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Self-Stigma and its Associations with Stress, Physical Health, and Health Care Satisfaction in Adults Who Stutter

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Contents lists available at ScienceDirect

Journal of Fluency Disorders

journal homepage: www.elsevier.com/locate/jfludis

Self-stigma and its associations with stress, physical health, and health care satisfaction in adults who stutter



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ARTICLE INFO

Keywords:

Stuttering
Self-stigma
Stress
Physical health
Health care satisfaction

ABSTRACT

Purpose: The aim of this study was to identify potential relationships between self-stigma (stigma awareness and stigma application) and stress, physical health, and health care satisfaction among a large sample of adults who stutter. It was hypothesized that both stigma awareness and stigma application would be inversely related to measures of physical health and health care satisfaction, and positively related to stress. Furthermore, it was anticipated that stress mediated the relationship between self-stigma and physical health.

Method: A sample of adults who stutter in the United States ($n = 397$) completed a web survey that assessed levels of stigma awareness and stigma application, stress, physical health, and health care satisfaction. Correlational analyses were conducted to determine the relationships between these variables.

Results: Higher levels of stigma awareness and stigma application were associated with increased stress, decreased overall physical health, and decreased health care satisfaction (i.e., discomfort obtaining health care due to stuttering, and adverse health care outcomes due to stuttering), and these relationships were statistically significant. Stress was identified as a mediator between stigma application and physical health.

Conclusion: Because adults who stutter with higher levels of self-stigma are at risk for decreased physical health through increased stress, and lower satisfaction with their health care experiences as a result of stuttering, it is important for professionals to assess and manage self-stigma in clients who stutter. Self-stigma has implications for not only psychological well-being, but stress, physical health, and health care satisfaction as well.

1. Introduction

The speech disruptions associated with stuttering can interrupt the normal flow of communication between the speaker and listener. Stuttering often elicits social penalties in the form of negative listener reactions and negative assumptions about the personality and competence of individuals who stutter (Li, Arnold, & Beste-Guldborg, 2016; St. Louis, 2015; Valente, St. Louis, Leahy, Hall, & Jesus, 2017). Many researchers claim that the anticipated negative public reactions in response to stuttering can contribute to elevated levels of anxiety in adults who stutter (Iverach & Rapee, 2014). In addition, public stigma can be internalized among people who stutter (PWS) to the detriment of their psychological well-being (Boyle, 2013; Boyle, 2015; Boyle and Blood, 2015). Although there is empirical support for the notion that self-stigma is related to lower psychological well-being in adults who stutter, there are likely many other implications of self-stigma that have yet to be discovered. Previous studies have not examined the associations

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<http://dx.doi.org/10.1016/j.jfludis.2017.10.002>

Received 1 May 2017; Received in revised form 7 September 2017; Accepted 19 October 2017

Available online 24 October 2017

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between self-stigma and physical health in adults who stutter. In this study, we analyzed the relationships between self-stigma and several variables associated with physical health including stress, overall somatic health, and health care satisfaction. The authors are using the term health care satisfaction in this paper to refer to the impact that stuttering has on general quality of communication between patient and medical providers, access to care, and satisfaction with services provided, rather than focusing on issues such as insurance coverage.

1.1. Self-stigma and its relevance to adults who stutter

Self-stigma has been conceptualized by [Corrigan, Rafacz, and Rüschi \(2011\)](#) as a process of internalizing negative public beliefs among individuals with stigmatized conditions. Those authors' work in mental illness stigma provided a model of self-stigma that includes several components. First, a person is *aware* of being stigmatized by the public, then they begin to *agree* with those negative attitudes, and *apply* them to the self. This process of internalized stigma then results in reduced psychological well-being (e.g., decrements in self-efficacy and self-esteem) and ultimately behavioral outcomes such as avoidance of pursuing educational or career goals. Importantly, even though this model separates public stigma from self-stigma, Corrigan and colleagues emphasize that they overlap because the self-stigma that is internalized results from negative public reactions and experiences. This model is helpful because it highlights the interconnectedness of environmental reactions and personal responses to a stigmatized condition.

Although research investigating psychosocial effects of stuttering has existed for quite a while (e.g., [Blood, 1995](#); [Craig, 1998](#)), not until recently has there been a validated way to measure the various components of self-stigma mentioned above that is relevant specifically for PWS. [Boyle \(2013\)](#) developed the Self-Stigma of Stuttering Scale (4S) as a way to measure the various aspects of self-stigma described above (stigma awareness, stereotypes agreement, and stigma application). Although other well documented scales in the area of stuttering, for example the Overall Assessment of the Speaker's Experience of Stuttering (OASES; [Yaruss & Quesal, 2006](#)) and the Unhelpful Thoughts and Beliefs about Stuttering Scale (UTBAS; [St. Clare et al., 2009](#)), include some items that reflect the concept of self-stigma, the construct is mixed in with many other constructs in order to create more general measures such as quality of life or negative thoughts. The 4S was the first scale to isolate and separately report on the specific constructs of stigma awareness, stereotype agreement, and stigma application and their relationships to well-being. In previous studies, the scale has demonstrated sound psychometric properties including internal consistency and test-retest reliability. In addition, initial evidence of construct validity has been shown in that the scale is positively related to other validated measures of anxiety and depression ([Boyle, 2015](#)), and negatively related to established measures of self-esteem, self-efficacy, life satisfaction ([Boyle, 2013](#)), hope, quality of life, empowerment, and social support ([Boyle, 2015](#)).

Although the trickle-down nature of the self-stigma model proposed by [Corrigan et al. \(2011\)](#) has not been entirely supported in the context of adults who stutter (i.e., stereotype agreement is not necessarily a prerequisite for stigma application), the model has been useful for analyzing different aspects of self-stigma and their differences within individuals. For example, it has been shown that even though stigma awareness of PWS is generally quite high, stigma application is much lower on average, indicating that awareness of stigma does not necessarily lead to its application to the self ([Boyle, 2013, 2015](#)). In addition, stereotype agreement appears to be a weaker predictor of many measures of well-being compared to stigma awareness ([Boyle, 2015](#)), which contrasts with predictions made by [Corrigan et al. \(2011\)](#). Despite the evidence that has already been collected regarding validity of the 4S, establishing construct validity is an ongoing process and there are several other variables that are hypothesized to be linked to self-stigma, including physical health.

1.2. Self-stigma and its impact on physical health

[Hatzenbuehler, Phelan, and Link \(2013\)](#) argued that stigma is a fundamental driver of population health. According to those authors, stigma is a source of stress and social disadvantage that can disrupt several life domains including access to resources, social relationships, and coping behaviors, which can ultimately contribute to unfavorable health outcomes. Specifically, [Hatzenbuehler et al. \(2013\)](#) proposed that adverse health outcomes in stigmatized populations can result from (1) reduced availability of material resources and conditions (e.g., reduced employment, wages, housing, quality of education and health care), (2) social isolation and avoidance of establishing close relationships due to fear of rejection or negative evaluation from others, (3) increased negative emotion regulation strategies (e.g., rumination, suppression) or maladaptive coping behaviors (e.g., smoking and drinking) resulting from continued efforts to cope with being stigmatized, and (4) excessive levels of stress experienced as a result of lower social position and external events (e.g., victimization or discrimination), or internal responses (e.g., anticipation of rejection). These continued coping efforts can lead to increased cortisol output which can negatively impact health (e.g., hypertension) if they are chronically used. Stigma therefore, according to [Hatzenbuehler et al. \(2013\)](#), needs to be conceptualized more globally as social determinant of population health and a cause of health inequalities in society.

[Link and Phelan \(2006\)](#) described that individuals who feel stigmatized about their conditions may delay or avoid seeking treatment to manage it, or be noncompliant with treatment plans. This is because individuals may wish to conceal stigmatized identities to avoid being labeled and discriminated against. Examples of conditions that are stigmatized include AIDS, mental illness, drug addiction, and physical deformities (both congenital and acquired) ([Keusch, Wilentz, & Kleinman, 2006](#)). If individuals with these conditions do not seek care either due to lack of resources or avoidance, health care outcomes will be adversely impacted. For example, anticipated or perceived stigma has been shown to be associated with increased symptoms in individuals living with HIV ([Earnshaw, Lang, Lippitt, Jin, & Chaudoir, 2015](#)), increased somatic symptoms in unemployed individuals ([O'Donnell, Corrigan, & Gallagher, 2015](#)), increased physical symptom severity in lesbian, gay, and bisexual individuals ([Denton,](#)

Rostosky, & Danner, 2014), and reduced self-reported physical health in individuals with mental health problems (Bahm & Forchuk, 2009). In addition, stigmatizing attitudes about mental health problems have been linked to negative attitudes about receiving psychological help, reductions in treatment adherence, and a lower likelihood of seeking psychological services (Vogel, Wade, & Haake, 2006). Importantly, the minority stress perspective (Meyer, 2003) proposes that social minority groups that are stigmatized face continual stresses in their efforts to cope with their lowered status in society, and that the experiences of stress are significant contributors to reduced physical health.

Although the research reviewed in the preceding paragraph involved populations other than PWS, it is quite possible that the stigma related to stuttering has implications for physical health as well. PWS experience public stigma and often feel that stigma acutely (Plexico, Manning, & Levitt, 2009; St. Louis, 2015). Previous research has shown that many PWS rarely discuss stuttering (Blood, Blood, Tellis, & Gabel, 2003) and many wish to keep it a secret and hide it from others (Butler, 2013). If hiding stuttering is not entirely possible, some individuals who stutter try to minimize stuttering to minimize listener distress or confusion (Plexico et al., 2009). These sustained coping efforts and attempts to manage a devalued identity could be stressful, and contribute to adverse physical and psychological outcomes. Previous research has shown that adults who stutter exhibit higher levels of distress compared to fluent controls (Tran, Blumgart, & Craig, 2011). Blood, Blood, Frederick, Wertz, and Simpson (1997) found elevated levels of stress reactivity in PWS who exhibited communication apprehension and emotion-based coping strategies (e.g., crying, avoiding, acting out, resigning). Furthermore, reduced ability to cope successfully with stuttering (i.e., experiencing greater levels of distress) has been linked to lower health status among adults who stutter (Craig, Blumgart, & Tran, 2011).

Finally, recent qualitative research by Perez, Doig-Acuña, and Starrels (2015) analyzed the health care experiences of adults who stutter. Sixteen adults who stutter were interviewed in three focus groups regarding their health status and the impact of stuttering on their health care experiences. From the interview transcripts, several key findings emerged including that PWS can feel discomfort speaking with office staff and doctors, and this discomfort can result in avoidance of health care interactions and the reliance on third parties to navigate the medical system. Importantly, in these interviews, stuttering was identified as the cause of the discomfort and avoidance. Despite these preliminary data, the qualitative nature of the study and small sample size prohibit making generalizations to the broader population of PWS.

1.3. Purpose of the current study

Taken as a whole, the previous research reviewed above suggests that PWS who are aware of and internalize stigmatizing attitudes from the public may be at risk for experiencing stress which can lead to reduced physical health, and reduced health care satisfaction. The purpose of this study was to build on previous research that has documented the burden of self-stigma by increasing our understanding of its implications on physical health, stress, and health care satisfaction in adults who stutter. It was hypothesized that higher levels of stigma awareness and application would be associated with higher levels of stress, and lower levels of physical health and health care satisfaction. In addition, because previous research has indicated that stress is a mechanism through which stigma leads to reduced physical health outcomes (Hatzenbuehler et al., 2013), it was predicted that stress served as a mediating variable between stigma application and physical health. A secondary purpose of the study was to examine the perceptions of adults who stutter regarding their health care satisfaction. Because this was an exploratory question seeking descriptive data, no a priori hypotheses were made for this question.

2. Methods

2.1. Participants

Participants needed to indicate that they were PWS and age 18 or above to participate in the study. There were 533 responses to the survey, however 136 responses were discarded because the participants did not meet the inclusion criteria above, or they failed to complete any portion of the survey. Therefore, the participants included in the analysis were 397 adults who stutter. They were recruited from speech-language pathologists and leaders of support groups for adults who stutter in the United States, as well as through various websites and social media. There were 218 males (55%), 102 females (26%), one participant reported being non-binary/third gender, and 76 participants (19%) chose not to answer. Participants ranged from 18 to 87 years in age ($M = 38$, $SD = 15.6$). The sample included 16 African Americans (4%), 21 Asian Americans (5%), 240 Caucasian, non-Hispanic Americans (61%), 24 Hispanic Americans (6%), 17 participants (4%) reported an “other” ethnicity, and 79 (20%) did not answer. Three-hundred and seven participants (77%) reported that they had been involved in previous treatment for their stuttering, 15 participants (4%) reported that they were never involved in treatment, and 75 participants (19%) did not respond to the question.

2.2. Procedure

This study utilized a web survey design to collect data. Web surveys are effective in collecting data from a wide range of individuals across several geographic locations. They are also helpful for collecting data on personal perceptions of potentially sensitive topics due to their anonymous nature. The survey was created and distributed using Qualtrics Survey Research Software (Qualtrics, Provo, Utah, Qualtrics, 2017). Potential participants were recruited from Board Certified Specialists in Fluency Disorders in North America, adult chapters of the National Stuttering Association (NSA), and speech-language pathologists listed in the therapy referrals page of the Stuttering Foundation website. The authors retrieved the e-mail addresses of all professionals and support group leaders

from public websites that provided contact information of these individuals by state. The individuals' names and e-mail addresses were then inserted into a contact list in Qualtrics. The survey was then e-mailed to everyone in this list along with a description of the study and a request to forward the link to clients, group members, or other acquaintances who stutter. Snowball sampling was used to maximize the number of respondents. Three separate e-mails were sent to each individual on the contact list: an initial invitation, a follow-up contact (sent one week after the initial contact), and a third and final reminder (sent one week after the second contact). Sending multiple requests is one of the most helpful strategies for maximizing response rate of a web survey (Dillman, Smyth, & Christian, 2009). In addition to e-mails, an anonymous survey link was posted on community sites of the American Speech-Language-Hearing Association (ASHA) including the sites for Special Interest Group 4 – Fluency and Fluency Disorders, speech-language pathologist (SLP) private practice, research, and SLP health care. Before recruitment of participants was initiated, the study was approved by the Institutional Review Board of the authors' university, and approval was given by the National Stuttering Association Research Committee (NSARC) to contact adult leaders of support groups directly with a request to consider forwarding the survey link to their local group members.

If individuals were interested in participating, they opened the survey link and read a brief introduction, followed by an informed consent form describing the purpose of the study, the security and anonymity of the data being recorded, and the voluntary nature of the study. If participants consented, they proceeded to provide responses to several questionnaires described in the next section.

2.3. Measures

2.3.1. Self-stigma

Portions of The Self-Stigma of Stuttering Scale (4S) (Boyle, 2013) were used to measure participants' levels of self-stigma. The portions of the scale used in this study assessed two different components of self-stigma including stigma awareness (e.g., "Most people in the general public believe that people who stutter are insecure"), and stigma application (e.g., "Because I stutter, I feel less assertive than people who don't stutter"). The scale has demonstrated satisfactory internal consistency, temporal stability, and construct validity in research projects to date (Boyle, 2013, 2015). In the current project however, the internal consistency of the stereotype agreement subscale ($\alpha = .26$) was considerably lower than previous studies documenting alpha values of at least .70 (Boyle, 2013, 2015). Because of this, the authors did not feel comfortable including the subscale average for stereotype agreement in the analysis for the current sample. In addition, the stereotype agreement subscale of the 4S measures perceptions of other PWS, rather than perceptions of the self and was therefore predicted to be less relevant for physical health outcomes or health care satisfaction compared to the other two subscales. Due to the omission of the stereotype agreement subscale score, the overall stigma scale was not able to be calculated. However, because the different subscales of the 4S assess separate constructs, subscale scores provide more precise data than an overall score. Responses in each of the two sections of the scale (stigma awareness, and stigma application) are averaged, and all positively worded items are reverse scored so that higher scores indicate higher levels of stigma. Possible scores range from 1 to 5 for each individual item and for each subsection.

2.3.2. Stress

Perceptions of stress were measured using the Perceived Stress Scale (PSS) (Cohen, Kamarck, Mermelstein, 1983). This scale intends to assess the typical level of stress participants feel in their daily lives within the past month with questions such as "In the past month, how often have you been upset because of something that happened unexpectedly?" and "In the past month, how often have you found that you could not cope with all the things you had to do?" The scale assesses participants' appraisal of how unpredictable, uncontrollable, and overloaded their lives are and the extent to which life situations are appraised as stressful. There are 10 items in the scale with response options ranging from 0 (*never*) to 4 (*very often*). Positively worded items (4, 5, 7, & 8) are reverse scored, and all items are summed or averaged to provide an overall score. Higher scores represent greater perceived stress, with a score of 13 being considered average. The scale has good internal consistency ($\alpha = .85$; Cohen et al., 1983). Because of an error in the survey, question 5 of the PSS was omitted, and so participants' averages were calculated from 9 questions, rather than 10. Because the scale is unidimensional with high levels of internal consistency, the authors decided that obtaining an average from 9 out of the 10 questions could yield an accurate average for the overall scale.

2.3.3. Physical Health

Physical health was measured using The Physical Health Questionnaire – PHQ (Schat, Kelloway, & Desmarais, 2005). This scale measures four components of somatic health including *sleep disturbances* (e.g. "How often have you had difficulty getting to sleep at night?"), *headaches* (e.g., "How often have you experienced headaches?"), *gastro-intestinal problems* (e.g., How often have you suffered from an upset stomach (indigestion)?), and *respiratory infections* (e.g. 'How many times have you had minor colds, that made you feel uncomfortable but didn't keep you sick in bed or make you miss work?'). The scale consists of 14 items with response options from 1 (*not at all*) to 7 (*all of the time*). All items except for Item 4 are reverse coded so that higher scores implicate better somatic health. The overall scale and its subcomponents have been reported to have good internal consistency (Schat et al., 2005). An overall physical health score is calculated by averaging all items in the scale.

2.3.4. Health care satisfaction

This scale was created by the first author for this study because no other validated scales related specifically to health care experiences of PWS had been developed at the time this project was planned. The items were generated after analyzing the qualitative research of Perez et al. (2015). Those authors conducted focus group interviews with 16 adults who stutter regarding their

Table 1
Factor loadings of items intending to measure healthcare satisfaction.

Items	Factor 1: Adverse health care outcomes due to stuttering ^a	Factor 2: Discomfort in obtaining health care due to stuttering ^b
1. I am uncomfortable calling my doctor's office to make an appointment because of my stuttering.	.291	.782
2. I am uncomfortable speaking with office staff when arriving for an appointment because of my stuttering.	.218	.888
3. I am uncomfortable speaking with my physician during an appointment because of my stuttering.	.253	.829
4. I am uncomfortable speaking with a new physician during an appointment because of my stuttering.	.319	.844
5. I avoid seeking health care because of my stuttering.	.775	.361
6. I rely on someone else to navigate the medical system for me (for example, make appointments, talk to doctors, etc.).	.473	.517
7. My stuttering has interfered with my ability to obtain health care.	.848	.294
8. The quality of my health care has been less than it could be because of my stuttering.	.877	.252
9. I have avoided getting medications (for example, getting refills) because of my stuttering.	.880	.170
10. There have been things that I would have liked to bring up with my physician, but I did not bring them up because of my stuttering.	.678	.408

Note. Bold values indicate primary factor loadings. Items 6 and 10 demonstrated significant cross loadings and therefore they were not included in averages for either factor.

^a Eigenvalue = 6.02.

^b Eigenvalue = 1.37.

experiences with health care interactions. Questions were generated that addressed the key themes reported by Perez et al. (2015) regarding health care experiences of PWS. For example, because it was found that some adults who stutter avoid health care interactions because of stuttering, an example question that was generated included “I am uncomfortable calling my doctor's office to make an appointment because of my stuttering.” The impact of stuttering on health care quality and outcomes was also assessed with questions like “The quality of my health care has been less than it could be because of my stuttering.” Therefore, the items generated for ‘health care satisfaction’ attempted to measure the specific impact of stuttering on quality of communication between patient and medical providers, access to care, and satisfaction with services provided. A list of all items in the scale can be seen in Table 1. Response options ranged from 1 (strongly disagree) to 7 (strongly agree) with 4 representing ‘neither agree nor disagree.’ Scores for each item were averaged and higher scores represented more difficulty with health care (i.e., more discomfort and more negative outcomes due to stuttering).

2.4. Data analysis

Because the scale measuring health care satisfaction was created by the first author, these items underwent exploratory factor analysis to determine the scale's factor structure and dimensionality. Internal consistency of each scale or subscale was determined with Cronbach's coefficient alpha. Because the scales used in this study required averaging across multiple items to determine an overall score, the data were considered to be continuous. Descriptive statistics including means and standard deviations were calculated for each variable of interest. It was also of interest to obtain descriptive information regarding participants' health care satisfaction, and so percentages of participants that chose certain responses on each item were calculated. The primary analysis of this project involved calculation of Pearson product moment correlation coefficients to assess potential relationships between self-stigma and stress, physical health, and health care satisfaction. In addition, mediation analysis was conducted by obtaining a partial correlation coefficient between stigma application and physical health while controlling for stress. In order for a participant's score to be averaged for a given unidimensional scale, at least 70% of the responses for that scale needed to be observed. This percentage is considered to lead to a reasonable estimate of the mean for all responses on a unidimensional scale if missing data are present (Schwarzer, 2005). Data from participants who did not respond to at least 70% of items in a unidimensional scale were excluded from analysis. The data were checked for errors that could result in outlying data (e.g., errors in data entry or recoding of variables). No such errors were found. The data were exported from Qualtrics to SPSS Statistics Version 22, eliminating the need for manual data entry and therefore minimizing the chances of errors. Therefore, all participant responses were included in the analyses.

3. Results

3.1. Preliminary analyses

Exploratory factor analysis with principal components extraction and varimax rotation was conducted on items intending to measure health care satisfaction to identify a clear pattern of factor loadings and determine dimensionality of the scale. Significant

Table 2
Internal consistency of items in various scales.

Variable	Cronbach's α
Stigma Awareness	.78
Stigma Application	.91
Stress	.86
Sleep disturbance	.75
Headaches	.88
Gastrointestinal problems	.85
Respiratory infections	.77
Overall Physical Health	.84
Adverse health care outcomes due to stuttering	.92
Discomfort obtaining health care due to stuttering	.90

factor loadings were considered to be at least 0.40 (Streiner & Norman, 2003). Scree plot analysis and a criterion of eigenvalues being greater than 1 helped determine the number of factors to extract. Table 1 shows a list of items on the scale, factor loadings, and eigenvalues for each factor. Using the methods above, a two factor solution was obtained which accounted for 74% of the overall variance. Four items (5, 7, 8, and 9) loaded onto the first factor, which was labeled “adverse health care outcomes due to stuttering” and four items (1, 2, 3, and 4) loaded onto the second factor labeled “discomfort in obtaining health care due to stuttering.” Items 6 and 10 demonstrated significant cross loadings (loadings were above 0.40 for both factors), so they were omitted from further analysis involving averages of the two main components of the scale.

Item analysis was conducted on each unidimensional scale or subscale measuring variables of interest in the study. Cronbach's coefficient alpha was calculated to determine the internal consistency, or degree of interrelatedness, of the items within the various scales. Alpha values ranged from .75 (acceptable) to .92 (excellent) as described by Nunnally (1978), indicating that items within the scales were sufficiently interrelated for calculating averages for that construct. Table 2 shows the alpha values for each scale or subscale.

Descriptive statistics including means, standard deviations, and ranges observed for all variables of interest are reported in Table 3, along with possible score ranges for the individual scales and interpretation of scores. Note that regarding self-stigma, the mean score for awareness was higher than application. This means that, on average, participants agreed that they were perceived negatively by society, however they disagreed or were neutral about applying the stigmatizing beliefs to themselves personally. This means that PWS can be aware of being stigmatized without internalizing public stigmatizing beliefs to the same degree. Although there are no absolute cutoff scores for categorizing individuals with high or low stress using the PSS, the overall sample average for stress was within one standard deviation above the mean reported in normative data for the PSS (Cohen et al., 1983). Physical health in each item in every subscale was also within one standard deviation from the mean reported in normative data (Schat et al., 2005). The results obtained for this sample indicated that on average most PWS disagreed that they experienced discomfort obtaining health care or that they experienced adverse health care outcomes due to their stuttering.

Because the scale measuring health care satisfaction was created for this study, further exploratory descriptive analysis for these items was conducted. Table 4 displays the percentages of participants who agreed with, disagreed with, or were neutral about items related to discomfort obtaining health care due to stuttering, and adverse health care outcomes due to stuttering. For statistical purposes, responses were categorized as agreeing, disagreeing, or being neutral. Most PWS in this sample disagreed that they were uncomfortable obtaining health care because of stuttering, and an even larger percentage disagreed that they experienced adverse health care outcomes because of their stuttering. Still, it is notable that over one-third of the sample reported being uncomfortable calling their doctor's office, and up to 10% of participants did report that the quality of their health care outcomes has been reduced because of their stuttering.

Table 3
Descriptive statistics (means, standard deviations, ranges) and interpretations for each variable of interest.

	M	SD	Range observed	Range possible	Interpretation
Stigma awareness	3.54	0.49	1.79–5.0	1.0–5.0	Higher scores represent more awareness
Stigma application	2.58	0.99	1.0–5.0	1.0–5.0	Higher scores represent more application
Stress	1.72	0.63	0.11–3.56	0–4.0	Higher scores represent more stress
Sleep disturbance	4.64	1.20	1.0–7.0	1.0–7.0	Higher scores represent better sleep
Headaches	5.44	1.33	1.0–7.0	1.0–7.0	Higher scores represent fewer headaches
Gastrointestinal problems	5.50	1.22	2.0–7.0	1.0–7.0	Higher scores represent better gastrointestinal health
Respiratory infections	5.81	0.97	1.0–7.0	1.0–7.0	Higher scores represent better respiratory health
Overall physical health	5.31	0.81	2.64–7.0	1.0–7.0	Higher scores represent better overall physical health
Discomfort obtaining health care due to stuttering	2.74	1.60	1.0–7.0	1.0–7.0	Higher scores represent more discomfort in obtaining health care
Adverse health care outcomes due to stuttering	1.75	1.20	1.0–6.25	1.0–7.0	Higher scores represent increased adverse health care outcomes

Table 4
Percentages (%) of responses regarding health care satisfaction items.

Items	Agree	Disagree	Neutral
Discomfort obtaining health care due to stuttering			
I am uncomfortable calling my doctor's office to make an appointment because of my stuttering.	35	61	4
I am uncomfortable speaking with office staff when arriving for an appointment because of my stuttering.	28	65	6
I am uncomfortable speaking with my physician during an appointment because of my stuttering.	14	80	7
I am uncomfortable speaking with a new physician during an appointment because of my stuttering.	24	70	6
Adverse health care outcomes due to stuttering			
I avoid seeking health care because of my stuttering.	9	87	4
My stuttering has interfered with my ability to obtain health care.	8	88	4
The quality of my health care has been less than it could be because of my stuttering.	10	85	6
I have avoided getting medications (for example, getting refills) because of my stuttering.	5	91	4

Note. Percentages are rounded. Agreement includes participants who responded either 'somewhat agree,' 'agree,' or 'strongly agree'. Disagreement includes participants who responded either 'somewhat disagree,' 'disagree,' or 'strongly disagree.'

3.2. Primary analysis

Zero-order Pearson product moment correlation coefficients between stigma awareness, stigma application, and variables related to physical health were obtained and can be seen in Table 5. The hypotheses of the study were supported in that both stigma awareness and stigma application were negatively related to physical health and positively related to stress, discomfort obtaining health care due to stuttering, and adverse health care outcomes due to stuttering. Increased levels of stigma awareness were significantly associated with increased stress, sleep disturbances, headaches, gastrointestinal problems, discomfort obtaining health care due to stuttering, and adverse health care outcomes due to stuttering. Increased stigma awareness was also significantly correlated with lower overall physical health. The effect sizes of these associations were all considered small (Cohen, 1992). Increased levels of stigma application were significantly related to increased levels of stress (medium effect size), discomfort obtaining health care due to stuttering (large effect size), and adverse health care outcomes due to stuttering (medium effect size). Increased stigma application was also significantly related to increased sleep disturbances, headaches, gastrointestinal problems, and lower overall physical health, and the effect sizes for these correlations were considered small.

For most variables, stigma application demonstrated a stronger association to the health related variables of interest compared to stigma awareness. The strongest correlations were observed between stigma application and discomfort obtaining health care due to stuttering, and adverse health care outcomes due to stuttering. In addition, the moderate correlation between stigma application and stress is noteworthy. Using the widely cited effect size guidelines of Cohen (1992), even though many of the significant correlations noted in Table 5 are small they are not considered trivial (i.e., $r > .10$ for all significant correlations).

It was also of interest to determine whether or not stress mediated the relationship between stigma application and overall physical health. First, it was determined that significant relationships existed between stigma application and overall physical health, $r = -.19, p < .001$, stigma application and stress, $r = .41, p < .001$, and stress and overall physical health, $r = -.40, p < .001$. Then, the partial correlation coefficient between stigma application and overall physical health was calculated holding stress constant. Because the partial correlation between stigma application and physical health was not significantly different from zero when stress was held constant, $r_p = -.027, p = .619$, this indicates that stress is a mediator between these variables. Stress therefore accounts for a significant amount of variance in the relationship between stigma application and overall physical health.

4. Discussion

The purpose of this study was to determine if relationships existed between self-stigma and physical health, stress, and health care satisfaction in adults who stutter. It was hypothesized that both stigma awareness and stigma application would be positively related to stress and negatively related to physical health and health care satisfaction, and that stress would mediate the relationship between

Table 5
Zero-order Pearson correlation coefficients (r) for stigma and health related variables.

	Stigma awareness	Stigma application
Stress	.11*	.41***
Sleep disturbances	-.15**	-.16**
Headaches	-.11*	-.11*
Gastrointestinal problems	-.16**	-.16**
Respiratory infections	.04	-.08
Overall physical health	-.16**	-.19***
Discomfort obtaining health care due to stuttering	.24***	.51***
Adverse health care outcomes due to stuttering	.25***	.45***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

stigma application and overall physical health. The results showed that the hypotheses were all supported. These findings suggest that the more awareness and internalization of societal stigma PWS demonstrate, the higher their risk for experiencing stress and physical health problems including headaches, sleep disturbances, and gastrointestinal problems. Importantly, the data support the notion that stress explains the observed relationship between stigma application and overall physical health. In addition, as awareness and application of stigma increase, discomfort in obtaining health care and adverse health care outcomes due to stuttering increase as well.

Data from this investigation support previous research in the area of stuttering that has demonstrated self-stigma to be relevant for the well-being of PWS (Boyle 2013, 2015). This study adds unique information to the previous research because it demonstrates the connections between self-stigma and physical health, rather than solely measuring psychological well-being. The results of the study also support the notion that stigma is related to increased stress which can have implications for physical health (Hatzenbuehler et al., 2013; Link & Phelan, 2006). Although previous research has identified that PWS may experience more distress than fluent controls (Tran et al., 2011) and that greater levels of distress are linked to poorer health outcomes (Craig et al., 2011), the finding from this study that stress mediates the link between stigma application and overall physical health is new in the area of stuttering. Stress appears to explain the relationship between stigma application and overall physical health. Based on these data, it could be proposed that stigma application in adults who stutter indirectly impacts physical health through the mediating cause of stress. That is, internalizing negative stigmatizing thoughts about the self could lead to increased stress. Individuals with higher stress are more likely to appraise external events as uncontrollable and unpredictable and this might lead to release of stress hormones such as cortisol that weaken immune functioning and compromise physical health (Sapolsky, 2004). If a PWS feels that stuttering is unpredictable and that little can be done to control it, then any situation which calls for efficient oral communication could trigger a stress response that, if chronically activated, could lower physical health in the long term. Because stuttering is a chronic disorder by adulthood, some adults who stutter may indeed be chronically over-activating the stress response in daily situations requiring speech. For example, everyday activities such as making phone calls, ordering food at restaurants, or introducing oneself to others could trigger this stress response in PWS.

The finding that stress can explain the association between how much PWS apply societal stigma to themselves personally and their physical health has implications for intervention. For example, helping clients to reappraise life events and situations in a more empowering way could be beneficial. Specifically, focusing on increasing self-efficacy is an important component of stuttering therapy for many clients. Self-efficacy is protective against experiencing high levels of stress. Individuals who feel helpless to exert control and modify their environment or behavior in the face of stressors experience lower levels of well-being (Bandura, 1997). Boyle (2016) found that increased perceptions of personal control over stuttering were significantly related to lower levels of self-stigma and higher levels of hope, self-esteem, and self-efficacy in a sample of 348 adults who stutter. Previous research has demonstrated that providing PWS with a sense of control over their ability to produce speech, or their ability to manage their psychology and emotions, can result in positive outcomes and reduce psychological stress (Beilby, Byrnes, & Yaruss, 2012; Blood, 1995; de Veer, Brouwers, Evers, & Tomic, 2009; Menzies, O'Brian, Lowe, Packman, & Onslow, 2016; Menzies et al., 2008). Therefore, clients exhibiting high levels of self-stigma may benefit from these types of treatment that seek to instill a sense of power and control regarding the ability to manage the stress and feelings of helplessness that often accompany stuttering.

The findings of Perez et al. (2015), which indicated that adults who stutter are uncomfortable speaking with health care staff and physicians due to stuttering and that this discomfort lead to avoidance of health care interactions, did not generalize on average to a larger population of PWS. The results of the current study showed that most adults who stutter are not uncomfortable seeking health care due to stuttering, and most do not report adverse health care outcomes due to stuttering. Still, it is important to note that although this was true for the sample as whole, individuals with higher levels of stigma awareness and application were significantly more likely to report discomfort obtaining health care and adverse health care outcomes due to stuttering. These findings are new in the stuttering literature and suggest that self-stigma could be an important factor for adults who stutter seeking the health care that they need and maximizing the effectiveness of that care. For individuals who stutter who are having difficulty with internalized stigma, helping clients to be open about their stuttering and educate others may help reduce the barriers they experience in the health care setting. For example, disclosing and briefly explaining stuttering to unfamiliar office staff or physicians at the beginning of an interaction may help to reduce the time pressure in these interactions. In addition, it could be helpful for clients to educate these professionals about what they believe the most helpful responses are that would make them feel more comfortable in the interaction (e.g., being give more time to talk, reducing interruptions, etc.).

4.1. Limitations and areas of future research

There were some methodological limitations in this study. First, this study used a correlational design and therefore statements of cause and effect between variables cannot be made. We cannot rule out the effects of other unmeasured confounding variables that would have implications for physical health (e.g., pre-existing diagnoses of anxiety or depression, diabetes, heart disease, or cancer; number of doctor's office visits in a certain time period), nor can we make definitive conclusions about the directionality of relationships between self-stigma, stress, physical health, and health care satisfaction. Despite these uncertainties, there has been a convincing body of evidence presented that the body's stress response (e.g., the release of cortisol) is a critical mediator between psychological events (e.g., cognitive distortions, rumination, anxious thoughts) and physical effects such as hypertension and heart disease with more damage to the body occurring if a person chronically activates the stress response for psychological reasons (Sapolsky, 2004). Therefore, even though statements of causal determination cannot be made based on the present study, external research supports the idea that stress is a critical link between negative thoughts and physical symptoms. Future research should also

take into account contributions of other factors such as chronic health conditions experienced by participants (e.g., cancer, heart disease, diabetes, anxiety, depression), frequency of doctor's office visits for treating certain conditions, and age, in further explaining the physical health and health care satisfaction of PWS. Also, it should be noted that the current study sought to measure the health care satisfaction (i.e., discomfort obtaining health care, and adverse health care outcomes) specifically due to stuttering. This was achieved by adding the phrase "because of my stuttering" to each item in the health care satisfaction scale. However, it would also be valuable for future research to investigate health care satisfaction of PWS using items that did not refer specifically to stuttering, and then use various measures of stuttering (e.g., physical severity, negative attitudes, etc.) to predict global health care satisfaction.

Future studies should also include questions about how participants access health care. The current study did not take into account the fact that electronic methods such as e-mail or patient portal options could be used by PWS to access health care (e.g., asking questions, scheduling appointments, refilling prescriptions, etc.). These types of factors could potentially impact patients' health care satisfaction regardless of stuttering. Furthermore, many issues related to health care satisfaction (e.g., access to care) are impacted by whether or not the individuals have insurance coverage and the quality of that coverage. Therefore, future studies should take these issues into account for explaining general health care satisfaction. Another limitation is that this study relied solely on self-report, rather than physiological measures of stress and physical health. Future studies should attempt to combine psychological and physical measurements of these variables. Finally, the participants in this study may not be representative of the overall population of PWS due to the recruitment methods. It is possible that because participants were recruited through professionals and self-help groups, they viewed stuttering differently from others who have not sought help from others. Despite this possibility, past research has shown that members of the National Stuttering Association demonstrate a variety of beliefs and experiences related to stuttering, rather than being homogenous (Yaruss, Quesal, & Murphy, 2002).

In addition to future research addressing the methodological limitations above, this study raises some other questions that could be addressed in future investigations. Future studies should investigate the role of enacted stigma for the physical and psychological well-being of PWS. Systematic research has not yet been conducted that would quantify the number of stressors PWS experience in their daily lives (related to public stigma of stuttering) and link those stressors to well-being. These types of studies are needed in order to separate the internal process of stigmatization from the actual events of public stigma themselves (e.g., instances of discrimination, bullying, or teasing). Moreover, future studies should attempt to measure a variety of other variables that are relevant for both self-stigma and enacted stigma. For example, quality of life and communicative participation are particularly relevant for SLPs to consider as part of their clinical practice and so determining predictors of those variables among adults who stutter will be important moving forward.

4.2. Conclusion

Despite the limitations of the study, several new findings were presented that could inform clinical decision making and future research objectives. This was the first study to report on relationships between self-stigma, physical health, stress, and health care satisfaction in a large sample of adults who stutter from various geographic regions in the United States. This study also contributed new information regarding the construct validity of the 4S. Specifically, the correlations between the stigma awareness and stigma application subsections of the 4S and the previously validated scales measuring stress and physical health continue to support the construct validity of those portions of the scale, supporting their use in clinical and research activities. However, additional research will need to be conducted regarding the reliability of the stereotype agreement section of the 4S and whether or not it should be categorized as a unidimensional subscale. This study also highlights the role of stress and its importance in explaining the connection between self-stigmatizing thoughts and physical health. These findings lend support to the idea that treatment programs that include stress management and increase self-efficacy can be beneficial for the well-being of PWS. Finally, this study raises certain questions that will be important to address in future research. If stigma is fundamentally about social injustice, it is critical that social contributors to the health and well-being of PWS continue to be investigated. Specifically, the role of enacted stigma and its relevance to the well-being of PWS should be analyzed, and our field should continue to establish effective anti-stigma programs that can improve public attitudes of stuttering, as has been done in recent studies (e.g., Boyle, Dioguardi, & Pate, 2016). Focusing on the intersection between public reactions and psychological responses to those events will help in further establishing the impact of stuttering on a person's life, and the treatment options that would be most beneficial.

Financial disclosure

None.

Acknowledgements

We would like to thank all participants in this study. We also thank the many speech-language pathologists in the United States, and support group leaders of the National Stuttering Association, who agreed to disseminate the survey used in this study and were invaluable for participant recruitment.

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