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Medication Use in Adults Who Stutter

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MEDICATION USE IN ADULTS WHO STUTTER

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and Agricultural
and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Arts

in

The Department of Communication Sciences and Disorders

by
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ABSTRACT

Previous studies have associated stuttering with increased levels of self-stigma. Prior research has shown that high levels of self-stigma may relate to increased medication usage. Therefore, in the present study, the authors sought to determine an association between levels of self-stigma and medication usage among adults who stutter. Results suggest that although there is not a significant difference for lifetime medication use between AWS versus AWNS, the self-imposed stigma by AWS could predict the likelihood of medication use. Findings provide insight into additional pharmacological factors to consider during clinical intervention, and highlight the importance of stigmatized beliefs when addressing the needs of a client who stutters.

CHAPTER I: INTRODUCTION

Stuttering is a multifactorial communication disorder that affects approximately 1% of the adult population and characterized by frequent sound prolongations, repetitions, and pauses during the production of speech (e.g., Conture, 2001; Guitar, 2013; Yairi & Seery, 2011). Along with these atypical speech disturbances, adults who stutter (AWS) often report negative cognitive and affective characteristics, such as overall lower quality of life (e.g., Craig, Blumgart, & Tran, 2009; de Sonnevile-Koedoot, Bouwmans, Franken, & Stolk, 2011), social anxiety (e.g., Iverach et al., 2009) and depression (e.g., Iverach et al., 2010). As described by Boyle (2015), one overarching characteristic – *self-stigma* – strongly correlates with these three negative psychosocial variables within AWS, and Boyle (2013) provided evidence that stuttering should be considered a highly stigmatized condition based on well-established models of stigmatization within the field of mental health (Corrigan, Rafacz, & Rüsck, 2011). Highly stigmatized conditions (e.g., anxiety disorders: Alonso et al., 2008; depression: Montesinos et al., 2012) have also been found to correlate with increased substance use (e.g., Lai, Cleary, Sitharthan, & Hunt, 2015). Given the stigmatized nature of persistent stuttering, it would be expected that increased substance use may also be present in AWS compared to adults who do not stutter (AWNS).

There have been many investigations of medication use within stigmatized clinical populations within the field of psychology; however, the relationship between medication use and stuttering has limited to one study by Iverach et al. (2010). Iverach et al. compared the likelihood of 92 AWS clients to meet the diagnostic criteria for substance abuse disorder, as defined by the DSM-IV (2000), compared to 920 age-matched controls from a national health database. Contrary to expectations, data from this study indicate a *reduced* likelihood of substance use disorders in AWS relative to AWNS. However, at least two critical limitations warrant caution when generalizing these data to characterize patterns of medication use in the larger AWS population. First, AWS included in the study were recruited from a waitlist for clinical services. As acknowledged by the authors, recruitment of AWS individuals who had actively sought treatment may have been more willing to enter performance-based situations involving potential scrutiny by others. If this is the case, the AWS sampled may represent (a) a cohort of AWS with lower levels self-stigma, and by extension, (b) a cohort with lower likelihood of self-medication. Second, the DSM-IV criteria used in the study – typically used to diagnose substance abuse disorder - may have been too stringent to assess *subclinical* patterns of medication use in AWS who do not exhibit physiological dependence or critical indicators of clinical impairment at the time the study was completed, such as withdrawal, tolerance, and drug-seeking behaviors.

Based on these limitations, the present study investigates patterns of medication use in AWS and AWNS within cohorts not restricted to clinical waitlists, and assessed irrespective of DSM-IV criteria. To further explore the relationship between self-stigma and medication use in AWS, perceived self-stigma of AWS respondents will be assessed using an established, psychometrically-valid questionnaire specific to the stuttering population. It is predicted that medication *use*, rather than medication *abuse*, will be greater in AWS relative to AWNS. It is further predicted that heightened stigmatization reported by AWS may result in increased medication use. Findings will provide much needed data regarding potential risk factors that may further diminish psychological and physical health in AWS.

Self-stigma and stuttering

Recent studies by Boyle (2013, 2015) have investigated the increased level of public stigma and self-stigma reported by AWS. According to Corrigan et al. (2011), the progression of self-stigma is composed of four stages: *awareness*, *agreement*, *application*, and *harm*: (1) the person is made *aware* that they are stigmatized by the public, (2) the person begins to *agree* with the stigmatizing attitudes of the public and stereotype others with the condition, (3) they *apply* the stigmatizing attitudes toward themselves personally, and (4) they experience psychological *harm* in the form of reduced well-being and societal participation. Heightened levels of self-stigmatization may also affect the decision to initiate treatment. Corrigan, Larson, and Rüsçh (2009) and Rüsçh et al. (2009) discussed the “Why Try” effect that often co-occurs within stigmatized individuals in clinical settings, which suggested that high levels of self-stigmatization results in the lack of empowerment to enhance service utilization, and reduced likelihood to initiate clinical services. Robinson, Sareen, Cox, and Bolton (2011) examined individuals with anxiety disorders such as social phobia, and found that self-stigmatized populations are also at greater risk for self-medication (e.g., use of alcohol or prescription drugs). Importantly, Robinson et al. also found that these populations were at increased risk for developing long-term substance dependence. Based on these data, populations with other stigmatized conditions such as stuttering may be particularly vulnerable to eventual substance abuse disorder if self-medication or elevated medication use are also present.

Boyle (2013, 2015) developed the *Self-Stigma Scale of Stuttering (4S)* that assessed a broad sample of AWS ($n = 354$) and their beliefs regarding stuttering, mental health, and overall quality of life. AWS completed a survey that included an assessment of self-stigma, anxiety, depression, and quality of life. Self-stigma was assessed using and adapted version of the Self-Stigma of Mental Health questionnaire developed by Corrigan, Watson and Barr (2006). Anxiety was assessed using the *Generalized Anxiety Disorder 7-item (GAD-7)* (Spitzer, Kroenke, Williams, & Löwe, 2006). Depression was measured using the *Patient Health Questionnaire (PHQ-9)* (Kroenke, Spitzer, & Williams, 2001). A quality of life measure followed, assessed using the *Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form* (Endicott, Nee, Harrison, & Blumenthal, 1993). Ratings of self-stigma shared a positive correlation with anxiety ($r = .42$) along with depression ($r = .44$), and a negative correlation with overall quality of life ($r = -.40$). Based on the heightened levels of self-stigma identified in many AWS, and the relationship between anxiety and self-medication reported by Robinson et al. (2011), increased substance use may also be prevalent within the adult stuttering population.

Medication use in adults who stutter

Surprisingly, there has been little experimental effort put into investigating substance use in AWS. Despite the fact that there has been no approved medication by the FDA for treatment of stuttering (Maguire, Yeh, & Ito, 2012), a large-scale survey study by the National Stuttering Association (2009) found approximately one-third of AWS ($n = 711$) and one-quarter of parents of children who stutter ($n = 164$) had tried alternative methods of treatment, including prescription medication, with varying levels of success. The reasons for potential medication use in fluency clients remain speculative and have received little empirical review. In a study by Yairi and Carrico (1992) investigating a sample of 100 pediatricians and their views of stuttering, 96% disagree that medications would be beneficial to children who stutter. However, this study also revealed that nearly four out of five pediatricians (79%) advocated a “wait-and-

see” approach, and over one-third (36%) reported that treatment, if sought, would be best provided by professionals other than speech-language pathologists. Consistent with these numbers, an estimated one-third of AWS within the 2009 NSA survey had reported seeking services from a psychologist and/or psychiatrist to address fluency concerns, thereby increasing the likelihood of medication prescription.

Even within the field of speech-language pathology, research indicate that many SLPs (a) express lack of competence when treating fluency clients (e.g., Cooper & Cooper, 1985; Kelly et al., 1997; Gabel, 2014), (b) believe that stuttering is psychological rather than biological in origin (Boyle, 2014), and (c) endorse the “stuttering stereotype,” or the belief that AWS exhibit certain negative personality traits more so than AWNS, such as being nervous, tense, afraid, shy, and self-conscious (e.g., Guntupalli, Nanjundeswaran, Dayalu, & Kalinowski, 2012; MacKinnon, Hall, & MacIntyre, 2007; Woods & Williams, 1976). The combination of SLPs’ limited knowledge of effective behavioral intervention, belief in psychological etiology of the disorder, and medication-conducive client profile may, at minimum, reduce the likelihood that SLPs would dissuade fluency clients from seeking or using medications. In sum, inconsistent treatment recommendations and limited qualification of professionals throughout life may provide the ideal scenario for increased substance use in AWS. Further, AWS report that they generally accept the negative stereotypes of the public and, when asked, tend to agree that individuals who stutter are more anxious, insecure, withdrawn, and fearful than AWNS (Lass et al., 1995; Logan & Willis, 2011). This increased level of self-stigmatization in AWS may further exacerbate the proclivity towards self-medication within the adult stuttering population.

Only one study by Iverach et al. (2010) has examined substance use disorders in AWS. Iverach and colleagues hypothesized that AWS with increased rates of anxiety detailed in Iverach et al. (2009) may also exhibit heightened rates of mood disorders and substance use disorders similar to individuals with anxiety disorders who do not stutter (for review see, Bolton, Cox, Clara, & Sareen, 2006). Similar to Iverach et al. (2009), AWS participants were recruited from a waitlist across university stuttering treatment clinics in Australia and New Zealand who were seeking treatment for stuttering. The CIDI-Auto-2.1 (WHO, 1997), a standardized computer interview used to assess and diagnose mental health disorders according to DSM-IV (2000) criteria, was administered to respondents who were then asked to provide information via self-report. Respondents provided symptomatic information and a relative time frame of symptomology (e.g., “Within the last two weeks, did you exhibit x symptom?” and “When did x symptom first appear?”). Logistic regression analyses revealed that, as predicted, AWS were characterized by higher likelihood of mood disorders than the matched controls according the DSM-IV description. However, contrary to predictions, AWS were found no more likely to meet the criteria for medication or alcohol abuse than AWNS based on DSM-IV criteria.

Limitations to Iverach et al. (2010)

Findings from Iverach et al. (2010) were surprising given the reported co-occurrence between fluency disorders and anxiety disorders in AWS. Despite the increased anxiety reported by Iverach et al. (2009) in AWS relative to AWNS and the increased likelihood of AWS to meet criteria for social anxiety disorder (four-fold increased odds) or social phobia (16- to 34-fold increased odds), Iverach et al. (2010) reported (non-significant) odds ratios for substance dependence ($OR = 0.50$) that indicate AWS were approximately two (i.e., $1/.050$) times *less* likely than AWNS to exhibit substance use disorder. This pattern of frequency in medication use

contrasts with data from non-stuttering adults with anxiety disorders (Kessler, Chin, Demler, & Walters, 2005), or anxiety disorders secondary to other medical diagnosis such as multiple sclerosis (Patten, Beck, Williams, Barbui, & Metz, 2003) and epilepsy (Swinkels, Kuyk, deGraaf, van Dyck, & Spinhoven, 2001). The unexpected lower likelihood of substance use disorder reported by Iverach and colleagues (2010), and its inconsistency with well-established data from other clinical populations, warrant further investigation based on two critical limitations.

First, as noted by Iverach et al. (2010), the potential influence of sampling bias in AWS respondents may have impacted the reported outcomes. AWS participants included in the study were selected from a waiting list for traditional clinical intervention and had initiated the treatment process at the time the survey was completed. It is possible that AWS who have not actively sought treatment may be more likely to exhibit higher levels of stigmatization, and by extension, an increased likelihood (or history) of self-medication. Non-stuttering adults who exhibit high levels of self-stigma have more negative attitudes toward seeking clinical services (e.g., Conner et al., 2010), and may be less willing to return for subsequent sessions after initial visit (e.g., Fung, Tsang, & Corrigan, 2008). Based on these associated patterns of substance use, stigma, and help-seeking in non-stuttering populations, AWS participants within Iverach et al. may not have provided the most representative sample of the broader stuttering population.

Second, diagnostic criteria for substance use disorder, as defined by the DSM-IV (2000) and implemented in Iverach et al. (2010), may have been too stringent to expose the overall frequency of medication use in AWS as compared to AWNS. The DSM-IV defines medication abuse as a *maladaptive pattern of use* and is manifested by three or more of the following within a 12-month period: (1) tolerance, as defined by the need for markedly increased amounts or diminished effects with continued use of the same amount, (2) physiological withdrawal symptoms, (3) substance taken longer than intended and in larger amounts, (4) persistent and/or unsuccessful attempts to reduce substance use, (5) excessive time dedicated to seeking or using substance, (6) participation in meaningful social, occupational, or recreational events are reduced or given up because of substance use, and/or (7) substance use is continued despite knowledge of addiction. Given the rigor of the criteria, it is possible that medication use may be more prevalent in AWS than AWNS, without breaching the DSM-IV criteria for substance use disorder.

Longitudinal studies of substance use by McCabe and colleagues (2004; 2005; 2007; 2011; 2014) utilize an alternative approach that can also be used to examine substance use frequency between AWS and AWNS. The *College Student Life Survey (CSLS)* (Johnston, O'Malley, Bachman, & Schulenberg, 2013, Substance Abuse Mental Health Services Administration [SAMSHA], 2009) examined trends in the lifetime and past-year prevalence of medical and nonmedical use of four prescription medication classes (i.e., sedative/anxiety, opioid, sleeping, and stimulant) of adults ages 17 to 56 (McCabe, West, Teter, & Boyd, 2014). Nonmedical use of prescription medications was assessed by the tool providing a brief definition of the terminology, and was followed by a question (e.g., "Sometimes people use prescription drugs that were meant for other people even when their own doctor has not prescribed it for them. On how many occasions (your lifetime or the past 12 months) have you used the drug type x not prescribed to you?"). Medical use of prescription medications was assessed in a similar manner (e.g., "Based on a doctor's prescription, on how many occasions (in your lifetime or the past 12 months) have you used drug type x?"). In McCabe et al.'s (2014) study, other than

general demographics (e.g., race, age, highest level of education), no other criteria included in the DSM-IV were asked. This broader assessment of medication use, as opposed to reliance on diagnostic criteria, may offset potential under-estimation of medication use in AWS relative to AWNS. Thus, the CSLS may be a better metric to measure medication *use*, as opposed to medication *abuse*, and may reveal more pertinent differences between groups.

Based on these potential limitations of data reported by Iverach et al. (2010), the purpose of the present study is to strengthen the fidelity of their data by (a) broadening the AWS sample frame beyond clinical cohorts, (b) examining substance use, rather than substance use disorder, in AWS and AWNS, and (c) simultaneously assessing the influence of self-stigma in AWS respondents. To expand the AWS sample frame, respondents were taken from the National Stuttering Association (NSA) membership database. To assess patterns of medication use irrespective of criteria for physiological dependence, AWS and AWNS respondents completed the *College Student Life Survey (CSLS)* (Johnston et al., 2013, SAMSHA, 2009) used in McCabe et al. (2014). To assess self-stigma, AWS participants completed the *Self-Stigma Scale of Stuttering (4S)* established by Boyle (2013). It was predicted that AWS would report increased substance use relative to AWNS, and that medication use in AWS would correlate with increased levels of self-stigma. Findings may provide a more precise picture of substance use differences in AWS relative to AWNS.

In sum, the present study investigated two specific research questions:

- 1) Does lifetime medication use in AWS differ from AWNS?
- 2) Does lifetime medication use in AWS correlate with perceived level of self-stigma?

CHAPTER II: METHODS

Participants

Table 1.0 illustrates the sample distribution for adults who do not stutter (AWNS) and adults who stutter (AWS). For the present study, potential AWS participants were recruited from the membership roster of the National Stuttering Association (NSA) upon approval from the NSA Research Committee, with a target sample size of 100. Similar to McCabe et al. (2014), AWNS were sampled from a college in the southern United States region, also with a target sample size of 100. Specifically, respondent distribution was taken from the following information: (1) gender, (2) race (3) age, and (4) highest level of education. The racial/ethnic responses in distribution for the overall sample included White, Asian, African-American, Hispanic, and Other/not included/none. Age of respondents were reported in terms of mean ages. The options for highest education completed included: (1) did not complete high school, (2) graduated from high school, (3) completed some college, (4) completed undergraduate college degree, (5) complete some graduate coursework, (6) completed graduate degree.

Table 1. Demographic characteristics for AWNS and AWS

	AWNS	AWS
Number of respondents	105	215
Gender		
Male	8.4%	39.1%
Female	24.4%	28.1%
Race		
White	25.9%	49.7%
Asian	2.2%	4.7%
African-American	2.2%	5.3%
Hispanic	1.3%	4.1%
Other/not included/none	1.3%	3.4%
Age	18-58	18-87
Education		
High school degree	8.3%	9.2%
Undergraduate college degree	19.4%	31.7%
Graduate degree	5.7%	25.7%

Measures

College Student Life Survey (CSLS; Johnson et al., 2013). The CSLS is a self-report medication survey that measures medication use such as stimulants and sleeping medications. There is a general consensus that self-report surveys have a high degree of validity, as long as the survey is a self-administered on the computer (McCabe et al., 2014), and the participant is aware that responses will remain anonymous. The CSLS included the following items: “How many occasions (in your lifetime or the past 12 months) have you used the following types of medications?” A separate question was presented for each of the four classes of prescription

medications: (a) sleeping medication (e.g., Ambien, Halcion, Restoril, temazepam, triazolam); (b) sedative/anxiety medication (e.g., Ativan, Xanax, Valium, Klonopin, diazepam, lorazepam); (c) stimulant medication (e.g., Ritalin, Dexedrine, Adderall, Concerta, methlyphenidate); and (d) pain medication (i.e., opioids such as Vicodin, OxyContin, Tylenol 3 with codeine, Percocet, Darvocet, morphine, hydrocodone, oxycodone). The response scale for each question ranged from (1) no occasions to (7) 40 or more occasions.

Self-Stigma Scale of Stuttering (4S; Boyle, 2013). The *Self-Stigma Scale of Stuttering (4S)* included the following items: “How severe overall (over your lifetime) do you find your stuttering to be?”, “How severe do you find your stuttering to be over the last week?”, “Most people in the general public believe that people who stutter are x”, “When talking to a person who stutters, most people in the general public feel x”, “Most people in the general public believe that people who stutter should x”, “I believe that people who stutter are generally x”, “Because I stutter, I feel x”, and “Because I stutter, I stop myself from x”.

Procedures

The *College Student Life Survey (CSLS)* (Johnston et al., 2013, SAMSHA, 2009) and the *Self-Stigma Scale of Stuttering (4S)* (Boyle, 2013) was administered to participants in the form of a combined survey entitled “Medication Use Questionnaire” via Qualtrics Survey Software. The study was conducted during a three-month period. The sample was sent a pre-notification letter including the description of the study, option to opt-out, and request of informed consent for participation in the study. If participants agreed to participate, each were self-administered the “Medication Use Questionnaire” survey. To ensure privacy and security, no identifying information was collected as part of the survey, and all IP addresses were compiled and stored on a password protected server. Only the director and approved research assistants had access to individual IP addresses. Respondents completed one online 24-question survey, taking about 15-20 minutes to complete. An identical pilot survey was used to identify unclear questions before beginning the study.

The survey request email included a description of the study, information regarding confidentiality of responses, the study’s IRB reference number, and informed consent. Respondents were free to terminate survey participation during or after completion. The survey included the following sections: (1) demographic information (e.g., gender, race, education), (2) lifetime medication use (*CSLS*; Johnston et al., 2013, SAMSHA, 2009) via a Likert scale, (3) past-year medication use (Johnston et al., 2013, SAMSHA, 2009) via Likert scale, (4) stuttering history (e.g., treatment history, stuttering severity over the past week), and if the respondent self-identified as an AWS, (5) the *Self-stigma of Stuttering (4S)*; Boyle, 2013). See Appendix A for the entire survey and informed consent form.

Sampling procedure. There were 320 adults (105 AWNS, 215 AWS) included in the study and recruited via two separate methods. To target AWS respondents, announcements of the survey were sent to the entire membership roster of the National Stuttering Association (NSA) via email. Membership roster for the NSA included an estimated 14,334 unique email addresses with permission of the National Stuttering Association Research Committee. Three email notifications were sent out between the months of January 2017 and February 2017. Of the 14,334 potential respondents, 14,122 (98.5%) did not respond, 17 (.12%) did not complete, zero

opted-out, and zero bounced back due to email settings, resulting in a total of 195 (1.36%) complete responses from the NSA participant pool. Of these 195 respondents, two respondents identified as AWNS, and the remaining 193 respondents identified as AWS.

The control group consisted of 105 AWNS in the study. In order to target AWNS respondents, announcements of the survey were sent to 2,000 students randomly selected by the Office of the University Registrar at Louisiana State University. All 2,000 potential respondents were notified of the survey via email. Three notifications were sent out between December 2016 and February 2017. Of the 2,000 potential respondents, 1,844 (92.2%) did not respond, 27 (1.35%) did not complete, zero opted-out, and four (0.20%) bounced back due to email settings, resulting in a total of 125 (6.25%) complete responses from the AWNS participant pool. Of these 125 respondents, 22 identified as AWS, and the remaining 103 respondents identified as AWNS. In sum, a total of 105 AWNS and 215 AWS completed the survey and were included in the present study.

Reliability

To assess the fidelity of the survey, one round of piloting was completed by five research assistants, as well as 10 first-year graduate students within the university's department of communication disorders. Any necessary clarifications or modification were made before wide distribution. Full return surveys were coded by the primary author and the faculty supervisor. Inter- and intra-rater reliability were assessed using Kappa coefficients and percent agreement between and within raters. Responses were coded with 100% accuracy and perfect correlation (Kappa = 1.00).

Analysis

All analyses were conducted using the IBM SPSS Statistics Software (version 23). A binary logistic regression model was conducted, with lifetime use of medication as the binary dependent variable, and talker groups serving as an independent variable (AWNS, AWS). Age, gender, education, and race/ethnicity were included as covariates based on the well-established relationship between these four factors and medication use (McCabe et al., 2014; Johnston & O'Malley, 1985). Based on the limitations of the Iverach et al. (2010) study, it was predicted that AWS not restricted to clinical waitlist will report higher likelihood of medication use relative to AWNS. Results of regression analyses were described in terms of odds ratio (OR) and 95% confidence intervals (CI).

A second binary logistic regression was conducted to examine the relationship between self-stigma related to stuttering within the AWS cohort ($n = 215$), with lifetime use of medication as the binary dependent variable and Total Stigma Score derived from responses on the *4S* and described by Boyle (2015) as the predictor variable. Based on previous studies that indicate a relationship between self-stigma and medication use, it was also predicted that higher frequency of medication use for AWS would be positively correlated with higher levels of self-stigma. Similar to measurement of overall use between groups, the four predetermined factors of age, gender, education, and race/ethnicity were controlled for during analysis.

CHAPTER III: RESULTS

Lifetime medication use in AWS versus AWNS

While controlling for the effects of age, gender, education, and race/ethnicity, self-identification as an adult who stutters was not as a significant predictor of medication use ($OR = 0.809$, $CI = 0.444-1.471$, $p = .487$). Similar to Iverach et al. (201), a non-significant trend was detected that suggests the odds or likelihood of medication use during their lifetime was 1.91 times lower for individuals who self-identified as AWS compared to AWNS.

Medication use and self-stigma in AWS

While controlling for the effects of age, gender, education, and race/ethnicity, increased self-stigma as measured by Total Stigma Score was as a significant predictor of medication use ($OR = 1.918$; $CI = 1.005-3.658$, $p = .048$). That is, as self-stigma scores for AWS increased on the Total Stigma Scale by one point (i.e., became more negative), the odds or likelihood medication use during their lifetime were 1.92 times greater. See Table 2.0 for detailed breakdown of medication use reported by AWS and AWNS.

Table 2. Lifetime medication use reported by AWNS and AWS

	AWNS ($n = 105$)	AWS ($n = 215$)	All Respondents
Lifetime use			
Sleeping medication	30.5%	28.4%	29.1%
Sedative/anxiety medication	35.2%	33.0%	33.8%
Stimulant medication	27.6%	20.5%	22.8%
Pain medication	54.3%	39.5%	44.4%
Other medication	13.3%	20.0%	17.8%
Any medication	61.0%	58.1%	59.1%

CHAPTER IV: DISCUSSION

The purpose of this study was to re-examine the frequency of medication use in AWS relative to AWNS reported by Iverach et al. (2010) based on two potential limitations. First, the measure used by Iverach et al. (2010) to compare groups relied on criteria for substance abuse as defined by the DSM-IV (2000), and were perhaps too stringent to detect non-clinical differences in medication use, rather than abuse, between groups. To address this issue, the present study assessed medication use without regard to clinical criteria. It was predicted that AWS may demonstrate increased medication use relative to AWNS without meeting criteria for formal diagnosis of substance abuse.

Second, the Iverach et al. (2010) sample was drawn from a clinical waitlist, which may have captured medication use patterns of AWS that were more willing to openly address stuttering, and perhaps less prone to self-medicate. Highly stigmatized populations such as stuttering have been found to correlate with increased medication use (e.g., Lai et al., 2015) and report more negative attitudes towards initiating treatment (e.g., Conner et al., 2010). To address this issue, the present study (a) sampled AWS from non-clinical cohort via a nationwide database, and (b) estimated the relationship between medication use and self-stigma within the AWS cohort. It was predicted that higher levels of self-stigma may be significantly correlated with medication use within the AWS cohort.

In sum, the present study adopted modified methodology to re-examine research question originally posed by Iverach et al. (2010). Based on the two noted limitations, this study investigated lifetime medication use in AWS relative to AWNS irrespective of DSM-IV criteria, and to what extent self-stigma may contribute to medication use in AWS. The following two specific research questions were posed:

- 1) Does lifetime medication use in AWS differ from AWNS?
- 2) Does lifetime medication use in AWS correlate with perceived level of self-stigma?

Results from the present study indicated that, similar to Iverach et al. (2010), the likelihood of lifetime medication use was not significantly higher for AWS compared to AWNS and, in fact, replicated the non-significant trend toward reduced medication use in AWS. However, of the AWS who completed the survey, the likelihood of medication use within their lifetime significantly increased as self-reported self-stigmatization increased. These findings suggest that cognitive and affective aspects of stuttering may mitigate medication use in AWS more so than the mere presence of a fluency disorder.

Medication Use in AWS Versus AWNS

Based on increased rates of anxiety in AWS reported by Iverach et al. (2009), and the two limitations noted within Iverach et al. (2010), it was predicted that AWS as a group would exhibit a greater likelihood of lifetime medication use than AWNS upon removal of DSM-IV criteria as an outcome measure. However, despite this modification, AWS were no more likely to report medication use within their lifetime than AWNS. These findings are inconsistent with our predictions but consistent with Iverach et al. (2010), and similarly, also indicate a non-significant negative likelihood of medication use in AWS. Combined, these findings provide an optimistic account of medication use trends by AWS and further suggest that medication use

within this population may be delimited by internal attitudes towards stuttering rather than the diagnostic label itself.

The proportion of AWS that reported medication use in the present study nearly doubled (58.1%, see Table 2.0) the proportion of AWS respondents identified by the NSA (2009) to have tried alternative methods of treatment -- such as medication -- to address fluency concerns. A few cautions are warranted when comparing between these studies. First, the number of AWS respondents in the NSA report ($n = 711$) were over three times larger than the present study ($n = 215$). Second, medication use was considered one of several alternative methods of treatment by NSA (2009; e.g., hypnosis, herbal remedy, motivational course), and therefore the specific number of respondents that used medication in the 2009 study cannot be determined. Third, only 46 of the 125 AWS who reported medication use in the present study also indicated that medication was taken specifically to address speech fluency. By this estimate, the number of respondents in the present study who consumed medication solely for the purposes of alleviating stuttering (21.4%) were more comparable to the 2009 NSA report. This consistency across surveys provides a valuable estimate regarding the prevalence of medication use in AWS taken specifically for symptoms related to stuttered speech (approximately 20% to 30%), even if overall use (58.1%) was similar to typically fluent adults in this study (61.0%), and within the broader population over the past 15 years (52.4% - 57.5%; McCabe et al., 2014).

The present findings are not without limitations and should be considered preliminary in nature. Response rate was low within each group (AWS = 1.6%, AWNS = 6.25%), and the number of AWNS respondents ($n = 105$) fewer than half of the total AWS respondents ($n = 215$). Response bias was a likely contributing factor to the disproportionate response rate between groups. Individuals who stutter, and perhaps individuals who use medication, may be more willing to complete the survey than a non-stuttering, non-medicated adults. Another potential factor which may have contributed to response bias is the reticence of respondents (AWS and AWNS) to willingly report medication use, in particular non-prescription use, during an online survey regardless of the safeguards provided to protect anonymity. In addition, sampling potential AWNS from a single university may have provided an atypical profile compared to AWS due to restricted age and geographic distribution. Future follow-up studies should sample AWNS respondents from a broader database with national distribution to more adequately compare between groups. Finally, and similar to Iverach et al. (2010), estimation of medication use in the present study did not directly address whether specific medications were taken for diagnoses that were unrelated to fluency disorders versus diagnoses that co-occur secondary to fluency disorders. As noted in the introduction, AWS may also exhibit heightened levels of anxiety, social phobia, or depression (Iverach et al., 2009; 2010), which may in turn increase the likelihood of pharmaceutical intervention. The second purpose of this study provides some insight into this final limitation by examining to what extent self-stigmatization – a measurement correlated with reported levels of anxiety, social phobia, and depression - may influence use of medication by AWS during their lifetime.

Medication Use and Self-stigma in AWS

Based on the potential for elevated negative self-perception in AWS, and the relationship between self-stigmatization and self-medication, it was predicted that medication use in AWS would be significantly associated with reported levels of self-stigma. Results from the *Self-*

Stigma Scale of Stuttering (4S) (Boyle, 2013) revealed that Total Stigma Score was indeed a significant predictor of medication use. Boyle (2015) reported that higher scores on the Total Stigma Scale are significantly associated with increased anxiety and depression, and decreased quality-of-life, hope, and empowerment. It is perhaps unsurprising, then, that as AWS scores on Total Stigma Scale increased by one (on a scale of five), AWS were nearly twice as likely ($OR = 1.92$) to report medication use. Again, it is important to acknowledge the comparable overall medication use between AWS and AWNS, which suggests that AWS *as a group* were not predisposed to increased substance use. Combined data indicate, instead, that increased medication use may occur as an *individual* AWS adopts increasingly negative beliefs about their experiences as a person who stutters.

Findings are also consistent with stigmatized populations within the field of mental health. For example, Robinson et al. (2011) found that populations with clinical anxiety disorders also reported greater levels of self-stigma, and are more likely to self-medicate. It should be noted that the average mean score on the Total Stigma Scale was statistically different but descriptively similar between AWS who did not report medication use ($M = 3.24, SE = .05$) and those who had ($M = 3.31, SE = .04$). Additional factors not included in this study undoubtedly contributed to the respondents' choice to take medication. That said, only one of the six AWS who scored between lower than 2.5 (lower levels of self-stigma) reported medication use during their lifetime, whereas 45 of the 65 AWS who scored above 3.5 (neutral or high self-stigma, $n = 65$) reported medication use during their lifetime. Thus, a shift from negative or even neutral self-perception to more overtly positive self-perception over the course of treatment for may correspond with lower likelihood to initiate medication for AWS. In a similar vein, AWS clients who enter treatment with scores that are more notably negative may be more likely to currently take medications. This pattern may also warrant further investigation with regard to potential risk factors of long-term medication use in AWS. Future research is necessary to confirm whether this is the case.

Admittedly, assessing medication use in a binary fashion (i.e., any use of any medication across a lifetime) is a broad metric. The decision to include all medications in to one category irrespective of type or dosage was intentional, as all types of medications included in this study (i.e., sedatives or “antianxiety” medications, and stimulants or “antidepressant” medications) have received some empirical attention with the exception of sleeping medications (see Saxon & Ludlow, 2007). As illustrated in Table 2.0, all medication types were used with similar frequency in AWS and AWNS. An interesting pattern was the increased proportion of AWNS (57 or 105, or 54.3%) compared to AWS (85 or 215, or 39.5%) who reported taking pain medication, described as “opioids, Vicodin, OxyContin, codeine, Percocet, Darvocet, morphine, hydrocodone, or oxycodone.” Of these 57 AWNS respondents who reported taking pain medication, 14 AWNS (24.6%) reported doing so without formal medication (higher than 8.8% nonmedical use of pain medication reported for college students by McCabe et al., 2014). In contrast, a greater percentage of AWS (43 of 85, or 50.5%) took pain medication with no formal prescription. Of these 43 AWS, almost half (19, or 44.18) took pain medication alone or in combination with other medications specifically to address symptoms related to stuttered speech. It should be cautioned that these response patterns are preliminary and a broader AWNS database should be compiled to accurately appraise the data at this level. Follow-up investigation is warranted to further examine the potential underlying reasons for this unique association between opioid-class medications and individuals who stutter.

Finally, the present study was designed for the specific purpose of evaluating medication use in AWS compared to AWNS, and the relationship between medication use and self-stigma. There is certainly additional information that can be gleaned from this data set, including the distribution of specific medication types, the potential impact of socio-economic factors on medication use, patterns of use with regard to dosage and prescription versus non-prescription medication, the relationship stuttering severity and medication use, and the potential relationship between subscales of the *4S* scale (awareness, agreement, and application). The data collected may provide preliminary insight into these topics in future studies, but the scope of the study was restricted to these topics to capture a broad picture of medication use in AWS relative to AWNS, and the potential relationship between broad psychosocial profiles specific to a lifetime of stuttering and the likelihood of medication use in AWS.

Conclusion

The purpose of the present study was to investigate differences in medication use between AWS and AWNS and to examine whether a relationship among their self-stigma and medication use is present in AWS. Results suggest that although there is not a significant difference for lifetime medication use between AWS versus AWNS, the self-imposed stigma by AWS could predict the likelihood of medication use. Findings provide insight into additional pharmacological factors to consider during clinical intervention, and highlight the importance of stigmatized beliefs when addressing the needs of a client who stutters.

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