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Factors Associated With Negative Attitudes Toward Speaking in Preschool-Age Children Who Do and Do Not Stutter

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Abstract

Purpose—This study explored relations between the negativity of children's speech-related attitudes as measured by the Communication Attitude Test for Preschool and Kindergarten Children Who Stutter (KiddyCAT; Vanryckeghem & Brutten, 2007) and (a) age; (b) caregiver reports of stuttering and its social consequences; (c) types of disfluencies; and (d) standardized speech, vocabulary, and language scores.

Method—Participants were 46 preschool-age children who stutter (CWS; 12 females, 34 males) and 66 preschool-age children who do not stutter (CWNS; 35 females, 31 males). After a conversation, children completed standardized tests and the KiddyCAT while their caregivers completed scales on observed stuttering behaviors and their consequences.

Results—The KiddyCAT scores of both the CWS and the CWNS were significantly negatively correlated with age. Both groups' KiddyCAT scores increased with higher scores on the Speech Fluency Rating Scale of the Test of Childhood Stuttering (Gillam, Logan, & Pearson, 2009). Repetitions were a significant contributor to the CWNS's KiddyCAT scores, but no specific disfluency significantly contributed to the CWS's KiddyCAT scores. Greater articulation errors were associated with higher KiddyCAT scores in the CWNS. No standardized test scores were associated with KiddyCAT scores in the CWS.

Conclusion—Attitudes that speech is difficult are not associated with similar aspects of communication for CWS and CWNS. Age significantly contributed to negative speech attitudes for CWS, whereas age, repetitions, and articulation errors contributed to negative speech attitudes for CWNS.

Keywords

stuttering; KiddyCAT; negative communication attitude; children; fluency

People who stutter often repeat, prolong, or block speech sounds as they attempt to communicate their wants, needs, and ideas with other people (Büchel & Sommer, 2004). Approximately 5% of children stutter at some point in their lives, with onset usually occurring between the ages of 2 and 5 and in twice as many preschool boys as girls (Bloodstein & Bernstein Ratner, 2008; Büchel & Sommer, 2004; Yairi & Ambrose, 2005,

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2013). Sixty-five percent to 85% of children who stutter (CWS) recover by 6 years of age without treatment (often called spontaneous recovery), or with treatment, leaving approximately 1% of the population to stutter intractably for the rest of their lives, with a male-to-female ratio of 4:1 (Andrews & Harris, 1964; Mansson, 1999; Panelli, McFarlane, & Shipley, 1978; Yairi & Ambrose, 1999, 2013).

The diagnosis of childhood stuttering has historically rested on its most noticeable feature—the child's prevalence of stuttering-like disfluencies (SLDs; Bloodstein, 1995). SLDs, or sounds that are most characteristic of stuttering, include sound/syllable repetitions (SSRs; *bl-bl-blanket*), monosyllabic whole-word repetitions (WWRs; *car-car-car*), and audible and inaudible sound prolongations (A-SPs and I-SPs; *shhhhhoe* and *s__tar*, respectively) (Conture, 2001; Yairi, Ambrose, Paden, & Throneburg, 1996; Yaruss, 1998). Normal disfluencies common in all humans' speech are called nonstuttering-like disfluencies (non-SLDs) and include interjections (INTJs; *um* and *like*), revisions (REVs; *I want, no, I need to go*), and phrase repetitions (PRs; *He was going…he was going to Italy*) (Conture, 1990; Yaruss, 1998). No one is perfectly fluent. Everyone usually displays a mixture of both SLDs and non-SLDs, with those who stutter exhibiting more SLDs than those who do not (Johnson & Associates, 1959; Vanryckeghem & Brutten, 2007; Yairi & Ambrose, 1999).

Adults who stutter have consistently held more negative views toward their speech than those who do not. Many researchers used to believe that this attitude did not develop until years after stuttering's onset, or at least well into elementary school (Ambrose & Yairi, 1994; Ammons & Johnson, 1944; Bloodstein, 1995; Cox, Seider, & Kidd, 1984; Guitar & Bass, 1978; Silverman, 1980). More recent findings, however, indicate that CWS as young as 2 years and children who do not stutter (CWNS) as young as 3 years can perceive stuttering in both their own and others' speech (Ambrose & Yairi, 1994; Ezrati-Vinacour, Platzky, & Yairi, 2001). It is possible that this documented awareness may contribute to the development of negative attitudes toward one's speech at an early age (Vanryckeghem & Brutten, 1997, as cited in Vanryckeghem, Brutten, & Hernandez, 2005; Yairi & Ambrose, 2005).

Because Vanryckeghem et al. (2005) found caregivers to be poor at accurately reporting their children's internal attitudes/emotional states, they developed a self-report assessment for preschool-age children of attitudes toward their speech. The Communication Attitude Test for Preschool and Kindergarten Children Who Stutter (KiddyCAT) is an age-appropriate, verbally administered survey requiring the child to answer 12 *yes* or *no* questions such as "Do words sometimes get stuck in your mouth?" and "Do your parents like the way you talk?" (Vanryckeghem & Brutten, 2007).

Vanryckeghem and Brutten (2007) and Clark, Conture, Frankel, and Walden (2012) reported that younger typically developing children tend to score significantly higher on the KiddyCAT, or view their speech more negatively, than older typically developing children. Clark et al. reported that a single strong dimension of the KiddyCAT reflects a child's perception that speaking is difficult and that children perceive speaking to get easier as they grow up.

To gather more holistic information regarding a child's speech in real-life communication settings outside of the treatment room, Gillam, Logan, and Pearson (2009) constructed two observational rating scales as part of the Test of Childhood Stuttering: the Speech Fluency Rating Scale (TOCS-1) and the Disfluency-Related Consequences Rating Scale (TOCS-2). Using these scales, a caregiver reports both (a) the amount of overt stuttering behaviors and (b) the ensuing negative consequences that he or she observes in his or her child's life. Comparing caregiver-reported data to his or her child's self-reports could help the caregiver determine whether observed overt behaviors and consequences of stuttering are significantly related to the child's own, self-reported attitudes.

However, motoric or linguistic deficits in areas other than fluency could contribute to a child's attitude that speech is difficult, especially because a number of the KiddyCAT questions ask children simply if they, their caregivers, and others "like the way they talk." In a 2011 meta-analysis, Ntourou, Conture, and Lipsey summarized the language abilities of CWS and found that they have significantly lower receptive, expressive, and overall language, and depressed mean length of unit compared to their fluent peers. Yairi et al. (1996) also reported that children with persistent stuttering display poorer phonological, expressive, and receptive language development than both recovered CWS and their fluent peers, although both research groups pointed out that CWS's lower language scores do not necessarily mean that they have *disordered* language abilities. Perhaps subtle differences in the language abilities of CWS and CWNS contribute to differences in their internal perceptions of the difficulty of their speech.

In order to more fully answer the question, "Why do preschool-age children perceive speaking as difficult?" we explored age-related, emotional, and linguistic factors that might influence children's negative attitudes toward their speech and whether those factors differ between CWS and CWNS. Understanding whether age, stuttering and its consequences, rates and types of disfluencies, and/or other speech, vocabulary, and language abilities contributes to young children's perceived difficulty of speech could provide both researchers and clinicians with a better grasp on the multifactorial nature of stuttering. We addressed four hypotheses.

First, for CWNS, we expected that their attitudes toward speech would be significantly negatively correlated with age. That is, we hypothesized that older CWNS would report lower KiddyCAT scores than younger CWNS. Conversely, for CWS, we expected that there would be no decrease in negative attitude toward speech with older age, as Vanryckeghem and Brutten (2007) and Clark et al. (2012) found.

Second, for both CWS and CWNS, we predicted that a child's TOCS-1 score would be positively correlated with his or her KiddyCAT score. That is, we predicted that children whose caregivers observed more overt stuttering-like behaviors would express more negativity toward their speech. However, because Vanryckeghem et al. (2005) found that caregivers are poor at describing their children's internal emotional states, we hypothesized that a child's TOCS-2 score would have no significant correlation with his or her KiddyCAT score; that is, we hypothesized that caregivers' perceptions of their children's reactions to stuttering would not relate to their children's KiddyCAT score.

Third, we hypothesized that higher KiddyCAT scores, both in CWS and CWNS, would be positively correlated with one or more specific types of SLD; namely, disfluencies that are either more repetitive (SSRs and WWRs) or prolonging (A-SPs and I-SPs; prolongations) in nature.

Finally, we hypothesized that lower scores on any of five standardized speech and language tests measuring receptive language and vocabulary, expressive language and vocabulary, and articulation (described later) would be significantly correlated with higher KiddyCAT scores. That is, we predicted that children's poorer speech and language abilities would be related to more negative attitudes toward speech.

METHOD

Participants

Participants included 46 English-speaking CWS (12 females, 34 males; $M = 46.68$ months) and 66 English-speaking CWNS (35 females, 31 males; $M = 49.74$ months) between 36 and 71 months of age. Data were gathered as part of a larger study of the emotional and linguistic influences on developmental stuttering (e.g., Arnold & Conture, 2011; Conture, Kelly, & Walden, 2013; Johnson, Conture, & Walden, 2012; Jones et al., 2014; Ntourou et al., 2011; Walden et al., 2012). Participants either were (a) recruited by an advertisement in a free, monthly parent magazine that was circulated throughout middle Tennessee; (b) contacted from a database of Tennessee state birth records; or (c) referred by the Bill Wilkerson Hearing and Speech Center after a clinical evaluation. Participants were compensated for their time. The study was approved by Vanderbilt University's Institutional Review Board. Caregiver informed consent and child assent were obtained.

Classification and Inclusion Criteria

The participants were classified as CWS if they exhibited three or more SLDs (e.g., SSR, WWR, A-SP, I-SP) per 100 words of conversational speech (i.e., ≥3%; see Conture, 2001, and Yaruss, 1998) and scored 11 or higher (mild to very severe) on the Stuttering Severity Instrument of Children and Adults—Third Edition (SSI–3; Riley, 1994). Participants were classified as CWNS if they exhibited fewer than three SLDs per 100 words of conversational speech (<3%) and scored 10 or lower (very mild) on the SSI–3.

In order to avoid confounds with other speech and language concerns, we required all of the participants to have a score of 85 or higher on all of the standardized speech-language measures (i.e., 1 *SD* below the mean score of 100 or better). These measures included the (a) Sounds in Words subtest of the Goldman-Fristoe Test of Articulation—Second Edition (GFTA–2; Goldman & Fristoe, 2000), which measures articulation abilities; (b) the Peabody Picture Vocabulary Test—Third Edition (PPVT–III; Dunn & Dunn, 1997), which assesses receptive vocabulary; (c) the Expressive Vocabulary Test (EVT; Williams, 1997), which evaluates expressive vocabulary; and (d) the receptive and expressive portions of the Test of Early Language Development—Third Edition (TELD–3; Hresko, Reid, & Hamill, 1999), which measures receptive and expressive language abilities, respectively. Participants had no known concomitant neurological, psychological, developmental, or behavioral disorders

(e.g., attention deficit hyperactivity disorder), and each passed bilateral pure-tone and tympanometric hearing screenings (American Speech-Language-Hearing Association, 1990).

Final Data Corpus

We began the study with an initial sample of 206 children. However, seven were removed because their stuttering frequency and SSI–3 score did not place them in a talker group, 47 were excluded due to missing KiddyCAT scores or scores deemed invalid by the speech-language pathologist due to inattentive child-response behaviors, 32 were excluded because they exhibited speech-language scores more than 1 *SD* below the mean, and eight were age outliers. The removal of these 94 children resulted in a final total of 112 participants (46 CWS and 66 CWNS). One participant in the CWS talker group had missing TOCs data, so for the analyses of the second hypothesis, the CWS group had 45 children.

Measurement of Children's Attitudes Toward Their Speech

The KiddyCAT measures children's attitudes toward their speech, with 12 being most negative. Clark et al. (2012) identified a single factor of the KiddyCAT as being speech difficultness, or how difficult young children view their speaking. In a normative evaluation ($N = 108$), the CWS scored significantly higher than their CWNS peers ($M = 4.36$, $SD = 2.78$ vs. $M = 1.79$, $SD = 1.78$, respectively, with a large effect size of 1.44), supporting the KiddyCAT's external validity for children 3–6 years of age (Cohen, 1988; Vanryckeghem & Brutten, 2007; Vanryckeghem et al., 2005).

Measurement of Caregiver Reports of Disfluencies and Their Consequences

The TOCS-1 is a series of nine questions rated on 4-point scales by caregivers that measures a child's overt speech behaviors, including SLDs observed in outside contexts, the relative length of repetitions in the child's speech, and how the child's fluency has changed in different situations (Gillam et al., 2009).

The TOCS-2 is a series of nine questions rated on 4-point scales by caregivers that measures observed consequences of concern, embarrassment, and frustration in response to stuttering; concomitant physical behaviors exhibited when stuttering; strategies used to avoid speaking and/or conceal stuttering; and the degree to which the child is penalized by listeners because of his or her stuttering (Gillam et al., 2009).

Each scale's total used in the analyses was the summed scores of items.

Measurement of Speech Fluency

We used Conture's (1990) protocol for recording SLDs (Coulter, Anderson, & Conture, 2009; Richels, Buhr, Conture, & Ntourou, 2010); that is, SSRs, WWRs, A-SPs, and I-SPs were categorized as SLDs, whreas INTJs, REVs, and PRs were deemed uncharacteristic of stuttering and were considered non-SLDs. To have sufficient variance in the distributions of disfluencies, we grouped SSRs and WWRs into a single category, named *repetitions*, and A-SPs and I-SPs into a single category, named *prolongations*.

A certified speech-language pathologist (SLP) coded the participants' disfluencies in real time during 300 words of a play conversation. Interjudge reliability reflected agreement between five SLPs who were trained coders of stuttered disfluencies, with intraclass correlation coefficients of $r = .93$ for SLDs, .98 for repetitions, .95 for prolongations, and .96 for non-SLDs.

Measurement of Speech and Language Skills

The participants' standard scores on four normed assessments were used to evaluate their speech and language. The GFTA–2 measures articulation, the PPVT–III measures receptive vocabulary, and the EVT measures expressive vocabulary. The TELD–3, though one standardized test, has two portions: one measuring receptive language and the other expressive language. The resulting battery of four speech and language assessments provided a total of five standardized test scores.

Procedure

We collected all data in a university laboratory. First, one of the five SLPs gathered fluency data from each participant during free-play. Then, the speech and language tests were administered by a trained undergraduate and/or graduate-level research assistant in the following order: GFTA–2, PPVT–III, EVT, and TELD–3. Next, the participants completed the KiddyCAT and, finally, their hearing was screened using routinely calibrated audiometric equipment. Although fatigue may have affected the participants' performance on the later tests (e.g., the TELD–3 and the KiddyCAT), this testing order was chosen in order to increase the chance that the participants would complete the entire sequence of tests (Clark et al., 2012). During test administration, each caregiver completed the TOCS-1 and TOCS-2.

RESULTS

Descriptive Statistics

Before investigating each variable's relation to the KiddyCAT, we calculated preliminary descriptive statistics for each of the talker groups (Table 1). We used *t* tests to compare the groups' mean ages, TOCS scores, disfluencies (including SLDs, repetitions, prolongations, and non-SLDs), and speech and language test scores. Gender did not significantly affect the children's KiddyCAT scores and thus was not included in the analyses (Clark et al., 2012; Vanryckeghem & Brutten, 2007).

The talker groups did not differ significantly in age ($p = .061$). Although technically nonsignificant, the *p* value was very close to the .05 level of significance; a caveat that perhaps the talker groups were close to significantly differing in age. The effect size between the groups was .36, between small (.2) and medium (.5) as articulated by Cohen (1988). Effect sizes greater than .8 are considered large (Cohen, 1988).

As expected based on the criteria for talker group classification, the CWS exhibited significantly more SLDs than did the CWNS ($t = 11.35$, $p = .0001$, $d = 2.36$), as well as

more repetitions ($t = -9.99$, $p = .0001$, $d = 2.07$) and prolongations ($t = -5.35$, $p = .0001$, $d = 1.11$). There were no between-group differences in non-SLDs ($t = 1.8$, $p = .074$, $d = .34$).

As expected in groups who differ on speech fluency, the CWS had significantly higher TOCS-1 scores (observed speech fluency; $t = -5.48$, $p = .0001$, $d = 1.08$) and higher TOCS-2 scores (observed consequences of stuttering; $t = -2.9$, $p = .005$, $d = .68$) than the CWNS.

There were no significant differences between the two talker groups' mean scores on any of the four standardized speech and language tests.

Confirming previous research (Clark et al., 2012; Vanryckeghem & Brutten, 2007), the CWS scored significantly higher on the KiddyCAT than the CWNS ($t = -2.27$, $p = .025$, $d = .43$), indicating that they viewed their speech as significantly more difficult than their fluent peers viewed their speech.

Hypothesis 1: Relation Between Age and KiddyCAT Score

We conducted separate bivariate correlations for each talker group in order to explore the relation between child age and his or her KiddyCAT score. Based on previous research, we hypothesized that a child's KiddyCAT score would be significantly negatively correlated with age in the CWNS but not in the CWS.

This hypothesis was confirmed for the CWNS: Their KiddyCAT scores were significantly negatively correlated with age ($r = -.25$ $p = .044$); that is, older children had lower KiddyCAT scores than younger children. Contrary to expectations, we found that KiddyCAT scores were also significantly negatively correlated with age in the CWS ($r = -.59$, $p < .001$). A Fisher's Z test ($z = 2.13$, $p = .033$) indicated that the correlation between KiddyCAT scores and age was significantly stronger for CWS than CWNS (Lowry, 1998). Scatterplots of these correlations are shown in Figure 1.

In a supplementary analysis aimed at better understanding the decline in KiddyCAT scores with age in CWS, we assessed the relation between time since stuttering onset (TSO) and KiddyCAT score in a subset of CWS with TSO data ($n = 38$), using a bivariate correlation that compared caregiver-reported TSO dates and their children's corresponding KiddyCAT scores. The results were significant ($r = -.39$, $p = .017$), meaning that a longer TSO predicted lower KiddyCAT scores (less negative attitudes) in 3- to 5-year-old CWS.

Hypothesis 2: Relation Between TOCS Scores and KiddyCAT Scores

To account for the nonnormality of our participants' KiddyCAT scores (i.e., many 0s and 1s in CWNS), we used generalized estimating equations with a Poisson distribution, which can handle correlated data with binary or skewed distributions, to analyze how strongly the caregiver-reported TOCS scores predicted the CWNS's and CWS's scores on the KiddyCAT. Age, a possible confound, was a covariate in the model (Hanley, Negassa, & Forrester, 2003). We hypothesized that the children's TOCS-1 scores would be positively correlated with their KiddyCAT scores in both talker groups, but that the children's TOCS-2 scores would not be correlated with their KiddyCAT scores.

Both hypotheses were confirmed. The children's TOCS-1 scores were related to their KiddyCAT scores in both the CWNS (β = .046, p = .001) and the CWS (β = .079, p = .0496). Thus, more care-giver-observed SLDs were associated with children's higher scores on the KiddyCAT. TOCS-2 scores, however, were not related to the KiddyCAT scores of the CWNS or CWS (β = −.057, p = .067 and β = −.007, p = .9340, respectively). These data are presented in Table 2.

Hypothesis 3: Disfluencies' Prediction of KiddyCAT Score

We used bivariate correlations to examine the relation between KiddyCAT scores and SLDs (in total), non-SLDs, repetitions, and prolongations (Table 3). Next, we used Poisson regression models to investigate whether the two types of SLDs were associated with the children's scores on the KiddyCAT, with age, repetitions, and prolongations as covariates (a Poisson regression model was used because Shapiro-Wilk tests showed that the distributions of disfluencies, especially in CWNS, were skewed right). These analyses are presented in Table 4.

In CWNS, KiddyCAT scores were positively correlated with total SLDs (r = .275, p = .026) but not with non-SLDs (r = −.03, p = .77). Of SLDs specifically, CWNS's KiddyCAT scores were positively correlated with the number of repetitions in their speech (r = .249, p = .044) but not the number of prolongations (r = .04, p = .697). In CWS, KiddyCAT scores were not correlated with the frequency of either total SLDs or non-SLDs in their speech (r = .27, p = .06 and r = −.26, p = .07, respectively), although they approached the .05 level of significance. However, CWS' KiddyCAT scores were positively correlated with the number of prolongations in their speech (r = .36, p = .01), although not with the number of repetitions (r = .12, p = .39).

In CWNS, the Poisson regression model was statistically significant as a whole (p = .01). Age was not a significant contributing factor to KiddyCAT scores (p = .07). The frequency of repetitions in children's speech, however, was related to KiddyCAT score (β = .09, p = .01).

In CWS, the model was significant as a whole (p < .001), but age was the only significant predictor of KiddyCAT score (β = −.05, p = .001). With increasing age, the CWS's KiddyCAT scores declined. Of note, however, was the borderline significance of prolongations in predicting KiddyCAT score (β = .02, p = .06).

Hypothesis 4: Speech and Language Tests' Prediction of KiddyCAT Scores

Using generalized estimating equations, we tested the hypothesis that lower articulation, vocabulary, and language scores would be associated with higher KiddyCAT scores (more negative attitudes) in both CWS and CWNS.

In CWNS, the hypothesis was confirmed. The CWNS's GFTA–2 score was related to their KiddyCAT score (β = .04, p = .001). Thus, an increase in articulation errors in CWNS coincided with a more negative attitude toward their speech. None of the vocabulary or language tests was a significant contributor to the CWNS's KiddyCAT scores.

No speech, vocabulary, or language test was related to the CWS's KiddyCAT scores. Only age was significant ($\beta = -.18$, $p < .001$); as age increased, KiddyCAT scores decreased (see Table 5).

Summary of Main Findings

The main findings indicated that

- Negative attitudes of preschool CWNS and CWS toward their speech (KiddyCAT score) were negatively correlated with age (Hypothesis 1).
- More caregiver-observed SLDs (TOCS-1 score) were related to higher child-reported KiddyCAT scores (Hypothesis 2a).
- Caregiver-observed adverse consequences to stuttering (TOCS-2 score) were not related to child-reported KiddyCAT scores (Hypothesis 2b).
- The number of repetitions in CWNS's speech was significantly related to their KiddyCAT scores (Hypothesis 3).
- The number of articulation errors in CWNS's speech (GFTA–2 score) was significantly related to their KiddyCAT scores (Hypothesis 4).

DISCUSSION

The main findings will be discussed in order of the study's four a priori hypotheses, followed by a discussion of their clinical implications and the limitations of this study.

Hypothesis 1: Relation Between Age and KiddyCAT Score

The confirmation of the hypothesis that negativity toward one's speech decreases as age increases in a cross-sectional sample of 3- to 5-year-old CWNS is consistent with findings reported by Vanryckegem and Brutten (2007) and Clark et al. (2012). However, the finding that young CWS's negative attitudes toward their speech significantly decrease with age is not. A difference in methodology may account for these diverging results.

To examine age and KiddyCAT score, Vanryckeghem and Brutten (2007) and Clark et al. (2012) dichotomized their samples into *older* and *younger* subgroups, compared mean KiddyCAT scores, and found that the mean CWS KiddyCAT scores did not decrease with age. Using bivariate correlations, which is a more statistically powerful approach, we found a significant decrease in scores with age (Cohen, 1983). The results of our ancillary analysis exploring TSO and KiddyCAT scores showed that a longer TSO is associated with less negative attitudes toward speaking in young CWS.

Both of these findings may seem counterintuitive at first, because adults who stutter report very negative attitudes toward their speech (Iverach et al., 2009). However, the mean age of the present CWS sample was very young, 3;10 (years;months), and although this study was not longitudinal, we may have been measuring the attitudes of many CWS who were in the midst of recovering from stuttering. If four of five CWS recover, it is logical to suppose that up to 80% of our sample who were classified as CWS at the time of investigation may

actually be on trajectories toward recovery. CWS present a significantly more negatively sloping correlation between age and KiddyCAT score than do CWNS ($r = -.59$ vs. $-.25$, respectively, $p = .033$). Figures 1 and 2 depict these associations between KiddyCAT score and age for CWNS and CWS, respectively. This suggests that CWS hold more negative attitudes early than their CWNS peers, but that those attitudes may get better as the children mature and perhaps recover.

In addition, perhaps as children mature, they develop more complex social cognition skills that allow them to misrepresent or minimize their feelings on explicit attitude ratings such as the KiddyCAT. This might explain why lower scores were reported in older CWS, some of whom may later go on to report significant negative attitudes toward their speech as adults (Iverach et al., 2009). It is possible that measures of implicit attitudes, which do not require awareness or even truthfulness to assess, may present a different picture (e.g., Greenwald & Banaji, 1995).

The results of this study, coupled with those of Vanryckegem and Brutten (2005, 2007) and Clark et al. (2012), indicate that the KiddyCAT is consistently able to capture the negative attitudes that preschool CWS have toward the difficultness of their speech. Using the instrument as part of a continuing, holistic assessment of the nature and impact of young children's stuttering to create the most effective treatment plans is recommended. In order to understand the role of communicative attitudes in the development of stuttering, it is recommended that future longitudinal investigations assess CWS's overt attitudes toward speech and trajectories of recovery and persistence. Illumination of exactly how CWS's attitudes toward their stuttering change with recovery would be an invaluable addition to SLPs' arsenals.

Hypothesis 2: Relation Between TOCS Scores and KiddyCAT Scores

TOCS-1—Higher caregiver-observed stuttering behaviors (as measured by TOCS-1 score) were associated with more negative attitudes toward speech for both the CWS and CWNS. However, the number of observed SLDs identified by an SLP was uncorrelated with CWS's KiddyCAT scores. Thus, the caregiver-reported measure of stuttering frequency, which relies on memory, and the trained clinician-reported measure taken in real time may not measure the same thing. Because the caregiver-reported measure of stuttering frequency is significantly associated with children's negativity toward their speech, but the clinician's measurement of SLDs is not, caregivers may be able to provide valuable information about the entirety of their children's stuttering that may not be captured in a single clinical snapshot. It is also possible that caregivers may be unwittingly folding more amorphous feelings and attitudes into their assessment of their children's stuttering frequency. These intangible factors may then influence the formation of negative speech attitudes in their children, as seen on the KiddyCAT.

TOCS-2—Caregiver-reported consequences of stuttering were not associated with the children's reported negativity toward speaking. We had hypothesized that caregiver- and self-report measures would be related because they both assess, in part, aspects of feelings and emotions related to stuttering. However, the lack of correlation between these measures

may be explained by a closer inspection of the content of each instrument. Three of nine questions on the TOCS-2 explicitly ask about the child's emotional equilibrium in response to stuttering; specifically, how often they seem "concerned, embarrassed, or frustrated" with their inability to speak fluently. One question asks how often listeners seem to reject the child; three ask about nonemotional, concomitant physical movements associated with protracted stuttering; and the final two ask about avoidance behaviors that the child employs to circumvent speaking.

The KiddyCAT, in contrast, asks six questions about children's awareness of the difficulty of certain facets of speech. Two questions ask how children think other people view their speech, and two ask about possible shame involved in not being able to speak fluently. One question asks if the child enjoys talking, and the last asks if speaking difficulty is the same across situations.

The KiddyCAT most saliently measures whether children perceive speech as difficult (Clark et al., 2012). The TOCS-1 asks caregivers to report more objective, observable stuttering behaviors, but the TOCS-2 asks them about a mixture of observable behaviors and subjective attitudes. Although there appears to be some overlap of the questions in the KiddyCAT and the TOCS-2 (roughly 2/3), there is not enough content agreement to predicate a significant relation.

The current results point to the inclusion of the KiddyCAT in initial assessments of preschool CWS. Because caregiver-observed stuttering behaviors were associated with children's attitudes toward their speech, but a clinician's disfluency count was not, using both caregivers' data about their children's speech and the children's own self-reported attitudes could give clinicians a better picture of how stuttering impacts their clients outside the narrow window of a clinical setting. The TOCS-2 (a mixture of physical and emotional effects of stuttering) is also useful, although the scale should be used alongside a measure of self-reported attitudes from CWS.

Hypothesis 3: Disfluencies' Prediction of KiddyCAT Score

Certain types of speech disfluencies were significantly associated with a negative speech attitude in CWNS but not in CWS. Repetitions of a sound or single syllable word contributed to a negative attitude toward speech in CWNS, but only age significantly contributed to that attitude in CWS. This is intriguing because CWS have more SLDs than do CWNS (*M*s = 27.84 vs. 4.17, respectively).

The previously mentioned issue of recovery in CWS might account for this finding. As many CWS in our sample may have been in the midst of recovering, they might have had less negative attitudes toward their speech than they previously held. Thus, although they displayed more repetitions and prolongations than CWNS, they may have had less negative thoughts and feelings because they were experiencing remediation from stuttering. Whereas the disfluencies in the CWNS in our study may not have been severe enough for a diagnosis of stuttering, they may be more negatively affected by even one disfluency (in our sample, most probably a repetition). That may be why repetitions were associated with KiddyCAT scores in the CWNS. Because the CWNS displayed an average rate of only .47

prolongations per 100 words of speech, perhaps that variable did not have enough variance for valid correlations.

At present, we cannot make strong claims that SLPs can predict a stuttering client's negative attitude toward his or her speech based on the number or types of disfluencies observed. Thus, just as initial severity does not always mean that a child will persist in stuttering, stuttering severity cannot always predict how negatively he or she views his or her speech (Yairi et al., 1996).

Because CWS have approximately four times as many repetitions as prolongations, it would be interesting in future studies to elucidate whether the less prevalent prolongations are associated with KiddyCAT scores in larger and/or longitudinal samples.

Researchers are not in agreement about whether the initial severity of stuttering predicts recovery or persistence. Yairi et al. (1996) observed that CWS with higher numbers of SLDs early on more frequently recovered from the disorder, whereas Howell, Bailey, and Kothari (2010) reported that CWS with lower numbers of SLDs are more likely to recover. Both concur, however, that CWS whose SLD counts stay constant and do not decrease swiftly (in the first 6–12 months) are more at risk for stuttering persistence. Longitudinal analyses may illuminate whether children's speech attitudes depend on severity, frequency, or types of SLDs, and if those contribute to recovery from, or persistence in, stuttering.

Hypothesis 4: Speech and Language Tests' Prediction of KiddyCAT Scores

Of the five standardized test scores of receptive vocabulary and language, expressive vocabulary and language, and articulation ability, in CWNS, only articulation was associated with negative speech attitudes. The more speech-sound errors that the CWNS had in single words, the more negative attitudes they had toward their speech. No vocabulary or language scores were associated with speech attitudes in the CWNS or CWS. Thus, although Ntourou et al. (2011) reported that CWS have been found to have, almost unequivocally, significantly lower language scores than CWNS (though usually within normal limits), they do not seem to factor into a child's attitude that speech is difficult.

This finding is interesting because although the KiddyCAT was originally developed to assess negative speech attitudes of CWS, the fact that in our study, the CWNS's KiddyCAT scores were associated with *articulation* ability suggests that the KiddyCAT may measure speech ability more broadly than simply speech fluency.

Analyzing which specific items on the KiddyCAT measure articulatory attitudes in CWNS may enable the development of a similar self-reported attitudinal rating scale for other speech and language deficits beyond fluency, thereby enhancing SLPs' ability to individualize treatment plans according to clients' needs in populations outside of developmental stuttering.

Limitations

Some limitations constrain the internal and external validity of this study. First, the participants' SLDs were not counted from transcriptions of their conversations using

Systematic Analysis of Language Transcripts software (Miller & Chapman, 1983); rather, they were based on SLPs' real-time perception of disfluencies while engaged with the child. Although the five different SLPs responsible for these counts in the present study showed a high rate of interrater reliability, it is possible that some SLDs were coded incorrectly.

Second, although children who scored more than 1 *SD* below the mean on any speech or language test were excluded from the study, children who scored higher than 1 *SD* above the mean were included. Thus, these results may not be valid for the entire population of preschool-age CWS but instead only for those scoring 1 *SD* below or higher on standardized speech and language tests.

Conclusion

The present study provides evidence that a number of factors are significantly associated with preschool-age CWS's and CWNS's negative speech attitudes. Younger age, a higher score on the TOCS, more repetitive disfluencies, and a higher score on the GFTA–2 were each associated with more negative speech-related attitudes in preschool-age CWNS. But, only younger age and a higher score on the TOCS were associated with negative speech-related attitudes in preschool-age CWS. A large number of CWS possibly undergoing recovery were undoubtedly included in this sample; therefore, future studies analyzing the longitudinal relation between fluency and negative speech attitude may illuminate possible contributions to the development of stuttering. As has been evidenced by other researchers (e.g., Clark et al., 2012; Vanryckghem 2007), the Kiddy-CAT is a useful tool in the comprehensive assessment of childhood stuttering. For the practicing clinician, present findings build on these previous studies and provide context on which to further understand and interpret factors that play a role in the self-reported communicative attitudes of young CWS and CWNS.

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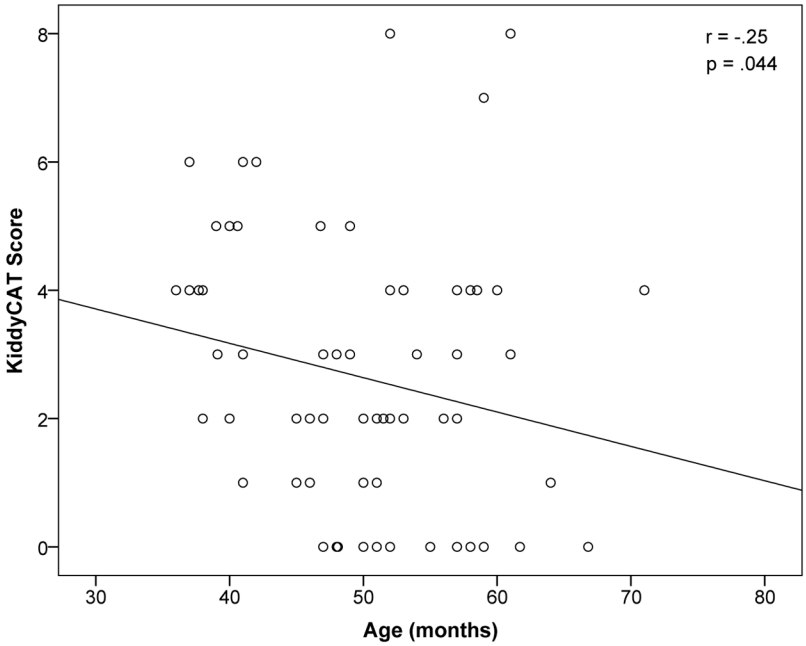

Figure 1.
Relation between age and KiddyCAT scores in CWNS.

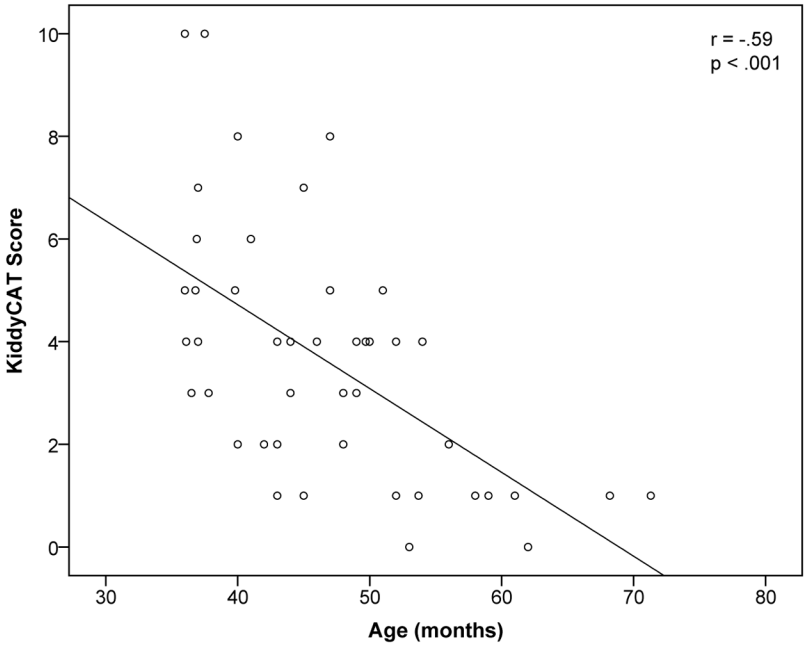

Figure 2.
Relation between age and KiddyCAT scores in CWS.

Table 1

Means for age, speech attitude, speech fluency, standardized tests of speech and language, and the Test of Childhood Stuttering (TOCS) observational rating scale for children who stutter (CWS) and children who do not stutter (CWNS).

	CWNS *n* = 66		CWS *n* = 46			
	Mean	***SD***	**Mean**	***SD***	***t* value**	***p* value**
Age information						
Age (months)	49.74	8.20	46.68	8.70	1.87	.061
Speech attitude information						
KiddyCAT score	2.65	2.09	3.63	2.45	−2.27	.025
Speech fluency information						
Total disfluencies	14.38	8.01	40.67	14.61	−11.1	<.001
Speech-language disfluencies (SLDs)	4.17	2.11	27.85	14.04	11.35	<.001
Repetitions	3.70	2.05	22.30	12.53	−9.99	<.001
Prolongations	0.47	1.15	5.55	6.36	−5.35	<.001
Non-SLDs	10.21	7.39	12.83	7.65	−1.8	.074
Standardized speech and language information						
Articulation abilities						
Goldman-Fristoe Test of Articulation—Second Ed.	110.76	8.02	110.18	9.00	−.350	.727
Receptive Language abilities						
Peabody Picture Vocabulary Test—Third Ed.	114.83	12.15	117.55	11.80	1.185	.238
TELD–3 Receptive portion	119.15	15.37	121.42	12.10	.874	.384
Expressive Language abilities						
Expressive Vocabulary Test	114.48	11.42	118.67	11.74	1.878	.063
TELD–3 Expressive portion	113.65	15.46	113.64	11.70	−.006	.995
TOCS observational rating scale information						
TOCS 1-Speech Fluency Rating Scale	6.42	6.00	14.22	8.23	−5.48	<.001
TOCS 2-Disfluency-Related Consequences Rating Scale	2.85	1.13	5.13	4.61	−2.92	.005

Note. KiddyCAT = Communication Attitude Test for Preschool and Kindergarten Children Who Stutter; TELD–3 = Test of Early Language Development—Third Edition.

Table 2

General estimating equations of the TOCS-1's and TOCS-2's ability to predict KiddyCAT score in CWNS and CWS with age covaried.

	B	*p* value
CWNS		
Goodness of Fit of the	Model Value	
QICC	122.984	
Individual parameters		
Age	−.014	.236
TOCS-1 score	.046	.001
TOCS-2 score	−.057	.067
CWS		
Goodness of Fit of the	Model Value	
QICC	170.671	
Individual parameters		
TOCS-1 score	.079	.0496
TOCS-2 score	−.007	.9340

Note. QICC = Quasi Likelihood under Independence Model Criterion (Corrected).

Table 3

Correlations (and *p* values) between KiddyCAT score and disfluencies in CWNS and CWS.

	SLDs		Repetitions		Prolongations		Non-SLDs	
	r	p	r	p	r	p	r	p
CWNS								
KiddyCAT score	.275	.026	.249	.044	.049	.697	−.032	.799
CWS								
KiddyCAT score	.276	.063	.129	.393	.367	.012	−.269	.071

Table 4

Poisson regression with age, repetitions', and prolongations' contributions to KiddyCAT score for CWNS and CWS.

	Deviance	χ^2 value	*p* value	B	*p* value
CWNS					
Overall model effect					
Goodness of Fit	1.91	1.71			
Omnibus Test	11.25	.01			
Individual model parameter estimates					
Intercept				1.43	.006
Chronological age				−.018	.07
Repetitions				.092	.015
Prolongations				.09	.167
CWS					
Overall model effect					
Goodness of Fit	1.07	1.04			
Omnibus Test		32.582	<.001		
Individual model parameter estimates					
Intercept				3.34	<.001
Chronological age				−.052	<.001
Repetitions				.006	.348
Prolongations				.021	.056

Table 5

General estimating equations of standardized tests of speech and language contributions to KiddyCAT score in CWNS and CWS with age as a covariate.

	Value	B	*p* value
CWNS			
Goodness of Fit of the Model			
QICC	126.926		
Individual parameters			
Age		−.02	.171
Phonological abilities			
GFTA–2 standard score		−.025	.009
Receptive Language abilities			
PPVT–III Standard score		−.012	.195
Receptive TELD–3 standard score		−.003	.695
Expressive Language abilities			
EVT standard score		.004	.665
Expressive TELD–3 standard score		.012	.228
CWS			
Goodness of Fit of the ModelValue			
QICC	189.623		
Individual parameters			
Age		−.180	<.001
Phonological abilities			
GFTA–2 standard score		−.005	.901
Receptive Language abilities			
PPVT–III standard score		−.009	.758
Receptive TELD–3 standard score		−.001	.973
Expressive Language abilities			
EVT standard score		.011	.780
Expressive TELD–3 standard score		−.022	.437