

## Awareness and reactions of young stuttering children aged 2–7 years old towards their speech disfluency

Ronny A. Boey<sup>a,\*</sup>, Paul H. Van de Heyning<sup>b</sup>, Floris L. Wuyts<sup>b</sup>, Louis Heylen<sup>b</sup>,  
Reinhard Stoop<sup>c</sup>, Marc S. De Bodt<sup>b</sup>

<sup>a</sup> Centre of Stuttering Therapy Antwerp, University of Antwerp, Belgium

<sup>b</sup> University of Antwerp, Belgium

<sup>c</sup> Department of Statistics Antwerp, Belgium

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### Abstract

Awareness has been an important factor in theories of onset and development of stuttering. So far it has been suggested that even young children might be aware of their speech difficulty. The purpose of the present study was to investigate (a) the number of stuttering children aware of their speech difficulty, (b) the description of reported behavioural expression of awareness, (c) the relationship with age-related variables and with stuttering severity. For a total group of 1122 children with mean age of 4 year 7 months (range 2–7 years old), parental-reported unambiguous verbal and non-verbal reactions as a response to stuttering were available. In the present study, awareness is observed for 56.7% of the very young children (i.e., 2 years old) and gradually increases with age up until 89.7% of the children at the age of seven. All considered age-related factors (i.e., chronological age, age at onset and time since onset) and stuttering severity are statistically significantly related to awareness.

**Learning outcomes:** Readers will be able to: (1) Describe findings of awareness of speech disfluency of stuttering children based on an overview of literature; (2) Describe methodological aspects of studies on awareness; (3) Know reported data on awareness of speech disfluency in young stuttering children of the present study; (4) Describe the relationship of awareness of speech disfluency with chronological age, age at onset, time since onset, gender and stuttering severity.

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### 1. Introduction

In stuttering research, the term “awareness” refers to being partially and acutely aware of speech difficulty/stuttering. Awareness is assumed to interact with the onset and development of stuttering. In earlier models of onset of stuttering, awareness has even been considered as a *causal* factor. Johnson et al. (1959) concluded that normal disfluency leads to stuttering due to parental reactions making the child aware of not speaking well. However, awareness has also been found to be absent in a child near the onset of stuttering and becoming apparent several years later (e.g., Bluemel in Bloodstein, 1995; Hansen & Iven, 2002, p. 15–24; Sandrieser & Schneider, 2001, p. 31–32; Van Riper, 1973). Furthermore, awareness has been thought to interfere with stuttering, triggering

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\* Corresponding author.

E-mail address: [ronny.boey@skynet.be](mailto:ronny.boey@skynet.be) (R.A. Boey).

stuttering events (e.g., Brutton & Shoemaker, 1967; Johnson et al., 1959), initiating the development of stuttering and stuttering behaviour, as well as facilitating emotional and behavioural reactions in response to the speech disfluency (e.g., Bloodstein, 2001; Conture, 2001; Kalinowski and Saltuklaroglu, 2006; Van Riper, 1973). Awareness of stuttering has been considered by clinicians as an indicator of persistence of the disorder and a recommendation for intervention for very young children, although there is limited evidence for such a prediction (Yairi & Ambrose, 2005, p. 355).

Seemingly, awareness of children about their speech difficulty/stuttering has been of interest and importance in theories of stuttering. Nevertheless, only a limited number of studies have been published so far. According to Yairi and Ambrose (2005, p. 69–70) this could be due to the difficulty to of studying awareness in very young stuttering children. They mentioned different methods that have been used to this purpose. First, parents can be asked to report what children actually say about their stuttering. Second, observations of children during stuttering can be used in order to reveal their emotional or cognitive reactions. Third, a testing procedure can be developed in which the children have to perform an identification task which is created to study their judgement about speech models assumed to reflect their awareness towards their own speech.

Ezrati-Vinacour, Platzky and Yairi (2001) studied the awareness of stuttering-like disfluency in 79 normally fluent children in five different age groups from 3.0 to 7.11 years old. A total of 79 children were asked to respond to video taped speech samples of two puppets and to discriminate between the speech (fluent and disfluent). The children had to identify 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.

Yairi (1983) reported that parents of 18% of children who stuttered perceived indications of their child's awareness of stuttering close to time of onset. Furthermore, Ambrose and Yairi (1994) found that 15% of pre-school children who stuttered showed possible awareness of stuttering, since they indicated that they talked like disfluent puppets displayed on a TV screen significantly more often compared to fluently speaking puppets. In this study however, 5% of the fluently speaking peers also indicated that their speech resembled the stuttering puppets' more frequently as the way they talked, making the results difficult to interpret. Furthermore, their data suggested that age is a factor in the development of awareness of stuttering in the 2- to 5-year-age range. For many children in this study awareness became observable or measurable until 5 or 6 years of age. Although, some of the very young children were able to identify their own speech pattern. Yairi and Ambrose (2005, p. 270–282) described the results of a follow-up study concerning 110 young stuttering children (age range 23–56 months) which were seen within 12 months of onset up to 3 years later. The children participated in an awareness test, using videotaped fluent and disfluent puppets appearing on the left or rights part of a TV screen. The children were asked to indicate the puppet that talks like him or her. A maximum score of 6 was given when all stuttering puppets are chosen, a score of 0 resulted from choice of all fluent puppets. The authors concluded that awareness of stuttering in pre-school children appears to be highly variable and “The percentage of aware children grows with age, especially between ages 4 and 5” (Yairi & Ambrose, 2005, p. 355).

Vanryckeghem, Brutton and Hernandez (2005) studied speech-associated attitude of 45 pre-school and kindergarten children who stuttered (mean age is 4.4 years, range 3.0–6.5) compared to 63 non-stuttering children (mean age is 4.6 years, range 3.3–6.3), using the KiddyCAT (Vanryckeghem & Brutton, 2002). They concluded that the stuttering children showed a significantly more negative attitude towards speech than the non-stuttering children. The older children (5 and 6 years old) gained a significantly more negative attitude compared to the younger children (3 and 4 years old). Female and male stuttering children did not differ significantly in attitude scores on the KiddyCAT. It is important to stress that stuttering children differed from non-stuttering children *as a group*. There was an overlap in scores (Vanryckeghem et al., 2005, p. 313 Fig. 1): 14% of the scores of stuttering children were higher than the highest score of the non-stuttering children.

Bajaj, Hodson and Westby (2005) studied concepts of communicative ability among 23 male children who stutter and 23 fluent peers, using analysis of interview responses as method. They concluded that children who stutter, less often described themselves as “good talkers” compared to their fluent peers. Results suggested that early conceptions of communicative abilities among children who stutter were influenced by their stuttering experiences (e.g., time since stuttering onset, family history, self-assigned values, level of stuttering awareness, temperament, other's reactions, atypical experiences, and treatment history). The role of treatment focussing on how to speak (“turtle talk”, “bumpy talking”, “slow talking”) seemed to be important to increase awareness.

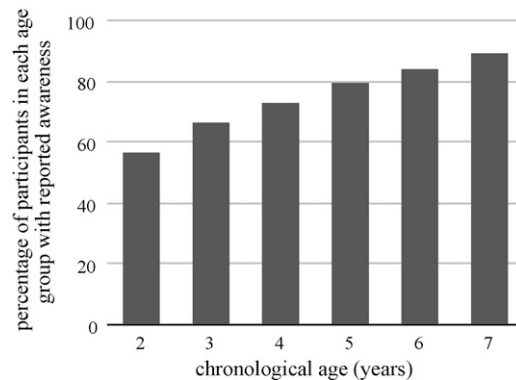


Fig. 1. Percentage of stuttering children with awareness of their own speech difficulties/stottering according to their chronological age in years ( $N = 1122$ ).

Based on clinical observations, clinicians reported that stuttering children might be aware of their speech disfluency from a very young age (Conture, 2001, p. 15–22; Logan and Caruso, 1997; Rustin & Cook, 1995; Rustin and Purser, 1991; Starkweather, 1987, p. 147–154; Starkweather & Givens-Ackerman, 1997). Even young children are made aware of their disfluency during treatment as seen, for example, in the Lidcombe program (Onslow, Menzies & Packman, 2001; Onslow, Packman, Stocker, Doorn, & Siegel, 1997). Furthermore, clinical studies on parental reports of their child's awareness of speech difficulty/stuttering revealed information concerning the percentage and age of stuttering children being aware. Boey (2001) used parental report on awareness in a study concerning 164 stuttering native Dutch-speaking children between 2 and 5 years old. He concluded that for 110 (67%) of these children parents observed verbal remarks in relation to their child's speech (e.g., I can't speak well, I stutter, my mouth does not work anymore, etc.) or unambiguous non-verbal reactions towards stuttering (e.g., sighing while stuttering and tapping the jaw). For 42 (25.6%) children the parents did not report such observations and for 12 (7.3%) other children the parents doubted if their child was aware of his or her stuttering.

Hitherto, both the theoretical role of awareness in young stuttering children and interesting findings about awareness-related characteristics have been described. The for-mentioned findings stimulated our interest to study awareness of young stuttering children further. Considering the effort put into these studies, the substantial number of participants inevitably restricted the number of variables that could be put into statistical analysis in order to reveal findings with sufficient statistical power. Consequently, some principal questions still exist. First, we wondered how many young stuttering children are aware of their speech difficulty/stuttering, according to their chronological age, when considering a relatively large group of children. Second, it has been suggested that often awareness is not expressed close to the onset of stuttering but rather emerges in a later stage of the disorder. In order to verify this assumption, the relationship between awareness and time since onset of stuttering needed to be studied. Third, so far no gender differences concerning awareness of speech difficulty have been found for young stuttering children. Gender differences for awareness have been examined in the present study. Fourth, although it can be assumed that awareness is the result of many characteristics (e.g., introspection and language capacity to express it, sensitivity, stimulus value and intensity) it can be hypothesised that more children with severe stuttering become aware of their speech difficulty compared to children with a mild stuttering. Fifth, often the universal traits of stuttering and stuttering-associated characteristics are claimed (e.g., Van Riper, 1973). Therefore, in order to support such cross-cultural generalisation of findings, it would be of interest to study awareness of speech difficulty/stuttering in a group of European native Dutch-speaking children.

## 2. Method

The present study is part of an epidemiological and phenomenological study on stuttering, conducted between July 03, 1991 and April 12, 2006, with 1549 stuttering participants. All children are native Dutch speakers, living in Flanders in the northern part of Belgium (Antwerp region) in Western Europe. The study has been approved by the Ethics Committee of the University Hospital Antwerp according to the ICH/GCP guidelines.

Table 1  
Number of participants for each age group (in years) according to gender.

Age (years)	2	3	4	5	6	7	Total of gender
Male	78	238	190	181	94	69	850
Female	51	80	67	33	26	15	272
Total of age group	129	318	257	214	120	84	1122

Table 2  
Descriptive statistical characteristics of age (in months) according to gender.

Group	<i>n</i>	min	max	<i>M</i>	SD	Me
Male	850	24	95	56.1	16.9	54.0
Female	272	25	94	51.3	17.1	48.5
Total	1122	24	95	54.9	17.1	52.0

## 2.1. Participants

The present study included 1122 children between 2.0 and 7.11 years old. This group consisted of 850 boys and 272 girls, resulting an overall male:female ratio of 3.1:1. The mean age was 54.91 months, i.e., 4 years 7 months. On the average, the boys were older than the girls. Central tendencies for age of are tabulated in Table 1 while the number of participants are tabulated in Table 2 according to age and gender.

## 2.2. Criteria and variables

First, we define the criteria and variables used in the present study below. Second, in the subsequent section, the procedure will be described.

### 2.2.1. Stuttering

Children were diagnosed as stuttering based on the criteria and procedure described in Boey, Wuyts, Van de Heyning, De Bodt and Heylen (2007). Following criteria had to be fulfilled: A child had to be (a) labelled as stuttering by one or both parents, (b) and/or referred to the Centre for Stuttering Therapy for reasons of stuttering. (c) Furthermore, data based on a structured interview with the parents (20–40 min) should reveal characteristics of stuttering such as repetitions of sounds and syllables, prolongation of vowels or consonants, blocks of sounds and/or stuttering-associated behaviour such as physical tensioned grimaces or foot tapping. (d) Also, a positive detection of stuttering has to be made, indicated by a score > 12 on the DIS, a Dutch standardized, normed, validated and published detection instrument for stuttering (Stes & Boey, 1997). The construction is based on the work of Riley and Riley (1989) and of Pindzola and White (1986). A score of 8 or less indicates non-stuttering and normal fluency and has a false detection rate of two per thousand cases. A score of 9–11 stands for stuttering and gives correct detection in 88% of the observed cases. Finally, a score of 12 or more indicates stuttering and gave no false detections so far. (e) Finally, in a speech sample of 100 words obtained from a direct conversation between the clinician, being the first author, and the child, a minimum of 3% stuttering-like disfluencies (SLD) should be observed. This procedure has proven to be highly sensitive (0.9452) and specific (0.9747) in order to correctly identify stuttering children. In addition, good to excellent intra- and interjudge reliability has been concluded (Boey et al., 2007).

### 2.2.2. Stuttering severity

Type, frequency and duration of SLD as well as avoidance/postponement behaviour or physical concomitants were observed in the speech sample of a child during a child–clinician conversation while the child was allowed to play. Characteristics of this procedure and judge-reliability have been described in detail (Boey et al., 2007). Frequency of SLD was calculated as a percentage against 100 words out of the longer sentences, obtained from a speech sample of

20–30 min. To obtain a measure for overall stuttering severity, the total score on the Stuttering Prediction Instrument (Riley, 1981) and on the Test voor Stotterernst Niet-Lezers [Test for Stuttering Severity Non-Readers] (Boey, 2000) was calculated.

### 2.2.3. Awareness

In the present study, awareness was defined either as parental-reported observations of self-remarks or unambiguous non-verbal reactions related to the child's own speech difficulty/stuttering.

### 2.2.4. Age

The age of the children referred to is their chronological age at the moment of clinical assessment.

### 2.2.5. Age at onset

The onset of stuttering refers to the moment stuttering was first present. Theoretically, this restricts the onset of stuttering to audible and/or visible observable characteristics of the speech disorder. Moreover, it should be noted that the clinician or researcher is seldom present at the very first moment when stuttering occurs. Therefore, with the use of refined interviewing methods (see procedure), parents are the source to inform on onset-related data such as age and manner. The "moment" of onset of stuttering was measured in terms of chronological age, further referred to as "age at onset".

### 2.2.6. Time since onset

The time since onset was calculated by subtraction of the age-of-onset from the chronological age.

## 2.3. Interview procedure

### 2.3.1. Conditions

The child and the parents were welcomed and were informed on what was going to happen. In case of the young children, the child was seated on the carpet in the examination room, where he was allowed to play. The clinician (first author) and parents were seated at the table in the same room and started the interview. Older children were informed about on what was going to happen, were then asked to wait in the waiting room near the examination room while playing or reading, allowing the clinician–parent interview to take place in the examination room.

### 2.3.2. Actual procedure

Parents were questioned in order to gather information about the reaction of their child towards his or her own speech. From the beginning of this study, the interview protocol has been standardised according to guidelines on assessment and interviewing of clients in a clinical setting appropriate for speech-language pathology or psychotherapy. The interview concerning the parents consisted of three main sections. Section 1 focussed on the speech disfluencies/stuttering (characteristics, onset, development). Questions about awareness were included in this section. Section 2 dealt with health, developmental milestones, personality and behavioural characteristics. Section 3 documented on demographic data and social environment (family constitution, education, school career, etc.). All parental information received was carefully written down. In order to encode answers for analysis, of check-boxes describing the answers were used.

### 2.3.3. Questioning related to awareness

Questions were posed in a neutral fashion and according to a method described in the section methodology of this chapter. Questions ranged from global to detail, from asking open answers to closed, or multiple choice answers. As a double check, answers from the father were compared to those from the mother. Only clear answers related to the child's reaction were registered. Principal questions were: (a) How does your child react towards the speech difficulties? (open question). (b) Do you think the child is conscious about the problem of speech? (yes/no/doubt/unknown to us). (c) If so, how do you know? (open question) (d) Then, different possibilities of reactions were asked for, specifically the following: (d1) The parents are sure about consciousness or reaction towards the child's speech because of the expression of the child (e.g., sighing, staring, etc.). (d2) During a stuttering moment, the child stops talking and avoids the situation. (d3) The child gives a remark about his speech (e.g., "My mouth doesn't work well."

“I stutter.” “I can not speak anymore.” “Something is stuck in my throat.”, etc.). (d4) The child cries because of the speech difficulty. (d5) The child becomes very impatient, crossed about his or her speech (e.g., the child says “Oh no always the same” interrupting a stuttering event and ticking on his head). (d6) The child asks for help (e.g., “I can’t talk well, can a doctor help me?” “Can you give me a syrup to help me speak at once?”). These examples refer to young stuttering children (< 48 months of age). (d7) Immediately after a stuttering event, the child deliberately starts to stutter, exaggerating the severity and duration. The child starts to behave clownish while stuttering.

#### 2.3.4. Questions related to the age-of-onset

In order to obtain the age-of-onset of stuttering as perceived by the parents, questions were asked and special care was taken to narrow down the date, manner and circumstances at onset. The time range was systematically narrowed down in order to identify the exact time of onset. This method has been conducted independently from that of Yairi and Ambrose (1992, 1999) because the study started in 1991. It is, however, analogue to what Yairi and Ambrose previously have described.

#### 2.3.5. Coding of the data and conditions

Awareness for a stuttering child was re-coded in terms of consciousness and/or reaction of the child towards his or her own speech (“yes”, “no”, “doubt” or “unknown”). Secondly, the kind of reaction was labelled according to the key words in the description of their reaction by the parents (see previous paragraph).

### 2.4. Data-analysis

All of the following data were recorded according to protocol and input in a computer database (Filemaker Pro): chronological age, age at onset, time since onset, awareness (re-coded as 0 = none, 1 = aware), descriptive label of awareness (re-coded to the for-mentioned description d1 up to and including d7), total score on SPI and TvS-NL. Data were exported to Excel and SPSS for statistical description and analysis. First, descriptive data of awareness concern the whole group of participants for who such data was available. Second, Chi-square analysis, logistic regression analysis or analysis of variance were conducted (Altman, 1999; Petrie & Sabin, 2000) to reveal a possible relation of variables with awareness. The number of data put into analyses are reported in each section of analysis.

## 3. Results

### 3.1. Descriptive data of awareness

The final analysis of data included 1096 of 1122 children. For 7 children data was missing and for 19 children parents could not decide if their child has been aware about its speech or not. On average, a child provided 1.37 response of being aware (1102 responses/802 children). Specifically, about 42% of the 802 children provided two different types of responses. Moreover, for about 36.5% even three different types of responses were registered. The number of different responses is tabulated in Table 3.

Based on self-remarks towards their stuttering, for 802 (73.2%) children, their parents could confirm the child’s awareness, for 294 children (26.8%) no such awareness was noticed. For these 802 children reported to be aware, 1102 unambiguous reactions towards their stuttering have been observed by their parents. The descriptive labels of the

Table 3  
Number of children according to the number of different responses of awareness.

Number of different responses	Number of children	Percentage to total children ( $N = 802$ ) with awareness
1	87	10.85
2	340	42.39
3	293	36.53
4	73	9.10
5	9	1.12
Total	802	100.00



Table 4

Different reported signs of awareness of speech difficulty/stuttering of 802 young children and the percentage (%) to total of 1102 responses.

Kind of response of awareness <sup>a</sup>	<i>n</i>	%
Give a remark, talk about, asking for help (d3, d6)	418	37.9
Attitude, posture (d1, d2)	287	26.0
Anger, crossed (d5)	261	23.7
Leaving, stop speaking (d2)	87	7.8
Sadness, crying (d4)	77	7.0
Ticking (d5)	50	4.5
Clownish behaviour (d7)	35	3.2
Sighing (d2)	13	1.2
Very impatient (d5)	4	0.4
Deliberately stuttering (d7)	1	0.1

<sup>a</sup> The indications d1...d7 refer to different possibilities of reactions described in the text.

reported reactions are tabulated in Table 3. The most frequent reported reaction had been a remark of the child or asking for help (37.9%). For approximately a quarter of the children (26.0%) parents reported beyond any doubt that the attitude or posture of the child had been related to the disfluent speech. More than one fifth (23.7%) of the children were reported as becoming crossed due to disfluent speech. Other reactions were less frequently reported: leaving and stopping to talk (7.8%), sadness and crying about their speech (7.0%), ticking (4.5%), clownish behaviour (3.2%), sighing (1.2%), showing impatient behaviour (0.4%), and deliberately stuttering (0.1%). On the average, a child provided 1.37 response of being aware (1102 responses/802 children). Specifically, most children provided a single response.

Table 4.

### 3.2. Awareness and age-related variables

#### 3.2.1. Chronological age and percentage of awareness

In Fig. 1 the percentage of stuttering children, that has been reported as being aware of their speech difficulty/stuttering is shown according to their chronological age. The awareness increased gradually with age and this increase has proven to be statistically significant, Wald  $\chi^2(1, N = 1096) = 42.287, p < .000$ . Of the youngest group of children (i.e., 2 years old) 56.7% were reported with awareness. This percentage gradually increased to 89.7% for the oldest group of children (i.e., 7 years old).

#### 3.2.2. Chronological age and kind of response of awareness

The kind of response observed as a sign of awareness was registered as mentioned in Section 2.3. The percentage of participants was calculated according to chronological age for sadness (d4), becoming crossed (d5), asking for help/

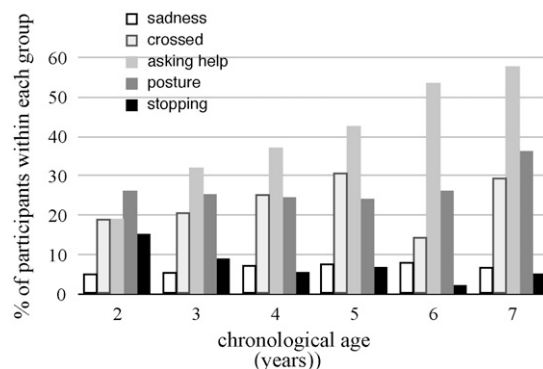


Fig. 2. Percentage of stuttering children with awareness of their speech difficulty in relation to their chronological age for different specific ways of reactions towards their speech (see legend).

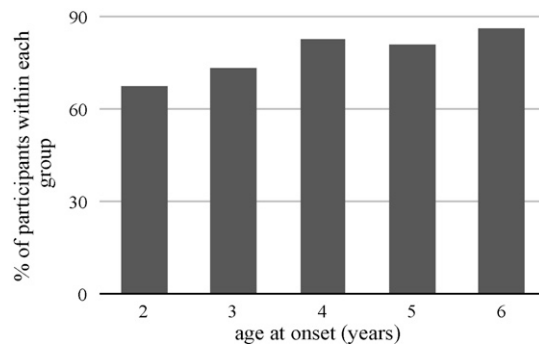


Fig. 3. Percentage of stuttering children within each age-of-onset group (in months) with reported awareness ( $N = 1058$ ).

giving a remark (d3 and d6), posture (d1) and stop talking and leaving the situation (d2). The results are shown in Fig. 2. The percentage of children becoming crossed and asking for help/giving a remark increased with increasing age. In contrast, stop talking/leaving the situation decreased with increasing age. For sadness and posture no clear relationship was present. Thus, age-related statistically significant relations could be determined for becoming crossed ( $\chi^2(5, N = 1102) = 16.281, p = 0.006$ ), asking for help/giving a remark ( $\chi^2(5, N = 1102) = 49.727, p < 0.000$ ) and stop talking/leaving the situation ( $\chi^2(5, N = 1102) = 17.995, p < 0.003$ ), but neither for sadness ( $\chi^2(5, N = 1102) = 1.855, p = 0.869$ ) nor for posture ( $\chi^2(5, N = 1102) = 4.686, p = 0.455$ ).

### 3.2.3. Age at onset

Age at onset was reported for 1073 children. On the average it was 40.3 months ( $SD = 12.3$ ). The median value is 36 months. Results suggest that awareness is reported more often for children who began to stutter at a later age compared to children who began to stutter at a younger age. With increasing age-of-onset between 2 and 4 years old, there is a gradual increase of the percentage of stuttering children with reported awareness, as is shown in Fig. 3. This relationship was statistically significant, Wald  $\chi^2(1, 1058) = 17.492, p < .000$ . The children reported to have an age-of-onset of 1 year ( $n = 11$ ) and of 7 years old ( $n = 4$ ) were not included, due to low numbers.

### 3.2.4. Time since onset

The percentage of children with reported awareness of their speech difficulty varies with time since onset of their stuttering. For almost two-thirds (64.0%) of the 306 children with a relative short time since onset (i.e., 0–4 months) awareness was reported. Even for the children seen within one month post onset, this percentage remained 64.2. After that, it gradually increased with increasing time since onset. Of 258 children with a time since onset between 5 and 11 months, 73.4% was perceived as being aware of their speech difficulty/stuttering. About three quarters (75.8%) of 271 children with a time since onset between 12 and 21 months were reported to be aware. Finally, of 262 children with a time since onset of 22 months or more, 83.8% were observed to be aware. This tendency is statistically significant (Wald  $\chi^2(1, N = 1076) = 15.860, p < .000$ ). This finding, however, does not remain significant when controlled for chronological age (Wald  $\chi^2(1, N = 1076) = 0.636, p = .425$ ). Chronological age remains significantly related to the number of children with reported awareness when controlled for time since onset Wald  $\chi^2(1, N = 1076) = 22.109, p = .000$ .

### 3.3. Gender

Awareness is reported for 73.7% of the 828 male participants and for 71.6% of the 268 female participants. No statistically significant differences between sexes was noticeably related to awareness,  $\chi^2(1, N = 1096) = 0.425, p = .526$ . This finding remains when controlled for gender differences concerning stuttering severity across age groups. In Table 5 the mean value of the SPI total scores are tabulated for each age group and gender. Overall, the mean SPI total score for males with awareness was 22.4 ( $SD = 6.6$ ) and for females 22.1 ( $SD = 6.9$ ). Levene's test revealed no statistical difference between the variances of both groups ( $p = .639$ ). No significant difference for stuttering severity was observed between males and females ( $F(1, 754) = 0.214, p = .644$ ). No interaction effect of age group



Table 5  
Mean SPI total score for males and females within each age group.

Age (years)	Gender	
	Male	Female
2	21.74	21.59
3	22.09	23.96
4	22.62	22.16
5	22.86	19.63
6	21.45	20.90
7	24.44	23.89

Table 6  
Mean SPI total score and standard deviations for a number of children with and without reported awareness within each age group.

Age (years)	Children without reported awareness			Children with reported awareness		
	Number of children	Mean	Standard deviation	Number of children	Mean	Standard deviation
2	54	16.93	6.15	71	21.68	5.77
3	101	20.37	6.84	204	22.50	6.51
4	66	19.5	6.65	182	22.49	6.73
5	42	18.19	5.95	166	22.33	7.12
6	16	16.33	8.12	90	21.32	6.77
7	6	18.98	6.68	43	24.33	6.21

and gender was observed concerning stuttering severity scores ( $F(1, 754) = 0.000, p = .988$ ). When comparing the type of response associated with stuttering awareness, the only significant difference between males and females was becoming crossed ( $\chi^2(1, N = 791) = 3.458, p = .037$ ), as boys showed a higher number concerning this type of response.

### 3.4. Stuttering severity

The total score of SPI and of TvS-NL were used in the analysis. Children *with* awareness of their speech difficulty seemed to obtain higher scores on the SPI ( $M = 22.35, SD = 6.661, n = 756$ ) compared to the children *without* awareness ( $M = 18.98, SD = 6.698, n = 285$ ). Levene's test revealed no statistical differences between the variances of both groups ( $p = .964$ ). The observed mean difference was statistically significant ( $F(1, 1039) = 52.893, p < .000$ ). Similar results were found for stuttering severity measured with TvS-NL and awareness. Levene's test revealed no statistical differences between the variances of both groups ( $p = .292$ ). Children *without* awareness obtained *lower* severity scores ( $M = 17.15, SD = 7.987, n = 162$ ) than the children with awareness ( $M = 21.01, SD = 8.567, n = 470$ ) ( $F(1, 630) = 25.429, p < .000$ ). Seemingly, both measures of stuttering severity indicated a significant relationship between stuttering severity and awareness as reported by their parents. Children with reported awareness were found to have higher stuttering severity compared to the children without reported awareness. This finding was observed for each age group. In Table 6 the statistical central tendencies are given for the SPI Total Score for each age group of the children with and without reported awareness.

Furthermore, it has been observed that within the group of children without reported awareness, the only significant difference concerning stuttering severity score occurred between the children of 2 years old and the children of 3 years old ( $F(5, 279) = 2.390, p = .038$  and Bonferroni post hoc analyses  $p = .034$ ). No other difference between age groups was noticed. Levene's test revealed no significant difference between the variances of each age group, both for children without reported awareness ( $p = .619$ ) as well as those with ( $p = .263$ ). In the group of children with reported awareness, no significant differences concerning stuttering severity scores were observed between age groups ( $F(5, 750) = 1.372, p = .233$ ). These findings indicate that children with reported awareness generally obtain higher stuttering severity scores compared to children without reported awareness. This finding is consistent throughout each age group.

#### 4. Discussion

Before discussing the major findings of the present study, it seems appropriate to elaborate on the use of the term awareness. The term awareness refers to having knowledge or perception of a situation or fact, in this case stuttering. Consequently, no doubt can exist concerning the use of the term awareness: a child is regarded as being aware once he/she clearly labels the stuttered speech as such, even if parental report was used as is the case in the present study. If such a verbal reaction (e.g., I stutter) was accompanied by a non-verbal one (e.g., crying, becoming angry, sighing), the term awareness can irrefutably be used to describe the child's reaction. If only a non-verbal type of reaction associated with stuttering was perceived and reported by the parents, some caution should be taken into account when interpreting these non-verbal reactions as awareness. Although efforts were made to select the unambiguous reactions of a child associated with his or her stuttered speech, there remains a risk of overestimating awareness. In contrast, a child can be aware of stuttering, without expressing this behaviourally, enhancing the risk of underestimating awareness. The use of parental perception and report can also add to the variability of findings.

Given these limitations, the present study resulted in the following findings. (a) Overall, the majority of stuttering children in the present study were reported by their parents to be aware of their speech difficulty/stuttering. On average, 75.1% of the children showed a stuttering-associated response. This percentage gradually increased for children between 2 and 7 years old, from 56.7% in the former age group to 89.7% in the latter. (b) For about 42% of the 802 children 2 different types of responses have been provided, while for about 36.5% even 3 different types of responses were registered. (c) The most frequently reported responses of the children were a remark of the child or asking for help, attitude or posture, becoming crossed due to disfluent speech, sadness and crying about their speech and stopping to talk and leaving the situation. (d) Also the type of response varied with age. More children became crossed and more children asked for help/giving a remark with increasing age. Stopping to talk/leaving the situation decreases with increasing age. (e) Children who started to stutter at an older age, showed more awareness compared to children who began to stutter at a younger age. At first sight, awareness increases significantly with time since onset, but the effect did not remain when controlled for the chronological age. (f) No gender differences were observed concerning the number of children with awareness. (g) A significant relationship was found between stuttering severity and awareness. Stuttering children who are classified as being aware of their speech difficulty/stuttering, have a higher mean stuttering severity when compared to stuttering children who are not aware of their speech difficulty/stuttering. This finding was found for each age group between 2 and 7 years old. Seemingly, the parental-reported awareness of the children in reaction to their speech disfluency/stuttering increases with the age and is associated with the stuttering severity observed by the clinician. A higher stuttering severity is associated with a higher frequency of reactions to the disfluent/stuttered speech of the child. However, in the group of children with awareness as well as the group without, parents observed reactions. These findings suggest that a higher stuttering severity more easily provoked reactions of a child. One can speculate that in case of a lower stuttering severity score associated with awareness, the perceptual capacity or sensitivity of the child might play a role.

As described in the introduction part of this article, different methods were used in other studies in an attempt to study awareness of speech difficulty/stuttering in young children. When comparing the findings of these different studies, some similarities to the findings of the present study occur. First, awareness of speech difficulty/stuttering evolves even in very young stuttering children. This finding is similar to what Yairi (1983), Ambrose and Yairi (1994), Yairi and Ambrose (2005), and Vanryckeghem et al. (2005) have previously found. It is also similar to the reports of clinicians. Awareness seems to be present close to onset of stuttering. Thus, this finding does not support the idea that stuttering children become aware about their speech several years post onset, as suggested by some authors (e.g., Bloodstein, 1995; Hansen & Iven, 2002; Sandrieser & Schneider, 2001; Van Riper, 1973). As suggested by Yairi and Ambrose (2005) the number of children reported by their parents to be aware is higher than compared to the number based on perceptual identification tasks. Probably this just reflects the difference in methods of examination between studies. Perhaps, a child is more likely to express awareness spontaneously in comparison to a perceptual identification task that needs the development of specific task-related skills. Also the fact that parents can observe their child in different situations and over a continuous period of time, might contribute to the higher number of children with reported awareness. A second similarity across studies, is that – not surprisingly – awareness increases with chronological age. This finding is also observed by Ezrati-Vinacour et al. (2001) for fluent speaking children. Time since onset is also mentioned as correlating with awareness. Also Bajaj et al. (2005) suggest that awareness in stuttering children has been influenced by time since onset of stuttering among others. However, according to the

findings of the present study, when controlled for chronological age, the significant association between time since onset and awareness does not remain. Third, as suggested by Vanryckeghem et al. (2005) based on KiddyCat results, no gender effect occurred related to speech attitude in young stuttering children was noticeable. Although the method used in the present study was completely different, similar conclusion could be drawn.

Fourth, Yairi and Ambrose have found a significant relationship between the estimated stuttering severity as estimated by a clinician and the awareness of a stuttering child. Similarly, the present findings confirm such a relationship. As a group, the children being aware of their speech difficulty/stuttering obtained a higher averaged stuttering severity score on SPI and TvS-NL than the children without reported awareness. Perhaps such a finding suggests that a more severe stuttering more easily triggers awareness. On the other hand, a different possibility is that being aware may trigger more intense stuttering. The components of SPI and TvS-NL include observation of stuttering behaviour such as avoidance and struggle behaviour. Possibly such behaviour can be stimulated by awareness as suggested in models of development, described in the introduction part, or as supported by clinical observation. The present finding of awareness being significantly associated with stuttering severity does not indicate the direction of the relationship nor any causality. Fifth, the findings of the present study, which focuses on native Dutch-speaking children, are consistent to other findings on awareness concerning native-English speaking children. In addition, interestingly, the kind of expression of awareness of speech difficulty/stuttering of a child as reported by the parents changes with increasing age. Stopping to talk and leaving the situation may be interpreted as rather drastic and obvious reactions. Possibly, this behaviour is shaped by parental comments such as “Don’t leave”, “Just say it”, “What did you want to say?”, as can be observed in clinical situations. Also the negative consequences of such a behaviour created by the child itself, could contribute to a decrease in showing such a behaviour. Another finding was that more children became crossed and more children asked for help/giving a remark with increasing age. In contrast, expressions of awareness such as stopping to talk/leaving the situation decrease. This increase in number of children becoming crossed with increasing age suggests a growing frustration related to stuttering, which in turn is behaviourally expressed more often. The increase of asking for help and/or giving a remark on behalf of its speech with age, suggests that older children are just more verbally skilled, have more introspective capacity and have learned that in case of a problem, help can be asked.

Yairi and Ambrose (2005) mentioned that awareness of a stuttering child about its speech difficulty is taken into account when deciding to offer therapy. Clinically, awareness is taken as a predictor of a negative evolution of stuttering, although no data are available to support such a prediction. Moreover, still other factors might be associated with the prediction of persistence or unassisted recovery of stuttering, e.g., gender (Boey, 2008). However, the findings of the present study suggest that awareness is associated with stuttering severity and age. Furthermore, our data also reveals that becoming crossed about speech, giving remarks and the asking for help increase with age. If treatment can prevent or reduce such unpleasant evolution, then the decision to offer it can be partially supported by the observation of awareness of a child. Furthermore, the current data seems to suggest that awareness in older children might result in positive coping behaviour such as asking for help, which may also be the result of treatment.

## 5. Limitations

First, the method of parental report used to study awareness of speech difficulty/stuttering of their child has certain limitations. Although the answers of parents have been restricted in an attempt to gather *unambiguous* responses, the reporting remains the result of parent’s perception, sensitivity, memory and interpretation adding some variance to the data. The present study did not rule out this influence. A second remark deals with the accuracy of estimation of awareness. Notice that awareness is accepted only if parents have been hearing the child saying “I stutter. I can’t speak well.”, etc. or react unambiguously non-verbally towards stuttering. In fact, more children might be aware of their speech difficulty/stuttering than the children expressing it verbally or non-verbally. Also, more children might be aware than could be observed by the parents. If so, then parents could have *underestimated* awareness in their children. Contrary, it could be possible that parents report more awareness than in fact should be the case and by doing so *overestimating* awareness. In order to reduce this effect of overestimation, both the procedure of interview and manner of asking questions were clearly defined and constructed to gather unambiguous responses. It is difficult to suspect parents of mistaking such clearly defined stimuli. Perhaps, in case of non-verbal remarks one should be more cautious. Third, probably still other stuttering-related variables or sources of awareness may be of interest to study. For instance, it might be interesting to study the relationship of awareness to the number and/or kind of reported listener reactions,

an object of study that fell beyond the scope of the present study. Furthermore, the relationship with temperament might be of interest to be examined.

## 6. Conclusion

The majority of stuttering children, even young children, seem to be aware of their speech difficulty/stuttering based upon parental-reported observations of their unambiguous verbal and non-verbal responses to stuttering. In comparison to some other studies on awareness the percentage of children with awareness in the present study is much higher. The kind of expression of awareness changes with age. More children become crossed and more children ask for help/give a remark with increasing age. Stopping to talk/leaving the situation decreases with increasing age. Chronological age, age at onset and stuttering severity seem to be significantly related to awareness. The tendency of findings for this group of native-Dutch stuttering children seems similar to the findings for native-English stuttering children.

## Appendix A. Question for continuing education

1. Awareness is assumed to play a role in stuttering. Which role?
  - a. a causal role provoking stuttering events,
  - b. triggering listener reactions,
  - c. facilitating the development of stuttering behaviour.
2. Which method is used to examine awareness in the present study?
  - a. identification task,
  - b. parental report,
  - c. deduction of emotion and cognition.
3. For which of the age-related factors has been found a significant relationship with awareness?
  - a. chronological age,
  - b. chronological age and age at onset,
  - c. age at onset and time since onset,
  - d. chronological age and time since onset,
  - e. chronological age, age at onset and time since onset.
4. Which of the following signs of awareness are ranked as the three most frequently reported?
  - a. give a remark/asking for help,
  - b. becoming very impatient,
  - c. leaving, stopping to talk.
5. The relationship between awareness and stuttering severity has been examined. What is the direction of this relationship?
  - a. children with a higher stuttering severity have been found to be more aware of their speech,
  - b. there is no significant relationship between stuttering severity and awareness,
  - c. awareness causes the higher stuttering severity,
  - d. the higher stuttering severity causes awareness,
  - e. both c and d.

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