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ORIGINAL ARTICLE

Turn-Taking Behaviors during Interaction with Adults-Who-Stutter

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Abstract Stuttering is a disorder that affects not only the speaker, but also the conversational partner (CP). This study was designed to examine whether people communicate differently with adults-who-stutter (AWS), compared to adults-who-do-not-stutter (AWNS). Specifically, we examined the occurrence of three basic and common turn-taking behaviors (TTBs) used by CPs, during interactions with AWS compared to AWNS. Ten adults (age range 20–32), naïve to the purposes of this study, were recorded during a conversation with four speakers: two AWS and two AWNS. Consequently, a total of 40 conversations were analyzed. Based on transcriptions of these interactions, the relative frequency of the three TTBs (*Reinforcers*, *Interruptions* and *Completions*) was calculated. The ten CPs exhibited a similar proportion of TTBs during their conversations with the AWS and AWNS ($p > 0.05$). However, during their conversations with the AWS, the CPs exhibited a higher proportion of *Interruptions* and *Completions* in response to stuttered turns, compared to fluent turns ($p < 0.05$). Additionally, the ten CPs exhibited a larger proportion of *Reinforcers* during their conversations with the AWS with moderate stuttering severity, compared to the AWS with mild severity ($p = 0.04$). Results provide a preliminary insight to CPs' communication behavior in the presence of stuttering. Results are interpreted as demonstrating that, within this context, CPs do not exhibit different turn-taking behaviors when conversing with AWS and AWNS. However, CPs exhibit different TTBs in association with stuttered speech, compared to fluent speech of PWS.

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Introduction

Stuttering is a speech fluency disorder, described as affecting aspects far beyond speech symptoms themselves. Yairi and Seery (2011), for example, have listed six dimensions of the stuttering disorder. These include three overt features: (*a*) *overt speech characteristics* (*b*) *physiological activity*, and (*c*) *physical concomitants*; as well as three covert features: (*d*) *affective features* (i.e., strong emotional reaction to stuttering, fear of talking in many speech situations), (*e*) *cognitive processes* (e.g., self-perception of stuttering and thoughts regarding others' reactions), and (*f*) *social dynamics* (i.e., effects on interpersonal communication and social interaction, attributed to fear of speech and stuttering).

Specifically relevant to the *social dynamics* dimension defined by Yairi and Seery (2011), a few studies have demonstrated altered communicational skills of adults-who-stutter (AWS) (Krause 1982; Mayberry and Jaques 2000), possibly attributed to fear (Yairi and Seery 2011; Krause 1982). Moreover, it has been suggested that "stuttering contains an inherent interpersonal aspect, and should be considered to be a problem that is manifested in the space between speaker and conversational partner (CP) in interpersonal communication" (Ezrati-Vinacour and Weinstein 2011; p. 179). Thus, communication skills are considered a vital target in many stuttering therapy programs, in addition or independently of speech modifications (e.g., Rustin et al. 1995).

While many studies focused, naturally, on the person-who-stutters (PWS); others have shifted the focus towards the CP's behavior while interacting with the PWS, especially while interacting with children-who-stutter (CWS). Most of these studies have focused on the communicational behavior of parents interacting with their stuttering child, and found differences in parental behavior toward CWS and children who do not stutter (CWNS). For example, parents of both CWS and CWNS were shown to use a faster speaking rate when talking to CWS (Meyers and Freeman 1985a). Parents were also shown to adjust their speaking rate to the child's fluency status (Kelly and Conture 1992). Furthermore, when speaking with CWS, parents interrupted the child's speech more frequently (Meyers and Freeman 1985b) and for longer periods of time (Kelly and Conture 1992), compared to when speaking with CWNS. It was also suggested that parents' communicative patterns (e.g., the use of more turn-exchanges, shorter pauses, requests for information) may change over time, due to the presence of stuttering in their children's speech. This change was also associated with recovery from stuttering or persistency in stuttering (Kloth et al. 1999). Accordingly, various stuttering therapy approaches for CWS target parental communicative behavior as a means to facilitating communication and improving speech fluency (Millard et al. 2009, 2008; Zebrowski et al. 1996).

While most studies on CPs communicative behavior have focused on how they interact with *children* who stutter, only a limited number of studies have examined how CPs interact with *adults* who stutter. For example, in a qualitative study, AWS reported perceiving people's reactions to their stuttering as negative. They commented on CPs' facial expressions and emotional reactions to stuttering, which included laughing, embarrassment, helplessness, shock, indifference, nervousness, being frightened and feeling awkward. PWS also reported that CPs tend to interrupt and complete their sentences during stuttering events (Klompas and Ross 2004). Such reports are further supported by

Bloodstein (1995), who described how AWS often feel that CPs address them differently (e.g., being laughed at, or treated as unintelligent). Additionally, numerous websites and brochures aimed for the general public address these issues and focus on CPs' behavior, by providing tips for those interacting with PWS. Admittedly, one of the most frequent pieces of advice is to refrain from interrupting PWS, not to complete their speech, and to allow them time to talk (e.g., The Stuttering Foundation 2014).

The interaction between the PWS and the CP is viewed as one of the key principles in stuttering therapy, recognizing that listeners have a significant role in the PWS's eventual success and sense of comfort during the conversation. Bloodstein (1958) argued that "whatever the punishing consequences of stuttering, they must practically always have something to do, ultimately, with a listener - that is, with the manner in which a listener reacts or is believed to react to the stuttering, with the attitudes which the listener seems to adopt, and with the inferences which he draws or seems to draw about the speaker" (Bloodstein 1958; p. 47).

Despite the subjective reports on how PWS perceive CPs' behavior, no empirical evidence is available for quantifying CP's communicative behavior towards PWS. Hence, our study was a preliminary inspection of CPs' communicative behavior, by examining their turn-taking-behaviors (TTB).

The turn-taking mechanism is the basis of a conversation, and allows switching of the talking role in a coordinated manner through the use of mutual signals (Duncan 1972; Wiemann and Knapp 1975). Duncan (1972) categorized turn-taking signals by their function. He listed them as: turn yielding, turn demanding, attempt suppressing and back-channel-communication. Of these, the present study focused on three common TTBs: *Interruptions* and *word/sentence Completions*, which are categorized as turn-demanding signals (i.e., CPs' behaviors, intended to signal the speaker that the CP wishes to talk), and *Reinforcers*, which are categorized as back-channel cues. The first two TTBs were chosen because they are highly common, and frequently reported by stuttering clients. They are also highlighted by many stuttering self-help organizations, in an attempt to educate the public on "appropriate" manners of communicating with PWS (e.g. The Stuttering Foundation of America 2014). The third TTB (reinforcers) was chosen because it is a back-channel cue, and it could represent a supportive reaction towards PWS, or as active listening.

Viewing stuttering in a communicational context with a reciprocal nature stresses the need to examine CP's behavior when interacting with AWS. So far, negative CP's reactions in response to stuttering have been reported; but no systematic examination of the CP's turn-taking behaviors has been performed. Hence, this study was a preliminary attempt to examine the association between stuttering and selected turn-taking behaviors of adult CPs. Specifically, we aimed to examine whether CPs exhibit different TTBs (i.e., *Interruptions*, S*entence*/W*ord Completions and Reinforcers*) during conversations with AWS compared to AWNS.

Materials and Methods

Participants

After receiving the approval of our Institutional Review Board, all participants completed and signed a written informed consent form.

Conversational Partners Ten conversational partners (CPs) (five men and five women), in the age range of 20 to 32 years (mean age = 24.6, *SD* = 3.71) participated in the study. CPs were unpaid volunteers, who were either university students or graduates. All CPs were, first, screened by a SLP, to confirm no speech, language or voice impediments. All CPs reported no history of speech or hearing problems, and no remarkable medical history. In addition, all CPs had reported no previous direct personal experience with PWS, and they were not affiliated with any therapeutic profession.

Procedure

Speakers In addition to the ten CPs, four adult speakers participated in the study; two of which were adults who stutter (AWS), whereas the other two were adults who do not stutter (AWNS). Both AWS were men, ages 39 and 51 years, who were judged by the SLP who referred them to the study as having a stutter, and who identified themselves as PWS. In addition, both AWS underwent a fluency screening by a trained SLP. Their stuttering frequency was quantified by percentage of stuttered syllables (%SS). In addition, stuttering severity was assessed using the Stuttering Severity Instrument-4 (SSI-4; Riley 2009). The first AWS exhibited 13.5 %SS, and a SSI-4 score of 28, which may be categorized as a moderate stuttering severity. His speech was characterized by stuttering-like disfluency (SLDs) (Ambrose and Yairi 1999), which included primarily part-word repetitions and dysrhythmic phonations (e.g., blocks and prolongations). He also exhibited 2.3 % of other disfluencies (ODs), including multisyllabic whole-word repetitions and revisions. The second AWS exhibited 4.67 %SS, and a SSI-4 score of 22, equivalent of a mild stuttering severity. His stuttering was also characterized by SLDs that included primarily part-word repetitions and dysrhythmic phonations (i.e., blocks). He also exhibited 4 % of ODs, which consisted only of phrase repetitions.

The two AWNS were 50 and 60 years old. Both were judged by a SLP as fluent speakers, and neither of them had reported having a stutter. The first AWNS exhibited 0 %SS, and 5 % of OD, and the other 0 %SS, and 4 % of OD. For both AWNS, ODs consisted of hesitations, interjections and monosyllabic word repetitions with 1–2 repeated units.

All four speakers were males, from similar ethnic and socio-economic background, and all were university graduates. None of the speakers had additional speech or hearing impediments, and none of them had any remarkable medical history.

Conversations

Each of the ten CPs conversed with each of the four speakers individually. Consequently, a total of 40 conversations were conducted.

Conversations were performed in a quiet room, clear of visual distractions or ambient noise. During conversations, both CPs and speakers sat on a chair, facing each other, keeping a distance of 1 m. No additional person was present in the room during the conversation. Each conversation lasted approximately 10 min, and the order of the speakers with whom CPs conversed, was randomized individually.

Prior to the conversation, each CP was informed that he/she will be asked to converse with four different speakers, on a given topic, for 10 min. CPs were also informed about the speakers' age and education, but not about his speech (dis)fluency. Both CPs and speakers were informed that the purpose of the study was to examine general communication patterns. They were not informed that the study was related to stuttering, or that it had focused on the CPs behavior.

Each dyad (speaker and CP) was presented with a conversational topic, on a printed card, at the beginning of each session. Topics included contemporary or controversial issues, such as politics, economy and euthanasia, which were expected to elicit interest and elaborated debates. Participants were allowed to change topics at will.

All conversations were audio and video recorded, using a digital video camera (Sony HDR-CX240E). The camera was placed on a tripod, at a distance of 1 m from both participants, at an angle of 90°, ensuring that both participants are properly audio- and video-recorded. The camera was set by the experimenter, who turned it on and adjusted its settings before the conversation, then left the room during the conversation, to reduce interferences, distractions or possible biases.

Data Coding

All recorded conversations were transcribed, first, by a SLP, experienced in stuttering analysis and coding. Following, transcripts were re-examined by a senior SLP. Then, all disagreements between the two SLPs were discussed, until full agreement was reached. The first 2 min of each conversation were excluded from the analysis, to reduce possible interfering effects of the beginning of the session.

Following the scheme described by Meyers and Freeman (1985b), transcriptions were segmented into conversational turns. A 'turn' was defined as a continuous segment of speech produced by a specific speaker, bound by the other speaker's speech, and including all utterances produced by the speaker, until the other partner begins to talk (Kelly and Conture 1992; Savelkoul et al. 2007). As shown in Fig. 1, conversations with AWS consisted of fewer conversational turns (i.e., fewer turn exchanges),

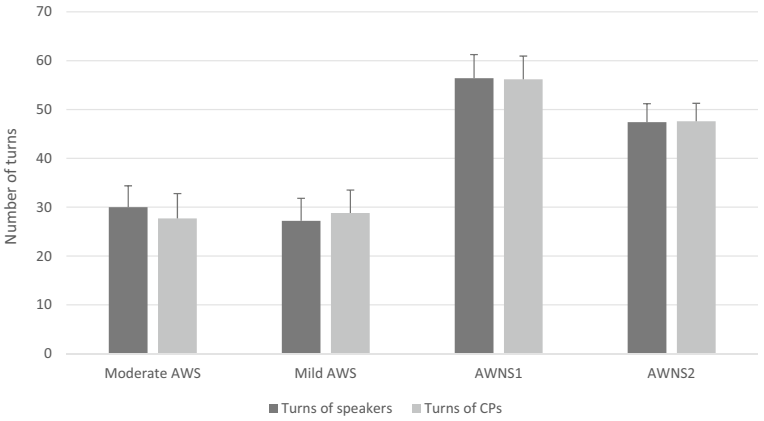


Fig. 1 Mean number of conversational turns (and standard error) performed by CPs and speakers

compared to those involving AWNS. Specifically, the mean number of conversational turns produced by the ten CPs was 40.1 (*SD* = 18.6). Of these, a mean of 28.3 turns (*SD* = 15.1) were directed towards the two AWS, and 51.9 (*SD* = 13.8) towards the two AWNS. The mean number of conversational turns produced by the four speakers was 40.3 (*SD* = 18.2). Of these, a mean of 28.6 turns (*SD* = 13.91) was exhibited by the two AWS, and 51.9 (*SD* = 14.2) by the two AWNS.

Turns produced by the AWS were marked as either normally-fluent or stuttered. Specifically, stuttered turns included any form of SLD (Ambrose and Yairi 1999), whereas normally-fluent turns included fluent utterances, as well as utterances with ODs.

Three basic categories of turn-taking behaviors were marked in the speech of the CPs. These followed the categorization scheme introduced by Wiemann and Knapp (1975). Categories included:

(a) *Reinforcers*: words/sounds produced by the CP, intended to provide feedback to the speaker (e.g., "um-hum", "yeah", "right").
(b) *Interruptions*: simultaneous speaking of the CP and speaker, representing an attempt of the CP to take the speaking role, before the current speaker had finished talking (e.g., AWS: "I went to the zoo and…", CP: "Yeah, I was there too last year"),
(c) *Completions*: utterances produced by the CP, intended to complete a word or phrase produced by the speaker (e.g., AWS: "So he took the b-b-…", CP: "banana").

The relative frequency of each TTB category was calculated, as suggested by Meyers and Freeman (1985b). Namely, the total amount of each TTB category exhibited by the CP in the conversation was divided by the total number of turns produced by the speaker.

Results

Differences in TTBs towards AWS and AWNS

Group means for the three TTB categories performed by the CPs are presented in Table 1. Values represent relative proportions of each TTB.

As shown, during conversations with AWS, CPs produced a larger proportion of TTBs, in comparison with their conversations with AWNS. However, these differences were relatively small in magnitude. Four separate analyses-of-variance (one for each TTB and for overall score) were conducted, in which speaker category (AWS versus AWNS) and CP's gender (male versus female) were defined as independent measures. No statistically significant differences were found between the CPs' reaction to the two speaker categories for overall TTB, as well as for *Interruptions*, *Reinforcers* and for *Completions* {$[F_{(1,8)} = 2.89, P = 0.12]$, $[F_{(1,8)} = 5.08, P = 0.06]$, $[F_{(1,8)} = 0.01, P = 0.91]$, $[F_{(1,8)} = 0.07, P = 0.8]$, respectively}. In addition, no significant main effect for CP's gender was found {$[F_{(1,8)} = 0.17, P = 0.69]$, $[F_{(1,8)} = 0.55, P = 0.47]$, $[F_{(1,8)} = 0.21, P = 0.65]$, $[F_{(1,8)} = 1.48, P = 0.25]$, respectively}.

Table 1 Group means (standard deviations in parentheses) for Reinforcers, Interruptions and Completions during conversations with AWS and with AWNS. Numbers represent proportion of each category from the total number of turn

TTB	Gender	Conversation with AWSs	Conversation with AWNSs
Reinforcers	Men	23.05 (16.65)	26.01 (16.68)
	Women	29.80 (11.08)	26.06 (14.86)
	Combined	26.42 (7.86)	26.03 (3.03)
Interruptions	Men	26.62 (11.85)	18.17 (10.1)
	Women	21.47 (9.30)	15.96 (13.73)
	Combined	24.04 (0.09)	17.06 (1.96)
Completions	Men	4.37 (4.39)	2.74 (2.98)
	Women	1.28 (2.08)	2.48 (2.37)
	Combined	2.82 (0.38)	2.61 (0.87)
Overall	Men	54.04 (15.33)	46.93 (17.41)
	Women	52.56 (11.72)	44.50 (12.00)
	Combined	53.30 (8.35)	45.71 (4.13)

Differences in TTBs towards Fluent and Stuttered Turns of AWS

Table 2 presents group means for the three TTB categories, performed by the ten CPs. Data is presented separately for TTBs performed towards fluent and stuttered turns, of both AWS with mild and moderate stuttering severity. Values represent relative proportions of each TTB.

Table 2 Group means (standard deviations in parentheses) for Reinforcers, Interruptions, Completions and overall TTBs produced in response to fluent and stuttered turns by the CPs during conversations with the AWS

TTB	Gender	Normally fluent turns		Stuttered turns	
		Mild	Moderate	Mild	Moderate
Reinforcers	Men	4.95 (6.02)	9.90 (5.70)	11.38 (11.74)	19.86 (12.14)
	Women	8.30 (8.51)	10.58 (3.69)	17.1 (8.09)	23.62 (12.71)
	Combined	6.62 (7.26)	10.24 (4.69)	14.24 (9.91)	21.74 (12.42)
Interruptions	Men	6.92 (4.14)	13.00 (5.46)	16.22 (9.29)	17.09 (12.64)
	Women	10.67 (5.37)	7.45 (7.23)	14.13 (2.76)	10.68 (6.76)
	Combined	8.79 (4.75)	10.22 (6.34)	15.17 (6.02)	13.88 (9.70)
Completions	Men	8.26 (1.17)	1.45 (3.25)	3.48 (3.34)	2.98 (4.28)
	Women	0.80 (1.78)	0.00 (0.00)	0.00 (0.00)	1.76 (2.45)
	Combined	4.53 (1.47)	0.72 (1.62)	1.74 (1.67)	2.37 (3.36)
Overall	Men	12.70 (9.61)	24.35 (6.77)	31.09 (14.45)	39.94 (10.44)
	Women	19.77 (9.91)	18.03 (7.46)	31.23 (7.68)	36.08 (15.43)
	Combined	16.23 (9.76)	21.19 (7.11)	31.16 (31.16)	38.01 (12.93)

As shown, CPs produced a larger proportion of TTBs during stuttered turns, in comparison with fluent turns. Four separate analyses-of-variance (one for each TTB and for overall score) were conducted, in which fluency category (stuttered versus fluent), stuttering severity (mild versus moderate) and CP's gender (male versus female) were defined as independent measures.

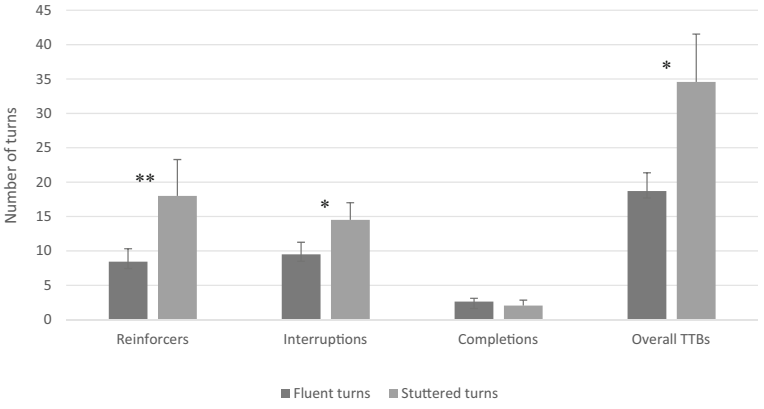
Analyses revealed a main effect for fluency category, for total TTB, for Reinforces and for Interruptions, but not for Completions {[$F_{(1,8)}$ = 21.47, P = 0.002], [$F_{(1,8)}$ = 16.34, P = 0.004], [$F_{(1,8)}$ = 5.54, P = 0.04], [$F_{(1,8)}$ = 3.17, P = 0.11], respectively}. These differences are illustrated in Fig. 2.

A main effect for stuttering severity was found only for *Reinforcers*, but not for all other TTBs. Specifically, CPs produced a larger ratio of *Reinforcers* while conversing with the AWS who exhibits moderate stuttering (as assessed prior to the study), compared to when conversing with the AWS who exhibits mild stuttering [$F_{(1,8)}$ = 5.53, P = 0.04]. Differences for overall TTBs, *Interruptions* and *Completions* failed to reach statistical significance {[$F_{(1,8)}$ = 2.97, P = 0.12], [$F_{(1,8)}$ = 0.01, P = 0.97], [$F_{(1,8)}$ = 1.40, P = 0.71]}.

Finally, no statistically significant main effect for CP's gender was found for neither overall TTB, *Reinforcers*, *Interruptions*, nor *Completions* {[$F_{(1,8)}$ = 0.06, P = 0.16]; [$F_{(1,8)}$ = 0.72, P = 0.42]; [$F_{(1,8)}$ = 0.9, P = 0.37]; [$F_{(1,8)}$ = 2.38, P = 0.16], respectively}.

Discussion

This study was a preliminary attempt to examine communicational behaviors toward people who stutter. To that end, we examined the occurrence of three basic turn-taking behaviors of ten people (CPs) who conversed with two AWS and with two AWNS. The primary motivation for this study stemmed from the realization that the nature of a verbal interaction between two partners is dependent upon combinations of circumstances and upon the personal characteristics of both participants, and does not rely on one of them alone (Gregory and Hoyt 1982). Moreover, this interaction is based on a



* P<0.05
** P<0.001

Fig. 2 Mean proportional number of TTBs, exhibited by CPs during fluent and stuttered turns of AWS

dyadic unit, in which the communication style of each participant may influence the other participant, and vice versa (Cappella 1981). Therefore, we were interested to learn whether people change their conversational style when conversing with a PWS, in comparison to their conversational style when conversing with a PWNS. Specifically, we examined differences in the occurrence of three basic and common TTBs during interactions with AWS and AWNS. Previous studies have shown that adults indeed modify their communication style when communicating with children-who-stutter (e.g., Kelly and Conture 1992; Meyers and Freeman 1985a, b). However, the present study is the first attempt to examine this in interactions with adults-who-stutter.

The primary finding of our study was that, on the whole, CPs exhibited a similar distribution of turn-taking behaviors (TTBs) towards both AWS and AWNS, as reflected by the lack of significant differences between the proportions of all TTB types in both cases. This result contradicted our initial hypothesis, which was based on previous clinical reports, suggesting that the characteristics of a conversation vary, as a function of participants' behavior, their communication skills and additional varied circumstances (e.g., Sacks et al. 1974). Our initial hypothesis was also based on clinical reports of PWS, about CPs' reactions to their speech (e.g., Bloodstein 1995; ASHA 2015), as well as on a large body of research on the negative attitudes toward PWS (e.g., Boyle and Blood 2015; Cooper and Rustin 1985; Craig et al. 2003; Dorsey and Guenther 2000; St. Louis 2011). Additionally, research has also documented physiological reactions in listeners, such as increased skin conductance and slower heart rate, while listening to stuttered speech (Guntupalli et al. 2007, 2012).

Our results suggest that despite the known negative attitudes held by listeners toward PWS, these are not necessarily manifested in the form of TTBs. It is, therefore, conceivable, that other behaviors, which were not examined in our study, may be exhibited by CPs. Such behaviors could be related to PWS reported complaints, and should be studied in future research.

An alternative interpretation may be suggested for the lack of differences in TTB pattern towards PWS and PWNS, despite consistent reports of PWS on being interrupted by their CP. It is possible that if PWS are often anxious about listeners' reactions to their stuttering, they may misinterpret their CPs' communicational behaviors, and perceive it more negatively than was intended. Bloodstein (1958), for example, explained that PWS could be highly sensitive to CPs' behavior, due to their negative past experiences. Therefore, their reaction to a specific interaction might be tainted or biased, leading them to exaggerate or misunderstand the CPs' natural conversational behavior (Ezrati-Vinacour and Levin 2001; Wiemann and Knapp 1975). Similar reactions have also been documented when AWNS were asked to stutter voluntarily (Lohman 2008; Rami et al. 2003). Accordingly, the fact that listeners do not exhibit different TTBs when conversing with PWS, may be incorporated into stuttering therapy programs, such as cognitive-behavioral therapy. This could assist in refuting specific beliefs and prejudices regarding the listeners' expected behavior.

The second finding of our study was that, in general, CPs exhibited more TTBs in response to stuttered turns, compared to fluent turns of the same speaker. Specifically, CPs produced significantly more *Reinforcers* and *Interruptions* in response to the stuttered speech of the AWS, compared to their response to the same speakers' normally fluent speech. This illustrates that people indeed distinguish between stuttering and normal fluency during a conversation, and react to them differently, even

during a conversation with the same speaker. This finding is reminiscent of Meyers and Freeman (1985b), who reported that mothers have interrupted their children's stuttered speech more than they have interrupted their children's normally disfluent speech.

Combining the first two findings of our study suggests that the identification of the speaker as a person-who-stutters does not necessarily affect the CP's turn-taking behavior while talking to him. However, identification of stuttered speech elicits different turn-taking-behavior patterns, compared to fluent speech. This demonstrates that, within this context, people modify their TTBs when facing stuttered speech, but not as a general behavior towards the stuttering person. This conclusion could lead to two clinical implications. First, from the listeners' perspective, the generally accepted notion, that people who communicate with PWS should avoid interrupting them during moments of stuttering, is reinforced. Our study demonstrates that, indeed, listeners tend to actively react to moments of stuttering (i.e., produce more TTBs), more than to fluent utterances. Therefore, encouraging listeners to refrain from such behaviors may assist the PWS during those moments, and reduce their perception of the situation as stressful or negative. Second, from the PWS's perspective, this result may be interpreted as emphasizing the importance of modifying the overt aspects of stuttering, as a means for affecting the mutual interaction between the PWS and the CP.

As noted above, the third finding of this study was that CPs behaved differently in response to mild versus moderate stuttering. Specifically, our participants exhibited more *Reinforcers* during their conversations with the AWS with moderate stuttering severity, compared to conversing with the AWS with mild stuttering severity. This tendency of naïve listeners to produce more interferences during conversations with speakers with more pronounced stuttering is in agreement with previous reports. For example, it was shown that listeners rated speakers with more severe stuttering as having more negative personal traits, and reacted more frequently to those speakers during a conversation (Panico et al. 2005; Susca and Healey 2001). Similarly, in our study, CPs exhibited *Reinforcers* more frequently when encountering a more severe stuttering pattern.

Another possible explanation to this observation may be related to the CP's perception of time pressure. It is possible that, in reaction to the stuttered moments, our CPs have experienced time pressure. This, in turn, has led them to take over the speaking role, to compensate for the 'time loss' caused by the stuttered speech. Therefore, they interrupted the PWS more frequently as they noticed more instances of stuttering. Alternatively, it is possible that the CPs identified the PWS's speech struggles, and intuitively attempted to assist the speaker, either by *Interruptions* or by *Completions* (Meyers and Freeman 1985b).

A possible alternative interpretation may be suggested in view of the turn-taking mechanism and its theory (Duncan 1972). The mechanism of turn-taking behavior is based on mutual signals produced by both CP and speaker. In most cases, this mutual signaling system assures conversation flow and order. Thus, in response to a stuttering moment, CPs may interpret the unexpected disfluency as a signal for turn yielding. Thus, they may produce an *interruption*, for example, for regaining a speaking turn (Meyers and Freeman 1985b; Duncan 1972). Following the same scheme, the larger proportion of the *Reinforcers* category towards stuttering may be explained by its role in the turn-taking mechanism. Duncan (1972) argued that *Reinforcers* may be viewed as a "back channel signal", produced by the CP to ensure the speaker that he/she may

uphold the speaking role. Therefore, it may be suggested that when CPs identify difficulties in speech production (i.e., stuttering), they produce more *Reinforcers*, to encourage the AWS to maintain speaking turn.

Although our study was not designed to explore gender differences, five of our CPs were men and the other five were women. This enabled a preliminary examination of gender differences within our sample. However, our data showed no gender differences in the proportion of TTBs towards AWS and AWNS, towards fluent and stuttered turns, and towards mild and moderate stuttering severity. A review of the literature did not reveal any published study that directly examined gender differences in TTBs towards PWS. The few studies that examined related aspects, focused on attitudes of men and women towards PWS. Burley and Rinaldi (1986), for example, reported that men rated PWS less favorably than women did. In contrast, St. Louis (2012) challenged that, and reported no gender differences in attitudes towards a single PWS. Although our findings support St. Louis', it should be noted that in many other studies, not related to stuttering specifically, women exhibit a more positive predisposition than men toward people with various disabilities (e.g., Hampton and Zhu 2011; Panek and Jungers 2008). Clearly, this issue warrants further examination, using a larger sample, gender-balanced, and a more specifically directed methodology.

In light of the preliminary nature of this study, several limitations should be noted. First, our study is based on a rather limited number of conversations between four speakers and ten CPs. In addition, it examined only three basic TTB categories. To enhance and validate our results, future studies should use a larger sample size, controlling for age differences, and expand into the exploration of a wider range of TTBs. Second, our study was designed to compare TTBs directed towards AWS during typically fluent turns versus stuttered turns. However, we did not compare TTBs during fluent versus normally disfluent turns (which can be produced by both PWS and PWNS). Therefore, our data does not provide information on CPs reaction to normal disfluency (as opposed to stuttering). Future research could examine whether people increase the amount of TTBs in response to stuttering specifically, or whether similar patterns are elicited in response to speech disfluency in general. Third, the current findings should be considered only in the context of the present setting (i.e., face-to-face conversation). It is expected that different interaction settings would result in different patterns of TTBs. For example, AWS often report the phone as the most difficult speech situation (e.g., Leith and Timmons 1983), due to the fact that it relies solely on verbal communication, without the support of visual cues. Therefore, it is likely that TTB patterns would be different during such a condition. Clearly, this should be examined separately in the future.

Despite these limitations, several basic clinical implications may be considered. First, the single most common recommendation given to people interacting with PWS is to refrain from interrupting them during speech (e.g., ASHA 2015). Our results may be viewed as supporting this general recommendation, by providing empirical evidence that, indeed, people interrupt stuttered speech more than fluent speech. While our data demonstrate that this reaction to stuttered speech may be associated with the mechanism of turn-taking behaviors, and may be intended to encourage the PWS to maintain his/her speaking turn; it is likely to be perceived by the PWS as stressful or even offensive. Therefore, the general public should be better educated about this effect, and this recommendation should be further supported by additional empirical

evidence. Second, people-who-stutter should be educated about the reciprocal nature of TTBs during a conversation. We believe that providing the PWS with a better understanding of this mechanism could elicit a more rational, neutral and perhaps even a positive view of these events, so that they would be perceived as less stressful or offensive. Because the subjective experience of the interaction is viewed as an important pivot in many stuttering therapy programs (e.g., Beilby et al. 2012; Menzies et al. 2008), this could alter the PWS's perception, and consequently adjust his/her reaction to the situation. Finally, our participants were shown to change their turn-taking behavior in the presence of stuttered speech, but did not modify their TTBs when talking to AWS compared to TTBs towards AWNS. This can serve to encourage PWS and speech therapists to target the speech symptoms themselves within stuttering therapy programs. Aside from the anticipated improvement in speech fluency, this may lead to diminishing the excessive use of TTBs by the listener, in response to stuttering.

Conclusion

This study demonstrated that people use similar patterns of TTBs during conversations with AWS and AWNS. However, a larger proportion of TTBs were exhibited in response to stuttered speech compared to fluent speech, and in response to more severe stuttering. Our data illustrates how stuttering affects not only the PWS, but also those who communicate with him/her. On the other hand, the data indicates that the modification in TTB is specific to the moment of stuttering, as it is not generally different when directed towards PWS compared to PWNS.

Compliance with Ethical Standards

Ethical Approval All procedures performed in this study were in accordance with the ethical standards of the institutional research committee, and the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Conflict of Interest Debora Freud declares she has no conflict of interest. Libat Moria declares she has no conflict of interest. Ruth Ezrati-Vinacour declares she has no conflict of interest. Ofer Amir declares he has no conflict of interest.

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