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Running Head: PROFILE OF ADOLESCENTS WHO STUTTER

A speech and psychological profile of treatment-seeking adolescents who stutter

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Highlights

- In the present study, anxiety and depression scores fell within normal limits

- High social desirability scores predicted under-reporting of anxiety and depression

- Boys reported externalizing problems (aggression, rule-breaking) in the clinical range

- Higher stuttering severity predicted higher anxiety and internalizing problems

- Higher stuttering severity and anxiety predicted a more negative impact of stuttering

Abstract

Purpose: The purpose of this study was to evaluate the relationship between stuttering severity, psychological functioning, and overall impact of stuttering, in a large sample of adolescents who stutter.

Method: Participants were 102 adolescents (11–17 years) seeking speech treatment for stuttering, including 86 boys and 16 girls, classified into younger (11–14 years, n = 57) and older (15–17 years, n = 45) adolescents. Linear regression models were used to evaluate the relationship between speech and psychological variables and overall impact of stuttering.

Results: The impact of stuttering during adolescence is influenced by a complex interplay of speech and psychological variables. Anxiety and depression scores fell within normal limits. However, higher self-reported stuttering severity predicted higher anxiety and internalizing problems. Boys reported externalizing problems—aggression, rule-breaking—in the clinical range, and girls reported total problems in the borderline-clinical range. Overall, higher scores on measures of anxiety, stuttering severity, and speech dissatisfaction predicted a more negative overall impact of stuttering.

Conclusion: To our knowledge, this is the largest cohort study of adolescents who stutter. Higher stuttering severity, speech dissatisfaction, and anxiety predicted a more negative overall impact of stuttering, indicating the importance of carefully managing the speech and psychological needs of adolescents who stutter. Further research is needed to understand the relationship between stuttering and externalizing problems for adolescent boys who stutter.

Keywords: Stuttering; Adolescents; Quality of Life; Anxiety; Avoidance.

1. A speech and psychological profile of treatment-seeking adolescents who stutter

Adolescence is characterized by a period of rapid and complex emotional, physical, social, and cognitive development (Spear, 2000). It is also a time when peer support is integral to self-esteem and wellbeing, pressure to conform to social and group norms is paramount, and self-consciousness is heightened (Adriaensens, Beyers, & Struyf, 2015; Heaven, 2001). Self-consciousness refers to increased awareness of both external and internal aspects of the self, such as physical appearance, social performance, and inner feelings (Davis & Franzoi, 1999). In a similar manner, self-esteem encompasses a subjective evaluation of the self, including appraisal of one's abilities, attributes, and worth (Brown, Dutton, & Cook, 2001). Self-esteem has been identified as a significant predictor of physical and mental health among adolescents from the general community (Mann, Hosman, Schaalma, & de Vries, 2004).

Research has also shown that negative peer experiences, such as experiencing teasing and bullying, may be associated with lower self-esteem during adolescence (O'Moore & Kirkham, 2001). In particular, negative peer experiences and lowered self-esteem have been found among adolescents with disorders such as specific language impairment (Conti-Ramsden & Botting, 2004; Durkin & Conti-Ramsden, 2010; Wadman, Durkin, & Conti-Ramsden, 2008), autism spectrum disorder (van Roekel, Scholte, & Didden, 2010), cerebral palsy (Lindsay & McPherson, 2012; Miyahara & Piek, 2006), learning disabilities (Baumeister, Storch, & Geffken, 2008; Valas, 1999), and chronic skin diseases such as acne, psoriasis, and eczema (Magin, Adams, Heading, Pond, & Smith, 2008). This suggests that difficulties with speech, language, learning, physical appearance, and daily functioning, may negatively impact peer relationships and self-esteem.

Anxiety is also common among adolescents with a range of disorders, including specific language impairment (Durkin & Conti-Ramsden, 2010), cleft lip palate (Hunt, Burden, Hepper, & Johnston, 2005), autism spectrum disorder (Simonoff et al., 2008), and children with chronic physical conditions such as epilepsy and cerebral palsy (Gortmaker, Walker, Weitzman, & Sobol, 1990). Longitudinal research has also shown a relationship between speech disorders in early childhood and anxiety disorders in early adulthood (Beitchman et al., 2001; Voci, Beitchman, Brownlie, & Wilson, 2006). In particular, children with a range of early speech impairments, including stuttering, were found to demonstrate a heightened rate of anxiety disorders, especially social anxiety disorder, at 19 years of age. This suggests that adolescents with speech impairment may experience the development of anxiety and social fears, and also indicates the potential for anxiety to be a concomitant of a range of disorders in adolescence.

1.1. Psychological impact of stuttering in adolescence

Stuttering during adolescence is associated with a host of negative experiences, including teasing, bullying, social isolation, and rejection (Beilby, Byrnes, & Yaruss, 2012; Blood et al., 2011; Davis, Howell, & Cooke, 2002). Evidence from several studies indicates that stuttering during adolescence may be associated with a negative impact on communication attitudes and competence, daily functioning, life satisfaction, quality of life, self-esteem, relationships and psychosocial functioning (Beilby et al., 2012; Blood & Blood, 2004; Blood et al., 2011; Erickson & Block, 2013; Van Borsel, Brepoels, & De Coene, 2011). For instance, adolescents who stutter may report negative attitudes to communication, negative peer experiences, low self-esteem, and heightened anxiety (Blood, Blood, Tellis, & Gabel, 2001; Blood & Blood, 2004; Blood et al., 2011; Mulcahy, Hennessey, Beilby, & Byrnes, 2008; Smith, Iverach, O'Brian, Kefalianos, & Reilly, 2014). Although this has not been found consistently across all studies (Craig et al., 1996;

Hancock et al., 1998; Hearne, Packman, Onslow, & Quine, 2008), research evidence to date indicates that stuttering during adolescence may be influenced by a host of speech and psychological factors.

Therefore, the purpose of the present study is to evaluate the relationship between stuttering severity, psychological functioning, and overall impact of stuttering in a large sample of adolescents who stutter, including a brief review of the literature on this topic. This information can be applied to the clinical management of adolescents seeking treatment for stuttering.

1.1.1. Impact of stuttering

The Overall Assessment of the Speaker's Experience of Stuttering (OASES; Yaruss & Quesal, 2010) has been used to evaluate the total impact of stuttering for children and adolescents who stutter (Beilby et al., 2012; Gunn et al., 2014; Mulcahy, Hennessey, Beilby, & Byrnes, 2008). The OASES includes four sections to evaluate general information, reactions to stuttering, communication in daily situations, and quality of life. Higher scores indicate a greater negative impact of stuttering, and are rated as mild, mild-moderate, moderate, moderate-severe, and severe. Findings from studies which have used the OASES have confirmed a moderate to moderate-severe impact of stuttering during adolescence (Beilby et al., 2012; Gunn et al. 2014), with total impact scores found to be correlated with stuttering frequency as measured by the percentage of syllables stuttered (Beilby et al., 2012) and anxiety (Mulcahy et al., 2008). Those findings highlight the potential for stuttering in adolescence to adversely impact a range of psychosocial factors evaluated by the OASES, including quality of life and communication in daily situations.

1.1.2. Negative attitudes towards communication

In light of the impact of stuttering on daily communication, it is not surprising that several studies of adolescents who stutter have reported evidence of negative attitudes about communication, increased communication apprehension, lowered communication competence, and perceived difficulty communicating (Blood et al., 2001; Guttormsen, Kefalianos, & Naess, 2015; Hearne et al., 2008; Smith et al., 2014). For instance, Blood and colleagues (2001) investigated communication apprehension and competence among 39 adolescents who stutter and 39 non-stuttering controls. Significant differences were found between groups, with a larger proportion of adolescents who stutter reporting high communication apprehension (39%) and low communication competence (41%), compared to only 18% and 13% of non-stuttering controls respectively. In addition, lower communication competence was associated with higher stuttering severity. In a study with no control group, Erickson and Block (2013) also found that a sample of 36 adolescents who stutter were characterized by below average self-perceived communication competence and heightened communication apprehension. Furthermore, communication difficulties in daily situations have been associated with trait and state anxiety for adolescents who stutter, but not for fluent controls (Mulcahy et al., 2008). State anxiety is transitory and only occurs in specific situations, whereas trait anxiety is stable across a range of situations.

1.1.3. Negative peer experiences and self-esteem

Several studies have investigated the relationship between stuttering, self-esteem, and peer victimization. Evidence from some studies has confirmed the propensity for some adolescents who stutter to report negative peer experiences, such as experiencing teasing and bullying. For instance, Blood and colleagues (2011) investigated experiences of bullying, self-esteem, life

satisfaction, and life orientation among 54 adolescents who stutter and 54 non-stuttering controls. When compared to controls, adolescents who stutter reported significantly more peer victimization, lower self-esteem, and a less optimistic life orientation. Similarly, Erickson and Block (2013) found that their sample of 36 adolescents who stutter was teased and bullied more than their non-stuttering peers, and also attempted to conceal their stuttering. Blood and Blood (2004) also found evidence of a significantly heightened risk for experiencing bullying among 53 adolescents who stutter when compared to 53 non-stuttering controls. The majority of adolescents who stutter reported positive self-esteem, which corresponds with previous evidence of positive self-esteem among the majority of a sample of 48 adolescents who stutter (Blood, Blood, Tellis, & Gabel, 2003). However, in Blood and Blood's (2004) study, participants with low self-esteem and poor communication competence were more likely to report experiences of bullying.

Although evidence of heightened experiences of bullying among adolescents who stutter has not been found consistently across all studies (e.g., Hearne et al., 2008), several authors have suggested that peer victimization among children and adolescents who stutter may contribute to the development of social anxiety and fear of negative evaluation (Iverach & Rapee, 2014; Smith et al., 2014). This is particularly relevant when considering evidence of an association between experiences of bullying and the later development of anxiety, depression, and low self-esteem in children from the general community (Hawker & Boulton, 2000; Kaltiala-Heino, Rimpela, Rantanen, & Rimpela, 2000). It is also possible that children and adolescents who stutter may be targets of peer victimization as a result of their displays of anxiety and nervousness (Blood & Blood, 2007). Therefore, evidence of heightened peer victimization among adolescents who

stutter highlights the need for increased vigilance and early intervention to avoid the development of negative psychological consequences (Blood et al., 2011).

1.1.4. Anxiety

Understanding the relationship between anxiety and stuttering during adolescence is of critical importance given the heightened rates of social anxiety disorder that have been found among adults who stutter compared to non-stuttering controls (Blumgart, Tran, & Craig, 2010; Iverach et al., 2009). However, research investigating the presence of anxiety in adolescents who stutter has yielded inconclusive results (Smith et al., 2014). To begin with, there is some evidence that adolescents who stutter may report significantly higher anxiety than non-stuttering controls. For instance, Mulcahy and colleagues (2008) reported higher trait, state and social anxiety for 19 adolescents who stuttered when compared to fluent controls, with trait and state anxiety significantly associated with communication difficulties. Related to this, Blood and colleagues (2001) found that 39 adolescent who stuttered had significantly more fears of speaking in group situations and interpersonal conversations than 39 non-stuttering controls.

However, other studies have reported no differences in anxiety between adolescents who stutter and non-stuttering controls (Andrews & Harris, 1964; Craig & Hancock, 1996; Craig et al., 1996; Hancock et al., 1998). For instance, in a large sample of 96 children and adolescents who stutter (9–14 years) and 104 non-stuttering controls, Craig and Hancock (1996) found no significant differences in anxiety, and no association between stuttering severity and anxiety. Two additional studies also found that anxiety symptoms for adolescents who stutter fell within normal limits based on normative data (Gunn et al., 2014; Messenger, Packman, Onslow, Menzies, & O'Brian, 2015). Further, a study conducted by Davis, Shisca and Howel (2007) yielded mixed findings, with no differences in trait anxiety found for children and adolescents

with persistent and recovered stuttering when compared to non-stuttering controls (10–17 years). However, higher state anxiety was found for the persistent group in three out of four speaking situations when compared to the recovered and control groups.

More recently, two studies using the Revised Children's Manifest Anxiety Scale (RCMAS, RCMAS-2; Reynolds & Richmond, 2000, 2008) found that adolescents who stutter are likely to provide socially desirable responses (Gunn et al., 2014, Messenger et al., 2015). Socially desirable responding indicates a need for social acceptance, and suggests the likelihood of inaccurate or misleading responses (Reynolds & Richmond, 2000). Gunn and colleagues (2014) found that RCMAS-2 anxiety scores for their sample of 37 adolescents who stuttered were within the normal range. However, 38% of their sample reported social desirability (defensiveness) scores in the clinical range. Based on guidelines provided by Reynolds and Richmond (2000, 2008), this finding casts doubt over the accuracy of total anxiety scores. Similarly, Messenger and colleagues (2015) found that RCMAS scores for 50 adolescents who stuttered were within normal limits. However, high social desirability scores were found for boys (n = 41), but not girls (n = 9). These findings regarding socially desirable responding may be related to evidence that adolescents who stutter are reticent to disclose their personal experiences of stuttering (Blood et al., 2003; Erickson & Block, 2013). For instance, Blood and colleagues (2003) found that 60% of their sample of adolescents who stutter "rarely" or "never" discussed their stuttering. Similarly, Erickson and Block (2013) found that adolescents who stutter attempted to keep their stuttering secret. Socially desirable responding has also been found in studies of non-stuttering children. For instance, in a large sample of 414 children and adolescents with chronic pain, Logan, Claar and Scharff (2008) found that higher socially desirable

responding was associated with fewer symptoms of anxiety and depression than lower socially desirable responding.

Finally, it is worth noting that only one study has evaluated the psychological functioning of stuttering adolescents using a structured diagnostic interview. Gunn and colleagues (2014) administered a computerized diagnostic interview to 37 stuttering adolescents (12–17 years) in order to evaluate the presence of mental health disorders. Diagnoses were made using computer algorithms based on the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association, 2000). Fourteen participants (38%) met criteria for the diagnosis of at least one mental disorder, with the majority of these diagnoses being anxiety-related. These findings contribute to a growing body of literature confirming the presence of anxiety among adolescents who stutter.

1.2. Relationship between psychosocial factors, stuttering severity, and age

Stuttering severity can be measured in several ways, with the most common being the percentage of syllables stuttered (%SS) and self-reported stuttering severity. The percentage of syllables stuttered is a gold standard stuttering-count measure obtained by a speech-language pathologist. Self-rated stuttering severity is measured by the person who stutters, typically using a scale ranging from 'no stuttering' to 'extremely severe stuttering.' Across the adolescent literature, there are some indications that stuttering severity and age may influence psychological functioning. First, a small number of studies have grouped adolescents who stutter into younger and older age groups, in order to determine whether the negative psychosocial impact of stuttering changes with age (Blood et al., 2003; Gunn et al., 2014). For instance, Blood and colleagues (2003) found that younger adolescents (13–15 years) perceived stuttering as more negative and stigmatizing than older adolescents (16–18 years), and older adolescents were

found to be more open about disclosing their stuttering than younger adolescents. However, in a sample of 37 adolescents seeking speech treatment for stuttering, Gunn and colleagues (2014) found that older adolescents (15–17 years) reported significantly higher anxiety, depression, reactions to stuttering, and emotional and behavioral problems, than younger adolescents (12–14 years), even though scores for both groups fell within normal limits. Overall, more research is required to determine whether there is convincing evidence of age differences in the psychosocial impact of stuttering. Therefore, reporting findings for younger and older adolescents in the present study is consistent with existing research, and has applications to the clinical management of these age groups, especially in cases where speech-language pathologists or psychologists choose to administer self-report measures of psychological functioning.

Another indication that stuttering severity and age may influence psychological functioning is a recent study of 55 adolescents who stutter (Adriaensens et al., 2015). Higher self-reported stuttering severity was associated with lower self-reported social acceptance, school competence, competence in close friendships, and global self-esteem. In addition, Blood and colleagues (2011) found that more severe stuttering, as measured by %SS, was associated with higher communication apprehension and lower communication competence. In contrast, several studies have found no association between stuttering severity and anxiety (Craig & Hancock, 1996; Gunn et al., 2014; Mulcahy et al., 2008). For instance, in their study of adolescents who stutter, using %SS as a measure of stuttering severity, Mulcahy and colleagues (2008) concluded that, "stuttering is a disorder that features psychosocial conflict regardless of its surface features" (p.306). Gunn and colleagues (2014) also stated that, "self-reported stuttering severity is not an indicator for developing anxiety or other mental health issues in stuttering adolescents" (p.65).

1.3. Purpose of the present study

Based on research evidence to date, it appears that the impact of stuttering for adolescents may be dependent on a range of speech and psychological variables. Several previous studies have evaluated the psychological functioning of adolescents who stutter, with particular focus on quality of life, negative attitudes toward communication, negative peer experiences, self-esteem, and anxiety. However, not all studies have investigated the relationship between psychological functioning, speech variables such as stuttering severity, and the overall impact of stuttering. In addition, findings across these studies have been inconclusive, suggesting the need for a well-powered study to evaluate speech and psychological variables among adolescents who stutter.

Therefore, the primary purpose of the present study was to evaluate the relationship between stuttering severity, psychological functioning, and overall impact of stuttering in a large sample of treatment-seeking adolescents who stutter. Based on evidence that older adolescents may report more negative psychological outcomes than younger adolescents (Blood et al., 2003; Gunn et al., 2014), adolescents in the present study were divided into younger and older age groups, with the following aims:

1. Determine whether scores on measures of psychological functioning fall within normal or elevated ranges when compared to normative scores;

2. Evaluate the presence and impact of socially desirable responding on self-reported anxiety;

3. Evaluate the relationship between self-reported stuttering severity and psychological functioning;

4. Determine whether speech or psychological variables, or both, predict the overall impact of stuttering.

2. Method

2.1. Participants

Adolescents who stutter were drawn from treatment waiting lists across three university-affiliated stuttering treatment clinics (Australian Stuttering Research Centre, The University of Sydney; School of Human Communication Sciences, La Trobe University, Melbourne; Department of Linguistics, Macquarie University, Sydney). The study was approved by the relevant Human Research Ethics Committees. Informed consent was obtained from all participants. Eligibility criteria were: (1) age 11–17 years, (2) seeking speech treatment for stuttering, (3) developmental stuttering present before 12 years of age, (4) onset of stuttering not due to known psychological or neurological causes, (5) presence of stuttering confirmed by participant or parent and speech pathologist during assessment (6) functional written and spoken English, and (7) no speech treatment during the preceding 6 months. Speech treatment at all sites included speech restructuring techniques designed to control stuttering. It is not known whether the motivation to seek speech treatment for stuttering was initiated by the adolescents or their parents.

The treatment-seeking adolescents were 86 boys (84.3%) and 16 girls (15.7%), 102 in total. A binomial test indicated that the proportion of boys (.84) in the study was not significantly higher than the expected proportion of boys who stutter from the Australian general community (.80) as reported by Craig and Tran (2005), $p = 0.167$ (one-tailed). Participants ranged in age from 11–17 years (mean = 14.2, SD = 1.69), with a similar age distribution for girls and boys (girls: mean = 14.8 years, SD = 1.56; boys: mean = 14.0 years, SD = 1.70). Given evidence that psychological outcomes may worsen with increasing age, participants were divided into younger and older age groups. The younger age group (11–14 years) consisted of 57 adolescents,

including 51 boys and 6 girls (89.5% boys), with a mean age of 12.9 years (*SD* = 0.93). The older age group (15–17 years) consisted of 45 adolescents, including 35 boys and 10 girls (77.7% boys), with a mean age of 14.2 years (*SD* = 1.70). A family history of stuttering was present for 68 participants (67%), and 89 had received previous treatment for stuttering (87%).

Data for the present study were collected over a 9-year period (2006–2015). Thirty-seven adolescents who stutter from a previous study conducted by Gunn and colleagues (2014) were not included in the present study on the grounds that their speech and psychological data had already been reported for measures included in the present study (i.e., RCMAS-2, Children's Depression Inventory [CDI], Child Behavior Checklist [CBCL], Youth Self-Report [YSR]). Hence, these participants were excluded to ensure the reporting of new knowledge. However, 50 adolescents who stutter (41 boys, 9 girls) from a previous study of anxiety and stuttering (Messenger et al., 2015) were included in the present study on the grounds that the previous study reported anxiety scores only. Therefore, these 50 participants were included in the present study, but their anxiety scores were excluded from analysis (see *Section 3.3.1.* for further details). That is, the present study included the 50 participants reported by Messenger and colleagues, but did not include the 37 participants reported by Gunn and colleagues.

The purpose of our study was to evaluate the relationship between stuttering severity, psychological functioning, and overall impact of stuttering for a large sample of adolescents who stutter. Hence, the purpose of our study was distinct from the previous studies conducted by Gunn and colleagues (2014) and Messenger and colleagues (2015). Specifically, Gunn and colleagues evaluated the presence of anxiety and related disorders among a small sample of adolescents who stutter using a structured, diagnostic interview and psychological questionnaires. Messenger and colleagues investigated the presence of anxiety in school-age

children and adolescents who stutter using a single measure of anxiety: the RCMAS (Reynolds

& Richmond, 2000).

2.2. Measures

The following speech and psychological measures were completed during each

participant's initial assessment for treatment:

2.2.1. Speech Measures

2.2.1.1. Self-reported stuttering severity

Adolescents were asked to rate their typical and worst stuttering severity across eight

speaking situations: (1) talking with a family member, (2) talking with a best friend, (3) talking

with a group of friends, (4) talking with a boss or teacher, (5) giving their name and address, (6)

giving a class presentation, (7) talking on the phone, and (8) buying food or drink. Typical and

worst stuttering severity for each situation was rated on a scale ranging from 1 = *no stuttering* to

9 = *extremely severe stuttering.* This scale is a valid and reliable method for evaluating stuttering

severity (O'Brian, Packman, & Onslow, 2004; O'Brian, Packman, Onslow, & O'Brian, 2004). In

the present study, self-report psychological measures were used to evaluate subjective ratings of

psychological functioning. Consequently, self-reported stuttering severity was chosen as the

primary speech measure in the present study.

2.2.1.2. Speaking Situations Avoidance Scale (SSAS; Iverach et al., 2016)

The SSAS evaluates avoidance of speaking situations. Adolescents rated how often they

avoided each of the eight speaking situations above using a three-point scale ranging from 0 =

never avoid, 1 = *sometimes avoid*, and 2 = *usually avoid*. Scores for each situation are summed

to calculate a total avoidance score, ranging from 0 = *no avoidance* to 16 = *high avoidance*.

2.2.1.3. Speech Satisfaction Scale

Adolescents were asked to rate their current speech satisfaction on a scale ranging from 1 = *extremely happy/satisfied* to 9 = *extremely unhappy/unsatisfied*.

2.2.2. Psychological Measures

2.2.2.1. Revised Children's Manifest Anxiety Scale (Reynolds & Richmond, 2000)

The RCMAS evaluates the level and nature of anxiety symptoms in children and adolescents 6–19 years. The measure consists of 37 items across four subscales: (1) Physiological Anxiety, (2) Worry/Oversensitivity, (3) Social Concerns/Concentration, and (4) Social Desirability (Lie Scale). Item responses for the three anxiety subscales are summed to derive a Total Anxiety score ranging from 0–28, with high scores indicating a higher level of anxiety. A high Social Desirability (Lie) score indicates a high need for social desirability or acceptance, and suggests the likelihood of an inaccurate report. The RCMAS has been used extensively in clinical and research settings, and has well-established psychometric properties (Reynolds & Richmond, 2000). The RCMAS provides separate percentiles for boys and girls by age. Participants in the present study completed the RCMAS prior to release of the RCMAS-2 (Reynolds & Richmond, 2008). The RCMAS was also completed by adolescents who stutter reported by Messenger and colleagues (2015). However, participants reported by Gunn and colleagues (2014) completed the RCMAS-2.

2.2.2.2. Children's Depression Inventory (Kovacs, 2003)

The 27-item CDI is a self-report measure of cognitive, affective and behavioral manifestations of depression in children 7–17 years. The CDI includes five subscales: (1) Negative Mood, (2) Interpersonal Problems, (3) Ineffectiveness, (4) Anhedonia (i.e., inability to experience pleasure during activities that would normally be enjoyable), and (5) Negative Self-

Esteem. Respondents rate each item according to how much they have experienced each depressive symptom during the previous two weeks, on a 4-point scale ranging from 0 = *not at all* to 3 = *much or most of the time*. Item responses are summed to derive a Total score ranging from 0 to 54, with a 19-point cut-off discriminating between non-depressed children and children at risk of depression. The CDI is widely used in clinical and research settings, and has good psychometric properties (Kovacs, 2003). The CDI provides separate percentiles for boys and girls by age.

2.2.2.3. Youth Self Report and Child Behavior Checklist (Achenbach & Rescorla, 2001)

The YSR (adolescent report) and the CBCL (parent report) are complementary measures designed to evaluate emotional and behavioral functioning in adolescents (11–17 years). Both versions include 112 items to evaluate behavioral, emotional and social problems experienced by adolescents within the past 6 months, rated on a 3-point scale ranging from 0 = *not true*, 1 = *somewhat or sometimes true*, to 2 = *very true or often true*. Item responses are used to calculate scores for eight Syndrome Scales, which can be classified into two broad categories: (1) Internalizing (sum of Anxious/Depressed, Withdrawn/Depressed, and Somatic Complaints scales), and (2) Externalizing (sum of the Rule-Breaking Behavior and Aggressive Behavior scales). A Total Problems score can be calculated by summing scores for the Internalizing and Externalizing scales, plus the Sleep Problems, Social Problems and Attention Problems Syndrome Scales. The Total Problems Score ranges from 0–210, with high scores indicating numerous problems. Scores for the YSR and CBCL can be classified as 'normal', 'borderline', or 'clinical', with separate norms available for boys and girls by age.

2.2.2.4. Assessment of the Child's Experience of Stuttering (ACES; 2006 Draft Version)

The ACES is a self-report measure designed to evaluate quality of life and the overall impact of stuttering for children and adolescents. The ACES is an earlier draft version of the Overall Assessment of the Speaker's Experience of Stuttering (OASES-S: 7–12 years; OASES-T: 13–17 years; Yaruss & Quesal, 2010), and was used in the present study with permission from the OASES authors before the new versions of OASES-S/T were published. The ACES consists of four sections: (1) General Information, (2) Your Reactions to Stuttering, (3) Communication in Daily Situations, and (4) Quality of Life. Items are rated on a 5-point scale, with higher scores indicating greater negative impact of stuttering. Impact scores for each section and the Total Impact Score range from 20–100, and are rated as *mild* (20.0–29.9), *mild–moderate* (30.0–44.9), *moderate* (45.0–59.9*), moderate–severe* (60.0–74.9), and *severe* (75.0–100.0).

2.2.3. Data analyses

Mean scores on all self-report measures were calculated and presented with: (1) the possible score range for each measure/scale (see footnotes for each table), and (2) the actual score range on each measure/scale for participants in the present study by age group/gender. Percentile ranks for scores on psychological measures were reported where possible, with scores for girls compared to normative data for girls and scores for boys compared to normative data for boys on the CBCL, CDI, RCMAS, and YSR.

Linear regression models were used to evaluate predictors of speech and psychological outcomes as follows:

- *Overall Impact of Stuttering (ACES):* A linear regression model was used to evaluate whether age group and gender were predictive of ACES Total Impact scores.

- *Anxiety (RCMAS):* On the grounds that socially desirable responding may influence the accuracy of responses to RCMAS items, a regression model was used to evaluate whether RCMAS Social Desirability (Lie) scores predicted RCMAS Total scores.

- *Depressive Symptoms (CDI)*: Given that depression and anxiety are often highly correlated, a linear regression model was used to determine whether age group, gender, and RCMAS Total Anxiety scores predicted CDI Total scores.

- *Relationship Between Self-Reported Stuttering Severity and Psychological Functioning*: Four linear regression models were used to determine whether self-reported stuttering severity, age group, and gender predicted RCMAS Anxiety scores, and YSR Internalizing, Externalizing, and Total Problems scores.

- *Speech and Psychological Predictors of Overall Stuttering Impact*: A linear regression model was used to evaluate speech and psychological predictors of the overall impact of stuttering (ACES Total score), with the following predictors: RCMAS Total score, avoidance of speaking situations, self-reported typical stuttering severity, speech satisfaction, age group, and gender.

In order to account for our eight planned regression models, a Bonferroni adjusted alpha of 0.006 was used to determine significance ($p = 0.05 / 8 = 0.006$).

3. Results

3.1. Self-reported stuttering severity, speech satisfaction, and avoidance

Table 1 shows mean self-reported stuttering severity, speech satisfaction, and avoidance of speaking situations for adolescents who stutter by age group and gender.

[Insert Table 1 about here]

3.2. Overall Impact of Stuttering

Table 2 outlines scores and ratings on the ACES, as a measure of the overall impact of stuttering. First, General Information scores fell within the Moderate-Severe range for both younger and older adolescents, indicating a view of the self as being unable to speak fluently or communicate easily across speaking situations, including physical tension and struggle when speaking (Yaruss & Quesal, 2010). Second, scores for Your Reactions to Stuttering were Moderate for younger adolescents and Moderate–Severe for older adolescents, with a Moderate score for both groups overall, indicating the presence of negative affective and cognitive reactions to stuttering, including concerns about the reactions of others and avoidance of speaking situations (Yaruss & Quesal, 2010). Third, scores for Communication in Daily Situations were also Moderate for younger adolescents and Moderate–Severe for older adolescents, with a Moderate score for both groups overall, indicating some limitations in the ability to communicate in key situations and difficulty getting a point across (Yaruss & Quesal, 2010). Fourth, Quality of Life scores were Moderate for younger and older adolescents, suggesting that stuttering may negatively impact participation in daily activities, decision-making, functioning and goals (Yaruss & Quesal, 2010). Finally, the Total Impact score was Moderate for younger adolescents and Moderate-Severe for older adolescents, with a Moderate score for both groups overall. A linear regression model with age group and gender as predictors accounted for 8% of the variance in the ACES Total Impact score, $F(2,99) = 4.60$, $p = 0.012$, with every 1 unit increase in age group predicting a 0.27 increase in the ACES Total Impact score (beta $= 0.27$, $p = 0.006$). However, based on our conservative Bonferroni-adjusted alpha of 0.006, this model only approached significance.

[Insert Table 2 about here]

3.3. Anxiety and depression (RCMAS, CDI)

Table 3 presents mean scores for the RCMAS and the CDI, including percentile ranks for boys and girls by age. All RCMAS scores fell within normal limits. Percentile equivalents for RCMAS mean scores ranged from 17–43 for the Total Anxiety score and all subscales, except for the Social Desirability (Lie) score which fell within a higher percentile rank (77–82). Mean scores for the CDI also fell within normal limits, and were below the 19-point cut-off that discriminates between non-depressed children and children at risk of depression. Younger and older boys scored within the 26–29th percentiles, and younger and older girls scored higher within the 29th–42nd percentiles.

3.3.1. Anxiety

Fifty participants from the present study (41 boys, 9 girls) were included in a previous study using the RCMAS (see Messenger et al., 2015). Therefore, these 50 participants were removed from our RCMAS analyses, resulting in a final sample of 52 adolescents who stutter (45 boys, 7 girls). Percentile equivalents for RCMAS mean scores ranged from 17–43 for the Total Score and all subscales, except for the Social Desirability (Lie) score, which fell within a higher percentile rank (80–82). Given the potential for socially desirable responding to influence the accuracy of scores on the full measure, a linear regression model was used to determine whether RCMAS Total scores were predicted by Social Desirability (Lie) scores, with age group and gender also entered as predictors. This model accounted for 19% of the variance in the RCMAS Total score, $F(3,48) = 3.72$, $p = 0.018$, with every 1 unit increase in Social Desirability predicting a 0.38 decrease in the RCMAS Total score (beta = -0.38, $p = 0.005$). However, based on our conservative alpha of 0.006, this model only approached significance.

3.3.2. Depressive symptoms

All CDI mean scores fell within normal limits, and were below the 19-point cut-off that discriminates between non-depressed children and children at risk of depression. Younger and older boys scored within the 23rd–29th percentiles, and younger and older girls scored higher within the 29th–42nd percentiles. Given that depression and anxiety are often highly correlated, a linear regression model was used to determine the relationship between RCMAS and CDI scores. This model included the following predictors: age group, gender, and RCMAS Total Score. This model accounted for 66% of the variance in CDI Total score, F (3,48) = 31.27, $p <$ 0.001, with every 1 unit increase in RCMAS Total score predicting a 0.83 increase in the CDI Total score (beta = 0.83, $p < 0.001$). Gender and age group were not statistically significant predictors in this model.

[Insert Table 3 about here]

3.4. Emotional, Behavioral, and Social Functioning (CBCL, YSR)

As shown in Table 4, scores on the YSR and CBCL are classified as 'normal', 'borderline', or 'clinical' for boys and girls by age. The majority of YSR and CBCL scores were in the normal range. However, YSR Externalizing scores were in the borderline-clinical range for younger boys (11–14 years), and the clinical range for older boys (15–17 years) and boys overall. In addition, YSR Total Problems scores were in the borderline-clinical range for younger and older girls.

[Insert Table 4 about here]

3.5. Relationship between self-reported stuttering severity and psychological functioning

Four linear regression models were used to determine whether self-reported typical stuttering severity, age group, and gender predicted RCMAS Anxiety scores (Model 1), YSR Internalizing scores (Model 2), YSR Externalizing scores (Model 3), and YSR Total Problems

scores (Model 4). Model 1 accounted for 27% of the variance in RCMAS Total scores, F (3,46) = 5.61, p = 0.002, with every 1 unit increase in typical stuttering severity predicting a 0.47 increase in RCMAS Total scores (beta = 0.47, p = 0.001). Given that RCMAS Anxiety scores were found to account for a large amount of the variance in CDI Total scores (see Section 3.3.2 above), a linear regression model was not used to determine whether CDI Total scores were predicted by typical stuttering severity, age group, and gender.

Model 2 accounted for 13% of the variance in YSR Internalizing scores, F (3,96) = 4.85, p = 0.003, with every 1 unit increase in typical stuttering severity predicting a 0.33 increase in YSR Internalizing scores (beta = 0.33, p = 0.001). Model 3 was not significant, F (3,96) = 1.30, p = 0.278, indicating that YSR Externalizing scores were not predicted by age group, gender, or typical stuttering severity. Model 4 was also not significant, F (3,94) = 2.66, p = 0.053, indicating that YSR Total Problems scores were not predicted by age group, gender, or typical stuttering severity.

3.6. Speech and psychological predictors of overall stuttering impact

A linear regression model was used to evaluate speech and psychological predictors of the overall impact of stuttering (ACES Total score). This model included the following predictors: RCMAS Total score, avoidance of speaking situations, self-reported typical stuttering severity, speech satisfaction, age group, and gender. This model accounted for 63% of the variance in ACES Total score, F (6,43) = 12.27, p < 0.001, with a 1 unit increase in RCMAS Total scores predicting a 0.31 increase in ACES Total scores (beta = 0.31, p = 0.008), a 1 unit increase in speech dissatisfaction predicting a 0.31 increase in ACES Total scores (beta = 0.31, p = 0.007), and a 1 unit increase in typical stuttering severity predicting a 0.28 increase in ACES Total

scores (beta $= 0.28$, $p = 0.017$). Gender, age group, and avoidance were not significant predictors in this model.

3.7. Summary of significant findings

In light of the complex interrelationships found between speech and psychological variables for the present sample of adolescents who stutter, a summary of significant findings is outlined below. A conservative Bonferroni-adjusted alpha of 0.006 was used to determine significance.

- *Overall impact of stuttering (ACES):* Overall impact was Moderate for younger adolescents and Moderate-Severe for older adolescents, with a Moderate score overall. A regression model including age group and gender as predictors approached significance ($p = 0.012$), with older age group indicating a more negative overall impact of stuttering ($p = 0.006$).

- *Anxiety and depressive symptoms (RCMAS, CDI)*: All scores fell within normal limits. A regression model including Social Desirability (Lie) scores as a predictor approached significance ($p = 0.018$), with higher Social Desirability (Lie) scores indicating lower anxiety ($p = 0.005$). In addition, higher anxiety predicted higher depressive symptoms ($p < 0.001$).

- *Emotional and behavioral functioning (adolescent YSR, parent CBCL):* Based on the YSR, internalizing problems were in the normal range, externalizing problems were in the clinical range for boys, and total problems were in the borderline-clinical range for girls.

- *Relationship between self-reported stuttering severity and psychological functioning*: Higher typical stuttering severity predicted higher anxiety and higher internalizing problems ($p = 0.001$ respectively). However, stuttering severity was not a significant predictor of externalizing problems or total problems.

- *Speech and psychological predictors of overall stuttering impact:* A more negative overall impact of stuttering was predicted by higher anxiety ($p = 0.008$), higher typical stuttering severity ($p = 0.017$), and higher speech dissatisfaction ($p = 0.007$). This model accounted for 63% of the variance in overall stuttering impact. Gender, age group, and avoidance were not significant predictors.

4. Discussion

Research to date has shown that stuttering during adolescence has the potential to negatively impact communication attitudes, life satisfaction, quality of life, self-esteem, and psychosocial functioning (Beilby et al., 2012; Blood & Blood, 2004; Blood et al., 2011; Erickson & Block, 2013; Van Borsel et al., 2011). Although research evidence to date remains inconclusive, several studies have shown that adolescents who stutter may report heightened anxiety, negative attitudes to communication, negative peer experiences, and low self-esteem (Blood et al., 2001; Blood et al., 2004, 2011; Mulcahy et al., 2008; Smith et al., 2014). The purpose of the present study was to evaluate the relationship between stuttering severity, psychological functioning, and overall impact of stuttering in a large sample of treatment-seeking adolescents who stutter. Findings from this study provide a unique speech and psychological profile of adolescents who stutter, and indicate that the impact of stuttering during adolescence is influenced by a complex interplay of speech and psychological variables. This is consistent with the perspective that stuttering involves several complex systems, both within the person and their environment (Packman & Kuhn, 2009). Understanding these variables may provide valuable insight into the clinical management of adolescents seeking treatment for stuttering.

4.1. Psychological functioning

The first aim of the present study was to determine whether scores on measures of psychological functioning fell within normal or elevated ranges, including scores relating to anxiety, depression, and emotional and behavioral problems. Related to this, our second aim was to evaluate the presence and impact of socially desirable responding on self-reported anxiety.

4.1.1. Overall impact of stuttering

Based on the ACES, the overall impact of stuttering was Moderate for younger adolescents and Moderate-Severe for older adolescents, with a Moderate score overall. A regression model approached significance ($p = 0.012$), with older age group indicating a more negative overall impact of stuttering ($p = 0.006$). Gunn and colleagues (2014) also reported OASES-S/T scores in the moderate to moderate-severe range for their sample of adults who stutter, with older adolescents reporting significantly higher scores for Section 2 (Your Reactions to Stuttering) than younger adolescents. These findings also correspond with OASES score ranges reported by Beilby and colleagues (2012) for a sample of 45 adolescents who stutter.

4.1.2. Anxiety and depression

In line with previous research (for example, Gunn et al., 2014; Messenger et al., 2015), scores on measures of anxiety (RCMAS) and depression (CDI) fell within normal limits. However, higher symptoms of depression were predicted by higher symptoms of anxiety, indicating a significant relationship between symptoms of anxiety and depression. In addition, our regression model including socially desirable responding approached significance ($p = 0.018$), with higher social desirability indicating lower anxiety ($p = 0.005$). This finding corresponds with previous evidence of socially desirable responding among adolescents who stutter (Gunn et al., 2014; Messenger et al. 2015), and suggest that adolescents who stutter may

refrain from providing an honest account of symptoms relating to anxiety. This may be partly explained by evidence of reticence among adolescents who stutter to disclose personal experiences of stuttering (Blood et al., 2003; Erickson & Block, 2013). Further research is required to determine whether this reticence is also related to reports of anxiety symptoms, and to understand why adolescents who stutter are inclined to hide their true experiences and/or feelings.

4.1.3. Emotional and behavioral problems

In the present study, the adolescent YSR and the parent CBCL were used to evaluate emotional and behavioral problems in adolescents. In a similar manner to findings reported by Gunn and colleagues (2014), the majority of YSR and CBCL scores for the present sample of adolescents who stutter fell within the normal range. However, boys reported externalizing problems in the clinical range, and girls reported total problems in the borderline-clinical range. These findings indicate that gender differences may exist in relation to the emotional and behavioral problems experienced by adolescents who stutter. That is, boys may externalize their emotions, resulting in conflict and aggression. Girls, on the other hand, may experience a broader range of emotional and behavioral reactions which result in a greater number of problems overall. This fits with evidence that boys are typically more at risk of developing externalizing problems, and girls are more at risk of developing internalizing problems (Hankin & Abramson, 2001; Leadbeater, Kuperminc, Blatt, & Hertzog, 1999).

A small number of studies have referred to behavioral concerns in children or adolescents who stutter. For instance, in their study of the social and communication impact of stuttering on 36 adolescents and their families, Erickson and Block (2013) found that a small proportion of parents reported, "difficulty managing their child's frustrations or unhappiness", and the

presence of "family conflict issues" in relation to their child's stuttering (p.318). Similarly,

Iverach and colleagues (2016) found that externalizing scores on the Spence Children's Anxiety

Scale (SCAS; Nauta et al., 2004; Spence, 1998) were significantly higher for 75 children who

stutter when compared with 150 non-stuttering controls, even though all scores fell within

normal limits.

Aside from this, however, there is little evidence regarding the presence of externalizing

problems in children or adolescents who stutter. One explanation for this may be that studies

investigating psychosocial variables among adolescents who stutter have typically relied on

measures designed to evaluate internalizing problems such as anxiety and low self-esteem,

thereby precluding an evaluation of externalizing problems. Findings from the present study

suggest that further attention needs to be paid to the assessment of behavioral problems among

adolescents who stutter, especially boys.

4.2. Relationship between stuttering severity and psychological functioning

Our third aim was to evaluate the relationship between self-reported stuttering severity and

psychological functioning. Higher self-reported stuttering severity was found to predict higher

anxiety and internalizing problems, but was not predictive of externalizing problems or total

emotional and behavioral problems. This suggests the potential for stuttering severity to

influence anxiety symptoms and internalizing problems among adolescents who stutter.

Although several previous studies have found no association between stuttering severity and

anxiety (Craig & Hancock, 1996; Gunn et al., 2014; Mulcahy et al., 2008), findings from the

present study are aligned with other studies that have found a relationship between stuttering

severity and psychosocial factors such as self-esteem, self-evaluation of social acceptance,

friendship competence (Adriaensens et al., 2015), and communication apprehension and

competence (Blood et al., 2011). Overall, the inconsistent nature of findings across studies

regarding the relationship between stuttering severity and psychological functioning may be

attributable to a range of factors, including evaluation of different aspects of psychological

functioning, using a broad range of psychological measures, and employing participants who

may vary according to age, sample size, and other demographic variables.

4.3. Speech and psychological predictors of the overall impact of stuttering

The final aim of our study was to determine whether speech and psychological variables

predicted the overall impact of stuttering. A more negative overall impact of stuttering was

predicted by higher anxiety, higher typical stuttering severity, and higher speech dissatisfaction.

This linear regression model accounted for 63% of the variance in overall stuttering impact, even

though gender and age group were not significant predictors. This corresponds with evidence

that anxiety predicts the overall impact of stuttering for adults who stutter (Manning & Beck,

2013).

4.4. Clinical implications and future directions

Findings from the present study provide valuable information about the psychological

status of adolescents seeking speech treatment for stuttering. Of particular note, the overall

impact of stuttering for adolescents who stutter appears to be influenced by a host of interrelated

speech and psychological variables. This suggests the need for careful clinical management of

adolescents who stutter to address both the speech and psychological needs of this age group. At

present, stuttering treatment options for adolescents are limited, and may not always be tailored

to their unique needs (Hearne et al., 2008; Huber, Packman, Quine, Onslow, & Simpson, 2004).

Therefore, understanding the unique experiences and profiles of stuttering adolescents may

inform clinical decision-making and contribute to better clinical management. This is of

particular importance when considering that adolescent boys in the present study reported externalizing problems in the clinical range, whilst adolescent girls reported total emotional and behavioral problems in the borderline-clinical range. This suggests that adolescent boys and girls who stutter may require additional psychological support based on individualized need. Further research is also required to understand the relationship between stuttering and externalizing problems, including family conflict, for adolescent boys who stutter.

Added to this, findings from the present study confirm that higher stuttering severity predicted higher anxiety. Despite the reticence of adolescents who stutter to seek treatment or to disclose personal information about stuttering, these findings underscore the importance of stuttering treatment as a means of reducing stuttering and thereby stemming the development of later psychological difficulties. Further research is also required to determine whether reticence to disclose personal information about stuttering is related to socially desirable responding when completing measures of anxiety symptoms. It is possible that some adolescents who stutter may respond in socially desirable ways when probed in the clinic about emotional experiences and anxiety associated with stuttering. Hence, careful and sensitive questioning may be required in order to obtain an accurate account of the adolescent's psychological wellbeing (Messenger et al., 2015). Furthermore, it may be helpful for speech-language pathologists to be aware that adolescents who stutter with scores in the normal range on measures of psychological functioning may still require further questioning and support. The complex interplay of speech and psychological factors pertaining to adolescents who stutter suggest that normal scores may not necessarily indicate the absence of psychological challenges.

4.5. Limitations

This study has several caveats. First, although findings are reported for a large sample of 102 adolescents who stutter, with comparisons to normative data, the absence of a non-stuttering control group limits our understanding of the psychological differences between adolescents who stutter and non-stuttering peers. Second, while the present findings provide valuable information about the psychological status of adolescents seeking speech treatment for stuttering, findings cannot be generalized to adolescents who stutter from the general community. Finally, it is unknown whether adolescents participating in this study were seeking treatment for stuttering based on personal choice or parental motivation. It is possible that differences in speech and psychological variables may exist for adolescents self-motivated to attend speech treatment versus those compelled by parents. This is particularly relevant given the reticence of some adolescents to seek speech treatment (Huber et al., 2004).

4.6. Conclusion

The present study provides a unique speech and psychological profile of adolescents seeking speech treatment for stuttering. To our knowledge, this is the largest cohort study of adolescents who stutter. Findings indicate that the overall impact of stuttering is influenced by a range of speech and psychological variables, with a more negative overall impact predicted by higher anxiety, stuttering severity, and speech dissatisfaction. Higher stuttering severity was also found to predict higher anxiety and internalizing problems. Adolescent boys reported externalizing problems in the clinical range, with higher externalizing problems predicted by higher anxiety and depression. Adolescent girls, on the other hand, reported total emotional and behavioral problems in the borderline-clinical range. This highlights the potential for differences to occur in the experience of stuttering based on gender. Overall, adolescents seeking treatment for stuttering require careful clinical management with regards to both stuttering and associated

psychological consequences, in order to prevent the later development of psychological

difficulties reported by adults who stutter.

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Tables

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Table 4: Scores on the Youth Self-Report (YSR, adolescent-report) and the Child Behavior Checklist (CBCL/6–18, parent-report) by age group for treatment-seeking adolescents who stutter

Table 1: Self-reported stuttering severity, speech satisfaction, and avoidance of speaking

situations by age group and gender for treatment-seeking adolescents who stutter

	Gender	Age	*N*	Mean (S.D.)	Range
Typical Severity[a]	Boys	11–14yrs	51	3.95 (1.12)	2.13–6.50
		15–17yrs	35	4.17 (1.28)	1.38–6.88
		Total	86	4.04 (1.19)	1.38–6.88
	Girls	11–14yrs	4	3.78 (1.44)	1.75–4.88
		15–17yrs	10	4.75 (1.99)	2.25–8.50
		Total	14	4.47 (1.85)	1.75–8.50
	Total	11–14yrs	55	3.94 (1.13)	1.75–6.50
		15–17yrs	45	4.30 (1.46)	1.38–8.50
		Total	100	4.10 (1.30)	1.38–8.50
Worst Severity[a]	Boys	11–14yrs	51	6.09 (1.56)	2.38–9.00
		15–17yrs	35	6.53 (1.15)	3.50–8.25
		Total	86	6.26 (1.42)	2.38–9.00
	Girls	11–14yrs	4	4.59 (1.03)	3.13–5.50
		15–17yrs	10	6.44 (1.32)	4.63–8.50
		Total	14	5.91 (1.48)	3.13–8.50
	Total	11–14yrs	55	5.98 (1.57)	2.38–9.00
		15–17yrs	45	6.51 (1.18)	3.50–8.50
		Total	100	6.21 (1.42)	2.38–9.00
Speech Satisfaction[b]	Boys	11–14yrs	51	5.67 (1.89)	2.00–9.00
		15–17yrs	35	6.23 (1.77)	3.00–9.00

		Total	86	5.90 (1.85)	2.00–9.00
	Girls	11–14yrs	6	5.33 (1.21)	3.00–6.00
		15–17yrs	10	6.60 (1.27)	4.00–8.00
		Total	16	5.13 (1.36)	3.00–8.00
	Total	11–14yrs	57	5.63 (1.83)	2.00–9.00
		15–17yrs	45	6.31 (1.66)	3.00–9.00
		Total	102	5.93 (1.78)	2.00–9.00
Avoidance[c]	Boys	11–14yrs	51	6.08 (3.41)	0.00–14.00
		15–17yrs	35	8.11 (3.41)	1.00–14.00
		Total	86	6.91 (3.54)	0.00–14.00
	Girls	11–14yrs	6	5.50 (2.88)	1.00–8.00
		15–17yrs	10	7.20 (4.83)	0.00–14.00
		Total	16	6.56 (4.18)	0.00–14.00
	Total	11–14yrs	57	6.02 (3.34)	0.00–14.00
		15–17yrs	45	7.91 (3.73)	0.00–14.00
		Total	102	6.85 (3.62)	0.00–14.00

[a]Possible scores range from 1–9, with higher scores indicating increased stuttering severity; Data missing for two participants.

[b]Possible scores range from 1–9, with higher scores indicating increased speech dissatisfaction.

[c]Possible scores range from 0–16, with higher scores indicating increased avoidance of speaking situations.

Table 2: Scores and ratings on the Assessment of the Child's Experience of Stuttering (ACES)

by age group for treatment-seeking adolescents who stutter

	Age Group	*n*	Mean (S.D.)[a]	Rating	Range
General	11–14 years	57	65.39 (8.74)	Moderate–Severe	42.11–86.25
Information	15–17 years	45	68.00 (8.63)	Moderate–Severe	53.00–85.88
	Total	102	66.54 (8.75)	Moderate–Severe	42.11–86.25
Your Reactions to	11–14 years	57	55.07 (13.60)	Moderate	27.33–84.67
Stuttering	15–17 years	45	64.51 (15.53)	Moderate–Severe	37.33–94.48
	Total	102	59.24 (15.16)	Moderate	27.33–94.48
Communication in	11–14 years	57	55.43 (13.60)	Moderate	27.20–88.00
Daily Situations	15–17 years	45	62.93 (11.43)	Moderate–Severe	34.40–94.17
	Total	102	58.74 (13.17)	Moderate	27.20–94.17
Quality of Life	11–14 years	57	47.77 (16.82)	Moderate	23.20–98.40
	15–17 years	45	54.53 (20.10)	Moderate	26.40–90.83
	Total	102	50.75 (17.03)	Moderate	23.20–98.40
Total Impact	11–14 years	57	54.76 (11.80)	Moderate	29.00–82.00
	15–17 years	45	61.76 (11.95)	Moderate–Severe	39.00–89.00
	Total	102	57.85 (12.31)	Moderate	29.00–89.00

[a]Possible impact scores range from 20–100.

Table 3: Scores on the Revised Children's Manifest Anxiety Scale (RCMAS) and the Children's Depression Inventory (CDI) by age group for treatment-seeking adolescents who stutter

		Age Group	*N*	Mean (S.D.)	Range	Percentile[a]
RCMAS[b]	*Total Anxiety*	11–14 yrs	31	8.29 (6.22)	0–24	40(M), 35(F)
		15–17 yrs	21	5.90 (4.46)	0–14	28(M), 17(F)
		Total	52	7.33 (5.65)	0–24	–
	Physiological Anxiety	11–14 yrs	31	2.71 (2.27)	0–8	28(M), 28(F)
		15–17 yrs	21	1.71 (1.62)	0–5	23(M), 17(F)
		Total	52	2.31 (2.07)	0–8	–
	Worry / Oversensitivity	11–14 yrs	31	3.77 (2.81)	0–11	38(M), 33(F)
		15–17 yrs	21	2.76 (2.36)	0–7	39(M), 19(F)
		Total	52	3.37 (2.66)	0–11	–
	Social Concerns	11–14 yrs	31	1.81 (1.97)	0–7	27(M), 27(F)
		15–17 yrs	21	1.43 (1.17)	0–3	43(M), 22(F)
		Total	52	1.65 (1.69)	0–7	–
	Social Desirability (Lie)[c]	11–14 yrs	31	4.55 (2.39)	0–9	82(M), 77(F)
		15–17 yrs	21	4.19 (2.38)	0–9	81(M), 80(F)
		Total	52	4.40 (2.37)	0–9	–
CDI[d]	*Total*	11–14 yrs	57	6.62 (5.69)	0–24	29(M), 42(F)
		15–17 yrs	45	6.34 (5.09)	0–22	26(M), 29(F)
		Total	102	6.50 (5.41)	0–24	–

[a]Percentile ranks for the RCMAS are based on mean age for younger (mean=12.9 years) and older adolescents (mean=14.2 years), and provided for male (M) and female (F) respectively; Percentile ranks for the CDI are provided for male (M) and female (F) respectively.

[b]Possible score ranges include Total Anxiety score (0–28), Physiological Anxiety (0–10), Worry/Oversensitivity (0–11), Social Concerns (0–7), Social Desirability (0–9); the Total Anxiety score is derived from summing scores on the Physiological Anxiety, Worry/Oversensitivity, and Social Concerns scales.

[c]Values of 6 or more indicate the need for follow-up.

[d]The CDI Total score ranges between 0–54, and is the sum of scores on the five subscales: (1) Negative mood, (2) Interpersonal Problems, (3) Ineffectiveness, (4) Anhedonia, (5) Negative self-esteem. A 19-point cut-off discriminates between non-depressed children and children at risk of depression.

Table 4: Scores on the Youth Self-Report (YSR, adolescent-report) and the Child Behavior Checklist (CBCL/6–18, parent-report) by age group for treatment-seeking adolescents who stutter

	Gender	Age	YSR (Adolescent)				CBCL (Parent)			
			N	Mean (S.D.)	Range	Classification[a]	*N*	Mean (S.D.)	Range	Classification[a]
Internalizing	Boys	11–14 yrs	51	10.37 (6.25)	0–26	Normal	51	9.80 (9.04)	0–33	Normal
		15–17 yrs	35	11.23 (7.18)	1–29	Normal	35	6.94 (6.55)	0–30	Normal
		Total	86	10.72 (6.62)	0–29	Normal	86	8.64 (8.20)	0–33	Normal
	Girls	11–14 yrs	6	13.00 (11.49)	2–33	Normal	6	4.00 (5.22)	0–14	Normal
		15–17 yrs	10	12.80 (6.71)	3–26	Normal	10	11.70 (11.58)	1–31	Normal
		Total	16	12.88 (8.43)	2–33	Normal	16	8.81 (10.21)	0–31	Normal
	Total	11–14 yrs	57	10.65 (6.88)	0–33	–	57	9.19 (8.87)	0–33	–
		15–17 yrs	45	11.58 (7.03)	1–29	–	45	8.00 (8.04)	0–31	–
		Total	102	11.06 (6.93)	0–33	–	102	8.67 (8.49)	0–33	–
Externalizing	Boys	11–14 yrs	51	19.75 (19.24)	5–96	**Borderline**	51	8.65 (8.79)	0–34	Normal
		15–17 yrs	35	22.89 (21.48)	4–81	**Clinical**	35	3.37 (4.24)	0–18	Normal
		Total	86	21.02 (20.11)	4–96	**Clinical**	86	6.50 (7.71)	0–34	Normal
	Girls	11–14 yrs	6	11.50 (6.98)	7–25	Normal	6	5.50 (9.25)	0–24	Normal

		15–17 yrs	10	12.50 (5.34)	7–22	Normal	10	7.40 (8.87)	0–29	Normal
		Total	16	12.13 (5.80)	7–25	Normal	16	6.69 (8.75)	0–28	Normal
	Total	11–14 yrs	57	18.88 (18.47)	5–96	–	57	8.32 (8.80)	0–34	–
		15–17 yrs	45	20.58 (19.53)	4–81	–	45	4.27 (5.73)	0–29	–
		Total	102	19.63 (18.87)	4–96	–	102	6.53 (7.84)	0–34	–
Total Problems	Boys	11–14 yrs	51	50.06 (26.83)	1–123	Normal	51	36.22 (28.85)	3–126	Normal
		15–17 yrs	35	38.03 (26.30)	0–89	Normal	35	19.54 (12.76)	2–50	Normal
		Total	86	45.16 (27.12)	0–123	Normal	86	29.43 (24.95)	2–126	Normal
	Girls	11–14 yrs	6	59.17 (35.20)	35–128	**Borderline**	6	19.67 (25.51)	3–71	Normal
		15–17 yrs	10	59.20 (13.97)	43–87	**Borderline**	10	32.40 (25.28)	4–74	Normal
		Total	16	59.19 (23.02)	35–128	**Borderline**	16	27.63 (25.31)	3–74	Normal
	Total	11–14 yrs	57	51.02 (27.60)	1–128	–	57	34.47 (28.76)	3–126	–
		15–17 yrs	45	42.73 (25.56)	0–89	–	45	22.40 (16.91)	2–74	–
		Total	102	47.36 (26.91)	0–128	–	102	29.15 (24.89)	2–126	–

[a]Classification of YSR and CBCL scores are based on separate norms for boys and girls by age.

Notes: Adolescents completed the YSR, and parents completed the CBCL/6–18; Internalizing score is the sum of the Anxious/Depressed, Withdrawn/Depressed, and Somatic Complaints Syndrome Scales; Externalizing score is the sum of the Rule-Breaking Behavior and Aggressive Behavior Syndrome Scales; Total Problems score ranges from 0–240; Bolding denotes YSR and CBCL scores within the borderline or clinical range.