The Young Child's Awareness of Stuttering-Like Disfluency

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The emergence of awareness of stuttering has been an important factor in theoretical and clinical considerations for early childhood stuttering. The present research program is aimed at studying the development of awareness of stuttering-like disfluency in normally fluent preschool and first-grade children using responses to video speech samples. A total of 79 children in five different age groups were asked to discriminate between the speech (fluent and disfluent) of two puppets, identify with the one who speaks like them, and evaluate the disfluent and fluent speech of the puppets. It was found that from age 3, children show evidence of awareness of the disfluency used in the study, but most children reached full awareness at age 5. Also, negative evaluation of disfluent speech is observed from age 4. Theoretical and clinical implications are discussed.

KEY WORDS: awareness, disfluency, stuttering

Although the research presented in this report focused on the awareness of stuttering-like disfluency in normally fluent children, much of the motivation for research of this phenomenon stems from a long history of interest in the awareness of such disfluency among children who stutter. In the great majority of cases, the disorder of stuttering begins before age 4 (Andrews & Harris, 1964; Yairi & Ambrose, 1999). For many years, the question of whether young children who stutter are aware of their stuttering has been central in both the theoretical and clinical thinking about the disorder. The Oxford Advanced Learner's Dictionary (Cowie, 1992) defines the term *aware* as "having knowledge or realization of" and "well-informed; interested, especially in current events" (p. 70). The Dictionary of Psychology (Drever, 1977, p. 26) defines awareness as "mere experience of an object or idea; sometimes equivalent to consciousness." It is interesting to note, however, that in spite of its common usage in the scientific and clinical literature of stuttering, neither adequate definition of awareness of stuttering nor evidence for its presence or absence in relation to the respective claims have been offered.

According to Bleumel (1932), awareness is absent during the early stage or *primary stuttering*. A more advanced stage, *secondary stuttering*, sets in later as physical tension becomes associated with the speech interruptions, a time when awareness of the speaking difficulties and secondary characteristics emerges, prompting the development of negative emotional reactions to stuttering. In other views of the developmental sequences of stuttering, awareness appears relatively late.

Bloodstein (1960) suggested that typically, during his Stage I (ages 2–7), some brief emotional reactions to stuttering moments may occur, but the child does not see himself/herself as a stutterer. Usually, full

awareness sets in only by Stage II. Later, Bloodstein (1995) acknowledged the possibility of very young children who stutter being aware of their stuttering, concluding that "secondary symptoms" are not essential signs of awareness. According to Van Riper's (1963) early account, awareness of stuttering is lacking during the first stage of the disorder. Some brief moments of awareness might be experienced in the second stage, with full awareness seen only in the third stage that often takes place in school-age children. Later, when Van Riper (1971) recognized variability in the development of stuttering, his four-track system also reflected differences in the factor of awareness of stuttering progressing from slowly developing awareness in Tracks I and II to the immediate presence of awareness in Tracks III and IV.

The essential role of awareness in the development of stuttering is also seen in Johnson et al.'s (1959) diagnosogenic theory, which was based on the idea that making the child aware of his/her disfluency creates stress that results in stuttering. This theory and the prevailing beliefs about the child's lack of stuttering awareness during the early stage of the disorder led to a clinical strategy of avoiding direct speech therapy for young children. Accepting the tenet that awareness is essential in the transition from normal disfluency to full-fledged stuttering, clinicians feared that the therapy itself would arouse the child's awareness and aggravate the problem (Ambrose & Yairi, 1994; Costello, 1985). Such beliefs and fear were an important, though not the only, reason that for several decades therapy focused on parent counseling (Johnson, 1961; Rustin & Cook, 1995; Schuell, 1949; Starkweather, Gottwald, & Halfond, 1990; Yairi, 1997).

The past 2 decades have seen a noticeable change in this domain as research evidence from very young children who stutter provided potential clues about awareness. In 1983, Yairi reported that the parents of 18% of children in his sample saw indications of their children being aware of their speaking difficulties at or close to the time of stuttering onset. Using video analyses of speech samples, Conture and Kelly (1991) and Yairi, Ambrose, and Niermann (1993) showed that head and neck movement associated with disfluencies are common in very young children who stutter. Conture and Kelly (1991) considered the possibility, among others, that some movements represent reaction to the child's real or perceived speaking difficulties. (Currently, however, there is no direct evidence linking head and neck movement with awareness of stuttering in young children.) More recently, Bernstein Ratner (1997) suggested that young stuttering children show atypically high awareness of their speech difficulty not seen in children with language or articulation disorders. This conclusion received further support from children's responses to DAF tasks (Razzak & Bernstein Ratner, 1999).

These, as well as other findings showing a marked difference between the disfluencies of young children who stutter and those of normally speaking children (e.g., Throneburg & Yairi, 1994), have contributed to changing the concept of early stuttering. If awareness and deviations from normal disfluency are present from a very early stage, the need to keep something normal from turning into stuttering is questioned. Indirectly, this provides theoretical support to a shift from the traditional "hands off the child" approach to treating childhood stuttering. Specifically, more recent literature indicates a change in the traditional clinical thinking, with a growing interest in reconsidering the traditional philosophy that objected to any mention of the stuttering or any attempt to modify the child's speech. Increasingly, there has been a willingness to call the child's attention to speech and stuttering, as well as to provide direct therapy to the child (e.g., Copolla & Yairi, 1982; Costello Ingham, 1999; Hill, 1991; Logan & Caruso, 1997; Martin, Kuhl, & Haroldson, 1972; Onslow, Costa, & Rue, 1990; Shine, 1980). Still, in spite of the change, there appears to be some ambivalence in the approach to awareness in current therapies. Some workers assume the child might be aware of his stuttering from a very early age (Gottwald & Starkweather, 1995; Logan & Caruso, 1997; Rustin & Cook, 1995), whereas others advocate assessment of awareness in each child before initiating treatment (Adams, 1991; Gregory, 1985; Luper & Mulder, 1964; Peters & Guitar, 1991; Schwartz, Zebrowski & Conture, 1990).

It is plausible that a child's awareness of stuttering is linked to general metalinguistic development, that is, "the ability to reflect upon and manipulate the structural features of spoken language" (Nesdale & Tunmer, 1984, p. 371). Metalinguistics is a broad term encompassing a wide array of particular language awareness abilities, including the ability to (a) correct language errors (Saywitz & Wilkinson, 1982); (b) use word play and humor (Berko Gleason, 1997); (c) judge the grammatical or semantic accuracy of language (Rice, Wexler, & Redmond, 1999); and (d) generate rhymes, segment words into sound, and blend sounds into words (i.e., phonological awareness skills; Catts, 1997; Chaney, 1994). Although precise details regarding the development of all metalinguistic skills are incomplete, it is generally accepted that certain abilities emerge during the early preschool years (e.g., correcting language errors, simple uses of word-based humor), whereas more challenging metalinguistic abilities are not apparent until later preschool or even early school years (e.g., making grammaticality judgments; segmentation and blending). With respect to pinpointing the age of acquisition of various metalinguistic skills, the nature of the task may also influence findings. For example, observing natural instances of metalinguistic awareness (e.g.,

noting a child's use of rhyme) may yield different impressions of children's abilities than highly structured tasks.

To date, relatively little is known about the processes by which children develop the awareness of stuttering that eventually may lead to tension and negative reactions toward self, speech, and social interaction (Bloodstein, 1960; Van Riper, 1971). Historically, a barrier to gaining this information has been the fear that inquiring about stuttering behaviors in any direct way might increase attention to and anxiety about stuttering, both in the child and in the child's family, consequently exacerbating the condition (Vanryckeghem & Brutten, 1992). Scant research has been conducted, mostly with school-age groups. Also, there is little data concerning whether the early awareness of stuttering in very young children is necessarily associated with negative evaluation of it. Two studies with young schoolchildren seem to indicate some awareness of stuttering. Giolas and Williams (1958) examined 120 kindergarten and second-grade normally fluent children. The task consisted of three stories told by three adults with three speech patterns identified as fluent, interjections, and repetitions. The results showed that the speech pattern was a determining factor in the selection of a person as a prospective teacher. Culatta and Sloan (1977) studied 60 first- to fourth-grade fluent children. They were instructed to listen to the beginning of a story read fluently and then read with disfluencies. The children were asked which reading they preferred and why, and if the readings were the same or different, and why. The investigators reported that although awareness of the word "stuttering" began to emerge in the third and fourth grades, children as young as 5 or 6 years old could discriminate between fluent and disfluent speech. The limited research with this older group, however, has dealt primarily with concerns and attitudes about stuttering (e.g., Silverman, 1970). The recently developed Communication Attitude Test (CAT; Brutten & Dunham, 1989), provides clinicians with a tool for assessing young stutterers' attitudes towards their speech, thus indirectly also assessing awareness. Unfortunately, the instrument is only applicable to children 6 years old and older.

Although there have been a number of reports of clinical experiences alluding to the existence of awareness of stuttering in preschool children who stutter (Sander, 1959; Van Riper, 1982; Yairi & Ambrose, 1992), it has not been systematically researched until recently. To date, there has been only one published experimental study concerning direct indications of preschoolers' awareness of disfluency (Ambrose & Yairi, 1994). The investigators used a pair of identical puppets, one fluent and the other displaying disfluent speech. Normally fluent and stuttering children aged 2 to 5 years were asked to identify the puppet whose speech resembled their own. As early as age 3, children who stutter identified themselves, in frequency greater than chance, with the stuttering puppet. Normally fluent children identify themselves more often with the fluent puppet. Such correct self-identification, taken by the investigators as awareness, increased with age. Nevertheless, the narrow age range did not allow for evaluation of the full development of awareness even in the normal children. Additionally, only one disfluency type, repetition, was employed.

Whereas much more research is needed to understand awareness of stuttering in young children who stutter, we posit that better understanding of the development of awareness of disfluent speech in general, and especially disfluency that is most typical of stuttering (stuttering-like disfluency), in normally fluent children should be one of the first steps in the systematic study of this phenomenon. First, from an experimental point of view, the appearance of awareness in normally fluent children is apt to be less contaminated by the possibly active role of parents and/or others who are more likely to call the stuttering child's attention to his/her disfluency. Second, data about awareness of stuttering-like disfluency in normally speaking children should provide relevant information concerning critical elements in the formative processes underlying children's attitudes toward stuttering. For example, when might they be expected to begin to express preference for fluent as opposed to disfluent speech (Culatta & Sloan, 1977; Giolas & Williams, 1958), or what might their initial response be, and when can they be expected to react negatively to their stuttering peers? A relevant unpublished doctoral study by Langer (1968) solicited responses of normally speaking preschool-age children to a speech sample of a school-age child who read normally and also simulated samples of mild, moderate, and severe stuttering. There was no difference between children's responses to normal speech and mild stuttering. There were significantly more negative responses, however, to moderate and severe stuttering than to normal speech. Such research needs to be expanded.

Third, it is important to have a developmental baseline of awareness in normally fluent children to which information on the stuttering child's awareness can be compared. Such comparisons would highlight the special features that awareness takes on in children who stutter. Thus, awareness could be considered more carefully in understanding the development of the disorder, evaluating theories of stuttering, and in clinical practice, both in parent counseling and direct treatment.

Keeping in mind the limitations of the Ambrose and Yairi (1994) study, there is a need to include a larger number of participants, as well as children older than 5 years, for determining the transition to 100% awareness

and to assess the influence of several types of disfluency. Therefore, the overall purpose of the present investigation was to assess the emergence and the development, over a period of several years, of the awareness of stuttering-like disfluencies in normally fluent children between the ages of 3 and 7 years. The specific objectives were to (a) identify the age at which fluent children become aware of such disfluencies, (b) investigate whether the particular type of disfluency influences the timing at which awareness emerges, and (c) assess the relation between the level of awareness of stuttering-like disfluency and the children's evaluation of the desirability of disfluent speech.

Method

Participants

Five groups of children from age 3 to 7 participated. Each consisted of 16 children, 8 boys and 8 girls, except for the youngest group, with 8 girls and 7 boys. The children in each group were selected randomly from their respective kindergarten or school class, averaging 35 children in size. The 3-year-old age group represented the entire class. Informed consent for the participation in this study was obtained from the parents. Details regarding the children's ages are provided in Table 1.

The children were identified in several different, randomly selected kindergartens or first-grade classes in the greater Tel-Aviv (Israel) area. Generally, they represented the middle to mid-high socioeconomic class. The children were classified as normally fluent speakers with no history of stuttering. The four people classifying the children were the two parents, the teacher, and one of the experimenters (RP). The teachers had extensive personal contact with each child in their respective classes for at least 6 months before the study was conducted. Most children were familiar with the teachers for considerably longer periods. The experimenter, a speech clinician with several years experience, had the opportunity to carefully listen to the children's speech during play activities and direct conversation for approximately 25 minutes during at least two visits. On this basis, she made independent judgments that their speech did not contain instances of perceived stuttering. The extensive and lengthy close contact with each child and independent judgment of all four observers was deemed satisfactory for the classification of *normally fluent*. All the children passed a battery of several screening tests in Hebrew for hearing, speech, and language development skills, as well as part of the Hebrew version of the Wechsler Intelligence Test (Wechsler, 1963) routinely administered in well-baby clinics. This screening eliminated children with noticeable problems. Additionally, potential subjects reported or suspected, during the time the study was conducted, to have any speech, language, hearing, visual, or attention problems were excluded.

Table 1. The age range, mean age, and standard deviation for each age group

Group	Age	Range	*M*	*SD*
I	3	3·0–3·11	3·8	29
II	4	4:0–4.11	4·6	29
III	5	5:0–5:11	5·10	.48
IV	6	6:0–6·11	6.3	17
V	7	7.0–7·11	7·6	28

Experimental Stimuli

An experimental stimulus was constructed, similar to that employed by Ambrose and Yairi (1994) in their study of the awareness of disfluency in children who stutter. Videotapes were made that presented two identical seal puppets positioned side by side on the television screen. One puppet spoke completely fluently and the other spoke with disfluent speech. The seal puppets were chosen because of their physical neutrality.

A series of six pairs of sentence stimuli in Hebrew, composed of high probability words that were also judged as frequently used and easily understandable to 3-year-olds, were prepared for the puppets to say. Ambrose and Yairi (1994) reported that six was the optimal number of sentences for the 3-year-old children in terms of keeping their interest, as well as having a sufficient number of responses. Each sentence was verbally produced once by the fluent puppet and once by the disfluent puppet. Thus, each pair of sentences differed only in its fluency. Although only one puppet talked at a time, both puppets were seen simultaneously.

The disfluencies incorporated into the sentences included those types labeled by Yairi and Ambrose (1992) as "stuttering-like disfluencies" because of their high probability to occur in speech of children who stutter as well as to be perceived by listeners as "stuttering." Of the six sentences produced by the disfluent puppet, three contained *clonic*-type disfluencies—sound, syllable, and single-syllable-word repetitions—whereas the other three sentences contained *tonic*-type disfluencies, blocks, and prolongations. Each of the six sentences differed with regard to their content. The fluent and disfluent characters of the sentences in Hebrew are illustrated in the following examples (the full list of sentences is presented in the Appendix):

Disfluent puppet: /ye ye ye yesh li ka ka ka kadur/ (I have a ball.)

Fluent puppet: /yesh li kadur / (I have a ball.)

Disfluent puppet: /aaaani (prolongation) mesachek im m (block) mechonit/ (I play with a car.)

Fluent puppet: /ani mesachek im mechonit/ (I play with a car.)

All instances of repetition included three extra iterations. Elongations and blocks lasted approximately one second. In each pair of sentences, the position of the fluent puppet on the TV screen alternated randomly with that of the disfluent puppet. The presentation of the nonfluent and fluent puppet sentences was randomized. That is, some sentences began with the disfluent version, whereas others began with the fluent version. The voice of the two puppets was that of a young woman who attempted to imitate the voice of a child. The speech of the disfluent puppet in each sentence was perceived as stuttering by three independent speech clinicians. No attempt was made to convey exaggerated tension or unusual movement of the puppet. The purpose was to focus on disfluencies, not on other possible parameters of stuttering.

Procedure

Each participant child viewed the video individually during a single session in a partitioned area of his/her day-care center, kindergarten, or school. Sessions lasted approximately 10 minutes. Before beginning, the same investigator explained to the child that he/she was about to see two puppets on the television monitor. One puppet would speak, and then the other puppet would speak. An example of one pair of sentences with clonic disfluency and one pair of sentences with tonic disfluency (not included in the experimental task) was given. In this phase, the child viewed the examples but did not respond. After the example, pairs of experimental sentences were presented to the child. After each pair, the tape stopped and the child was asked the following questions: (1) Do the puppets talk in the same way [discrimination subtask]? (2) Which puppet talks like you [self-identification subtask]? The puppets' images remained frozen on the television monitor for 20 seconds to allow the child to point to the desired puppet and register his or her response. The tape was then allowed to advance to the next pair of sentences.

Following the six pairs of sentences, a new disfluent sentence of clonic type was presented, and the child was asked to respond to the following two questions: (3) What do we call this kind of talking [labeling subtask]? (4) Is that talking good or not good [evaluation subtask]? Finally, another pair of fluent and disfluent sentences was presented and the following questions asked: (5) Which one would you like to play with? (6) Why [evaluation subtasks]? All the children finished the entire task in one sitting.

Data Analysis

Responses to Questions 1 and 2, regarding the ability to discriminate between the two puppets and the ability to identify with one of the puppets, were scored as follows. For each sentence, the child received a score of 1 for correct discrimination and a score of 0 for incorrect discrimination. The criterion for correct discrimination was when the child said that the two puppets did not speak the same. Similarly, a score of 1 for correct self-identification and a score of 0 for incorrect self-identification were given. The criterion for correct self-identification was when the (fluent) child pointed at the fluent puppet. Therefore, the range of each individual subject's scores for each of these two questions could vary from 0 to 6.

The responses of the children to the two questions were also tallied to allow comparisons between the two major classes of disfluencies. For each subject, responses to the three sentences that contained repetitions were combined into a single score that ranged from 0 to 3, as were responses to the three sentences that contained prolongations. These scores were assumed to provide an indication of the influence of the type of disfluency on awareness.

The answers to Question 3 ("What do we call this kind of talking?") were classified into one of four categories: (a) statements including the word *stuttering*, (b) statements including references to speech-related problems, but not the word *stuttering*, (c) statements including references to problems that are not specifically speech-related, and (d) no responses. *I don't know* answers were included in the no-response category. The responses to Question 4 ("Is that talking good or not good?") were either *good* or *not good*. The responses to Question 5 ("Which one would you like to play with?") were categorized as a preference for the fluent or disfluent puppet. The responses to Question 6 (the reason given for choice in Question 5) were classified as either speech reason or nonspeech reason.

Reliability

Test-Retest Reliability

Intrasubject consistency in responding to the experimental task was estimated by having 3 children from each of the age groups 4, 5, 6, and 7 repeat the tasks after a week's interval. Unfortunately, technical problems prevented re-administration of the task to 3-year-olds. For Questions 1 and 2, the percentage of agreement between the first and second trials in responding to the six items of the two tasks were calculated. The resultant agreement was 94%, 100%, 94%, and 89% for the ages 4, 5, 6, and 7, respectively, for both discrimination and self-identification tasks. The overall reliability

Table 2. Group means, standard deviation, ranges of scores, and percentages of children who responded 100% correct for the discrimination and self-identification subtasks.

Age group	Discrimination				Self-identification			
	M	*SD*	Range (max = 6)	Percentage	*M*	*SD*	Range (max = 6)	Percentage
3	2.67	2.06	0–6	25.00	2 13	1 99	0–6	12.50
4	3.06	2.35	0–6	6 00	2.31	1 45	0–5	0 00
5	5.06	1.57	0–6	56.00	5 00	1 37	1–6	50.00
6	5.06	1.06	3–6	43.00	5.13	1 31	1–6	50 00
7	5.44	0.89	3–6	63.00	5 63	0.81	3–6	75 00

was 94%. These data suggest that the instrument elicited acceptably reliable responses. Assessment of self-agreement was also obtained for three other tasks: labeling, evaluation of good and not good, and preference for the fluent or disfluent friend. The agreement was 100% for the evaluation and preference tasks in all five groups and 85% for the labeling task.

Interrater Reliability

The reliability in classifying the children's responses in the labeling task and the specific friend preference task, in all four groups, was evaluated by comparing the classifications done by two of the authors (RE and RP). They classified each response in one of the four categories in the labeling task and in one of the two categories in the preference task. The classification was done independently with disagreement resolved by consensus. The percentages of agreement were 85% and 93%, respectively.

Results

Discrimination and Self-Identification

To identify the age at which fluent children become aware of stuttering-like disfluencies, the five age groups were compared on discrimination and self-identification task scores. The group means, standard deviations, ranges for the two scores, and percentages of the children who responded 100% correctly are presented in Table 2. As shown, the mean discrimination scores range from 2.67 at age 3 to 5.44 at age 7. The range of perfect discrimination extends from 25% of the subjects at age 3 to 63% at age 7. The respective figures for the self-identification scores are 2.13–5.63 and 12.5–75%.

One-way analyses of variance were applied to the group data on the discrimination and self-identification tasks. For this purpose, the individual scores were first expressed as proportions, then transformed using an arcsine transformation to stabilize the variance (Winer, Brown, & Michels, 1991). The analysis yielded a significant group effect for the discrimination task: $F(4, 74) = 7.27$, $p < .001$, and a significant group effect for the self-identification task: $F(4, 74) = 19.58$, $p < .001$. Looking at the pattern of the results of the post-hoc Duncan test ($p < .05$), it appears as though the subjects were behaving as two groups, one including ages 3 and 4 and the other including ages 5, 6, and 7. These results were found for both tasks. To highlight the trend, the data are also illustrated in Figure 1. Inspection of the figure clearly reveals that the largest differences occurred between ages 4 and 5. In general, the data reveal that at age 5, fluent children are highly, though not completely, aware of stuttering-like disfluencies.

The Effect of Disfluency Category

To investigate whether the particular type of disfluency influences the age at which awareness emerges, the mean scores for clonic and tonic disfluencies were calculated for each of the two tasks, discrimination and self-identification. These data are presented in Table 3.

Figure 1. Group means for the discrimination and self-identification subtests

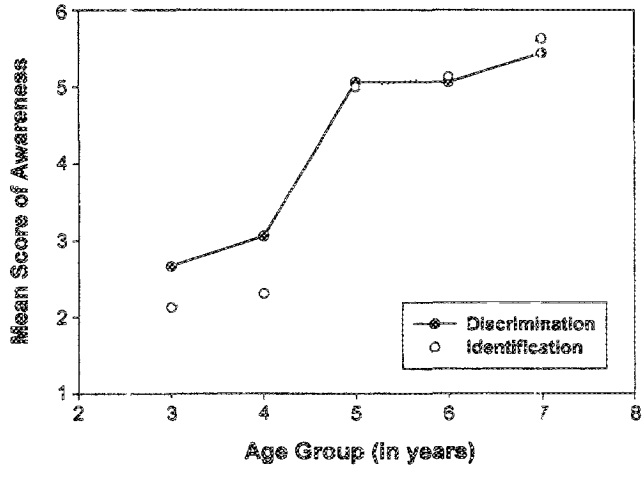

Table 3. Group means, standard deviations (in parentheses), for *clonic* and *tonic* sentences for correct discrimination and correct self-identification subtests.

	Discrimination		Self-identification	
Age group	Clonic	Tonic	Clonic	Tonic
3	1.20 (1 37)	1.47 (1 40)	1 13 (0.99)	1.00 (1 07)
4	1.81 (1.37)	1.25 (1.12)	1.44 (1.09)	0 88 (0.80)
5	2.50 (0 89)	2 56 (0 89)	2.69 (0.60)	2 31 (0.94)
6	2 88 (0.34)	2.19 (0 98)	2 75 (0 77)	2 38 (0 80)
7	3.00 (0.00)	2.44 (0.89)	3 00 (0.00)	2.63 (0.80)
Total	2.28 (1 15)	1.98 (1.17)	2.21 (1.08)	1 85 (1 14)

Two 2-way ANOVAs (age × disfluency type) with repeated measures were carried out for discrimination and self-identification separately. The ANOVA for the discrimination task yielded a significant main effect for disfluency type [$F(1, 74) = 5.15, p < .05$], resulting from higher scores of correct discrimination in the clonic sentences ($M = 2.29$), as compared to the tonic sentences ($M = 1.98$). The main effect of age was significant [$F(4, 74) = 7.50, p < .001$]. The post-hoc Duncan test ($p < .05$) was used to identify which differences between specific age groups were statistically significant. Again, the results showed that subjects were behaving as two groups, one including ages 3 and 4, and the other including ages 5, 6, and 7. The interaction between age and type of disfluency was significant [$F(4, 74) = 3.14, p < .05$]. Post hoc paired t tests were conducted for each age group comparing the two types of disfluencies. The results show that significant differences were found for age group 4 [$t(30) = 2.52, p < .05$], for age group 6 [$t(30) = 2.71, p < .05$], and for age group 7 [$t(30) = 2.52, p < .05$].

The ANOVA for the self-identification task yielded a significant main effect of type of disfluency [$F(1, 74) = 9.93, p < .01$], resulting from higher scores of correct self-identification in the clonic sentences ($M = 2.21$) than in the tonic sentences ($M = 1.85$). The main effect of age was significant [$F(4, 74) = 16.73, p < .001$]. The post-hoc Duncan test ($p < .05$) was used to identify which differences between specific age groups were statistically significant. The results showed that subjects were behaving as two groups, one including ages 3 and 4, and the other including ages 5, 6, and 7. The interaction between age and type of disfluency was not significant [$F(4, 74) = 0.31, p > .05$]. The easier self-identification of clonic sentences compared to tonic sentences was not age dependent. In sum, our results reveal that although from age 4 to 7 clonic type is easier to discriminate and identify, the type of disfluency does not influence the timing at which awareness emerges.

Labeling

To examine the relationship between the labeling of the speech of the disfluent puppet and the age of the children, a chi-square test was used to compare the frequency distribution of the four categories of labeling across the groups. The counts for the four labeling categories and the respective percentages for each age are presented in Table 4.

This analysis yielded a significant effect indicating that more children used the label *stuttering* as their age advanced [$\chi^2(12) = 58.54; p < .001$]. To further understand these results, the percentage of responses of *stuttering* and of *problem related to speech* were combined, as were the categories of *general problem* and *don't know*. Results reveal that the ability to label the source of the problem as speech related increased from age 5 to 6. The results also show that even for the 7-year-olds only 6 out of 16 children label the source of the problem as speech related.

The Evaluation of Stuttering

To examine the evaluation of stuttering-like disfluency, the frequency of the two categories of evaluation (*good* or *not good*) was cross-tabulated with the age

Table 4. Frequency and percentage (in parentheses) of responses to the label *stuttering*.

	Labeling				
Age group	Stutter	Problem related to speech	General problem	No response	Total
3	0 0 (0 0)	1.0 (6.7)	0 0 (0.0)	14.0 (93 3)	15 0 (100 0)
4	0 0 (0.0)	3 0 (18 8)	1.0 (6 3)	12 0 (75 0)	16 0 (100 0)
5	0.0 (0 0)	2.0 (12 5)	1.0 (6 3)	13 0 (81 3)	16 0 (100 0)
6	1 0 (6 3)	6 0 (37 5)	0 0 (0 0)	9 0 (56.3)	16 0 (100.0)
7	4 0 (25.0)	2 0 (12 5)	2 0 (12 5)	8.0 (50.0)	16 0 (100 0)
Total	5 0 (6 3)	14.0 (7 7)	4 0 (5 1)	56 0 (70 9)	79.0 (100 0)

group. The results are presented in Table 5. A chi-square test revealed a significant effect indicating that more children have a negative evaluation of disfluency as their age rises [$\chi^2(4) = 34.1$; $p < .001$]. A sharp increase in the negative evaluation occurs at 4 years of age.

The last task in this study also examined the participants' evaluation of disfluent speech, through choosing the puppet that they would like as a friend. Table 6 presents the frequency distribution of the two categories of choice of friend. A chi-square test revealed a significant effect indicating that more children choose the fluent puppet as their friend as their age rises [$\chi^2(4) = 21.1$; $p < .007$]. As shown, the choice of the fluent puppet as a friend increases with age from 46.7% at age 3, to 68.8% at age 4, and 87.5% at age 5.

The children were also asked to give a reason for their choice of friend. The frequency of the two categories, speech and nonspeech reasons, was computed for children who chose the fluent puppet as a friend. The results are presented in Table 7. The chi-square test revealed a significant effect indicating that the reason for choice of friend becomes more speech related as age increases [$\chi^2 = 15.83$; $p < .003$]. The table shows that from age 5 the choice of the fluent puppet was most explained by speech reasons.

To assess whether the evaluation of stuttering becomes more negative with the increase in awareness, a correlation between the discrimination and self-identification scores and the evaluation responses was conducted. The means of the discrimination and self-identification subtests were combined to provide an overall individual awareness score ranging from 0 to 12. Also, the responses of the children to the two questions—evaluation of the puppet's speech as good/not good, and the choice of which puppet to play with—were combined to provide an individual score of evaluation ranging from 0 to 2. The maximum negative evaluation score was 2. It was given when the child evaluated the speech as not good and chose the fluent puppet as a friend to play with. The minimum negative evaluation score was 0. It was given when the child evaluated the speech as good and chose the disfluent puppet as a friend to play with. The medium score 1 was given when the child evaluated the speech as not good, but chose the disfluent puppet as a friend, or vice versa. The Pearson correlation was $r = .56$, $p < .001$, indicating a mild positive relationship between awareness and negative evaluation.

Table 5. The frequency distribution and percentages (in parentheses) of the *good* and *not good* responses by age.

Age group	Good	Not good	Total
3	11.0 (73.3)	4.0 (26.7)	15.0 (100.0)
4	3.0 (18.7)	13.0 (81.3)	16.0 (100.0)
5	1.0 (6.2)	15.0 (93.8)	16.0 (100.0)
6	0.0 (0.0)	16.0 (100.0)	16.0 (100.0)
7	1.0 (6.2)	15.0 (93.8)	16.0 (100.0)

Table 6. The frequency distribution and percentages (in parentheses) of the choice of *fluent* and *disfluent* friend by age.

Age group	Fluent	Disfluent	Total
3	7.0 (46.7)	8.0 (53.3)	15.0 (100.0)
4	11.0 (68.8)	5.0 (31.2)	16.0 (100.0)
5	14.0 (87.5)	2.0 (12.5)	16.0 (100.0)
6	14.0 (87.5)	2.0 (12.5)	16.0 (100.0)
7	15.0 (93.8)	1.0 (6.2)	16.0 (100.0)

Discussion

The present results provide additional evidence of awareness of stuttering-like disfluencies in normally speaking children as early as age 3. Twenty-five percent of the youngest group differentiated 100% between

Table 7. The frequency distribution and percentages (in parentheses) of *speech* reason and *nonspeech* by age in the group of children who chose the fluent puppet as a friend.

Age group	Speech reason	Nonspeech reason	Total
3	2.0 (29.0)	5.0 (71.0)	7.0 (100.0)
4	6.0 (55.0)	5.0 (45.0)	11.0 (100.0)
5	11.0 (79.0)	3.0 (21.0)	14.0 (100.0)
6	13.0 (93.0)	1.0 (7.0)	14.0 (100.0)
7	14.0 (93.0)	1.0 (7.0)	15.0 (100.0)

fluent and disfluent speech. Furthermore, there is a rise in awareness of disfluent speech, of the type employed here, among normally fluent children as their age increases. The largest and most statistically significant difference among the age groups was noted between the 4- and 5-year-olds. These results support the findings of Ambrose and Yairi (1994) regarding the presence of awareness in some 3-year-old children, and that awareness increases with age. Overall, these investigators found similar patterns of development of awareness in their normally fluent participants. Whereas not all 3- and 4-year-olds provide indications of awareness, the results of their and our studies constitute good evidence that awareness of stuttering-like disfluency becomes quite pronounced in normally fluent children at 5 years of age. However, as shown in Table 2, although the average level of correct discrimination and self-identification (used as an indication of awareness) increases, not all the children reach 100% awareness, even at ages 5 through 7. In this regard, it will be interesting, as well as of practical value, to explore in future research whether children who have stuttered for several years achieve a higher level of awareness at these ages. The two studies also support an earlier report by Langer (1968) concerning indications of awareness of stuttering among normally fluent preschool children.

It is also interesting to note that, on average, for each age group the discrimination task of deciding whether the puppets' speech was similar or different, and the self-identification task of recognizing the puppet whose speech was similar to the listening child's own speech, yielded similar results. This finding would seem to suggest that these two indicators of awareness emerge simultaneously. For some 3-year-old children, however, rudiments of awareness are apparent only in the ability to discriminate. The simultaneous emergence of the ability to discriminate stuttering-like disfluency from fluent speech, and the ability for correct self-identification with fluency shown by the children who participated in the study, is of some interest because empirical evidence and clinical experience show that, typically, the ability to discriminate precedes self-identification skills (Aungst & Frick, 1964; Chaney & Menyuk, 1975; Locke & Kutz, 1975). For example, children who have phonological disorders can discriminate between correct and incorrect phonemes produced by another speaker, although unable do so when they are asked to monitor their own distorted phoneme (Bernthal, Greenlee, Eblen, & Marking, 1987). In the present study, however, it is possible that the children judged that they did not possess certain characteristics. It will be of interest to see if children who stutter show earlier discrimination than self-identification of their own stuttering.

The general finding that awareness of stuttering-like disfluency is present in some 3-year-olds and in most children 5 years of age or older was accompanied by several other findings that shed some light on this phenomenon. With a few exceptions, awareness was higher when the disfluency was characterized by repetitions rather than by sound prolongation and blocks. These results, if confirmed in future research, are at variance with the traditional views (Bloodstein, 1961; Johnson et al., 1959; Van Riper, 1963) that consider repetitions as less deviant because of their frequent occurrence in the early phases of stuttering and in the speech of normally fluent children and adults. There is something about repetition that apparently is more apt to catch a child's attention. The present finding, however, is not unique. Ham (1990) reported that when lay people were asked to describe stutterers and stuttering, the most common response was a reference to some sort of repetitious speech production, whereas only 6 out of 563 interviewees even mentioned prolongations. A study by Giolas and Williams (1958) also indicates that repetitions are viewed negatively by children. According to our own clinical experience, some parents assign the term stuttering to repetitions, but not to prolongations. The higher awareness of repetitions, as opposed to prolongations and blocks, may be explained by perceptual salience. The repetitions of the puppet in this study could be perceived by auditory and visible cues, whereas the prolongations could be perceived by auditory cues only, because they were not accompanied by unusual facial movement.

One of the interesting outcomes of the present study was that awareness was rarely associated with knowledge of the word *stuttering*. It appears that the term *stuttering* is acquired relatively late by children. Only one 6-year-old and only four 7-year-olds (out of 16 in each of the respective age groups) used the term stuttering to label disfluent speech. This finding is in agreement with Culatta and Sloan (1977), who reported that none of their first or second graders used the word stuttering and only approximately one-third of third and fourth graders used the word stuttering. On the other hand, Giolas and Williams (1958) reported that many of the second graders in their study were able to define the disfluent speech as stuttering.

The labelings provided by the 3-year-olds were almost all *don't know*. Others related their labeling to the content of the stuttered utterance. In both the 4- and 5-year-old groups, although the majority of children still replied *don't know*, there were children who attempted to explain stuttering in terms of a general problem (e.g., "she is cold," "she is shivering"). There were even those who described the speech (e.g., "she repeats," "loud speech," "bad speech"). These responses indicate that children, from a young age, begin to realize that something is wrong.

The infrequent use of the word stuttering among the older children who clearly were aware of disfluency

is even more surprising. All but one of the 6-year-olds tried to explain the disfluent speech (e.g., "he is hiccuping" or "chattering"). A few related their descriptions directly to the speech (e.g., "slow," "doesn't know how to speak," "repeats everything as if he is hoarse"). In the 7-year-old group, although 4 of the children used the word stuttering, most provided explanations (e.g., "deaf," "swearing," "slow," "her mouth doesn't know how to speak well"). These responses show that as children get older, the labels they assign become more accurate even if they do not know the technical term for the disorder. Perhaps they have a better understanding of the nature of the interruptions. These responses were similar to those found in previous research (Ambrose & Yairi, 1994; Culatta & Sloan, 1977; Giolas & Williams, 1958), all of whom reported on a wide range of qualitative and descriptive statements that may be comparable to the answers given by the participants in the present. Why children become familiar with the word *stuttering* much later than their recognition of the problem is not clear to us. Infrequent encounters with the disorder might be the reason. The absence of an adult to provide the word at the time of the encounter or reluctance of teachers to use the label at school are other plausible explanations. It would be interesting to find out whether stuttering children label stuttering-like disfluency as stuttering at a younger age because of their direct experience with this disorder, and perhaps due to exposure to the word. Another explanation of late use of the word stuttering in our study may be related to the nature of the experimental task. In the present study, children were asked to retrieve a label from their memory (recall technique). The use of a recognition method (i.e., choosing the label *stuttering* from among several alternatives) may yield different results.

It is interesting to note that there was an almost unanimous agreement at age 4 that disfluent speech was not good and that a fluent speaker was a preferred friend rather than one who stutters. However, awareness did not increase significantly until age 5. Although this finding is difficult to explain, it seems to agree with Giolas and Williams' (1958) report that preschool children were less consistent in their choice of nonfluent patterns of speech (discrimination), but were generally disapproving of any nonfluent speech. One possible interpretation is that evaluation reflects social training, which begins very early, whereas discrimination, identification, and labeling require abstract skills and thus appear later. It may be that a subthreshold sense of stuttering exists in some form or level before the time that it can be clearly expressed. The Gestalt philosophy of the cycle of experience proposes this exact pattern of development (Nevis, 1992). The cycle defines points on a continuum that explain the natural process of learning. It begins with sensation, a primary response to a stimulus. Sensation is seen as the precursor to awareness (Nevis, 1992; Polster & Polster, 1974). This may explain why children show preferences and evaluate the disfluency negatively before they express awareness in a more direct way. Such interpretation appears reasonable in view of recent data indicating that children show a preference for their own sex when choosing a friend before they have a clear awareness of gender identity (Brown, 1995).

Overall, the findings that some normally fluent children begin to be aware of stuttering at age 3, and most or all of them begin to show social preference for fluent speakers at age 4, might be an eye-opener concerning the nature of the environment in which young children who stutter might live. It is possible that from early on stuttering may be complicated by social factors that may add negative emotional aspects to the speech disorder. The problem gets worse with age. It is not surprising that the older groups in the present study were almost unanimously disapproving of disfluent speech and preferred the fluent speaker as a friend. This finding also supports the observations of Culatta and Sloan (1977) and Giolas and Williams (1958). It has been shown that normal preschoolers are likely to reject their peers with special needs (Gerber, 1977). They also tend to rate their peers with special needs as less popular (Guralnick, Connor, Hammond, Gottman, & Kinnish, 1995). Nabors (1997) also used a choice-of-friend task to evaluate children's feelings toward their peers with special needs. She concluded that children with special needs are ignored by their peers. Not being perceived as a suitable playmate provides a child with fewer opportunities to interact socially. Delay in social development, poorer social competence, and lower self-esteem may result. With more research of this phenomenon, clinicians, parents, and teachers should be able to take educational and preventive measures. The fact that normally fluent children begin to perceive differences negatively by age 5 may help us to focus on the appropriate age for educational intervention. This education process may prevent stereotyping and negative images of people with stuttering or other disabilities.

Although the present findings showing awareness of speech disfluencies at a relatively young age are based on normally fluent children, it is reasonable to hypothesize that children who stutter also possess similar cognitive abilities. In fact, Ambrose and Yairi's findings (1994) attested to this possibility. Thus, the growing evidence concerning the development of awareness serves to question traditional assumptions that awareness of stuttering is lacking at ages at which stuttering begins (Bloodstein, 1961; Bluemel, 1932).

Recognizing that no conclusions can be drawn from our data regarding the age at which children who stutter become aware of their disfluency, it would not be

surprising if, in some cases, awareness emerges even earlier in these children by virtue of first-hand experience and environmental reactions (Ambrose & Yairi, 1994; Yairi & Ambrose, 1992). Such early awareness may be caused by exposure of stuttering children to their own excessively disfluent speech, and from people in their environment who react to their stuttering (Ambrose & Yairi, 1994; Yairi & Ambrose, 1992). On the other hand, children who stutter may exhibit some denial. Information regarding children's emerging awareness of ethnic differences may shed some light on this. From as young as age 3, children can identify with a doll of their race (Clark & Clark, 1947). However, when comparing majority groups to minority groups, it has been shown that children from a minority group are more likely to identify with the race of the majority group (Brown, 1995). Such dynamics may cause children who stutter to be late in identifying themselves as stutterers. Obviously, more relevant and direct information could enhance current intervention procedures. Such considerations provide the motivation for a rich research program to further study awareness of various forms of disfluent speech, both in normally fluent children and in those who stutter.

Finally, consideration of several caveats regarding this study could facilitate further progress. First, more sensitive instruments and experimental procedures should be developed (e.g., objective responses such as eye movement). Also, procedures that reduce possible contaminating factors such as short-term memory, phonological awareness, type, and duration of disfluency should be useful. Finally, the present instrument included only a small number of items for labeling and evaluation tasks. Additional items would strengthen the conclusions derived from the data.

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