Is what I think I think really what I think? Implicit and explicit attitudes toward stuttering among practicing speech-language pathologists

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ABSTRACT

Purpose: Two studies assessed implicit (Study 1) and explicit (Study 2) attitudes toward stuttering and those who stutter among speech-language pathologists (SLPs).
Method: In Study 1, 15 SLPs completed the Stuttering Implicit Association Test, a measure of implicit attitudes toward stuttered speech. In Study 2, 40 SLPs provided explicit attitudes about individuals who stutter, assessed via self-report ratings of an adult who stutters and one who does not. Participants also completed measures of experience with stuttering.
Results: As a group, clinicians displayed negative implicit attitudes toward stuttering. Explicit attitudes toward a person who stutters were positive, albeit less positive than attitudes toward a person who does not stutter. Amount of prior exposure to stuttering among these experienced SLPs was not significantly associated with either implicit or explicit attitudes.
Conclusions: These findings highlight the importance of evaluating both implicit and explicit attitudes toward stuttering. The finding of positive explicit attitudes but negative implicit attitudes among similar samples of SLPs underscores the need to study implicit attitudes toward stuttering. Considering only explicit attitudes could lead to incomplete conclusions about the complex nature of attitudes toward stuttering.

1. Introduction

In Plato's *The Republic* he writes, "See human beings as though they were in an underground cave-like dwelling with its entrance, a long one, open to the light across the whole width of the cave. They are in it from childhood with their legs and necks in bonds so that they are fixed, seeing only in front of them, unable because of the bond to turn their heads all the way around." Every day the people in the caves watch shadows that were projected on a blank wall from people moving outside the cave. Because that's all they see, the shadows shape their entire reality. Plato's allegory likens human perception to the shadows, a *representation* of experience but not direct reality. Such are the effects of our attitudes, perceptions of reality filtered through the lens of our biases and previous experiences, evaluations of people, objects, or events that are stored in memory and influence the way individuals interact with the world around them (e.g., Eagly & Chaiken, 1993). Attitudes become stigmatizing when a group of individuals is associated with negative characteristics or stereotypes, leading others to discriminate against and distance themselves from individuals belonging to the group (Goffman, 1963). Negative stereotypes tend to persist because stigmatizing attitudes are difficult to change once formed (Olson & Zanna, 1993). This paper examines attitudes toward stuttering and those who stutter from the perspective of two different

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types of attitudes, implicit and explicit.

1.1. Attitudes toward people who stutter

Stuttering is a common developmental disability, with an estimated prevalence of 1 % (68 million people) worldwide. It is more prevalent in young children, with 5–8% of preschoolers stuttering for at least 6 months (Yairi & Ambrose, 2013). A number of negative outcomes are associated with stuttering, beginning in childhood. These include social and emotional difficulties, such as peer rejection and lack of positive peer relationships (Davis, Howell, & Cooke, 2002; Evans, Healey, Kawai, & Rowland, 2008; McAllister, 2016), increased risk of being bullied (Blood & Blood, 2004; Erickson & Block, 2013), diminished success in activities requiring communication with others and increased apprehension about speaking (Blood & Blood, 2004; Blood, Blood, Tellis, & Gabel, 2001; Erickson & Block, 2013; Langevin, Packman, & Onslow, 2009), and elevated stress and mental health concerns (Craig, Blumgart, & Tran, 2009; Iverach et al., 2009; Tran, Blumgart, & Craig, 2011). These difficulties may hinder the success of children and adolescents who stutter, which may partially account for the poorer educational (e.g., O'Brian, Jones, Packman, Menzies, & Onslow, 2011) and vocational (e.g., Klein & Hood, 2004; Yairi, 1993) achievement of adults who stutter. It is likely that the perceptions and actions of others contribute to the difficulties faced by people who stutter (e.g., Boyle, 2018).

Stuttering influences listeners' perceptions of speakers' non-speech personality and intellectual characteristics, resulting in negative perceptions of those who stutter. Negative stuttering stereotypes have been reported for the general population (e.g., Amick, Chang, Wade, & McAuley, 2017; Walden & Lesner, 2018), teachers (e.g., Arnold, Li, & Goltl, 2015; Li & Arnold, 2015), professors (e.g., Dorsey & Guenther, 2000), special educators (e.g., Ruscello, Lass, Schmitt, & Pannbacker, 1994), students of communication disorders (e.g., St. Louis & Lass, 1981), and speech-language pathologists (SLPs; e.g., Lass, Ruscello, Pannbacker, Schmitt, & Everly-Myers, 1989; Woods, 1978). These stuttering stereotypes include negative beliefs about personality traits, intelligence, and physical appearance, among other characteristics.

Although attitudes toward stuttering have been studied using various instruments, one commonly-used tool is the Public Opinion Survey of Human Attributes-Stuttering (POSHA-S), (e.g., St. Louis, 2011; St. Louis & Roberts, 2010). The POSHA-S has documented self-reported negative beliefs about and intended reactions toward stuttering and those who stutter across international groups of participants, generally finding that stuttering is viewed unfavorably by adults (e.g., St. Louis & Lass, 1981) and even preschool children (Weidner, St. Louis, Burgess, & LeMasters, 2015). Li and Arnold (2015) used the large POSHA-S database to demonstrate differences between teachers and nonteachers on some POSHA-S components such as accommodating/helping, and sympathy/social distancing.

A common method of studying attitudes toward stuttering is to have participants complete rating scales of various personal attributes, indicating the extent to which they believe a speaker exhibits each trait. For instance, Amick et al. (2017) asked naïve participants to listen to and provide ratings of 16 naturally-read speech samples, half produced by adults who stutter (severity classifications ranged from very mild to severe, and average percentage of disfluencies in the recordings was 2.4 %) and half with no stuttering. Participants rated three attributes of each speaker. Adults who stutter were perceived to have lower cognitive ability, to be less likeable and more anxious than nonstuttering speakers (all effects were large).

1.2. Speech language pathologists' attitudes toward people who stutter

Practicing SLPs are in a position to play a supportive therapeutic role in the lives of individuals who stutter, but their attitudes toward stuttering may impact their success in doing so. Cooper and Cooper (1996) argued that attitudes and beliefs about stuttering and those who stutter may influence what clinicians do in therapy and the outcome of the therapeutic intervention. They surveyed self-reported attitudes of 1872 SLPs across the United States on the Clinician Attitudes Toward Stuttering Inventory (CATS; Cooper, 1975), which consists of endorsements of 50 attitudinal statements about stuttering. Results indicated that 63 % of clinicians agreed that people who stutter have a feeling of inferiority, 58 % believed that there are personality traits that are characteristic of those who stutter, and 36 % indicated that most people who stutter have psychological problems. Furthermore, most clinicians believed that the public reacts more negatively toward stuttering than other speech disorders and that stuttering is the most psychologically adverse of the speech disorders. Cooper and Cooper (1996) compared clinician attitudes in 1996 to those of another sample of clinicians in 1975 using the CATS and found that clinician's attitudes had become more positive over the 20-year period, especially in terms of the accuracy of beliefs about etiology. However, over that period there was no significant change in attitudes concerning personality traits of people who stutter. This is striking given that it is highly questionable whether those who stutter can be characterized as psychologically atypical or as having certain personality traits as a group (for discussion see Iverach et al., 2010; Manning & Beck, 2013).

Lass et al. (1989) asked SLPs to list as many adjectives as they could think of to describe four hypothetical individuals who stutter (8-year-old and adult males and females). The majority of traits reported (70 %) were negative, such as *nervous*, *frustrated*, and *shy*, and 93 % pertained to personality, whereas the remaining 7 % pertained to physical appearance or intelligence. Gender and age had little impact on what traits were attributed to the person who stutters; 87.5 % of reported characteristics were identical across age and gender. These findings are consistent with earlier studies that asked clinicians to describe those who stutter (e.g., Turnbaugh, Guitar, & Hoffman, 1979; Woods & Williams, 1971, 1976; Yairi & Williams, 1970), indicating negative personality stereotypes (c.f., Swartz, Gabel, & Irani, 2009). Importantly, clinicians' negative attitudes do not appear to depend on severity of stuttering, as they have reported negative attitudes toward individuals with mild, moderate, and severe stuttering (Turnbaugh et al., 1979).

According to Smart (2001), the existence of negative attitudes in authority figures in the lives of those with disabilities (such as

SLPs) can have a negative impact. Smart argued that individuals with disabilities internalize many of society's negative stereotypes and reactions to their disabilities, thus incorporating false assumptions into their self-concepts (see also Boyle, 2018). In clinicians, stereotypes may have negative consequences for patients and clients. Yairi and Williams (1970) argued that SLPs' unfavorable perceptions of personality traits of those who stutter may influence the development of stuttering. For instance, stereotypes may influence clinicians' expectations of their clients who stutter, which may in turn play a role in shaping the self-concepts and behavior of the clients (Lass et al., 1989; Turnbaugh et al., 1979; Yairi & Williams, 1970). In this way, such biases may interfere with clinicians' effectiveness in treating stuttering. In addition, beliefs associated with a salient attribute (such as stuttering) may lead to biased judgments about other personality traits of an individual who displays the salient trait. In other words, an overall stereotype may be based upon one noticeable trait (e.g., Dorsey & Guenther, 2000; Greenwald & Banaji, 1995). Furthermore, intended behavioral and emotional responses to those who stutter are influenced by attitudes toward stuttering (Li & Arnold, 2015). These findings support a potential link between the challenges faced by those who stutter and negative attitudes toward stuttering, especially if these are held by authority figures such as clinicians.

1.3. Implicit and explicit attitudes

Prior research on attitudes toward stuttering has almost exclusively relied on explicit self-report measures of attitudes (c.f., Boyle, 2017). These measures are direct, simple and widely used; however, they are imperfect. They assume that all respondents are as honest and introspective as possible, which is unlikely. When attitudes being assessed are of a socially-sensitive nature, such as attitudes toward a stigmatized group, it is especially likely that respondents may provide answers that are not entirely truthful (e.g., Baumeister, 1982). Self-presentation or other motivational biases such as a social desirability bias can influence responses when individuals attempt to respond in a socially-acceptable manner (e.g. Crowne & Marlowe, 1960; Lalljee, Brown, & Ginsburg, 1984), calling into question the interpretation of self-reports. In one recent study, participants' social desirability concerns were significantly related to their self-reported explicit attitudes toward those who stutter (Walden & Lesner, 2018) but such concerns were unrelated to their implicit attitudes (described below).

Self-report measures assess only one type of attitude. Attitudes, like most cognitions, exist at both the implicit and explicit level, each of which functions differently (e.g., Greenwald & Banaji, 1995; Kahneman, 2011). Dual-process models of cognition, as applied to attitudes, view implicit and explicit cognitions as arising from two distinct modes of information processing (e.g., Kahneman, 2011). Explicit attitudes operate under high conscious control (called Type 2 mechanisms in dual process theory), and they are formed and expressed through deliberation and reasoning. Implicit attitudes, in contrast, are formed through associative processes (Rydell & McConnell, 2006), may be automatically activated upon encountering stimuli (Type 1 processing), and may function outside of conscious awareness. Due to their automatic, associative nature, they require less cognitive capacity and effort than explicit attitudes, and they guide human attention and processing even at early stages of attention, perception and cognition (Gawronski & Bodenhausen, 2006). When individuals attempt to retrieve and express implicit attitudes, they may be incapable of doing so because these attitudes may not be available for introspection (Greenwald & Banaji, 1995). Because of these key differences, implicit attitudes are more difficult to capture and must be assessed using indirect measures.

Implicit and explicit cognitions also operate in different ways and serve different functions. Whereas explicit attitudes are susceptible to reporting biases and cognitive distortions, such as social desirability bias (e.g. Shiffrin & Schneider, 1977; Walden & Lesner, 2018), implicit attitudes appear to be less flexible and perhaps more consistent across situations (Strack & Deutsch, 2004; Wilson, Lindsey, & Schooler, 2000; cf., Payne & Vuletich, 2018). Dovidio, Kawakami, and Gaertner (2002) found that whereas implicit attitudes were correlated only with nonverbal behavior, explicit attitudes were correlated only with verbal behavior, supporting the notion that these two types of attitudes operate differently and may be differently related to prejudicial behaviors. Furthermore, implicit attitudes are more resistant to change, even when information is presented that directly contradicts the belief (e.g., Gregg, Seibt, & Banaji, 2006). In addition, implicit and explicit attitudes on the same topic may be inconsistent or even contradictory (Baron & Banaji, 2006; Dovidio et al., 2002; Greenwald & Banaji, 1995; Hicks, McNulty, Meltzer, & Olson, 2016).

Because of 1) the divergence between implicit and explicit attitude formation, function, and change, and 2) the focus of past research regarding attitudes toward stuttering on direct, self-report measures to the exclusion of indirect measures of implicit attitudes, there is a gap in knowledge about attitudes toward stuttering. It is critical to assess both types of attitudes, especially among those who are in positions of influence in the lives of those who stutter, such as SLPs, to more fully understand negative stuttering stereotypes and their impact on those who stutter.

1.4. The implicit association test

The Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) is a widely-used measure of implicit attitudes. It examines automatic evaluation processes by assessing how strongly a target concept (such as stuttering) is associated with positive and/or negative evaluations. IATs are frequently used to assess the degree to which respondents hold a given attitude or stereotype. Users are tasked with sorting stimulus exemplars from four categories as quickly as possible using only two response keys. In the critical trials, an evaluative concept (i.e. *good* or *bad*) is paired with a target concept (in our case, *stuttered* or *non-stuttered speech*); that is, the respondent must press the same response key when a stimulus belonging to *either* of the paired categories is presented. The logic is as follows: the stronger the association between concepts sharing a response key, the easier it is to respond correctly, yielding faster response times. Concepts that do not seem to go together require more effort, resulting in slower responses. Respondents experience mental conflict when they attempt to override automatic associations with controlled, top-down thinking, leading to

slower response latencies (Greenwald & Banaji, 1995; Greenwald et al., 1998; Nosek, Greenwald, & Banaji, 2007). When a pattern of differences in response times while pairing strongly- versus weakly-associated concepts emerges across trials, this is known as an IAT effect, the magnitude of which is thought to reflect the degree of discrepancy in associative strength. The IAT has been repeatedly validated as a measure of implicit attitudes (e.g., Banaji, Nosek, & Greenwald, 2004; Dasgupta, McGhee, Greenwald, & Banaji, 2000; Greenwald, Nosek, Banaji, & Klauer, 2005; Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Kim, 2003) that resists attempts at strategic self-presentation. Respondents are tasked with categorizing stimuli as quickly as possible, discouraging deliberation over responses and instead encouraging reliance on automatic cognitive processes. Therefore, the IAT reduces concerns about social desirability that might skew self-report measures of attitudes.

Previous IAT research has revealed the existence of implicit bias across various topics of social importance. Included among these are implicit preference for young people over old (e.g. Nosek, Banaji, & Greenwald, 2002) and White people over Black (e.g., Greenwald et al., 1998), beliefs related to gender roles, such as associating males with career and science and females with family and liberal arts (e.g., Nosek et al., 2002), and implicit bias against individuals with physical and intellectual disabilities (e.g., Wilson & Scior, 2014). The Stuttering Implicit Association Test (Stuttering IAT) has been used previously to assess attitudes toward stuttering in an undergraduate student sample (Walden & Lesner, 2018). Results indicated that both implicit and explicit attitudes toward stuttering were negative. Stuttering IAT scores were not significantly related to social desirability, but explicit attitude scores were. These findings supported 1) the necessity of assessing both types of attitudes toward stuttering to more completely understand the negative stuttering stereotype, and 2) the utility of the IAT measure in separating attitudes from social desirability bias. To our knowledge, this method has not previously been used to assess implicit attitudes toward stuttering among SLPs. Based on the critical differences in the roles of implicit and explicit attitudes and the potential for attitudes held by authority figures to affect quality of life of those in stigmatized groups, it is necessary to study both implicit and explicit attitudes toward stuttering among those who serve influential roles in the lives of individuals who stutter (such as SLPs).

1.5. Present studies

This research assessed implicit and explicit attitudes of SLPs toward stuttering and individuals who stutter. In Study 1 implicit attitudes were assessed with the Stuttering IAT, which measured strength of association between stuttered/fluent speech and positive/negative evaluations. In Study 2 explicit attitudes were measured via self-report scales using pairs of opposing traits (e.g., *attractive* versus *unattractive)* rated on 5-point scales. The relation between attitudes toward stuttering and prior exposure to stuttering was also assessed in both studies.

These two studies addressed the following research questions:

1) Do SLPs hold more negative implicit attitudes toward stuttered than fluent speech?
2) Do SLPs exhibit more negative explicit attitudes toward individuals who stutter than toward those who do not?
3) Do clinicians with greater exposure to stuttering, both in and outside of their clinical work, have more positive implicit and/or explicit attitudes toward stuttering?

2. Study 1

Speech clinicians' implicit attitudes toward stuttered speech were measured with the Stuttering Implicit Association Test (Walden & Lesner, 2018). The relation between self-reported prior exposure to stuttering and implicit attitudes toward stuttered speech was also assessed.

2.1. Method

2.1.1. Participants
Following approval of study methods by the University's institutional review board (IRB), fifteen SLPs were recruited from a university speech and hearing clinic and the local public school system. Recruitment consisted of providing a brief description of the study and research team contact information during a staff meeting. Interested SLPs contacted the research team to schedule a time to participate. Clinic participants were unknown to the research team, with the exception of the individual who coordinated scheduling for this study and worked part-time in the clinic. This individual was not involved with study design, data collection, or analyses. School recruitment took place through a prior team member working as an SLP in the public school system, who passed along study information to colleagues. One SLP was recruited in this way. SLPs were eligible to participate if 1) they reported no problems related to hearing or speech, and 2) they were general practitioners without a fluency specialization. The sample consisted of 13 females and two males with a mean age of 34.33 years. Based on the findings of a pilot study using the same measure of implicit attitudes, a priori power analyses indicated that a sample size of nine would detect an IAT effect with 90 % power.

All participants indicated having known at least one person who stutters and 73.33 % had worked clinically with people who stutter. Of those who had worked clinically with people who stutter, four indicated having worked with those who stutter fairly infrequently (yearly to a few times per year, 36.36 %), whereas the rest indicated more regular experience (monthly: 18.18 %, weekly: 18.18 %, or several times per week: 27.27 %). 45.45 % had worked with adults, 81.82 % with adolescents, and 90.91 % with children who stutter. Therefore, while all participants indicated having at least the most basic familiarity with stuttering, the clinicians studied here had various levels of expertise in working with those who stutter. Most participants (93.33 %) had no prior

experience with the IAT instrument, although one SLP had previously completed an IAT on a different topic. Prior experience with the IAT instrument may decrease the magnitude of detected effects, however the scoring algorithm used in this study is thought to mitigate the effects of repeated IAT administration (Greenwald, Nosek, & Banaji, 2003).

2.1.2. Measures

2.1.2.1. Stuttering IAT. The Stuttering IAT (Walden & Lesner, 2018), a brief stimulus sorting task that assesses implicit attitudes toward stuttered speech, was administered with Millisecond Inquisit 5 (2016) software on a Macintosh laptop in a laboratory setting. The classification tasks used four sets of stimuli: 1) words related to positive evaluation (e.g., *joy, wonderful*); 2) words related to negative evaluation (e.g., *rotten, horrible*); 3) neutral words without stuttering (e.g., *circle, building*); and 4) the same neutral words with stuttering. See Walden and Lesner (2018) for a full list of the 27 Stuttering IAT stimuli. The fluent and stuttered words were presented aurally, whereas the positive and negative words were presented textually. Most versions of the IAT present only visual stimuli, however, to assess attitudes toward stuttered speech, auditory stuttered stimuli were required. Some previous IAT research has combined auditory and visual stimuli to assess children's implicit attitudes (see Baron & Banaji, 2006 for more information about the Child IAT).

All auditory stimuli were recorded by one fluent adult male. The first author and a skilled audiovisual engineer used Apple Logic to create the stuttered stimuli from non-stuttered stimuli, eliminating any variability that might result from different speakers. The engineer and first author used the speaker's naturally-occurring disfluencies and pauses, as well as sound repetitions and tense pauses the speaker was asked to produce, to insert stuttering-like disfluencies into the non-stuttered stimuli. They then worked with five SLPs (all with expertise in stuttering and affiliated with a university speech-language pathology clinic with a stuttering emphasis) to iteratively produce and refine the stuttered stimuli. Audio of the stuttered words was given to each SLP individually. SLPs then rated each stuttered stimulus using the following criteria: *natural-sounding, typical,* and *spontaneous.* If a word did not reach the highest criterion on any dimension by even one rater, it was returned for improvement and implementation of SLPs' suggestions. All stuttered stimuli were then re-evaluated by the SLPs. After several rounds of revision, the team of SLPs rated each word as reaching the highest criteria and the final stimuli were unanimously approved. All indicated that the engineered stuttering was indistinguishable from natural stuttering. Of the nine stuttered words used in the Stuttering IAT, five contained single syllable repetitions (SSRs), four comprised sound prolongations with SSRs, and all contained brief tense pauses.

2.1.2.2. Exposure to stuttering. Exposure, or degree of prior experience with individuals who stutter, was represented by three measures in this experiment, all of which were based on SLPs self-reported experiences with people who stutter. *Interaction frequency* is an ordinal measure of how often the respondent typically interacts with individuals who stutter, and *clinical frequency* is a similar ordinal measure of SLPs' frequency of interaction with individuals who stutter in their clinical work. To assess exposure, participants selected the statement that best represented their experience with stuttering. *Lifetime exposure* was scored as follows: 1 = *I have never known anyone who stutters,* 2 = *I have an acquaintance/colleague who stutters,* 3 = *I have a friend who stutters,* 4 = *I have a family member who stutters.* Frequency of interaction with those who stutter in everyday life (*interaction frequency*) and in clinical work (*clinical frequency*) were assessed similarly, with respondents selecting the statement that best represented their interaction with those who stutter in each setting. Items were scored as follows: 0 = *no interaction,* 1 = *yearly interaction,* 2 = *interaction several times per year*, 3 = *monthly interaction,* 4 = *weekly interaction,* 5 = *interaction multiple times per week,* and 6 = *daily interaction.*

2.1.3. Procedure

2.1.3.1. Intake interview. After SLPs provided informed consent, a brief intake interview assessed their prior exposure to stuttering.

2.1.3.2. The stuttering IAT. The Stuttering IAT procedure (Walden & Lesner, 2018) closely followed the recommendations of Greenwald et al. (2003). It consisted of seven blocks of trials, detailed in Table 1. Each trial block consisted of a sorting task in which participants were instructed to respond to a set of sequentially-presented stimuli by pressing one of two response keys to categorize each stimulus word correctly, according to sorting rules that changed between trial blocks. Prior to every trial block, instructions describing the new sorting rules were presented textually. Sorting rules consisted of the assignment of stimulus categories to left- or right-hand response keys (*E* and *I*, respectively). Within each trial block, a target concept (stuttered or fluent speech) an evaluative concept (positive or negative), or a paired target and evaluative concept (e.g., stuttered speech and positive versus non-stuttered speech and negative) was assigned to each response key for categorization. Throughout each trial block, the stimulus category (or categories) assigned to the left- and right-hand response keys remained visible in the upper corners of the screen as a reminder of the sorting rules. Participants were instructed to respond as quickly as possible while trying to avoid errors.

For each trial, a single stimulus word was presented. Positive and negative words were presented textually, appearing centered on the computer screen against a high-contrast background. Neutral stuttered and non-stuttered words were presented aurally through the computer speakers at a moderate volume. Participants sorted each stimulus as belonging to a category on the left or right side of the computer screen using the response keys and the IAT program recorded the latency between onset of stimulus presentation and correct response in ms[1] . As per Greenwald et al. (2003), errors were included in the analyses and accounted for by a time penalty built into the IAT itself. Errors were followed by a red *X*, prompting participants to correct the response. To further illustrate how this measure works, Fig. 1 depicts exemplar trials from each type of sorting task used in the Stuttering IAT. In the example, stimuli

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[1] Note that non-stuttered stimuli were slowed down slightly to equate presentation length across the stuttered and non-stuttered stimuli.

Table 1
Sequence of Trial Blocks in the Stuttering IAT (Study 1).

Block	No. Trials	Block Type	Response Items	
			Left Hand	Right Hand
1	20	Practice	Non-stuttering	Stuttering
2	20	Practice	Positive	Negative
3	20	Test	Non-stuttering + Positive	Stuttering + Negative
4	40	Test	Non-stuttering + Positive	Stuttering + Negative
5	40	Practice	Stuttering	Non-stuttering
6	20	Test	Stuttering + Positive	Non-stuttering + Negative
7	40	Test	Stuttering + Positive	Non-stuttering + Negative

Note: The position of Blocks 1, 3, and 4 were counterbalanced with the positions of Blocks 5, 6, and 7, so half the participants paired stuttering and positive stimuli in the first test blocks and the other half paired non-stuttering and positive stimuli in the first test blocks.

belonging to the *stuttering* and *good* categories are initially assigned to the left-hand (*E*) response key and *nonstuttering* and *bad* stimuli are assigned to the right-hand (*I*) response key. In 1a, an incorrect response has occurred, prompting the red *X* to appear. The stimulus in 1b ("excellent") belongs to the *good* category, therefore, the *E* key is the correct response. In 1c, all four response key/stimulus category pairings appear on the screen. The stimulus ("happy") again belongs to the *good* category, requiring an *E* response. 1d depicts the presentation of new sorting rules prior to trial Block 5, and 1e similarly depicts the sorting rules for the final test Blocks 6 and 7. Finally, 1f depicts a trial in Block 6 or 7, in which the stimulus ("rotten") belongs to the *bad* category. The *I* key is the correct response in this trial.

Blocks 1 and 2 were unscored practice blocks to familiarize participants with the stimuli and task and allow learning of four response key/stimulus category pairings. Blocks 3, 4, 6, and 7 were test blocks, measuring the strength of association between the target concept (stuttering or non-stuttering) and the attribute concept (positive or negative evaluation). In the test blocks, one target and one attribute category was assigned to each response key, as demonstrated in Fig. 1. The response key/stimulus category pairings used in test Blocks 3 and 4 were learned in practice Blocks 1 and 2. Block 5 was an additional unscored practice block in which participants learned to reverse the target concept/response key pairing used in prior trial blocks (e.g., if stuttered words were previously assigned to the left-hand response key, they were now assigned to the right-hand response key). Blocks 6 and 7 used the newly-learned response key/stimulus category pairings. Initial pairings were counterbalanced between subjects, with half first responding to stuttering and negative words with the same response key and half first categorizing stuttering and positive words with the same response key (see Table 1).

IAT D scores were calculated using the revised scoring algorithm as recommended by Greenwald et al. (2003). The difference in the mean response latencies for the shorter test blocks (3 and 6) was divided by the pooled standard deviation for those blocks. The difference in mean response latencies for the longer test blocks (4 and 7) was similarly divided by the corresponding pooled standard deviation. The average of these two quotients, the respondent's IAT D score, is an index of the difference in the strength of association between stuttered/fluent speech and negative/positive evaluations (D scores are effect size indicators similar to Cohen's *d*). A positive D score indicates that stuttering is more strongly associated with positive evaluations than negative (e.g., faster responses), whereas a negative D score results from a stronger association between stuttering and negative evaluations.

2.1.4. Data analyses

IAT D scores were compared to zero to assess the presence of bias as compared to no bias. Positive versus negative D scores assessed the direction of bias, either more positive or more negative toward stuttering (Research Question 1). Spearman correlations between D scores and exposure to stuttering assessed the relation between implicit attitudes toward stuttering and exposure to and frequency of interaction with those who stutter (Research Question 3). Data analyses were performed using SPSS computer software. Power analyses were performed using G*Power 3.1 software (Faul, Erdfelder, Lang, & Buchner, 2007).

2.2. Results

2.2.1. Implicit Attitudes

Results showed a stronger association between stuttered speech and negative evaluation than between stuttered speech and positive evaluation (mean D score = -0.41, SD = 0.39, a moderate effect). The mean D score was significantly less than zero [$t(14)$ = -3.98, $p <$ .01], indicating that the SLPs' implicit attitudes toward stuttered speech were negative. Fig. 2 shows the distribution of participants' Stuttering IAT D scores across categories determined by the sign and absolute value of each score (positive scores are reversed to show the full continuum of positive and negative attitudes). As described above, negative D scores suggest a preference for non-stuttered speech over stuttered speech, or more positive associations for non-stuttered speech than for stuttered speech. Scores further from zero indicate stronger preferences, or greater discrepancy in associations (as indicated by more discrepant mean response latencies across the response key/stimulus category pairings). As depicted in Fig. 2, the majority of participants (10, or 66.67 %) demonstrated at least a slight preference for non-stuttered speech. Conventional cut points for slight, moderate and strong values of D are .2, .5 and .8, respectively (as used by Greenwald et al. (1998), and are standard in the IAT literature. The mean error
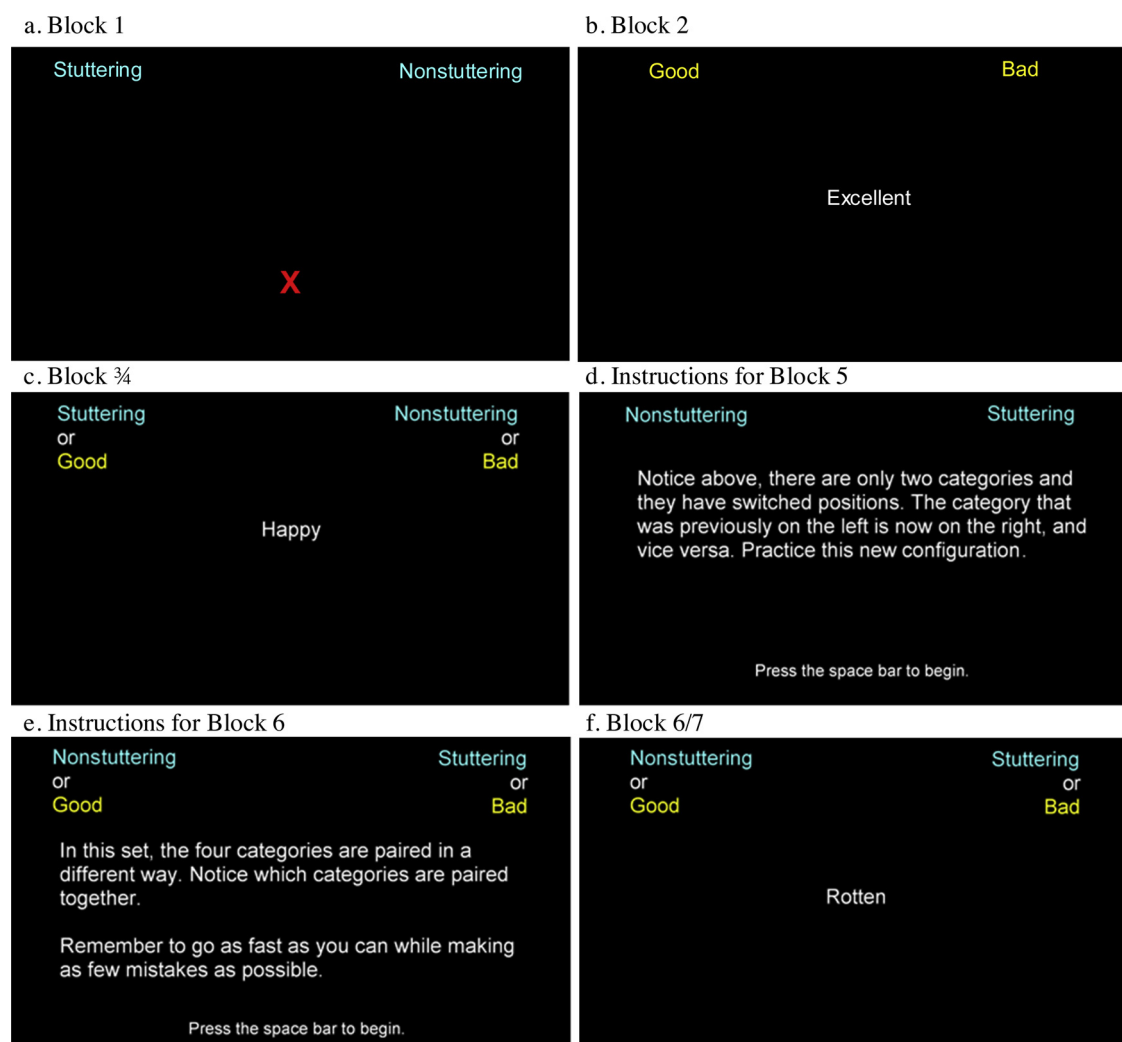
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Fig. 1. Depiction of a Single Trial Within the Stuttering IAT Trial Blocks. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article).

Note: These screenshots show what the participant sees during a single trial within various trial blocks. For purposes of illustration, only the textual stimuli are presented. Stuttered and non-stuttered stimuli were neutral words (e.g., "circle") presented aurally. Panel A: In Block 1, the participant practices response key/stimulus category pairings for stuttered/non-stuttered stimuli. The participant presses the incorrect response key and sees the red *X*, prompting an error correction. Panel B: During Block 2, the participant practices response key/stimulus category pairing for negative versus positive stimuli. Panel C: During Blocks 3 and 4, the participant hears an auditory stuttered/non-stuttered stimulus or sees a positive/negative stimulus word on each trial. Panel D: During Block 5, the response key/stimulus category pairing for stuttered/non-stuttered stimuli is reversed, and the participant practices the new configuration. Panel E: In Blocks 6 and 7 the new stuttered/non-stuttered response key assignment is combined with the positive/negative response key pairing learned earlier. Panel F: As in Blocks 3 and 4, a single auditory or textual stimulus is presented in each trial.

rate across participants was 4.28 % (SD = 2.65).

2.2.2. Implicit attitudes and exposure to stuttering

Spearman correlations assessed the relation between implicit attitudes (Stuttering IAT D scores) and measures of exposure to stuttering (*lifetime exposure*, *interaction frequency*, and *clinical frequency*). For the exposure measures, higher scores indicate greater exposure to stuttering, and for implicit attitudes, higher D scores indicate more positive attitudes toward stuttering. Correlations appear in Table 2. In this sample, implicit attitudes were not significantly related to any measure of exposure to stuttering. However, these analyses were exploratory and all correlations were undoubtedly underpowered. While not statistically significant, some of these relations may be worth considering in a future study. In particular, the relation between D scores and exposure to stuttering was 0.43, suggesting a potential relation between these variables.
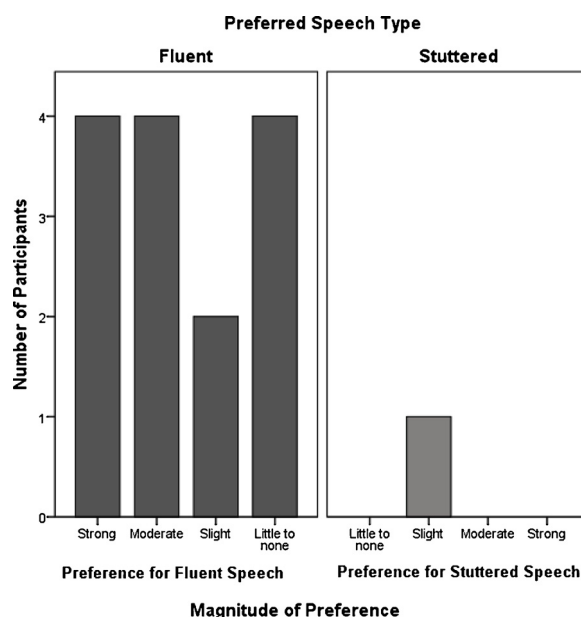
Preferred Speech Type

Fig. 2. Distribution of Implicit Preferences for Stuttered vs. Fluent Speech (Study 1).
Note: Magnitude ranges are based on Stuttering IAT D Scores. Positive scores are reversed to show the full continuum of positive and negative attitudes. Conventional cut points for little-to-none, slight, moderate and strong values of D are < .2, 0.2, .5 and .8, respectively (as used by Greenwald et al. (1998).

Table 2
Correlations Among IAT D Scores and Measures of Exposure to Stuttering (Study 1).

		D Score	Exposure	Interaction Frequency	Clinical Frequency
D Score	Spearman's ρ	1			
	Sig. (2-tailed)				
Exposure	Spearman's ρ	.43	1		
	Sig. (2-tailed)	.11			
Int. Frequency	Spearman's ρ	.06	.10	1	
	Sig. (2-tailed)	.84	.72		
Clin. Frequency	Spearman's ρ	-.34	-.46	.14	1
	Sig. (2-tailed)	.30	.16	.68	

Note: D Score is the Stuttering IAT effect measure, indicating implicit attitudes toward stuttered speech. Exposure represents degree of prior experience with individuals who stutter. Interaction Frequency is an ordinal measure of how often the respondent typically interacts with in-dividuals who stutter, and clinical frequency is a similar ordinal measure of SLPs' frequency of interaction with individuals who stutter in their clinical work.

2.3. Study 1 summary and discussion

This study measured SLPs' implicit attitudes toward stuttering, as well as the relation between implicit attitudes and exposure to stuttering. SLPs showed negative implicit attitudes toward stuttering on the IAT measure, as predicted. However, there was no significant relation between exposure to stuttering and implicit attitudes among SLPs (though the small N makes this conclusion questionable). This finding differs from an earlier finding that greater exposure correlates with less negative implicit attitudes toward stuttered speech (Walden & Lesner, 2018), however that study used an undergraduate student sample. SLPs' exposure to stuttering was greater and less variable across the range because all SLPs had known at least one person who stutters, but many undergraduates had never known anyone who stutters. This suggests the possibility that the positive effect of exposure asymptotes at low levels of experience with stuttering, and further exposure beyond this threshold does not lead to more positive attitudes.

2.3.1. Potential origins and nature of negative implicit attitudes

Identifying the origins of social biases is critical to prevent biases and devise strategies to overcome stereotypes and prejudice. How do clinicians (or anyone else) develop these perceptions? Negative beliefs about stuttering appear early in life (e.g., Evans et al., 2008; Langevin, 2009; Weidner et al., 2015), but where do they come from? Skinner, Meltzoff, and Olson (2017) found in two studies that preschool children can "catch" novel social biases from brief exposure to biased nonverbal signals from others. In their first study, children who were exposed to a 30-second video depicting positive nonverbal bias (smiling, leaning in, and warm tone of

voice) in favor of one adult subsequently liked and behaved prosocially toward the target of positive signals, whereas they were less likely to behave prosocially toward the target of negative nonverbal signals (scowling, leaning away, and cold tone of voice). The targets were distinguished and identified by their t-shirt color. In a second study, children generalized this bias to other members of each t-shirt color group. The authors argued that others' nonverbal messages may play an important role in the development of social biases during childhood, and that the pattern of results might suggest that generalized bias is implicit and children are unaware of it. Thus, it is possible that the implicit bias against stuttering observed in the SLPs in this study has its roots in attitudes formed much earlier in life.

As we speculated elsewhere (Walden & Lesner, 2018), negative attitudes toward stuttering may be mediated by emotional reactions to stuttered disfluencies by way of hedonic fluency. The hedonic fluency hypothesis proposes that people favor stimuli that are easily processed (including a wide range of visual, auditory and conceptual modalities; for a review see Lick & Johnson, 2015). Since processing disfluencies is difficult, requiring greater attentional and other processing resources to decode and understand, this could lead to a subjective experience of unpleasantness (Reber, Schwarz, & Winkielman, 2004; Winkielman, Halberstadt, Fazendeiro, & Catty, 2006). Thus, these difficulties and negative emotional reactions to them may create negative attitudes toward stuttering. Future studies including measures of emotional reactions to stuttered speech as well as attitudes toward that speech could address this possibility.

3. Study 2

Study 2 assessed SLPs' explicit attitudes toward people who do and do not stutter using self-report rating scales. As in Study 1, the relation between attitudes and prior exposure to those who stutter was also assessed.

3.1. Method

3.1.1. Participants

This study was approved by the University's IRB. SLPs attending a professional development conference were recruited to participate. All SLPs working in the local public school district are invited and most attend this conference, hosted every summer at the University. The conference covers a broad range of professional development topics relevant to SLPs' work in schools and the SLPs in attendance vary in their professional experience and expertise. Recruitment procedures involved providing survey packets and a brief study description among other conference materials at the conference check-in counter. Those who wished to participate were instructed to place their anonymous, completed surveys in a collection box at any time before the end of the conference. Fifty-six SLPs elected to provide at least partial responses to the questionnaires. Two respondents were excluded due to self-reporting a past or present personal stuttering history (attitudes toward stuttering may differ between those who do and do not stutter, but that is beyond the scope of this study). Seven respondents left one or both rating scales blank and were excluded. One participant's responses were indecipherable. Three participants were excluded because they did not pass the attention check of the reverse-scored items. Finally, three participants responded with *neither (0)* for all items in both rating scales, citing unwillingness to judge an unknown individual. The final sample consisted of 40 SLPs, all female.

All participants knew or had known at least one person who stutters. All also had at least some experience working with those who stutter in a clinical setting, and 95.00 % were actively working with individuals who stutter at the time of data collection. Of these, 10.00 % indicated working with those who stutter fairly infrequently (yearly to a few times per year), with the rest indicating more frequent interaction (monthly: 7.50 %, weekly: 52.50 %, several times per week: 22.50 %, or daily, 2.50 %). All participants had worked with children who stutter, 62.50 % had worked with adolescents, and 22.50 % with adults.

3.1.2. Measures

3.1.2.1. Intake survey and exposure to stuttering.
The intake survey asked SLPs to provide general information including gender, personal stuttering history, and exposure to stuttering both in and outside of their clinical work. We derived two measures of prior exposure to stuttering from the information SLPs provided. *Interaction frequency* and *clinical frequency* were assessed and scored in the same manner as in Study 1.

3.1.2.2. Explicit attitude scales.
Explicit attitude scales were used to assess self-reported attitudes toward those who do and do not stutter. Participants were instructed as follows: "Please rate your impressions of an adult who (stutters/does not stutter) on the following attributes. For each pair of adjectives, choose only one of the options." Each participant rated both a person who does stutter and a person who does not. Participants rated 19 attribute pairs (e.g., *Nervous/Calm*, *Intelligent/Unintelligent*) using bipolar 5-point scales with a midpoint of 0 (e.g., for *Nervous/Calm* -2 = *very nervous*, +2 = *very calm*, and 0 indicates neither). Six pairs were reverse-scored. Trait pairs were chosen via review of previous studies of self-reported attitudes toward stuttering. After recoding reverse-scored items, negative scores indicated more negative self-reported attitudes. Table 3 lists all trait pairs.

3.1.3. Procedure

Participants received a packet and provided their responses on paper. The packet contained the informational intake survey and two versions of the explicit rating scale: one for evaluating a person who stutters and the other for a person who does not. The order of the rating scales in the packet was counterbalanced between subjects so that approximately half the participants were asked to evaluate a person who stutters first (ST-1), whereas the others were asked to evaluate a fluent individual first, followed by an

Table 3
Mean Explicit Attitudes by Trait and Speaker (Study 2).

Trait Pair	Mean Stuttering	Mean Fluent
Friendly/Unfriendly	0.9 (0.87)	0.9 (0.84)
Brave/Scared	0.88 (1.16)	0.53 (0.75)
Honest/Dishonest	0.78 (1.0)	0.65 (0.80)
Happy/Unhappy	0.48 (0.96)	0.78 (0.86)
Helpful/Annoying	0.7 (0.99)	0.93 (0.76)
Good/Bad	1.15 (0.83)	0.9 (0.84)
Pretty/Ugly	0.68 (0.86)	0.5 (0.85)
Fun/Boring	0.83 (0.87)	0.7 (0.82)
Nice/Mean	1.23 (0.73)	0.9 (0.74)
Strong/Weak	0.93 (1.0)	0.63 (0.74)
Healthy/Sick	0.65 (0.92)	0.63 (0.87)
Leader/Follower	0.13 (0.94)	0.48 (0.78)
Calm/Nervous	−0.78 (0.86)	0.2 (0.72)
Bold/Shy	−0.65 (0.92)	0.0 (0.64)
Self-Assured/Self-Conscious	−0.8 (1.04)	0.18 (0.78)
Relaxed/Tense	−0.8 (0.99)	0.3 (0.85)
Pleasant/Unpleasant	0.93 (0.73)	0.83 (0.81)
Intelligent/Unintelligent	1.15 (0.80)	0.78 (0.89)
Approaching/Avoiding	−0.38 (1.13)	0.48 (0.78)
Mean of All Items	0.42 (0.62)	0.59 (0.51)

Note: Scores for each trait pair range from -2 to +2. Positive trait listed first in this table. Standard deviations are in parentheses.

individual who stutters (ST-2).

3.1.4. Data analyses

Mean explicit attitude scores were compared to zero to assess the presence of positivity versus negativity as compared to neutral for hypothetical stuttering and non-stuttering persons (Research Question 2). A 2 (Speaker Rated: person who stutters/PWS, person who does not stutter/PWNS) × 2 (Survey Order: ST-1, ST-2) mixed repeated-measures ANOVA assessed the effect of rating a stuttering speaker versus non-stuttering speaker and order in which the ratings were performed (Research Question 2). Spearman correlations between explicit attitude scores and exposure to stuttering assessed the relation between reported attitudes toward stuttering and experience with stuttering and those who stutter (Research Question 3). Data analyses were performed using SPSS computer software. Power analyses were performed using G*Power 3.1 software (Faul et al., 2007).

3.2. Results

3.2.1. Explicit attitudes

Responses to the 19 items were averaged to obtain two aggregate ratings, one for a person who stutters and one for someone who does not. Using Cronbach's alpha, the internal consistency of the explicit attitude scales was .93 for attitudes toward a person who stutters and .88 for attitudes toward a person who does not. The mean explicit attitude score for rating the fluent individual was 0.59 (SD = 0.51), significantly greater than 0 [$t(39) = 7.33$, $p < .01$]. The mean explicit attitude score for rating the individual who stutters was 0.42 (SD = 0.62), also significantly greater than 0 [$t(39) = 4.27$, $p < .01$]. Therefore, explicit attitudes toward both speakers were positive. Table 3 contains mean ratings toward those who do and do not stutter for each trait pair and overall mean ratings. Of note, some of the largest differences reflect a negative stuttering stereotype in that a person who stutters was rated as more nervous, shy, self-conscious, tense, and avoiding, as well as less happy and less of a leader than a person who does not stutter. These discrepancies indicate that despite comparable aggregate attitudes (see below), SLPs may have negative attitudes toward those who stutter regarding specific traits.

A 2 (Speaker Rated: person who stutters (PWS), person who does not stutter (PWNS)) x 2 (Survey Order: ST-1, ST-2) mixed repeated-measures ANOVA assessed the effect of the order in which the ratings were performed. There was a significant main effect of speaker rated [$F(1, 38) = 8.63$, $p < .01$], indicating that, regardless of the order in which ratings were made, ratings of a PWS were less positive than ratings of a PWNS. Levene's test indicated that error variances were approximately equal for ratings of the two speakers [$F(1, 38) < 0.01$, $p = .95$]. The main effect of survey order was not significant [$F(1, 38) = 0.03$, $p = .87$], indicating that, when ignoring order of the ratings, participants in both order conditions gave similar ratings. However, there was a significant Speaker Rated x Survey Order interaction [$F(1, 38) = 17.84$, $p < .01$]. As Fig. 3 shows, PWS and PWNS were rated similarly when the PWS was rated first (mean difference = 0.10, $p = .62$), but participants who rated PWS after rating PWNS tended to rate PWS significantly less positively [mean difference = -0.54, $p < .01$]. The estimated marginal means indicate that overall PWNS were rated more positively than PWS, although both were rated somewhat positively on average, as described above. The estimated marginal mean rating for PWNS was 0.61 with a standard error of 0.08, as compared to 0.39 with a standard error of 0.10 for PWS.
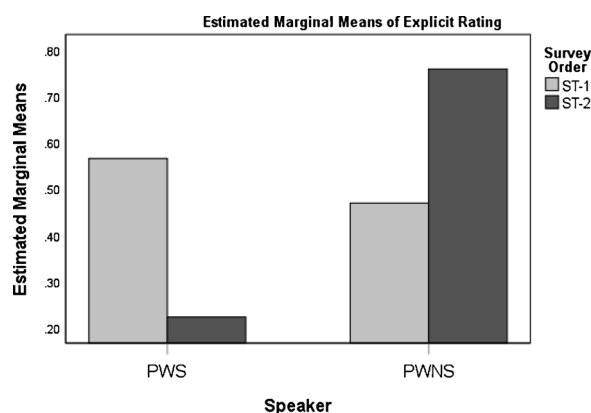
Fig. 3. Graph of Interaction Effect of Speaker Rated and Survey Order (Study 2).

3.2.2. Explicit attitudes and exposure to stuttering

Spearman correlations assessed the relation between explicit attitudes toward PWS and PWNS and both measures of exposure to stuttering (*interaction frequency* and *clinical frequency*). For the exposure measures, higher scores indicate greater exposure to stuttering, and for explicit attitudes, higher scores indicate more positive attitudes. Correlations are in Table 4. In this sample, explicit attitudes were not significantly related to either measure of exposure to stuttering. As in Study 1, however, correlations were exploratory and undoubtedly underpowered.

3.3. Study 2 summary

Explicit attitudes toward both speakers were somewhat positive regardless of survey order, however ratings of PWS were less positive overall than ratings of PWNS. Survey order contributed, in that PWS were rated more similarly to PWNS when the PWS was rated first. However, those who rated PWS after rating PWNS rated PWS less positively.

The significant Speaker Rated x Survey Order interaction effect was not anticipated. One plausible explanation for this finding may be that rating a PWNS before a PWS encourages a comparison of the two speakers. Perhaps, when an SLP has just considered her attitudes toward a PWNS and is subsequently asked to rate a PWS, she is primed to consider how the two speakers may differ. On the other hand, when rating a PWS first, this type of comparison is not primed since the PWS is considered *before* another group is introduced. Further research is needed to confirm this interaction and better understand factors that may influence how SLPs view people who stutter under various conditions.

4. General discussion

Considered together, the findings of Study 1 and Study 2 paint a complicated picture of SLP's attitudes toward stuttering. The studies were conducted using two similar samples. Both were predominantly-to-entirely female, all participants had at least some prior exposure to stuttering, and all participants were employed as SLPs in the same metropolitan area at the time of data collection, either in the local schools or a University speech and hearing clinic. Additionally, the measures of implicit and explicit attitudes were similar in that they aimed to hold constant all interpersonal characteristics except the presence/absence of stuttered speech in an adult who stutters. In the case of the Stuttering IAT, participants' evaluations of stuttered and fluent speech were assessed as they

Table 4
Correlations Among Explicit Ratings and Exposure to Stuttering (Study 2).

		PWNS Rating	PWS Rating	Interaction Frequency	Clinical Frequency
PWNS Rating	Pearson's r	1			
	Sig. (2-tailed)				
PWS Rating	Pearson's r	.54**	1		
	Sig. (2-tailed)	.00			
Int. Frequency	Spearman's ρ	.08	.07	1	
	Sig. (2-tailed)	.65	.69		
Clin. Frequency	Spearman's ρ	.01	.08	.55**	1
	Sig. (2-tailed)	.97	.64	.00	

Note: * denotes significant correlation at the 0.05 level. ** denotes significant correlation at the 0.01 level. PWNS Rating and PWS Rating indicate explicit attitudes toward a person who does not stutter and a person who stutters, respectively. Interaction Frequency is an ordinal measure of how often the respondent typically interacts with individuals who stutter, and clinical frequency is a similar ordinal measure of SLPs' frequency of interaction with individuals who stutter in their clinical work.

were presented with auditory examples. As described above, these examples were produced by the same adult speaker, therefore, there were no differences between the speakers (aside from speech fluency) that provided participants with information from which to draw conclusions about the speakers. For the explicit rating scales, participants were provided no information about the individuals except that it was an adult who did or did not stutter. In both cases, participants' assumptions about the speakers that were unrelated to the presence or absence of stuttering should have been similar, with differences in attitudes being attributable to fluency of speech.

This being said, in Study 1 implicit attitudes toward stuttering were negative as compared to the neutral attitudes toward typically-fluent speech. In Study 2, self-reported attitudes toward a person who does not stutter were more positive than attitudes toward a person who does, even though attitudes toward both speakers were somewhat positive overall. These findings, taken together, suggest that while SLPs may report somewhat positive attitudes regarding the traits and attributes of those who stutter, they likely have simultaneous negative implicit attitudes that may not reach the level of conscious awareness. This is consistent with decades of research on implicit social cognition, which suggests people can have biased perceptions or behavior without intending to do so. That is, associatively activated (implicit) representations can influence reactions even when the content of those representations is rejected (Brownstein, Madva, & Gawronski, 2019). This is important because SLPs are often involved in the treatment of stuttering, and if they hold negative implicit attitudes toward stuttering it may impact their treatments and treatment success (for related speculation see Cooper & Cooper, 1996; Lass et al., 1989; Smart, 2001).

4.1. Implicit versus explicit attitudes toward stuttering and those who stutter

There are important differences in the way explicit and implicit attitudes are formed, measured, and changed. Previous research on attitudes toward stuttering has focused on explicit self-reports. These measures are fallible if respondents are not fully introspective or honest, are not aware of their negative attitudes, or have social desirability concerns. Thus, the external validity of self-report measures of attitudes may be questionable. This is particularly likely when socially-sensitive attitudes are being assessed, since participants may attempt to display more socially-acceptable attitudes. Implicit attitudes, in contrast, are thought to operate at least partially below the level of conscious awareness and are formed involuntarily based on past associations. Therefore, implicit responses may be less amenable to attempts to self-present in a socially desirable manner. However, Gawronski, LeBel, and Peters (2007) suggested that social desirability may be too general to capture specific motivational distortions in self-reports. Future studies might profit from more using more targeted measures of motivational biases in attitudes toward stuttering.

Although clinicians' explicit attitudes were found to be positive, though less positive than attitudes toward individuals who do not stutter, implicit attitudes were significantly negative. It may be that SLPs believe that they are not negative about stuttering broadly, even though other people may be (the so-called blind spot bias), therefore reporting no explicit bias while demonstrating bias on an implicit level. Bias turns out to be relatively easy to recognize in others but more difficult to detect in one's own judgments (Pronin & Kugler, 2007; Pronin, Lin, & Ross, 2002). That is, we are all apt to believe that we ourselves are unbiased and our decision-making is objective and reasonable. Furthermore, West, Meserve, and Stanovich (2012) reported that blind spot biases were not reduced by cognitive sophistication such as cognitive ability or thinking dispositions. They interpreted the effect in terms of dual process theories of cognition (e.g., Evans, 2008), that implicit biases may be fundamental and not easily controlled strategically. Thus, the positive explicit attitude ratings of the SLPs may reflect their desire to be, or appear to be, unbiased (Type 2 processing in dual-process theory), whereas the biased implicit ratings may reflect less conscious negative attitudes and beliefs (Type 1 reasoning in dual-process theory).

The implicit and explicit attitudes measured in these studies differ in one important way besides the measurement techniques themselves (i.e., the IAT versus deliberative rating scales), and this difference should be considered when interpreting the present results. The explicit rating scales focused SLPs on rating the characteristics of a hypothetical adult *person* who stutters by asking them to judge the individual's intelligence, honesty, happiness, attractiveness, friendliness, and so on, when provided with no information about this individual other than the fact that he does (or does not) stutter. Those attitudes were slightly positive, regardless of the stuttering status of the person being rated (albeit more strongly positive when evaluating a typically-fluent individual). The IAT task asked SLPs to classify adult stuttered *speech* in conjunction with positive or negative evaluations; unlike the explicit rating scales, the speaker was not mentioned and only adult stuttered speech was prominent. Thus, there is some ambiguity about what SLPs were thinking about and reacting to during the IAT task. Their implicit attitudes may have been reactions to characteristics of the disfluent speech, such as dysfluent information processing (making the words more difficult to understand), lack of flow, perceived effort or struggle in the disfluent speech samples, or speech that is simply unusual.

Alternatively, because SLPs are therapists trained to notice and remediate speech disfluencies, they may be reacting to the presence of a difficulty that they would aim to address in therapy. Thus, negative implicit attitudes toward the stuttered speech samples could stem from several possible sources, and there is no way to determine whether the negative bias generalizes to the speaker and his characteristics. The differences between results for explicit and implicit ratings in this study may reflect SLP's unwillingness to generalize their reactions toward stuttered speech to characteristics of those who stutter. In support of this speculation, Weidner et al. (2015) reported that preschool and kindergartner's attitudes toward *stuttering* were more negative than toward the actual *person* who stutters. The discrepancy led them to speculate that young children (a) have a partly developed negative reaction to the disorder even after brief exposure to examples of stuttering but (b) do not necessarily attribute negative personal judgments to the person who stutters.

Implicit attitudes are thought to reflect the accessibility of mental content and the readiness with which information can be brought to mind and used in cognitive processing. They are more likely to be relied upon under time pressure, distraction or fatigue

(raising the issue of whether implicit attitudes are better conceived as "traits" or "states"). Greenwald and Banaji (1995) viewed implicit bias as "introspectively unidentified traces of past experience" and Wilson et al. (2000) described implicit bias as previously learned attitudes that may co-exist with newer attitudes. Alternatively, Gawronski et al. (2007) proposed a conceptualization of indirect attitude measures that focuses on activation of associations in memory; it avoids assumptions about conscious awareness or the influence of motivational processes such as social desirability. Thus, processes that contribute to attitudes, whether implicit or explicit, are far from settled.

Traditionally, implicit biases have been viewed as an individual difference, with some individuals having high levels of bias and others having low or no bias. However, it has also been speculated that when an individual exhibits an obvious trait that indicates belonging to a particular group, implicit attitudes toward the individual may reflect commonly held evaluations of the group (e.g., Haslanger, 2015; McConnell, Rydell, Strain, & Mackie, 2008), whereas explicit attitudes may be more likely to reflect evaluations of an individual than of a group. Furthermore, the Bias of Crowds model (Payne & Vuletich, 2018) proposes that implicit biases may indicate more about social environments than the individuals in them. From this perspective, implicit biases may characterize situations and shared cultural beliefs reflected in common stereotypes. Payne and Vuletich (Payne & Vuletich, 2018; Vuletich & Payne, 2019) argue that one way to understand implicit bias is as a social phenomenon that "passes through" the minds of individuals but operates as a function of social environments rather than of individuals.

Thus, it is possible that implicit attitudes may at least partly reflect stereotypes and may be negative even when an individual exhibits positive traits and behaviors, whereas more deliberative explicit attitudes may take into account the actions and traits of individuals. This is another plausible explanation for the discrepancy between implicit and explicit attitudes toward stuttering among SLPs. This perspective would suggest that interventions to reduce bias could operate more effectively at the group level than the individual level. Increasing the positive visibility of members of a stigmatized group and providing counter-stereotypical examples have been shown to reduce implicit biases (e.g., Blair, 2002; Dasgupta & Greenwald, 2001).

4.2. Consistency with findings of previous studies

A major difference between the findings of the present study as compared to prior research on (mostly explicit) attitudes toward stuttering among speech clinicians is that the SLPs studied here reported slightly positive explicit attitudes toward a person who stutters. Since prior research has detected negative attitudes toward stuttering with explicit measures (but c.f., Swartz et al., 2009), this is an interesting discrepancy that could be sample specific, perhaps reflecting the rather high level of experience with stuttering in the SLPs studied here.

It is also informative to examine differences between the findings of the present study and an earlier study of implicit and explicit attitudes toward stuttering among undergraduate students (Walden & Lesner, 2018). Although negative implicit attitudes were found among both groups of respondents, the undergraduates indicated negative explicit attitudes, whereas the SLPs here did not. A plausible explanation for this is that SLPs hold unbiased explicit attitudes or feel more compelled to present unbiased attitudes toward those who stutter than does the general population. Speech clinicians, having received training in communication disorders, as well as having increased experience with people who stutter, may experience less explicit bias towards those who stutter. In a related vein, those who are attracted to the helping professions, such as speech language pathology, may be motivated to guard against discrimination toward a population they work with. Whatever contributes to the speech clinicians' somewhat positive attitudes toward a *person who stutters*, it does not appear to preclude negative implicit attitudes toward *stuttered speech*. However, it is important to bear in mind that SLPs' attitudes toward a person who stutters were still not as positive as their attitudes toward a person who does not.

Another key difference in the findings of these two studies is that among undergraduates, students with greater exposure to stuttering had more positive implicit attitudes. That finding was not replicated among SLPs. However, it is important to note that all correlations in the present study were undoubtedly underpowered, and the correlation between exposure to stuttering and Stuttering IAT D scores was moderately positive and approached significance ($\rho = 0.43$, $p = .11$). In addition, a significant minority of the undergraduates had never known anyone who stutters (25 %); whereas every SLP had at least some experience with stuttering, and most had worked professionally with individuals who stutter. It may be that exposure to stuttering is only helpful in reducing implicit bias below a certain threshold, after which additional exposure ceases to increase positive attitudes; if that is the case, it makes sense to find a significant relation between exposure and attitudes among the general population, but not among clinicians who have experience with stuttering. However, additional investigation with increased sample sizes and multiple measures is necessary to establish a more comprehensive understanding of the relation between exposure to stuttering and implicit attitudes in speech clinicians.

4.3. Limitations and future directions

Just as self-report measures are imperfect measures of explicit attitudes, the IAT is only one method of assessing implicit attitudes and some concerns have been expressed about its psychometric properties (e.g., Arkes & Tetlock, 2004; Ottaway, Hayden, & Oakes, 2001; Rothermund & Wentura, 2004). Other methods for studying implicit attitudes exist, such as the Affect Misattribution Procedure (Payne, Cheng, Govorun, & Stewart, 2005) in which participants make evaluative judgments of ambiguous images after brief priming. Extensive research shows that evaluations of the ambiguous stimuli are influenced by the primes, despite participants having been told to ignore them. Olson and Fazio (2001) used an evaluative conditioning procedure that repeatedly paired neutral stimuli (CS) with negative or positive unconditioned stimuli (US). Boyle (2017) found that attitudes about perceived *public* opinion were more negative than direct questions about one's *personal* opinion. Beattie and McQuire (2012) used eye tracking to study the relation

13

between implicit attitudes about climate change and negative images of effects of climate change versus nature scenes (whereas explicit attitude did not predict eye gaze toward the negative images). Gawronski et al. (2007) note that different indirect measures may not highly correlate if they do not represent a coherent category, for example, they may differ in the extent to which they tap into category-related versus exemplar-related associations (Olson & Fazio, 2003). For example, audio exemplars of stuttering may vary in their typicality versus atypicality by using different stuttering types (e.g., repetitions versus tense blocks or variations in severity) in the category "stuttered speech" (possibly a similar source of variability when participants are asked to imagine hypothetical stuttering or persons who stutter).

Despite some concerns about the IAT, it is a well-validated method that is often used for assessing implicit attitudes. Its typical interpretation as a measure of the differential strength of association between concepts has been empirically supported (e.g., Dasgupta et al., 2000; Banaji et al., 2004; Greenwald et al., 2005). It is also a useful predictor of behavior, particularly regarding socially-sensitive topics (Greenwald et al., 2009), and has been shown to resist voluntary control over results (e.g., Kim, 2003). Furthermore, although it has been suggested that IAT effect sizes tend to decrease in magnitude each time an individual takes an IAT test (e.g., Greenwald et al., 2003), the present Study 1 sample contained only one individual who had taken an IAT (on an unrelated topic) prior to this study, so results are unlikely to have been skewed by this (and if they were, the effect would be to minimize the IAT effect). Regardless, it would be wise in future studies to include additional measures of implicit attitudes toward stuttering (such as those described above). We also suggest that future work should expand the auditory IAT speech to females, as well as adult and child speakers.

Another important future direction would be assessing the attitudes of a larger and more varied sample of SLPs. Study 1 had a small number of participants. Although the sample size was predetermined so that the analyses of greatest interest would be sufficiently powered, this was not necessarily the case with other analyses, which may have prevented us from detecting true effects. For example, with a larger sample it may have been possible to detect the expected correlation between exposure to stuttering and implicit attitudes. Generalizability may also be limited due to the predominant number of females in both samples. Although this is typical of the population of SLPs, male and female attitudes may differ. In a more varied sample, it would be possible to examine individual variables of interest, such as the gender and age of clinicians (as did Li & Arnold, 2015, who found that female teachers and nonteachers were more accommodating/helping than their male counterparts), as well as to compare SLPs with varying levels of prior exposure to stuttering to test the possibility that amount of exposure to stuttering only influences attitudes toward stuttering up to a certain point (none versus some). In addition, exposure to stuttering could be assessed using more finely-graded scales to investigate in greater detail the relation between exposure and attitudes. It was not possible to explore such questions in the present studies due to small sample sizes and lack of SLPs without any prior exposure to stuttering. Examining explicit and implicit attitudes toward stuttering in the same participants (i.e., a repeated measures design), would allow more direct comparisons.

Finally, we suggest that future work on explicit attitudes might include samples of stuttered/non-stuttered speech before participants rate "a person who does/does not stutter." This would make the ratings less "hypothetical." In addition, work comparing implicit and explicit attitudes would be well served by increasing the correspondence of the two types of ratings (matching exactly what is being rated, for example "people" vs "speech"), as suggested by Hoffmann, Gawronski, Le, and Schmitt (2005).

4.4. Conclusion

The present findings, considered with the existing body of knowledge regarding attitudes toward stuttering among clinicians, highlight the importance of assessing, understanding, and addressing negative attitudes toward stuttering on both an explicit and an implicit level. More fully understanding the interplay between implicit and explicit attitudes, and how each influences actions and treatment outcomes may facilitate effective interventions with maximal benefit to individuals who stutter. Due to the important role clinicians serve in the lives of those who stutter, it is critical that we further investigate explicit attitudes toward those who stutter and implicit attitudes toward stuttering in this population so we may hope to understand how to facilitate positive, clinically-relevant impact for those who stutter.

Author statement

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