



## Prevalence of anxiety disorders among adults seeking speech therapy for stuttering

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### ABSTRACT

The present study explored the prevalence of anxiety disorders among adults seeking speech therapy for stuttering. Employing a matched case–control design, participants included 92 adults seeking treatment for stuttering, and 920 age- and gender-matched controls from the *Australian National Survey of Mental Health and Well-being*. A conditional logistic regression model was used to estimate odds ratios for *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* and *International Classification of Diseases (ICD-10)* anxiety disorders. Compared with matched controls, the stuttering group had six- to seven-fold increased odds of meeting a 12-month diagnosis of any *DSM-IV* or *ICD-10* anxiety disorder. In terms of 12-month prevalence, they also had 16- to 34-fold increased odds of meeting criteria for *DSM-IV* or *ICD-10* social phobia, four-fold increased odds of meeting criteria for *DSM-IV* generalized anxiety disorder, and six-fold increased odds of meeting criteria for *ICD-10* panic disorder. Overall, stuttering appears to be associated with a dramatically heightened risk of a range of anxiety disorders.

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The capacity to use speech to communicate is fundamental to interpersonal relationships, occupational success, and quality of life. Stuttering is a universal speech disorder which affects the capacity to communicate effectively. The incidence of stuttering is estimated at approximately 4–5%, with a 1% prevalence rate (Bloodstein & Bernstein Ratner, 2008), and there is a male to female ratio of 4:1 for the disorder in adulthood. The cause of the condition is unknown, although there is clearly a genetic contribution to emergence of stuttering (Bloodstein & Bernstein Ratner, 2008). Onset typically occurs between the ages of two and five years (Yairi, Ambrose, & Cox, 1996), and whilst the majority of children who begin to stutter will recover naturally, stuttering will become an intractable, long-term problem for a small proportion of adults (Onslow, 2004). Behavioral speech therapy for chronic stuttering typically involves speech restructuring to reduce or eliminate stuttering by changing aspects of speech production. However, relapse after such treatment is common (Block, Onslow, Packman, & Dacakis, 2006).

Stuttering is frequently associated with negative consequences across the lifespan. In particular, children who stutter are often teased and bullied (Blood & Blood, 2007), and children as young as four years of age may experience negative peer reactions (Langevin, Packman, & Onslow, 2009). These problems multiply in adolescence, negatively impacting self-esteem, anxiety levels, social relationships and academic performance (Blood & Blood, 2004). Children, adolescents, and adults who stutter frequently experience negative stereotypes and listener reactions (Snyder, 2001), and many develop negative attitudes towards speaking and experience avoidance, struggle, or anxiety in speech situations (Peters & Starkweather, 1989). These experiences may lead to feelings of helplessness, shame, embarrassment, and expectancy of social harm, and may diminish occupational and educational success, and quality of life (Yaruss, 2001). Consequently, adults who stutter may be at increased risk of developing psychological, emotional, and behavioral problems (Craig, 2003).

Anxiety, in particular, has been highlighted as one of the most common psychological concomitants of stuttering (Menzies, Onslow, & Packman, 1999), and there is a growing body of evidence which suggests the presence of social anxiety or social phobia in people who stutter (Schneier, Wexler, & Liebowitz, 1997; Stein, Baird, & Walker, 1996). Social phobia is one of the most

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commonly experienced anxiety disorders (Moutier & Stein, 1999). It is characterized by significant, enduring, and excessive fear of humiliation, embarrassment, or negative evaluation in social or performance-based situations, often resulting in extreme distress (American Psychiatric Association, 2000). In most cases, social phobia develops in childhood or adolescence, and its developmental course is often associated with age-related increases in fear and avoidance of social interaction, peer group rejection and victimisation, traumatic or negative life events, and behavioral inhibition. Hence, the negative childhood experiences associated with stuttering may act as precursors to the development of social anxiety in adults who stutter (Blood & Blood, 2007).

Unlike the *International Classification of Diseases (ICD-10)* (World Health Organisation, 1993), the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* (American Psychiatric Association, 2000), currently excludes the diagnosis of social phobia in individuals whose anxiety relates only to the fear of stuttering (Moutier & Stein, 1999). Stein et al. (1996) evaluated social phobia in adults seeking treatment for stuttering, and modified the *DSM-IV* criteria to allow a diagnosis of social phobia in cases where phobic symptoms were in excess of the real demands associated with the stutter. According to these authors, 44% of their sample warranted a diagnosis of social phobia. These findings were subsequently supported by Schneier et al. (1997), who found that more than half their sample of adults who stuttered demonstrated social anxiety scores similar to those of social phobia patients from an anxiety disorder clinic.

If a large proportion of adults who stutter experience significant social anxiety, this would suggest the need for the routine involvement of psychiatrists and clinical psychologists in the assessment and treatment of this population. To date, there are no placebo controlled trials of serotonergic agents in adults who stutter. Although there have been a number of studies investigating the use of cognitive behavioral therapy (CBT) to treat anxiety in adults who stutter (Neilson, 1999; Stein et al., 1996), there has only been one randomized controlled trial of such treatment (Menzies et al., 2008). In this trial, Menzies et al. (2008) found that the addition of a CBT treatment package for social anxiety in adults who stutter was associated with significant improvements in global functioning and significant reductions in anxiety and avoidance, even though rates of fluency were no better than that achieved by speech pathology treatment alone. Of note, at 12-month follow-up no participant who had received CBT was given a diagnosis of social phobia in blinded psychiatric interviews. In comparison, 50% of the participants who had received speech therapy alone were diagnosed with social phobia at the same assessment point. Menzies et al. (2008) suggest that involvement of psychiatric services in the treatment of adults who stutter is urgently needed and that such services may significantly enhance long-term outcomes for these patients.

To our knowledge, no previous studies have comprehensively assessed presence of anxiety disorders in a large sample of adults who stutter according to the diagnostic criteria employed by the *DSM-IV* and the *ICD-10*. Hence, the present study sought to investigate the relationship between anxiety and stuttering in a large sample of adults who stutter, with the following aims: (1) determine the rate of social phobia, and other anxiety disorders, among adults seeking speech therapy for stuttering using the Composite International Diagnostic Interview (CIDI-Auto-2.1) (World Health Organization, 1997); (2) compare the rate of anxiety disorders in this sample with age- and gender-matched controls from the *Australian National Survey of Mental Health and Well-being (ANSMHWP)* of 10,641 Australian household residents (Andrews, Henderson, & Hall, 2001); (3) assess anxiety via a number of self-report measures including the State-Trait Anxiety Inventory – Trait (STAI-T) (Spielberger, 1983) and the Endler Multidimensional

Anxiety Scales – Trait (EMAS-T) (Endler, Edwards, & Vitelli, 1991); and (4) evaluate the extent of fear of negative evaluation among those who stutter. Given previous research findings, it was hypothesized that adults seeking speech therapy for stuttering would (1) exhibit a significantly higher rate of anxiety disorders than the Australian general community and (2) demonstrate heightened levels of self-reported anxiety and fear of negative evaluation when compared with normative data.

## 1. Method

### 1.1. Participants

#### 1.1.1. Adults seeking speech therapy for stuttering

Adults who stutter were drawn from treatment waiting lists across seven university-affiliated stuttering treatment clinics in four cities across Australia and New Zealand (Australian Stuttering Research Centre, The University of Sydney; School of Human Communication Sciences, La Trobe University, Melbourne; Discipline of Speech Pathology, The University of Sydney; Department of Linguistics, Macquarie University, Sydney; School of Humanities and Social Science, University of Newcastle, Australia; Royal Prince Alfred Hospital, Sydney; Stuttering Treatment and Research Trust, Auckland, New Zealand).

Eligibility criteria for inclusion in the study included: (1) age 18 years and above, (2) developmental stuttering present before 12 years of age, (3) seeking speech therapy for stuttering, (4) no previous speech therapy in the six months prior to commencement in the present study, and (5) presence of stuttering confirmed by participant and speech pathologist during assessment. Speech therapy at all sites included behavioral and speech restructuring techniques designed to control stuttering. The study was approved by the University of Sydney Human Research Ethics Committee and the Human Research Ethics Committees overseeing each site. Written informed consent was obtained from all participants.

#### 1.1.2. Age- and gender-matched controls

Controls were selected from the 1997 *ANSMHWP (Australian Bureau of Statistics, 2000)*. The *ANSMHWP* was conducted by the *Australian Bureau of Statistics (ABS)* to comprehensively assess the prevalence of mental health disorders in Australia. Overall, 10,641 Australian household residents, aged 18 years and above, participated in the survey. The sample was weighted to match the distribution of age and gender in the Australian census, and included residents living in private dwellings across Australia, excluding remote and special dwellings such as hospitals and institutions. Interviewers administered a computerized psychiatric interview (CIDI-Auto-2.1) to all respondents using a laptop computer.

### 1.2. Measures

Adults seeking treatment for stuttering completed the following measures during their initial assessment for treatment.

#### 1.2.1. Computerized version of the CIDI-Auto-2.1 (World Health Organization, 1997)

The CIDI-Auto-2.1 is a standardized computer interview designed to comprehensively assess and diagnose mental health disorders according to the diagnostic criteria employed by the *DSM-IV* and the *ICD-10*. The interview is self-administered by the respondent via a laptop computer. It takes approximately 70 min to complete, and does not necessitate the use of medical records or outside informants. The CIDI-Auto-2.1 has demonstrated adequate reliability and validity for research purposes (World Health Organization, 1997). As the interview is computer-scored and all diagnoses are programmed, the interview requires no clinical

judgment which eliminates interviewer bias (Andrews and Peters, 1998; Wittchen, 1994). The CIDI-Auto-2.1 has demonstrated adequate reliability and validity for research purposes (Andrews & Peters, 1998; World Health Organization, 1997), and evidence also suggests that the CIDI returns comparable prevalence rates for the anxiety disorders to those obtained through psychiatric interviews with clinicians (Lampe, Slade, Issakidis, & Andrews, 2003).

### 1.2.2. STAI-T (Spielberger, 1983)

The STAI-T is a 20-item self-report measure of trait anxiety. Items are rated on a scale ranging from 1 (“almost never”) to 4 (“almost always”), with total scores range from 20 to 80. Extensive data support the psychometric properties and utility of the STAI-T as a unidimensional measure of trait anxiety (Shamir-Essakow, Ungerer, & Rapee, 2005; Willoughby & Edens, 1996).

### 1.2.3. EMAS-T (Endler, Edwards et al., 1991)

The *Social Evaluation* (EMAS-T-SE) Scale and the *New/Strange Situations* (EMAS-T-AM) Scale of the EMAS-T were administered to participants. Both scales consist of 15 statements which are rated on a 5-point scale ranging from 1 (“not at all”) to 5 (“very much”), with total scores for each scale ranging from 15 to 75. The EMAS-T has demonstrated satisfactory reliability and validity as a multi-dimensional measure of anxiety (Endler, Edwards, Vitelli, & Parker, 1989; Endler, Parker, Bagby, & Cox, 1991).

### 1.2.4. The Fear of Negative Evaluation Scale (FNE) (Watson & Friend, 1969)

The FNE consists of 30 items which assess fear of negative evaluation. Seventeen “true” and 13 “false” responses are summed to create a total score out of 30. The FNE has been utilized extensively in research regarding social anxiety and social phobia (Stopa & Clark, 2001), and has demonstrated excellent psychometric properties (Durm & Glaze, 2001; Garcia-Lopez, Olivares, Hidalgo, Beidel, & Turner, 2001).

### 1.2.5. Anxiety Problems DSM-Oriented Scale of the ASEBA Adult Self-Report (ASR) (Achenbach & Rescorla, 2003)

The ASR assesses adaptive functioning in adults aged 18–59 years of age, and includes 123 items regarding behavioral, emotional, and social problems. Scores are used to generate 6 *DSM-IV-Oriented Scales* including the *Anxiety Problems Scale*. The ASR is widely used, and has strong research foundations and psychometric properties (Achenbach & Rescorla, 2003).

## 1.3. Data analysis

Rate of anxiety disorders in the stuttering group was compared with rate reported in the ANSMHWB (Andrews et al., 2001; Australian Bureau of Statistics, 2000). Approval was obtained from

the ABS to access data from the ANSMHWB in the form of a Confidentialized Unit Record File (CURF) (Australian Bureau of Statistics, 2000). Under the Census and Statistics Act 1905, these data are released as unit records which protect the confidentiality of individuals involved in the survey. Approved CURF users are able to tabulate and statistically analyze data for their own specific purposes. Analysis was performed using SAS version 8.2 for Windows (SAS Institute, Cary, NC) and Stata version 10.0 for Windows (StataCorp LP, College Station, TX). A conditional logistic regression model was used to estimate odds ratios, 95% confidence intervals and *P*-values for the primary outcome: 12-month prevalence of any *DSM-IV* or *ICD-10* anxiety disorder as well as specific anxiety disorders, with sufficient numbers to obtain valid estimates. There was 80% power to detect 2.5 increased odds of having any anxiety disorder with a 5% level of significance. One-month prevalence rates were also estimated for the specific anxiety disorders, with statistical comparisons made only for those disorders which demonstrated a significant difference between groups for 12-month prevalence. Data from all other self-report measures (*FNE*, *EMAS-T*, *STAI-T*, and *ASR*) were reported descriptively (means, standard deviations, and ranges) and presented alongside data from stuttering, control and social phobia/anxiety samples. Indirect comparisons based on 2-sample *t*-tests were used to compare the self-report measures of the present study with the previous samples.

## 2. Results

### 2.1. Demographic characteristics of adults who stutter

Participants consisted of 94 adults seeking speech therapy for stuttering, including 72 males (76.60%) and 22 females (23.40%), ranging in age from 18 to 73 years of age mean = 32.8, S.D. = 12.0. As illustrated in Table 1, participants were drawn from a wide and diverse population. In terms of stuttering history, 64.90% of participants reported a family history of stuttering ( $n = 61$ ), and 81.91% reported receiving previous treatment for stuttering ( $n = 77$ ). Of the 94 adults in the present sample, 92 completed the CIDI-Auto-2.1, and a minimum of 92 participants completed all other self-report measures.

### 2.2. Age- and gender-matched controls

Based on Hennessy, Bilker, Berlin, and Strom (1999), 10 age- and gender-matched controls were randomly selected and matched to each of the 92 adults in the stuttering group who completed the CIDI-Auto-2.1, resulting in a sample of 920 matched controls. A limitation of this control group is the expectation that a small proportion may have been stuttering adults. However, as this proportion is expected to be less than 1%, the impact on the comparison should be negligible.

**Table 1**  
Demographic data for 94 adults seeking speech therapy for stuttering.

Demographics % (n)					
Marital status	Married 26.6 (25)	In a relationship 21.3 (20)	Single 44.7 (42)	Separated/divorced 6.4 (6)	Not specified 1.1 (1)
Employment	Full-time 51.1 (48)	Part-time/casual 18.1 (17)	Studying 11.7 (11)	Not employed 10.6 (10)	Not specified 8.5 (8)
Household income <sup>a</sup>	\$0–19,999 9.6 (9)	\$20,000–39,999 11.7 (11)	\$40,000–79,999 31.9 (30)	\$80,000+ 22.3 (21)	Not specified 24.5 (23)
Education	Did not finish high school 6.4 (6)	Completed high school 28.7 (27)	Tertiary degree/diploma 50.0 (47)	Masters/PhD 11.7 (11)	Not specified 3.2 (3)

<sup>a</sup> Australian dollars per annum, 2006–2008.

### 2.3. Prevalence of anxiety disorders

Table 2 reports the 12- and 1-month prevalence rates of *DSM-IV* and *ICD-10* anxiety disorders for 92 adults seeking speech therapy for stuttering and 920 matched controls.

As can be seen in Table 2, 12-month prevalence of any *DSM-IV* or *ICD-10* anxiety disorder for adults seeking speech therapy for stuttering was significantly higher than the rate for matched controls, demonstrating six to seven-fold increased odds. Twelve-month prevalence of *DSM-IV* and *ICD-10* social phobia was also

significantly higher for the stuttering group when compared with matched controls, indicating 16- to 34-fold increased odds. One-month prevalence of any anxiety disorder and social phobia was also significantly higher in the stuttering group than controls.

In addition, 12-month prevalence of *DSM-IV* generalized anxiety disorder (GAD) was significantly higher for adults seeking speech therapy for stuttering than matched controls, demonstrating four-fold increased odds. Furthermore, 12-month prevalence of *ICD-10* panic disorder (PD) was higher for the stuttering group when compared with matched controls, demonstrating

**Table 2**

Prevalence of anxiety disorders for 92 adults seeking speech therapy for stuttering and 920 age- and gender-matched controls.

Anxiety disorder	Stuttering group (N = 92) % (n)	Controls (N = 920) % (n)	Odds ratio (95% CI)	P-value
<b>Any anxiety disorder</b>				
<i>DSM-IV</i>				
12-Month	27.2 (25)	5.3 (49)	7.31 (4.11–13.03)	<.001
1-Month	21.7 (20)	3.9 (36)	–	<.001
<i>ICD-10</i>				
12-Month	33.7 (31)	7.3 (67)	6.68 (3.99–11.17)	<.001
1-Month	22.8 (21)	4.5 (41)	–	<.001
<b>Social phobia</b>				
<i>DSM-IV</i>				
12-Month	21.7 (20)	1.2 (11)	34.17 (12.74–91.66)	<.001
1-Month	18.5 (17)	1.0 (9)	–	<.001
<i>ICD-10</i>				
12-Month	26.1 (24)	2.5 (23)	16.62 (8.22–33.57)	<.001
1-Month	19.6 (18)	1.5 (14)	–	<.001
<b>Generalized anxiety disorder</b>				
<i>DSM-IV</i>				
12-Month	8.7 (8)	2.1 (19)	4.49 (1.91–10.96)	.001
1-Month	4.4 (4)	1.9 (17)	–	.12
<i>ICD-10</i>				
12-Month	2.2 (2)	2.2 (20)	1.00 (0.23–4.31)	.99
1-Month	2.2 (2)	1.5 (14)	–	–
<b>Panic disorder with/without agoraphobia</b>				
<i>DSM-IV</i>				
12-Month	1.1 (1)	0.9 (8)	1.26 (0.15–10.34)	.83
1-Month	0 (0)	0.2 (2)	–	–
<i>ICD-10</i>				
12-Month	4.4 (4)	0.8 (7)	6.14 (1.72–21.95)	.005
1-Month	0 (0)	0.1 (1)	–	–
<b>Obsessive compulsive disorder</b>				
<i>DSM-IV</i>				
12-Month	3.3 (3)	0.9 (8)	3.75 (0.99–14.14)	.051
1-Month	3.3 (3)	0.7 (6)	–	–
<i>ICD-10</i>				
12-Month	0 (0)	0.3 (3)	*	*
1-Month	0 (0)	0.2 (3)	–	–
<b>Posttraumatic stress disorder</b>				
<i>DSM-IV</i>				
12-Month	1.1 (1)	10 (1.1)	1.00 (0.13–7.81)	.99
1-Month	0 (0)	5 (0.5)	–	–
<i>ICD-10</i>				
12-Month	1.1 (1)	1.9 (17)	0.58 (0.08–4.43)	.60
1-Month	0 (0)	1.2 (11)	–	–
<b>Agoraphobia with/without panic disorder</b>				
<i>DSM-IV</i>				
12-Month	0 (0)	0.2 (2)	*	*
1-Month	0 (0)	0.1 (1)	–	–
<i>ICD-10</i>				
12-Month	1.1 (1)	0.8 (7)	1.44 (0.17–12.17)	.74
1-Month	1.1 (1)	0.5 (5)	–	–

\*Insufficient data.

a significant difference and six-fold increased odds. However, the stuttering and control groups did not differ significantly in terms of 1-month prevalence of *DSM-IV* GAD and *ICD-10* PD. Moreover, the prevalence of 12-month *ICD-10* GAD and *DSM-IV* PD did not differ significantly between groups.

Twelve- and 1-month prevalence rates for all other *DSM-IV* and *ICD-10* anxiety disorders, including obsessive compulsive disorder (OCD), posttraumatic stress disorder (PTSD), and agoraphobia (AG), were not found to be significantly higher in the stuttering group when compared with prevalence rates for matched controls.

#### 2.4. Self-report measures of anxiety and fear of negative evaluation

Table 3 presents mean scores on the EMAS-T, FNE, STAI-T and ASR for adults who stutter, compared with mean scores from previous samples of adults who stutter, community control samples, and social phobia/anxiety samples, using indirect comparisons based on 2-sample *t*-tests. Comparison samples were Australian in all but 3 cases.

As illustrated in Table 3, the mean score for the stuttering group on the Anxiety Problems *DSM-IV*-Oriented Scale of the ASR was significantly higher than the mean score for a normative sample. Secondly, the mean STAI-T score for adults who stutter was significantly lower than the mean score for a social phobia sample, but significantly higher than a community control sample and a previous stuttering sample. Thirdly, the mean score for the stuttering group on the Social Evaluation Scale of the EMAS-T was significantly lower than mean scores for a social phobia sample and a previous stuttering sample, but not significantly different from a community control sample. Fourthly, the mean score for the stuttering group on the New/Strange Situations Scale of the EMAS-T was significantly lower than the mean score for a

clinically anxious sample, but significantly higher than a community control sample. Finally, the mean FNE score for the stuttering group was significantly lower than the mean score for a social phobia sample, equivalent to a previous stuttering sample, and significantly higher than a community control sample.

### 3. Discussion

To our knowledge, the present study is the first to comprehensively assess presence of *DSM-IV* and *ICD-10* anxiety disorders in a large sample of adults seeking speech therapy for stuttering. In support of the first hypothesis, the 12-month prevalence of any *DSM-IV* or *ICD-10* anxiety disorder for adults seeking speech therapy for stuttering was significantly higher than matched controls. More specifically, adults in the stuttering group had six- to seven-fold increased odds of meeting criteria for a 12-month diagnosis of any *ICD-10* or *DSM-IV* anxiety disorder, respectively, when compared with matched controls. This result is startling, and points towards the potential for adults seeking treatment for stuttering to experience debilitating anxiety.

In terms of specific *DSM-IV* and *ICD-10* anxiety disorders, adults in the stuttering group demonstrated significantly higher 12-month prevalence rates for social phobia, *DSM-IV* GAD, and *ICD-10* PD, when compared with matched controls. Of particular interest, adults seeking treatment for stuttering had 34- and 16-fold increased odds of meeting criteria for a 12-month diagnosis of *DSM-IV* and *ICD-10* social phobia, respectively. More specifically, the 12-month prevalence rate of *DSM-IV* and *ICD-10* social phobia in the stuttering group was 21.7 and 26.1%, respectively, which was significantly higher than the rate of 1.2–2.5% for matched controls, and is also substantially higher than 12-month prevalence rates reported in large national epidemiological surveys

**Table 3**  
Mean scores on the EMAS-T, FNE, STAI-T and ASR for 94 adults seeking speech therapy for stuttering, compared with previous stuttering, community control and social phobia/anxiety samples.

Measure	Sample	<i>n</i>	Mean	S.D.	<i>P</i> -value
EMAS-T Social Evaluation Scale (range 15–75)	Stuttering group <sup>a</sup>	94	47.8	9.3	
	Previous stuttering sample <sup>b</sup>	34	51.8	10.3	.039
	Community control sample <sup>b</sup>	34	44.6	10.3	.097
	Social phobia sample <sup>c</sup>	57	54.8	4.3	<.0001
EMAS-T New/Strange Situations Scale (range 15–75)	Stuttering group <sup>a</sup>	94	44.2	9.4	
	Previous stuttering sample <sup>b</sup>	34	47.1	10.0	.13
	Community control sample <sup>b</sup>	34	38.2	9.4	.0018
	Clinically anxious sample <sup>d</sup>	189	53.6	13.1	<.0001
FNE (range 0–30)	Stuttering group <sup>a</sup>	94	15.6	7.8	
	Previous stuttering sample <sup>b</sup>	34	15.6	7.1	.99
	Community control sample <sup>b</sup>	34	10.7	5.7	.0011
	Social phobia sample <sup>e</sup>	133	22.9	5.0	<.0001
STAI-T (range 20–80)	Stuttering group <sup>a</sup>	94	41.9	10.4	
	Previous stuttering group <sup>f</sup>	63	38.5	9.6	.040
	Community control sample <sup>g</sup>	102	35.8	7.0	<.0001
	Social phobia sample <sup>h</sup>	51	46.8	14.8	.022
ASR (range 0–14)	Stuttering group <sup>a</sup>	94	5.2	3.2	
	Previous stuttering sample	–	–	–	–
	Normative sample <sup>i</sup>	1767	3.7	2.5	<.0001
	Social phobia sample	–	–	–	–

<sup>a</sup> Based on *t*-test comparison with the present stuttering group (i.e., 94 adults seeking speech therapy for stuttering).

<sup>b</sup> Missing data for the present sample of 94 adults were minimal: 1 participant did not complete the FNE, STAI-T, or ASR; and 2 participants did not complete the EMAS-T.

<sup>c</sup> Messenger et al. (2004). For the EMAS-T, Messenger et al. (2004) utilized a 5-point rating scale ranging from 0 to 4 rather than the standard 1–5 rating scale. Therefore, the EMAS-T mean scores and ranges reported in the above table for Messenger et al. (2004) have been adjusted to reflect the use of the standard 1–5 rating scale.

<sup>d</sup> Kocovski, Endler, Rectora, and Flett (2005); non-Australian sample.

<sup>e</sup> Kocovski, Endler, Cox, and Swinson (2004); non-Australian sample.

<sup>f</sup> Rosser, Erskine, and Crino (2004).

<sup>g</sup> Craig et al. (2003)

<sup>h</sup> Craig (1990); Craig et al. (2003).

<sup>i</sup> Heimberg, Makris, Juster, Öst, and Rapee (1997).

<sup>j</sup> Achenbach and Rescorla (2003); non-Australian sample includes mean score for males only.

which generally range between 2 and 7% (Fehm, Pelissolo, Furmark, & Wittchen, 2005; Lampe et al., 2003; Ruscio et al., 2008; Wells et al., 2006). Furthermore, nearly one-fifth (18.5–19.6%) of the stuttering group met criteria for *DSM-IV* and *ICD-10* social phobia in the previous month compared with only 1.0–1.5% of matched controls, indicating the potential for many adults who stutter to have a current social phobia diagnosis.

Unlike the *ICD-10*, the *DSM-IV* does not allow the diagnosis of social phobia in cases where anxiety relates only to the fear of stuttering (Moutier & Stein, 1999). Despite this, the present study found high rates of social phobia among adults who stutter using either set of diagnostic criteria. Our findings support previous claims that a significant proportion of adults who stutter may experience clinically relevant levels of social anxiety that is out of keeping with the actual demands of their social encounters (Schneier et al., 1997; Stein et al., 1996). Stein et al. (1996) argue that, “Prohibiting a diagnosis of social phobia is likely to lead clinicians, under the misconception that social phobia is an inevitable, expected concomitant of stuttering, to ignore clinically relevant social anxiety when it occurs in their patients who stutter” (p. 279). The present authors strongly agree, and suggest that the *DSM-IV* exclusion criteria related to stuttering be dropped.

In terms of other anxiety disorders, adults who stutter in the present sample were also found to report a significantly higher rate of 12-month *DSM-IV* GAD. This suggests that anxiety for some adults who stutter may extend beyond speech-related anxiety to a more generalized experience of anxiety or worry. This is not surprising when considering the high rate of comorbidity between GAD and social phobia (Henning, Turk, Mennin, Fresco, & Heimberg, 2007). What is more surprising, however, is the significantly higher rate of 12-month *ICD-10* PD in adults who stutter when compared with matched controls. To our knowledge, such a result has not been reported before, and requires further exploration. Obviously, greater attention needs to be paid to the presence and impact of anxiety and its numerous disorders among adults who stutter.

In terms of other self-report measures, the hypothesis that adults who stutter would demonstrate heightened levels of self-reported anxiety and fear of negative evaluation when compared with normative data was also largely supported. On the whole, these results correspond with previous research (Messenger, Onslow, Packman, & Menzies, 2004), and indicate that adults who stutter may be characterized by heightened levels of anxiety and fear of negative evaluation when compared with controls. However, these levels may not be as high as typical social phobia groups in the clinic.

The high rate of anxiety found in this sample of adults who stutter may be the consequence of the bullying, social isolation and humiliation experienced across the lifespan by people who stutter. It is also plausible that the lack of occupational and educational attainment often reported by adults who stutter may stem not only from chronic communication difficulties, but also from debilitating levels of social phobia. Individuals with social phobia often demonstrate behavioral deficits in social situations, including poor conversation skills and eye contact, which may result in negative reactions from others and exacerbated anxiety in social interactions. Therefore, for individuals who stutter, the comorbid presence of an anxiety disorder may amplify poor social skills, increase functional impairment, and interfere with treatment effectiveness, accounting somewhat for the high rate of relapse and poor long-term outcome data for adults seeking treatment for stuttering (Block et al., 2006).

It is important to note that adults in the present study were seeking treatment for stuttering. It is reasonable to expect that adults seeking treatment may exhibit higher rates of anxiety disorders than would be found in community samples of

individuals who stutter. It is possible that the comorbid presence of an anxiety disorder and stuttering may increase the chances that an individual will seek treatment for their stuttering. Having said this, it should be remembered that Craig, Hancock, Tran, and Craig (2003) found higher trait anxiety scores in a community sample of adults who stuttered (i.e., a nontreatment seeking sample) than in a matched control sample. Further, regardless of possible differences between clinical and community samples, the discovery of such high rates of anxiety disorders among adults seeking treatment is alarming and significant, and remains an important finding with considerable implications for clinical practice. Social phobia in adults who stutter has largely gone untreated in the past, and this trend may continue unless adults who stutter with debilitating social anxiety are afforded an appropriate diagnosis. Menzies et al. (2008) have shown that treatment directed at social anxiety among adults who stutter can effectively eliminate social phobia diagnoses at long-term follow-up, and can dramatically improve overall functioning and engagement in everyday activities. It seems highly appropriate for the assessment and treatment of anxiety disorders among adults who stutter to be a significant priority. There is an urgent need for further research exploring the management of anxiety among adults who stutter to enhance their overall functioning (Ballenger et al., 1998; Menzies et al., 2008; Schneier et al., 1997), including further studies of CBT and pharmacological treatments for social phobia in stuttering. Undoubtedly, psychiatrists and clinical psychologists have a great deal to offer in this pursuit.

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