
Expressive language	73.47 (10.06)	98.70 (14.40)	184.83**	.51
Receptive language	83.96 (17.23)	101.15 (13.18)	59.40**	.25
GCSE/GNVQ points	23.16 (18.52)	52.28 (17.96)	114.12**	.39
Difficult behaviour				
- Conduct problems subscale	2.40 (1.56)	1.68 (1.62)	9.11**	.05
- Hyperactivity subscale	4.43 (2.41)	3.62 (2.28)	5.50*	.03
- Peer problems subscale	2.59 (1.89)	1.19 (1.03)	38.50**	.18
Bullying	0.36 (0.84)	0.10 (0.40)	^a 3654.50* ^b -.16	

Note. PIQ and standardised language scores were collected at 14 years for 64 of the participants in the SLI group.

^aMann Whitney *U*, ^b effect size *r*.

** $p < .01$, * $p < .05$.

Table 2

Mean (Standard Deviation) Depressive and Anxiety Symptom Scores at 16 and 17 years

Group		Depressive symptoms 16	Depressive symptoms 17	Anxiety symptoms 16	Anxiety symptoms 17
SLI	Female	7.68 (7.08)	5.57 (4.70)	11.11 (6.98)	10.86 (7.09)
	Male	5.84 (4.55)	5.05 (4.50)	9.90 (5.99)	8.98 (6.21)
	Total	6.54 (5.60)	5.21 (4.54)	10.28 (6.30)	9.57 (6.52)
TD	Female	5.22 (4.72)	5.54 (4.68)	7.86 (5.39)	9.16 (5.47)
	Male	3.32 (3.88)	3.45 (2.91)	6.07 (4.11)	5.74 (4.14)
	Total	4.13 (4.31)	4.31 (3.86)	6.80 (4.73)	7.13 (4.99)

Table 3

*Percentages of Participants Classified as at High Risk for Depression or Anxiety**Disorder at 16 and 17*

Group	At risk for depression at 16	At risk for depression at 17
SLI	39% (35/90)	20% (18/89)
TD	14% (13/91)	18% (16/90)
	At risk for anxiety disorder at 16	At risk for anxiety disorder at 17
SLI	13% (12/90)	11% (10/89)
TD	2% (2/91)	1% (1/91)

Table 4

Correlations of Depressive Symptoms at 16 and 17 with PIQ, Language Ability, Educational Achievement, Behaviour Problems and Bullying

	Depressive symptoms at 16	Depressive symptoms at 17	T2
SLI group			
Performance IQ	-.10	.08	1.76
Expressive language	-.13	.00	1.26
Receptive language	-.21*	-.06	1.43
GCSE/GNVQ points	-.25*	-.05	1.97
Conduct problems	.32**	.15	-1.75
Hyperactivity	.22*	.25*	0.28
Peer problems	.43**	.29*	-1.54
Bullied ^a	.28**	.29**	0.10
TD group			
Performance IQ	-.27**	-.14	1.31
Expressive language	-.11	-.12	-0.14
Receptive language	-.13	.07	2.02*
GCSE/GNVQ points	-.25*	-.03	2.29*
Conduct problems	.36**	.21	-1.67
Hyperactivity	.46**	.34**	-1.38
Peer problems	.04	.15	1.09
Bullied ^a	-.12	.08	2.04*

^a Spearman's correlation coefficient

** $p < .01$, * $p < .05$

Table 5

Concurrent Predictors of Depressive Symptoms at 16

Variable	Unadj. R^2	Adj. R^2	ΔR^2	f^2	B	$SE\ B$	B
SLI group							
Step 1	.01	.00		.01			
Performance IQ					-.03	.03	-.11
Step 2	.07	.05	.06	.06			
Performance IQ					.01	.04	.04
GCSE/GNVQ points					-.09	.04	-.28*
Step 3	.29	.23	.22	.31			
Performance IQ					-.02	.03	-.05
GCSE/GNVQ points					-.02	.04	-.06
Conduct problems					.77	.39	.21
Hyperactivity					.14	.25	.06
Peer problems					.93	.33	.31**
Bullied					.85	.75	.13
TD group							
Step 1	.07	.06		.08			
Performance IQ					-.08	.03	-.27*
Step 2	.09	.07	.02	.02			
Performance IQ					-.06	.03	-.19
GCSE/GNVQ points					-.04	.03	-.16
Step 3	.29	.24	.20	.28			
Performance IQ					-.04	.03	-.13
GCSE/GNVQ points					.03	.03	.11

Changes in Emotional Health

Conduct problems	.57	.29	.21
Hyperactivity	.76	.20	.40**
Peer problems	.04	.40	.01
Bullied	-1.63	1.01	-.15

* $p < .05$, ** $p < .01$

Table 6

Predictors of Depressive Symptoms at 17

Variable	Unadj. R^2	Adj. R^2	ΔR^2	f^2	B	$SE\ B$	B
SLI group							
Step 1	.01	-.01		.01			
Performance IQ					.02	.03	.08
Step 2	.02	.00	.01	.01			
Performance IQ					.04	.03	.15
GCSE/GNVQ points					-.04	.03	-.14
Step 3	.16	.10	.14	.17			
Performance IQ					.02	.03	.09
GCSE/GNVQ points					.00	.03	.01
Conduct problems					.04	.34	.01
Hyperactivity					.32	.22	.17
Peer problems					.46	.29	.19
Bullied					.95	.67	.17
TD group							
Step 1	.02	.01		.02			
Performance IQ					-.04	.03	-.15
Step 2	.02	.00	.00	.00			
Performance IQ					-.04	.03	-.17
GCSE/GNVQ points					.01	.03	.05
Step 3	.18	.12	.15	.20			
Performance IQ					-.04	.03	-.15
GCSE/GNVQ points					.06	.03	.27*

Changes in Emotional Health

Conduct problems	.28	.28	.12
Hyperactivity	.63	.20	.37**
Peer problems	.38	.38	.10
Bullied	-.03	.98	.00

* $p < .05$, ** $p < .01$

Figure 1: Mean Depressive Symptom Scores at 16 and 17

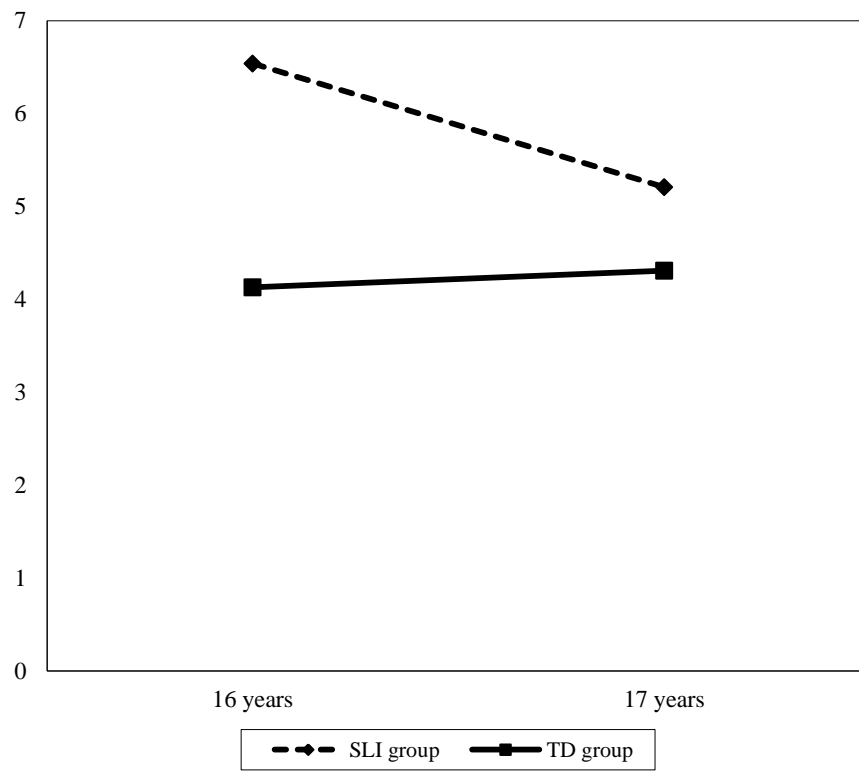


Figure 2: Subgroups Showing Change in Depression Risk between 16 and 17

