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Research Article

Pediatrician Referral Practices for Children Who Stutter

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Purpose: Given the marked increase in evidence-based information regarding the nature/treatment of stuttering, coupled with the fact that pediatricians tend to be one of the initial points of contact for parents who suspect their preschool-age child may stutter, this study explored pediatricians' (a) accuracy in identifying children who may stutter and (b) likelihood of referring children who present with a profile indicative of stuttering to speech-language pathologists.
Method: Pediatricians recruited nationally through professional organizations completed a 5- to 7-min online survey that probed stuttering identification and referral practices via responses to experimental case vignettes. Each vignette featured a 4-year-old boy with a family history of stuttering whose mother reported signs of stuttering and manipulation of two factors: stuttering during the pediatrician visit (or not) and negative communication attitude (or not).
Results: Our findings suggest pediatricians' identification and referral of children who may stutter is largely prompted by observation of overt speech behaviors and/or negative communication attitude. Participants' gender, years in practice, and experience working with children who stutter did not influence likelihood of referral.
Conclusions: Results indicate pediatricians are less likely to implement a "wait and see" approach with young children who stutter today than in the past. Unlike other common child onset diagnoses, however, parent report of atypical behavior does not yield pediatrician referral to a specialist. Future education and advocacy efforts directed toward pediatricians should emphasize inclusion of factors other than direct observation of stuttering behavior that may warrant referral (e.g., parent report).

Childhood stuttering is a neurophysiological communication disorder originating between ages 2 and 6 years (Yairi & Ambrose, 2013). Due to the early onset of stuttering, parents typically seek guidance from their child's pediatrician, among other early childhood providers, before seeking a formal speech-language evaluation when they first observe behaviors that are atypical or have concerns about their child's speech fluency (Guitar & Conture, 2013; Molt et al., 2016; Riley & Riley, 1989). Pediatricians are recommended to refer children with signs of stuttering and/or parent report of stuttering to a speech-language pathologist (SLP), as early intervention for young children who stutter may facilitate positive communication attitudes, build resilience against social preferences for fluency, and decrease stuttering frequency (Boey et al., 2009; Byrd & Donaher, 2018; de Sonneville-Koedoot et al., 2015; Ezrati-Vinacour et al., 2001; Guitar & Conture, 2013). Early identification of young children who stutter is critical, because we cannot (yet) predict if an individual child who stutters will recover or persist, and persistent stuttering increases the risk of negative academic, emotional, and social consequences (Byrd & Donaher, 2018; Craig et al., 2009; Ezrati-Vinacour et al., 2001; Langevin et al., 2010; Vanryckeghem et al., 2005; Yaruss & Quesal, 2004). Therefore, pediatricians should refer young children who may present with this complex disorder to an SLP for further screening, evaluation, and/or possible intervention.

The American Academy of Pediatrics recommends general developmental screening and monitoring for young children up to 5 years of age in order to identify a variety of developmental disorders and refer children to intervention at a young age (American Academy of Pediatrics et al., 2006; Lipkin et al., 2020). Although formal screening instruments have been shown to identify speech/language disorders in children up to 5 years of age, there is no current recommendation for or against their use by pediatricians (Wallace et al., 2015). This recommendation is due, in part, to a scarcity of screening accuracy

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studies conducted in primary care settings in the United States.

Parents play a large role in communicating concerns to their child's pediatrician early in childhood and throughout school age. Parent report screeners have been shown to demonstrate acceptable sensitivity and specificity in identifying children with speech and language impairment (Wallace et al., 2015). Additionally, parents have been proven to be able to accurately identify a variety of behaviors indicative of language, motor, and cognitive developmental disorders in their children (Finke et al., 2010; Glascoe, 1997, 2003; Ivanova et al., 2010; Marshall et al., 2016; Miller et al., 2017; Sacrey et al., 2018). Specific to stuttering, parents have demonstrated high reliability judging the quantity and quality of stuttering-like disfluencies in their young children who stutter (Einarsdóttir & Ingham, 2009; Onslow et al., 2018; Tumanova et al., 2018). Nevertheless, research to date suggests that, unlike other developmental disorders (e.g., autism spectrum disorder) wherein pediatricians refer to specialists solely based on parent report of a behavior they observe in their child that they perceive to be atypical (Finke et al., 2010), pediatricians appear to rely more on their own observation of stuttering-like behaviors as opposed to parent report when deciding whether or not to refer a young child who may stutter to an SLP (Yairi & Carrico, 1992). Given the marked variability in frequency of stuttering-like disfluencies across communication contexts (Buhr et al., 2016; Byrd et al., 2012; Wagovich & Hall, 2018; Yaruss, 1997), this reliance on behavioral observation is concerning, as pediatricians (similar to SLPs or other early childhood providers) may not have the opportunity to observe stuttering-like behaviors during a brief screening. Therefore, unless parents report behavior they perceive to be atypical and/or advocate for a screening, children who may stutter may be underidentified during early childhood, thereby delaying the benefits of early intervention.

Early Screening of Young Children Who May Stutter

To address the need for effective early developmental screening, Riley and Riley (1989) developed a screening procedure for physicians to facilitate referral of young children who may stutter to an SLP. This instrument provides examples of speech disfluencies considered to be normal (e.g., interjecting "uh"), borderline (e.g., repeating the first sound of a word 2–3 times without tension), and abnormal (e.g., repeating sound 4 or more times with tension) as well as interpretations for the frequency of these behaviors (Riley & Riley, 1989, p. 64). In addition to these descriptions of overt, stuttering-like speech behaviors, Riley and Riley encouraged physicians to take into consideration a child's reaction (e.g., communication attitude) and his or her parent's reaction to stuttering-like disfluencies. Notably, the authors reported reservations regarding the diagnostic accuracy of their criteria to "refer" a child observed to have three or more abnormal characteristics but to only "monitor" a child with two or fewer abnormal characteristics. Additionally, the authors noted concerns regarding the ability of physicians to observe and identify both speech behaviors and negative communication attitude associated with stuttering in their patients. This concern is well founded, as pediatricians infrequently and inconsistently screen for early developmental motor, behavior, and language skills (Green et al., 2019; Weitzman et al., 2015) or more "hidden" disorders later in childhood (e.g., attention-deficit/hyperactivity disorder, anxiety) for which the distinct characteristics may not be readily or consistently apparent during the pediatrician visit (Stein et al., 2016).

Yairi and Carrico (1992) later surveyed pediatrician attitudes and beliefs about young children who stutter. Pediatricians reported inaccurate causal contributors to stuttering (e.g., learned behaviors, a deep emotional problem, and parent behavior; Johnson, 1959; Johnson & Leutenegger, 1955), and most deferred immediate referral of children presenting with stuttering behaviors for further assessment. Pediatricians noted sound and word repetitions as both indicative of stuttering and typical to a child's speech and language development, and they did not strongly support the presence of physical tension associated with speech disfluency as a diagnostic sign of stuttering. With respect to communication attitude, approximately half (54%) of the participants agreed negative emotions associated with stuttering behaviors were indicative of stuttering. The majority of pediatricians identified SLPs as the best provider of treatment services for children who stutter, but some suggested alternative providers (e.g., psychiatrists). Additionally, most pediatricians reported receiving inadequate education related to stuttering and expressed concern regarding the insufficient number of publications in medical journals related to stuttering in children. Of the 27 questions in this survey, only three sought to understand how a pediatrician might apply his or her understanding of stuttering to a realistic clinical case. Pediatricians most often recommended a "wait and see" approach to parents of a child with a recent onset of stuttering due to the perspective that some stuttering is normal and that most children outgrow it. Based on their findings, Yairi and Carrico recommended SLPs educate pediatricians on typical disfluencies in preschool-age children, the role of early intervention in stuttering treatment, and common misconceptions regarding the etiology of stuttering such as parenting or personality.

Pediatrician Access to Best Practices for Childhood Stuttering

In the nearly three decades that have passed since publication of the Yairi and Carrico (1992) study, there has been an increase not only in our understanding of the nature of stuttering as SLPs but also in pediatrician access to evidence-based information regarding the nature and treatment of stuttering. Specifically, there has been an increase in literature published in medical journals and through national organizations tailored toward pediatricians and physicians (Ashurst & Wasson, 2011; Costa & Kroll, 2000; Guitar & Conture, 2013; Korstjens et al., 2011; Molt et al.,

2016). Costa and Kroll (2000) identified speech therapy as the main treatment option for developmental stuttering, and they differentiated characteristics indicative of typical disfluency among preschool-age children (e.g., interjections and revisions) from behaviors commonly associated with stuttering, such as part-word repetitions and dysrhythmic productions. In their recommendations to physicians, Costa and Kroll included observation of three or more stuttering-like disfluencies per 100 syllables spoken, avoidance behaviors, and perceived tension or discomfort when speaking as indications for referral to an SLP.

More recently, an overwhelming majority (95.86%) of surveyed physicians identified SLPs as the professionals who provide services to persons who stutter (Ashurst & Wasson, 2011). Additionally, national organizations such as The Stuttering Foundation and the National Stuttering Association have made concerted efforts to educate pediatricians about diagnostic signs of stuttering and characteristics commonly associated with stuttering (e.g., repetition or prolongation of sounds and syllables, family history of stuttering, age of onset, time since onset, gender, and additional speech and language concerns) that warrant referral to an SLP through brochures and checklists (Guitar & Conture, 2013; Molt et al., 2016). Notably, The Stuttering Foundation's *To the Pediatrician* (Guitar & Conture, 2013) explicitly outlines the pediatrician's role in identifying childhood stuttering, applies this role to case examples, and provides printable checklists of stuttering-like behaviors and recommendations for parents. This reference also identifies risk factors for persistent stuttering, including male gender, family history, and age of onset. In addition, and of particular relevance to this study, this guide recommends pediatricians refer all children who stutter, regardless of severity, to an SLP as opposed to using a "wait and see" approach. These resources have since been reprinted in medical journals (Ashurst & Wasson, 2011), suggesting pediatricians' access to information about stuttering has increased.

Despite substantial growth in the number of publications related to stuttering in young children, these resources continue to provide some incorrect information. Perez and Stoeckle (2016) accurately identify genetics as a possible cause for stuttering and early intervention as best practice for children who stutter but inaccurately report that (a) children who stutter present with greater frustration with increased frequency of stuttering and (a) increased signs of anxiety do not appear until adolescence. Although this supports referral for young children who stutter who exhibit stuttering-like disfluencies, it does not prepare pediatricians to potentially observe a negative communication attitude independently from stuttering frequency, nor does it encourage referral of young children who may stutter who exhibit a negative communication attitude, but no overt behavioral signs during their pediatrician visit. Additional inaccurate reports include recommendations to refer to a psychiatrist if stuttering persists into adolescence or adulthood, prognoses that severe stuttering or stuttering in individuals older than 18 years will see minimal or no results from speech therapy, and use of interjections such as "uh" or "um" as signs indicative of stuttering (Ashurst & Wasson, 2011; Costa & Kroll, 2000). Again, these statements minimize the presence and effect of a negative communication attitude in young children who stutter compared to their typically fluent peers (Vanryckeghem et al., 2005) as well as the positive quality of life impact of addressing the negative emotions and thoughts related to communication, educating individuals and families about stuttering, and providing peer-to-peer groups for young children who stutter (American Speech-Language-Hearing Association, 2016; Byrd et al., 2018).

Purpose of This Study

Given the marked increase in evidence-based information regarding the nature and treatment of stuttering and that pediatricians remain an initial point of contact for parents who suspect their child might stutter, the purpose of this study was to assess whether pediatrician referral practices have improved in the last 30 years. Similar to Yairi and Carrico (1992), we included pediatrician identification of overt speech behaviors associated with stuttering, but we extended their efforts to also include nonspeech characteristics associated with the onset and diagnosis of stuttering, such as age, family history of stuttering, male gender, and thoughts and feelings related to speech or communication attitude (Vanryckeghem et al., 2005). To further extend previous research, rather than using the same survey employed by Yairi and Carrico, we created experimental case vignettes designed to capture the extent to which pediatricians rely on observation of stuttering-like disfluencies and/or negative communication attitude in their identification and referral of children who stutter. Specifically, we manipulated the presence (or absence) of stuttering during the pediatrician visit and negative communication attitude across vignettes, while maintaining age, gender, family history of stuttering, and parent report of signs of stuttering. Additionally, we expanded the measurement sensitivity of Yairi and Carrico from 3-point (e.g., "How important is each of the following as a specific cause of stuttering?") to 7-point (e.g., "How likely are you to refer a child to a speech-language pathologist for evaluation or consultation based on the following criteria?") Likert scales. Finally, this study extends content of the Yairi and Carrico survey to include descriptive and demographic information about pediatrician participants to include consideration of the potential influence of individual factors that might uniquely contribute to pediatrician referral practices (e.g., age, state of practice, experience working with children who stutter). With these distinctions in methodology and design, this study aimed to provide an updated account of pediatrician practices related to childhood stuttering by answering the following questions:

1. Do pediatricians accurately identify hypothetical children who present with a profile indicative of stuttering when presented with experimental written case vignettes?

2. Do pediatricians refer hypothetical children who present with a profile indicative of stuttering to an SLP when presented with experimental written case vignettes?
3. Are there individual factors that impact pediatrician referral practices for hypothetical children who stutter when presented with experimental written case vignettes?

Method

Participants

Approval for the completion of this study was obtained through the authors' university institutional review board. Participants were recruited through county, state, and other national pediatrician organizations from June 2018 to February 2019. The first author and an undergraduate research assistant contacted 60 state-level pediatric organizations (e.g., chapters of the American Academy of Pediatrics and the Pediatric Society) across all 50 U.S. states by inviting them via e-mail to participate in the study. Fifteen organizations participated in survey dissemination by distributing the survey to current organization members through monthly newsletters. One state-level organization in Minnesota authorized the purchase of an e-mail directory of current members. For this organization, we e-mailed 992 members with a certificate in pediatrics inviting them to participate in the survey. These individual e-mails contained the same language as the invitations featured in monthly newsletters. In addition to these state-level organizations, we contacted 21 county-level organizations in Texas. Of these organizations, one organization participated in survey dissemination by providing a free directory of physician members within the county. From this directory, we e-mailed the 224 members with a certificate in pediatrics inviting them to participate in the survey. For each recruitment method, participants were encouraged to forward the survey to other individuals or groups who may qualify for participation (i.e., snowball sampling). No incentives were offered to participants.

A total of 158 pediatricians consented to complete the online survey by advancing to the first section. Because our participant recruitment included advertisement in monthly newsletters and forwarding to relevant colleagues, we are unable to provide an overall response rate for the entirety of those invited to the survey. However, when accounting for the number of individuals who entered the survey and the number of pediatricians invited individually via e-mail to participate, the response rate is 12.7%. This response rate is consistent with the most recently reported pediatrician online survey response rates (Cook et al., 2016; Green et al., 2019; Stein et al., 2016). Of these 158 participants, 132 (83%) finished the first section of the survey (i.e., experimental case vignettes) and 128 (81%) responded to questions in the second section of the survey. We excluded participants with incomplete responses or missing data from our statistical analysis.

A total of 122 pediatricians (64 men and 58 women) with a mean age of 50.4 years (range: 27–77 years) were included in the analysis. This distribution of age and gender is consistent with what is reported in the literature, suggesting the sample is representative of pediatricians practicing in the United States (American Academy of Pediatrics, 2013). Pediatricians surveyed reported working in private practice (45.08%), hospitals (28.69%), alternative settings (21.31%), and community clinics (6.56%). Alternative settings included medical schools, large pediatric health settings, and multispecialty clinics.

Participants included in the analysis practiced in 15 states representing the West (e.g., California), Northeast (e.g., Maine), Mid-Atlantic (e.g., Pennsylvania), Midwest (e.g., Wisconsin), and South (e.g., North Carolina). The majority of participants were from Minnesota (43%), Texas (21%), and Oklahoma (11%). Additional states each represented less than 1%–4% of the sample. Participants reported an average of 19 years in practice (SD = 11.58 years, range: 1–41 years). A total of 118 participants (96.70%) reported knowing a person who stutters, and three (2.54%) self-identified as a person who stutters. A total of 102 participants (83.61%) reported having referred a child who stutters to an SLP in the past. Additional participant characteristics are summarized in Table 1.

Survey Design and Development

The first and second authors, with over 30 years of combined clinical and research specialization in stuttering, developed all survey content. In addition to this expertise, the authors referenced content accessible to pediatricians via medical journals (Ashurst & Wasson, 2011; Costa & Kroll, 2000; Korstjens et al., 2011) and national stuttering advocacy organizations (Guitar & Conture, 2013; Molt et al., 2016) related to the identification and referral of young children who stutter. This information included common characteristics associated with the manifestation of childhood stuttering (e.g., age), persistence of childhood stuttering (e.g., family history), as well as distinct speech behaviors and attitudes toward communication. All survey questions were written in Qualtrics, an online survey software, and edited for clarity, format, order of presentation, and later statistical analysis in conjunction with a paid statistical consultant at the authors' university.

An initial draft version of the survey was sent to one pediatrician with a research background unrelated to stuttering who was asked to participate in, and provide feedback for, the survey. Based on this feedback, the wording of the descriptive questions related to participants' personal and professional experience with stuttering was edited for clarity. The revised survey was distributed to 24 pediatricians (1–35 years of experience representing five states and five clinical settings) for an additional pilot to determine whether further edits to the wording or design were needed. Pilot participants were recruited through convenience sampling of the authors' professional contacts and through an undergraduate research assistant who contacted local pediatrician

Table 1. Pediatrician characteristics (N = 122).

Variables	*M*	*SD*	Minimum	Maximum
Age (years)	50.40	11.63	28.00	77.00
Years in practice	19.00	11.58	1.00	41.00
Percentage of caseload ages 0–2 years	25.46	16.31	0.00	100.00
Percentage of caseload ages 3–6 years	29.50	19.16	0.00	100.00
Percentage of caseload ages 7–10 years	21.23	11.63	0.00	70.00
Percentage of caseload ages 11+ years	23.81	18.10	0.00	100.00

offices in Central Texas. Participants were asked to complete the survey and comment on its format, clarity, and length. The only feedback provided was specific to the survey's length and resulted in changing the advertised estimated time of completion from 3–5 min to 5–7 min.

The final version of the survey (see Appendix) consisted of a total of 26 Likert-scale, multiple-choice, and open-ended questions with 13 subitems. Survey Section I contained four experimental vignettes. Survey Section II contained 11 post-experimental questions relating to the participants' professional and personal experience with stuttering as well as their basic knowledge and referral practices for individual signs indicative of stuttering (e.g., overt speech behaviors such as syllable repetition).

Procedure

Participants self-selected to access the online survey via Qualtrics and provided their informed consent for participation in the study by advancing to the survey's first question. After consenting to participate in the study, participants read the following instructions:

> On each of the next four pages, you will be asked to read one 3-sentence case vignette and answer three accompanying questions. The vignette appears at the top of each question for your convenience. On the final two pages, you will be asked to answer general questions related to your experience with children who stutter.

Participants then read each of the four vignettes (presented in a randomized order) and answered three questions per vignette (Survey Section I). When participants completed Survey Section I, they were then prompted to answer questions related to their experience with children who stutter followed by questions related to their experience with and knowledge of stuttering (Survey Section II). Participants were only permitted to complete the survey one time and were not permitted to return to earlier questions or change previous answers. Due to the experimental nature of the case vignettes in Survey Section I, survey sections were not randomized. That is, all participants responded to the case vignette questions in Survey Section I before advancing to Survey Section II.

Survey Section I: Experimental Case Vignettes

The authors developed four case vignettes using a factorial design with the purpose of measuring the likelihood of pediatricians identifying and referring children who may stutter to an SLP. Each experimental vignette was three sentences long and featured a 4-year-old boy with a family history of stuttering and whose mother reported her son may be exhibiting signs of stuttering. Thus, each of the four vignettes presented parent identification of behaviors that are not typical and the same three characteristics associated with increased likelihood of stuttering: male gender, age 4 years, and family history of stuttering (Kefalianos et al., 2017; Reilly et al., 2013; Yairi & Ambrose, 2013, 1999). We then manipulated each vignette with two factors: stuttering-like disfluency and negative communication attitude. Pediatricians observed stuttering-like disfluencies (i.e., sound prolongation and repetition) in two vignettes and did not observe stuttering-like disfluencies in the remaining two vignettes. Similarly, two case vignettes featured a negative communication attitude (i.e., avoids speaking with others), and two featured a positive communication attitude.

Vignettes created a within-subject comparison for these variables: presence (or absence) of a child's negative communication attitude and observation (or not) of stuttering-like disfluencies during the pediatrician visit. After reading each vignette, participants were first asked to rate on a 7-point Likert scale (a) the extent to which they agreed the patient was a child who stutters and (b) the likelihood of referring the patient for a stuttering evaluation. Participants then completed a free response item measuring which factors (if any) influenced their decision to refer the child for an evaluation.

Survey Section II: Post-Experimental Questions

Following the vignettes, participants answered questions related to their knowledge as well as their personal and professional experience with stuttering. Participants reported if they were a person who stutters, knew a person who stutters, had current or former patients who stutter, and had ever referred a child who stutters for further evaluation. Additional questions investigated the participants' demographic information and general professional experience including distribution of children's ages within current caseload, years of experience, and practice setting (e.g., private practice or hospital). Participants were also asked to provide ratings with regard to how likely they were to refer a child who stutters to specific kinds of providers (e.g., SLPs and psychiatrists) for evaluation based on characteristics commonly associated with stuttering (e.g., age of onset after 3.5 years) and for evaluation based on specific

behaviors commonly associated with stuttering (e.g., repetition of sounds, syllables, or words) on a 7-point Likert scale.

Data Analysis

Participant responses to each of the survey questions were imported into RStudio for statistical analysis (RStudio Team, 2015). These analyses explored pediatricians' (a) accuracy identifying children who may stutter, (b) likelihood of referring children who present with a profile indicative of stuttering to SLPs, and (c) individual factors that may uniquely contribute to their referral practices. To evaluate participant accuracy in identifying children who may stutter, we used a two-way repeated-measures analysis of variance (ANOVA) comparing within-subject responses across experimental vignettes for two reasons. First, while participant Likert-scale responses are likely not normally distributed, there is no nonparametric analysis for the factorial design of our experimental case vignettes (Feys, 2016). As a result, we confirm our main effects findings with a nonparametric alternative. Second, although ANOVA traditionally assumes data to be normally distributed, research has demonstrated ANOVA is robust to violations of normality in terms of Type I error (Blanca et al., 2017). To evaluate possible order or cumulative effects across the four vignettes, we used an ANOVA comparing participant responses across their first vignette. We employed the same analysis to evaluate participant likelihood referring children who may stutter. Finally, we used a linear mixed-effects model to investigate if individual factors (e.g., years of experience) impacted participant referral ratings.

Additional descriptive analyses included thematic coding of pediatricians' free-write responses to the question, "Which factor(s) (if any) drove your decision to refer or not to refer?" for each of the four vignettes (Q5, Q8, Q11, and Q14 in the Appendix). For this procedure, the first author and an undergraduate research assistant reviewed each of the free-write responses for the sample ($N = 122$). Responses were used to develop a key of eight possible reasons for referral and six possible reasons against referral (see Table 2). The first author and undergraduate research assistant then used this key to code each free-written response independently. Specifically, referral responses with Likert-scale responses of 5 (*slightly likely*) and higher were coded with themes supporting referral, whereas responses with Likert-scale responses of 4 (*neither likely nor unlikely*) and lower were coded with themes indifferent to or against referral. Coders agreed to use multiple codes for each response. For example, the response "family history, avoiding speaking to others" warranted codes for both family history and negative attitude. Codes were then summed across participants. Frequencies for these codes are reported in Table 3.

This independent rating achieved an agreement of 94% (1,046/1,114). The two raters reviewed and resolved each instance of disagreement together. All original disagreements were determined to be due to omission of one or more codes. For example, the response "avoids speaking, and witnessed stutter" was coded as "negative attitude, disfluency" by one coder and "negative attitude" by a second coder and was ultimately resolved to include both codes. No disagreements were found to have conflicting codes. In addition to these statistical and thematic coding analyses, descriptive statistics were used to report trends in pediatricians' stuttering-specific knowledge collected through the post-experimental Survey Section II.

Results

This study provides an updated account of pediatrician referral practices with young children who stutter by expanding on the efforts of Yairi and Carrico (1992). We explored pediatrician identification and referral of young children who may stutter through experimental case vignettes in Survey Section I. Then, in Survey Section II, we investigated the influence of pediatrician knowledge of and experience with stuttering on their referral practices.

RQ1: Do Pediatricians Accurately Identify Children Who May Stutter?

To answer this question, we compared pediatrician responses to the first question of each case vignette: "To what extent do you think [name] is a child who stutters?" (Q3, Q6, Q9, and Q12 in the Appendix). A two-way repeated-measures ANOVA comparing within-subject responses across vignettes yielded significant main effects for both observation of stuttering-like disfluencies, $F(1, 128) = 140.59$, $p < .0001$, and negative communication attitude, $F(1, 128) = 52.51$, $p < .0001$. The main effect of pediatricians identifying stuttering in vignettes with observation of stuttering during the pediatrician visit accounted for 52% of the total within-subject effect for pediatricians given its error ($\eta^2_{partial} = .52$; see Richardson, 2011). The main effect of pediatricians identifying stuttering in vignettes with negative communication attitude accounted for 29% of the total within-subject effect for pediatricians given its error ($\eta^2_{partial} = .29$). A Wilcoxon signed-ranks test confirmed Likert-scale responses were significantly different across vignettes with and without observation of stuttering ($V = 188.5$, $p < .01$) as well as with and without negative communication attitude ($V = 409$, $p < .01$).

There was a significant interaction between disfluency and negative communication attitude, $F(1, 128) = 12.61$, $p < .0001$, suggesting observation of stuttering-like disfluencies during the pediatrician visit and negative communication attitude increased the likelihood of a pediatrician identifying a child who may present with stuttering as a child who stutters. This interaction effect accounted for 9% of the total within-subject effect for pediatricians given its error ($\eta^2_{partial} = .09$). Figure 1 shows estimated marginal means and standard deviations for Likert-scale responses to the identification question for each vignette. Comparing the two positive communication attitude vignettes, pediatricians were significantly less likely to identify a child who did not exhibit stuttering-like disfluencies during the

Table 2. Thematic coding key for pediatrician free-write responses.

Code supporting referral	Example	Code opposing referral	Example
Disfluency	Stuttering is a concern and present, would want to refer to the specialist	No disfluency	Not observing stuttering
Negative attitude	Doesn't talk to others	Positive attitude	The fact that he likes to talk makes me less likely to refer and more likely to monitor
Family history	Family history	Typical development	It is normal at this age
Age	His age was the primary factor for me.	Wait and see	Can follow until worsens or improves
Parent observation	I'm a big believer in parents. If a child is not observed to stutter but parents state that he does, I'm inclined to trust their judgment and observations.	Unsure	Want more info
Unsure	Outside of my comfort for diagnosis	Other[a]	Would recommend child developmental evaluation prior to referring for speech evaluation
Other[a]	The referral would be for a speech evaluation not just a stuttering evaluation, which could shed some light on any speech or developmental abnormalities		

[a]Responses were considered as "other" if they did not relate to or reflect the alternative coding options and did not occur frequently enough to warrant their own code.

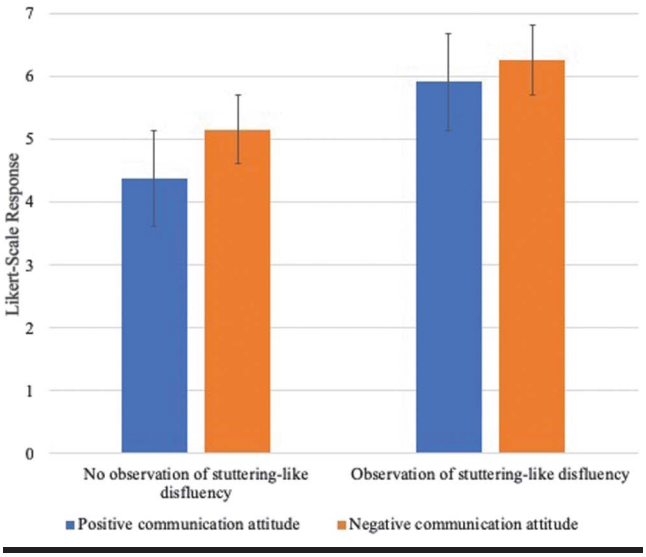
pediatrician visit (4.39) than a child who did (5.91) as a child who may stutter, $t(194.7) = -12.139$, $p < .0001$. Similarly, when comparing the two negative communication attitude vignettes, pediatricians were significantly less likely to identify a child who did not exhibit stuttering-like disfluencies during the pediatrician visit (5.16) than a child who did (6.27), $t(194.7) = -8.812$, $p < .0001$. This interaction effect was also noted when comparing vignettes by disfluency. Between the two vignettes without disfluency during the pediatrician visit, pediatricians were significantly less likely to identify a child with a positive communication attitude (4.39) than a child with a negative communication attitude (5.16) as a child who may stutter, $t(238.09) = -7.924$, $p < .0001$. Again, when comparing the two vignettes where a child does exhibit stuttering-like disfluencies during the pediatrician visit, pediatricians were significantly less likely to identify a child with a positive communication attitude (5.91) than a child with a negative communication attitude (6.27), $t(238.09) = -3.645$, $p = .0003$.

In order to evaluate possible order or cumulative effects for variables held constant across each of the four vignettes (i.e., male gender, age, family history of stuttering, and parent-reported signs of stuttering), we compared participant responses across their first vignette. If participants were subject to a cumulative effect, they would be least likely to identify these variables during their first vignette. A one-way between-subjects ANOVA was conducted to compare the effect of vignette type on identification across participant

Table 3. Free-write response thematic coding by vignette.

	Disfluency		No disfluency	
	Negative attitude	No negative attitude	Negative attitude	No negative attitude
Code	(Adam)	(Michael)	(Leo)	(Corey)
Reasons to refer				
Disfluency	94.68% (89/94)	76.79% (43/56)	0% (0/72)	0% (0/38)
Negative communication attitude	74.47% (70/94)	0% (0/56)	65.28% (47/72)	0% (0/38)
Family history	37.23% (35/94)	51.79% (29/56)	36.11% (26/72)	65.79% (25/38)
Age	13.83% (13/94)	7.14% (4/56)	4.17% (3/72)	7.89% (3/38)
Parent observation	28.72% (27/94)	53.57% (30/56)	48.61% (35/72)	94.74% (36/38)
Other	5.32% (5/94)	10.71% (6/56)	4.17% (3/72)	5.26% (2/38)
Unsure	1.06% (1/94)	1.79% (1/56)	.06% (1/72)	2.63% (1/38)
Reasons not to refer				
No disfluency	0% (0/11)	0% (0/28)	57.89% (11/19)	62.75% (32/51)
Positive communication attitude	0% (0/11)	32.14% (9/28)	0% (0/19)	39.22% (20/51)
Typical development	27% (3/11)	32.14% (9/28)	10.52% (2/19)	17.65% (9/51)
Wait and see	18% (2/11)	21.42% (6/28)	15.79% (3/19)	17.65% (9/51)
Other	27% (3/11)	21.42% (6/28)	52.63% (10/19)	17.65% (9/51)
Unsure	0% (0/11)	0% (0/28)	0% (0/19)	3.92% (2/51)

Figure 1. Estimated marginal means and standard deviations for Likert-scale responses to the identification question (i.e., "To what extent do you agree that [name] is a child who stutters?") for each vignette type. Larger Likert-scale response values are indicative of stronger agreement that a child is a child who stutters.



responses to their first vignette. There was a significant effect of vignette type on identification for the four vignettes, $F(3, 125) = 14.60$, $p < .0001$, suggesting differences in identification rating across vignettes were present during participants' first vignette exposure.

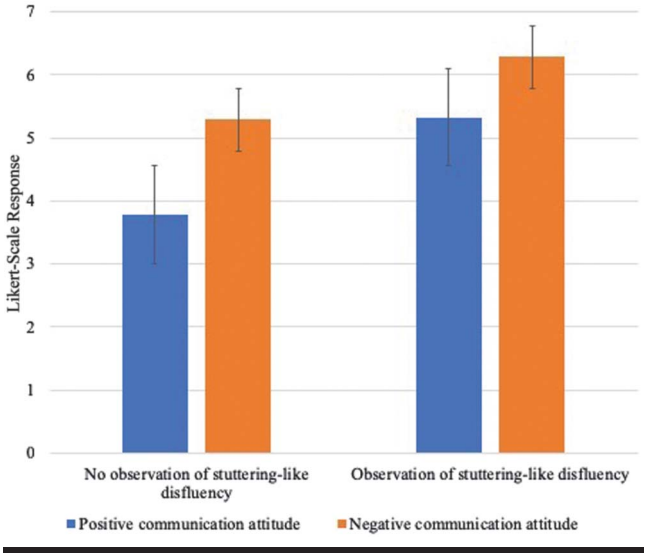
Overall, when holding factors associated with increased stuttering likelihood (i.e., male gender, age, family history, and parent report of signs of stuttering) constant across all four vignettes, participants reported they were most likely to identify stuttering in children presenting with both stuttering-like disfluencies during the pediatrician visit and negative communication attitude, followed by children presenting with stuttering-like disfluencies and positive communication attitude, and finally in children presenting with negative communication attitude and without stuttering-like disfluencies. Pediatricians were least likely to identify stuttering in the vignette featuring a positive communication attitude in the absence of stuttering-like disfluencies during the pediatrician visit, and the mean Likert-scale response for this vignette (4.39) suggested participants were neither likely nor unlikely to refer. Therefore, factors held constant across all vignettes, such as male gender, family history, parent report of signs of stuttering, and age, did not yield pediatrician identification of stuttering independent of observation of stuttering during the pediatrician visit or negative communication attitude.

RQ2: Do Pediatricians Refer Children Who Present With a Profile Indicative of Stuttering to an SLP?

To evaluate whether pediatricians refer children who present with a profile that may be indicative of stuttering to SLPs, we compared pediatrician responses to the second question of each case vignette: "How likely are you to refer [name] for a stuttering evaluation?" (Q4, Q7, Q10, and Q13 in the Appendix). A two-way repeated-measures ANOVA comparing within-subject responses across vignettes yielded significant main effects of both observation of stuttering-like disfluencies, $F(1, 128) = 122.22$, $p < .0001$, and negative communication attitude, $F(1, 128) = 99.76$, $p < .0001$. The main effect of pediatricians' increased likelihood of referral for vignettes with stuttering-like disfluencies during the pediatrician visit accounted for 49% of the total within-subject effect for pediatricians given its error ($\eta^2_{partial} = .49$). The main effect of pediatricians' increased likelihood of referral for vignettes with negative communication attitude accounted for 44% of the total within-subject effect for pediatricians given its error ($\eta^2_{partial} = .44$). A Wilcoxon signed-ranks test confirmed Likert-scale responses were significantly different across vignettes with and without observation of stuttering ($V = 83.5$, $p < .01$) as well as with and without negative communication attitude ($V = 268$, $p < .01$).

There was a significant interaction between disfluency and negative communication attitude, $F(1, 128) = 9.16$, $p < .01$, suggesting that both observation of stuttering-like disfluencies during the pediatrician visit and negative communication attitude increased the likelihood of a pediatrician referring a child who presents with a profile that may be indicative of stuttering to an SLP for further evaluation. The interaction effect accounted for 7% of the total within-subject effect for pediatricians given its error ($\eta^2_{partial} = .07$). Figure 2 presents estimated marginal means and standard deviations for Likert-scale responses to the referral question for each vignette. Comparing the two positive communication

Figure 2. Estimated marginal means and standard deviations for Likert-scale responses to the referral question (i.e., "How likely are you to refer [name] for a stuttering evaluation?") for each vignette type. Larger Likert-scale response values are indicative of increased referral likelihood.



attitude vignettes, pediatricians were significantly less likely to refer a child who did not stutter during the pediatrician visit (3.78) than a child who did (5.33) for a stuttering evaluation, $t(243.37) = -10.543$, $p < .0001$. Similarly, when comparing the two negative communication attitude vignettes, pediatricians were significantly less likely to refer a child who did not stutter during the pediatrician visit (5.29) than a child who did (6.29), $t(243.37) = -6.781$, $p < .0001$. When comparing the two vignettes without observation of stuttering during the pediatrician visit, pediatricians were significantly less likely to refer a child with a positive communication attitude (3.78) than a child with a negative communication attitude (5.29) for a stuttering evaluation, $t(234.96) = -9.842$, $p < .0001$. In addition, when comparing the two vignettes with observation of stuttering during the pediatrician visit, pediatricians were significantly less likely to refer a child for a stuttering evaluation if the child presented with a positive communication attitude (5.32) compared to a negative communication attitude (6.27), $t(234.96) = -6.258$, $p < .0001$.

We again compared participant referral responses across their first vignette to evaluate possible order or cumulative effects for variables held constant across each of the four vignettes. If participants used information from earlier vignettes to influence their responses on subsequent vignettes, the results from our primary analysis would not be present in participants' responses to their first vignette. A one-way between-subjects ANOVA was conducted to compare the effect of vignette type on referral across participant responses to their first vignette. There was a significant effect of vignette type on referral, $F(3, 125) = 13.97$, $p < .0001$, suggesting differences in referral rating across vignettes were present during participants' first vignette exposure.

The results of this analysis, similar to our findings investigating pediatrician identification of stuttering, suggested pediatricians were most likely to refer children who may stutter if they observed stuttering during the visit and if the child presented with a negative communication attitude and factors held constant across vignettes (e.g., family history). Pediatricians were less likely to refer on the basis of observation of stuttering and positive communication attitude followed by negative communication attitude in the absence of disfluency during the pediatrician visit. Participants, however, did not consistently refer all children who present with a profile that may be indicative of stuttering for further evaluation. Specifically, participants were unlikely (mean Likert-scale response = 3.78) to refer based on male gender, a family history of stuttering, parent observation of possible disfluency, and age 4 years, if the child also presents with a positive communication attitude and does not stutter during the pediatrician visit.

Although our participants were significantly more likely to refer a child who may stutter when the child presented with stuttering-like disfluencies during the pediatrician visit, negative communication attitude, or both stuttering-like disfluencies and negative communication attitude, our statistical analysis did not explain why pediatricians were more likely to refer in this vignette. We offer two distinct descriptive methods to supplement our experimental findings: thematic coding of participants' free-write responses during Survey Section I and participant ratings of individual factors that might influence their referral during Survey Section II.

Our thematic coding of participants' free-write responses ("Which factor(s) (if any) drove your decision to refer or not to refer?"; Q5, Q8, Q11, and Q14 in the Appendix) provided additional information as to which factors most influenced pediatricians' decisions to refer a child who may stutter for a speech-language evaluation across each vignette. In total, 112 of the 122 participants completed the free-write response for each of the four clinical case vignettes. Table 3 reports coding of free-write responses per vignette. Observation of stuttering-like disfluencies (76%–94%) and negative communication attitude (65%–74%) were the most frequently reported factors driving pediatrician referral across vignettes, when those details were present in a vignette. Factors held constant across vignettes (e.g., age, parent report) were reported inconsistently across vignettes. Interestingly, almost all participants (94%) reported parent observation as most influencing their referral decision for the vignette without stuttering during the pediatrician visit and with a positive communication attitude, compared to only 28%–53% of participants for the remaining three vignettes. Additionally, more participants (35) reported family history as a factor influencing referral for the vignette featuring stuttering and a negative communication attitude than for any other vignette (25–29), but a higher percentage of participants (65%) reported family history as a factor for the vignette with neither stuttering nor a negative communication attitude compared to other vignettes (36%–51%). Across each vignette type, the primary reasons not to refer included the absence of stuttering-like disfluencies (30%–43%), positive communication attitude (25%–38%), typical development (9%–43%), and implementing a "wait and see" approach (9%–29%). Overall, these results are in line descriptively with what we found experimentally.

During our post-experimental survey, we had participants rate individual factors that could influence their decision to refer a child who may stutter (see Table 4). A strong majority (98%) of participants reported they were slightly, moderately, or extremely likely to refer a child with suspected stuttering to an SLP ($M = 6.63$). Participants reported they were slightly, moderately, or extremely likely to refer a child for a speech and language evaluation based on child frustration or embarrassment in speaking situations ($M = 6.26$) and repetition of sounds and syllables ($M = 5.86$), which is consistent with our experimental findings. The range of mean Likert-scale ratings from our participants for all other factors varied from 2.88 (family history of stuttering) to 6.52 (other speech and language concerns). Participants reported they were slightly, moderately, or extremely likely to refer based on other speech and language concerns, parent observation, age of onset, time since onset, and secondary behaviors. These data suggest pediatricians did not consider these individual factors equally, which is consistent with the

Table 4. Referral matrices (N = 122).

Matrix item	Extremely unlikely (1)	Moderately unlikely (2)	Slightly unlikely (3)	Neither likely nor unlikely (4)	Slightly likely (5)	Moderately likely (6)	Extremely likely (7)	*M* (*SD*)
Refer to provider								
Speech-language pathologist	0.80%	0.80%	0%	0%	5.65%	16.94%	75.81%	6.63 (0.87)
Psychiatrist	44.26	17.21	9.84	18.03	7.38	1.64	1.64	2.39 (1.57)
Psychologist or social worker	25.83	16.67	13.33	13.33	24.17	4.17	2.50	3.16 (1.75)
Neurologist	29.27	21.95	9.76	14.63	20.32	3.25	0.80	2.88 (1.67)
Referral criteria								
Family history of stuttering	10.48	8.06	3.23	23.39	22.58	24.19	8.06	2.88 (1.67)
Age of onset after 3.5 years	0.80	1.61	0.80	4.03	29.84	29.03	33.87	5.83 (1.15)
6–12 months since onset	0.80	4.03	0.80	8.87	16.94	31.45	37.10	5.80 (1.33)
Male gender	4.03	4.03	0	36.29	21.77	20.97	12.90	4.82 (1.44)
Other speech-language concerns	0.80	0	0	0	8.94	24.39	65.32	6.52 (0.82)
Repetition of sounds and syllables	0.80	0.80	1.62	4.88	24.39	34.96	32.52	5.86 (1.11)
Eye blinking, averted gaze, physical tension while speaking	2.44	2.44	3.25	5.69	15.45	33.33	37.40	5.79 (1.42)
Child frustration or embarrassment	1.53	1.63	0	0.80	8.13	27.64	60.16	6.26 (1.12)
Parent concern regarding speech fluency	0.80	0.80	0	5.69	19.51	34.96	38.21	6.00 (1.07)

variation in referral likelihood observed in our experimental findings.

RQ3: Are There Individual Factors That Impact Pediatrician Referral Practices for Children Who Stutter?

A linear mixed-effects model was used to assess how well individual pediatrician characteristics (gender, years in practice, and experience with children who stutter on caseload; see Table 1) predict referral likelihood for each of the four vignettes while controlling for vignette structure. Self-reported gender was categorized as male (46%) or female (53%). Experience with children who stutter on caseload was dichotomized as a self-reported experience with children who stutter as either current, former, both current and former patients (83%), or no experience or knowledge of children who stutter on caseload (17%). Results are reported in Table 5. When controlling for these variables in the model, none of the three individual pediatrician characteristics yielded a significant influence on referral likelihood, suggesting these characteristics do not result in pediatricians being more or less likely to refer a child who may stutter for further evaluation.

Discussion

Pediatricians are recommended to refer children with signs of stuttering or parent report of stuttering to an SLP immediately for further evaluation and possible intervention (e.g., Guitar & Conture, 2013). Early identification and intervention for young children who stutter may facilitate positive communication attitudes in these children and build resilience against the social preference for fluent speakers in young children (Boey et al., 2009; Byrd et al., 2018; Ezrati-Vinacour et al., 2001). Thus, the purpose of this study was to investigate pediatrician referral practices when provided four experimental vignettes of young children presenting with a profile indicative of stuttering. Within these vignettes, we manipulated the presence of overt, observable behaviors and thoughts associated with stuttering—namely, stuttering-like disfluencies and negative communication attitude. Characteristics associated with increased likelihood of stuttering and available in resources designed specifically for

Table 5. Linear mixed-effects model.

Variables	*b*	*SE*	*df*	*t* value
Gender (female)	–0.458	0.246	118	–1.860
CWS caseload experience	–0.355	0.335	118	–1.060
Years in practice	–0.003	0.011	118	–0.244
Negative communication attitude	1.590**	0.159	223	10.000
Observation of stuttering-like disfluency	1.557**	0.153	229	10.195
Interaction of negative communication attitude and observation of disfluency	–0.598*	0.189	121	–3.160

Note. CWS = children who stutter.

*$p < .01$. **$p < .001$.

pediatricians—parent report of signs of stuttering, family history of stuttering, age, and male gender—were held constant across vignettes.

Historically, pediatricians have reported insufficient training/access to information about stuttering and have stated they use a "wait and see" approach prior to referral for evaluation and potential intervention (Yairi & Carrico, 1992). Our data suggest pediatricians are likely to refer a child who may stutter on the basis of observing stuttering-like disfluencies and/or negative communication attitude when coupled with parent report of observation of possible stuttering, family history, and other factors commonly associated with stuttering. Thus, findings from this study suggest pediatricians are more likely to refer hypothetical children who may stutter than they were 30 years ago.

When Do Pediatricians Refer Children Who May Stutter for Further Evaluation?

Overall, our findings suggest pediatricians appear likely to refer for further evaluation when presented with written, hypothetical case vignettes, if the child in the vignette (a) is observed to stutter during the visit, (b) is reported to present with a negative communication attitude, or (c) is observed to stutter and reported to present with a negative communication attitude. For the vignette wherein the child was not observed to stutter or present with a negative communication attitude, pediatricians were not likely to refer. Together, these findings suggest that parent report alone, even when age, gender, and family history are indicative of a higher risk of stuttering, does not yield a high likelihood of referral. Rather, pediatricians are more likely to rely on observation of overt speech behaviors and/or negative communication attitude.

Importantly, young children who do not present with stuttering-like disfluencies during a pediatrician visit but who do present with a negative communication attitude are still likely to be referred. This finding is promising as it demonstrates that pediatricians do not need to observe the behavior of stuttering in order to refer. Recall that, in the previous study by Yairi and Carrico (1992), only half of the pediatricians in their study reported negative communication attitude as indicative of stuttering. In addition, although not the direct focus of this study, one additional encouraging finding is that pediatricians reported a high likelihood of referral when a child presents with additional speech and language concerns. Descriptively, this suggests that those children who may be more likely to persist in their stuttering are likely to be referred to an SLP.

However, though there are data to suggest children as young as 2.5 years of age may present with a negative communication attitude (Boey et al., 2009), some children who stutter, even severely, may present with a positive communication attitude. Thus, if pediatricians are relying on either negative communication attitude and/or observation of stuttering during the visit to necessitate referral, they will fail to refer some children in need. Notably, all of the children in this study warrant referral, as all presented with characteristics associated with increased risk for persistent stuttering and parent report of possible stuttering. Future pediatrician education should emphasize other signs that may be indicative of stuttering, particularly those more consistently observed across time (e.g., parent report or a family history of stuttering), as useful determinants in the early identification and/or referral of stuttering.

Parent Report Alone Does Not Prompt Pediatrician Identification or Referral of Stuttering

Parent report was rated as a factor strongly influencing referral in our post-experimental survey; however, pediatricians inconsistently noted parent report of possible stuttering as a determining factor for referral across each of the four case vignettes. Pediatricians least often noted parent report or observation as a determining factor for referral in the three vignettes featuring stuttering during the pediatrician visit and/or negative communication attitude. These are also the three vignettes with the highest likelihood of referral.

Survey Section I's mean Likert-scale responses suggest pediatricians are not likely to identify or refer a 4-year-old boy with a family history of stuttering, parent report of observation of possible stuttering, positive communication attitude, and lack of stuttering-like disfluencies upon exam. Many participants (67%) noted a lack of stuttering as a determining factor in this decision. Of the participants who did refer the child in this vignette, a strong majority (94%) reported parent observation as a determining factor for referral. In other words, when stuttering and negative communication attitude were not present, pediatricians more often referenced parent observation of stuttering in their determination for referral. However, when these factors were not present, the majority of pediatricians did not refer, despite there being parent report of observation of possible stuttering, suggesting that parent report in and of itself does not yield referral.

Inconsistent use of parent observation in referring a child who may stutter contrasts with other complex neurodevelopmental and behavioral disorders where pediatricians rely heavily upon parent report (Finke et al., 2010; Glascoe, 1997, 2000, 1991). Given the high accuracy of parents identifying stuttering moments (Einarsdóttir & Ingham, 2009; Onslow et al., 2018; Tumanova et al., 2018) coupled with the data to support the validity of parent report of the possible presence of other child onset diagnoses, pediatricians should be advised to refer for further evaluation when parents indicate they think their child may be showing signs of stuttering. They should do this even if the pediatrician does not observe stuttering themselves.

Pediatrician Experience Does Not Influence Referral Practices for Children Who May Stutter

Participants' gender, number of years practicing as a pediatrician, and experience working with children who stutter did not change the likelihood of referring a hypothetical child who may stutter to an SLP. Across each vignette, pediatricians who had practiced longer or who reported

more experience were no more likely to refer a child who may stutter than pediatricians with less experience. Additionally, experience unique to stuttering—namely, working with children who stutter as current or former patients—does not appear to influence pediatrician referral likelihood of a child who may stutter to an SLP. Therefore, pediatricians of all levels of experience may benefit from education emphasizing identification and referral for stuttering based on parent observation and consistent identifying signs (e.g., family history).

Recommendations for Referring Children Who May Stutter

Stuttering-like disfluencies do not need to be observed each time a child speaks in order for that child to be diagnosed with stuttering, and it is possible that a young child who stutters may not stutter during a brief encounter with a pediatrician, teacher, or other early childhood provider. Due to the variable nature of stuttering, even a child exhibiting a severe presentation of stuttering due to frequent and long-lasting stuttering moments and secondary behaviors may not demonstrate these behaviors during a short appointment. Similar to stuttering behaviors, it may be difficult for a pediatrician (or another early childhood provider) to determine a child's overall attitude, thoughts, and feelings associated with communication during a brief visit, even if those feelings cause significant impact on the child's communication.

Pediatricians, therefore, may not refer a child who needs therapy if they are unable to observe stuttering-like disfluencies or a negative communication attitude. Similar to concerns introduced by Riley and Riley (1989, p. 63), failure to refer a child who needs therapy may have more serious consequences than referring a child who, after further evaluation with an SLP, does not need therapy. Future education and advocacy to increase referral of young children who may stutter should emphasize consideration of parent report, as well as more constant factors (e.g., family history of stuttering). This information is relevant not only to pediatricians but also to other professionals working with preschool-age children.

Limitations of This Study

Our sample extended the amount of demographic information collected by Yairi and Carrico (1992) to include age, expanded options for practice setting, and state in which pediatricians practice. Although our sample was representative of pediatricians in the United States in terms of gender, age, and years in practice, the majority (75%) of participants practiced in one of three states: Minnesota, Texas, and Oklahoma. State- and county-level professional organizations in Minnesota and Texas permitted the authors to contact individual pediatricians directly via e-mail, and this likely resulted in a greater frequency of participation than recruitment announcements via monthly newsletters of the other participating states. Current findings may not generalize to all pediatricians within the United States or abroad due to differences in professional training or responsibilities across a variety of educational and health care systems. Future research should explore referral practices for children who may stutter outside of the United States in order to support early identification and intervention globally. Additionally, this future research should measure how pediatricians have learned or continue to learn about stuttering, as this was not explored in this study, and we are unable to determine if an increase in pediatrician access to evidence-based practices for childhood stuttering prompted the increase in referral practices.

Given the large majority of participants who reported knowing a person who stutters, we are unable to determine the extent to which knowing an adult or child who stutters mitigated survey outcomes. This study shows pediatricians recognize stuttering at a young age, even if the child does not present with stuttering-like disfluencies upon exam. The influence of knowing a person who stutters, therefore, does not appear to be a negative one. Additionally, the three participants who self-reported as people who stutter did not show a distinct pattern in their responses. With such a limited sample, we cannot determine if being a person who stutters uniquely impacts referral practice. Future investigations of familiarity with stuttering should ask participants how they define stuttering, their relationship to a potential person who stutters, and the extent to which a personal experience with stuttering influences clinical practice.

The nature of the hypothetical written case vignette may overestimate pediatricians' abilities to identify and refer children who may stutter, regardless of whether the child stutters or presents with a negative communication attitude upon exam. This is because our case vignettes offer the most pervasive characteristics associated with stuttering clustered into a short description. Although participants were not able to go back to change prior responses, they could use information or acute differences between previous vignettes to influence responses on subsequent vignettes (e.g., presence or absence of stuttering during the pediatrician visit; Hsee & Zhang, 2004; Kahneman & Egan, 2011; Ritov & Baron, 2011).

In actual practice, there may also be other factors that preclude pediatricians from gaining salient information related to a child's speech fluency. Pediatricians may prioritize other topics, may not know to ask questions about signs other than disfluency, may not learn the extent to which a parent might be concerned about his or her child's disfluency, or, frankly, may not have time to observe the child's speech fluency and/or communication attitude during the child's visit. Additionally, pediatricians may not associate parent reports of "loves to talk" or "avoids speaking with others" with a child's communication attitude or stuttering and may attribute these reports instead to a child's personality. Finally, pediatricians may be unaware of potential benefits of early intervention for stuttering or may not have an established relationship with an SLP who feels confident and competent in the area of stuttering. Although this study did not explore pediatrician referral practices as it relates to

SLPs' knowledge related to stuttering, this is an important area of study for future research.

Conclusion

Although pediatrician referral practices of children who may stutter to SLPs appear to have improved over the last 30 years, continued education and advocacy are needed to support early identification of young children who stutter. Pediatricians rely on their own observation of stuttering-like disfluencies and/or negative communication attitude prior to identifying possible stuttering and referring a child who may stutter to an SLP, even when the child presents with other signs indicative of stuttering (e.g., family history) and parent report of possible stuttering. Greater number of years practicing as a pediatrician and experience working with former or current children who stutter do not result in greater likelihood of identification or referral for possible children who stutter. Present findings suggest pediatricians are more likely to refer children who stutter today than in the past but that children who do not stutter during exam or who do not exhibit a negative communication attitude may be underidentified and therefore delayed in speech-language treatment.

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Appendix (p. 1 of 5)

The University of Texas at Austin
Pediatrician Survey

The following represents the exact wording of each of the survey questions with the exception of Question 1, which was the consent form for participation in the study.

Q2 On each of the next four pages, you will be asked to read one 3-sentence case vignette and answer three accompanying questions. The vignette appears at the top of each question for your convenience. On the final two pages, you will be asked to answer general questions related to your experience with children who stutter.

Q3 Corey is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Corey's mother stated Corey loves to talk. You do not observe any stuttering behaviors during his appointment.

To what extent do you agree that Corey may be a child who stutters?

- ○ Strongly agree
- ○ Agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Disagree
- ○ Strongly disagree

Q4 Corey is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Corey's mother stated Corey loves to talk. You do not observe any stuttering behaviors during his appointment.

How likely are you to refer Corey for a stuttering evaluation?

- ○ Extremely likely
- ○ Moderately likely
- ○ Slightly likely
- ○ Neither likely nor unlikely
- ○ Slightly unlikely
- ○ Moderately unlikely
- ○ Extremely unlikely

Q5 Corey is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Corey's mother stated Corey loves to talk. You do not observe any stuttering behaviors during his appointment.

Which factor(s) (if any) drove your decision to refer or not to refer?

_____
_____
_____
_____
_____

Q6 Michael is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Michael's mother stated Michael loves to talk. You hear Michael prolong sounds and repeat sounds during his appointment.

To what extent do you agree that Michael may be a child who stutters?

- ○ Strongly agree
- ○ Agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Disagree
- ○ Strongly disagree

Q7 Michael is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Michael's mother stated Michael loves to talk. You hear Michael prolong sounds and repeat sounds during his appointment.

How likely are you to refer Michael for a stuttering evaluation?

- ○ Extremely likely
- ○ Moderately likely
- ○ Slightly likely
- ○ Neither likely nor unlikely
- ○ Slightly unlikely
- ○ Moderately unlikely
- ○ Extremely unlikely

Q8 Michael is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Michael's mother stated Michael loves to talk. You hear Michael prolong sounds and repeat sounds during his appointment.

Which factor(s) (if any) drove your decision to refer or not to refer?

_____
_____
_____
_____
_____

Q9 Adam is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Adam's mother stated Adam avoids speaking with others. You hear Adam prolong sounds and repeat sounds during his appointment.

To what extent do you agree that Adam may be a child who stutters?

- ○ Strongly agree
- ○ Agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Disagree
- ○ Strongly disagree

Q10 Adam is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Adam's mother stated Adam avoids speaking with others. You hear Adam prolong sounds and repeat sounds during his appointment.

How likely are you to refer Adam for a stuttering evaluation?

- ○ Extremely likely
- ○ Moderately likely
- ○ Slightly likely
- ○ Neither likely nor unlikely
- ○ Slightly unlikely
- ○ Moderately unlikely
- ○ Extremely unlikely

Q11 Adam is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Adam's mother stated Adam avoids speaking with others. You hear Adam prolong sounds and repeat sounds during his appointment.

Which factor(s) (if any) drove your decision to refer or not to refer?

_____
_____
_____
_____
_____

Q12 Leo is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Leo's mother stated Leo avoids speaking with others. You do not observe any stuttering behaviors during his appointment.

To what extent do you agree that Leo may be a child who stutters?

- ○ Strongly agree
- ○ Agree
- ○ Somewhat agree
- ○ Neither agree nor disagree
- ○ Somewhat disagree
- ○ Disagree
- ○ Strongly disagree

Q13 Leo is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Leo's mother stated Leo avoids speaking with others. You do not observe any stuttering behaviors during his appointment.

How likely are you to refer Leo for a stuttering evaluation?

- ○ Extremely likely
- ○ Moderately likely
- ○ Slightly likely
- ○ Neither likely nor unlikely
- ○ Slightly unlikely
- ○ Moderately unlikely
- ○ Extremely unlikely

Q14 Leo is a 4-year-old boy with a family history of stuttering whose mother reported he may be exhibiting signs of stuttering. Leo's mother stated Leo avoids speaking with others. You do not observe any stuttering behaviors during his appointment.

Which factor(s) (if any) drove your decision to refer or not to refer?

_____
_____
_____
_____
_____

Q15 Have you ever known or do you currently know a person who stutters?

- ○ Yes
- ○ No
- ○ I do not know

Q16 Are you a person who stutters?

- ○ Yes
- ○ No

Q17 Are any of your former or current patients children who stutter?

- ○ Yes - I have current patients who stutter
- ○ Yes - I have former patients who stutter
- ○ Yes - I have both former and current patients who stutter
- ○ No - I have neither former nor current patients who stutter
- ○ I do not know

Q18 Have you ever referred a patient for an evaluation for stuttering?

- ○ Yes
- ○ No

Q19 What circumstances or situation led you to refer this patient for a stuttering evaluation?

_____
_____
_____
_____
_____

Q20 What percentage of your patients fall within the following age ranges?

0 to 2 years old: _____
3 to 6 years old: _____
7 to 10 years old: _____
11 years and older: _____
Total: _____

Q21 Please enter your year of birth.

_____

Q22 Please enter the number of years you have practiced as a pediatrician.

_____

Q23 In which state do you practice? Please enter the abbreviation (e.g., “MD” for “Maryland”)

_____

Q24 What is your gender?

- ○ Male
- ○ Female
- ○ Other (please specify): _____

Q25 What best describes your current place of practice?

- ○ Independent Private Practice (I am the only practicing MD)
- ○ Private Practice (Two or more MDs)
- ○ Community Clinic
- ○ Hospital-based Clinic
- ○ Other (please specify): _____

Q26 How likely are you to refer a child with suspected stuttering to the following provider for evaluation or consultation?

	Extremely likely	Moderately likely	Slightly likely	Neither likely nor unlikely	Slightly unlikely	Moderately unlikely	Extremely unlikely
Speech-language pathologist	○	○	○	○	○	○	○
Psychiatrist	○	○	○	○	○	○	○
Psychologist or social worker	○	○	○	○	○	○	○
Neurologist	○	○	○	○	○	○	○

Q27 How likely are you to refer a child to a speech-language pathologist for evaluation or consultation based on the following criteria?

	Extremely likely	Moderately likely	Slightly likely	Neither likely nor unlikely	Slightly unlikely	Moderately unlikely	Extremely unlikely
Family history of stuttering	○	○	○	○	○	○	○
Age of onset after 3.5 years of age	○	○	○	○	○	○	○
Time since onset of 6–12 months	○	○	○	○	○	○	○
Male gender	○	○	○	○	○	○	○
Other speech-language concerns	○	○	○	○	○	○	○

Q28 How likely are you to refer a child to a speech-language pathologist for evaluation or consultation based on the following criteria?

	Extremely likely	Moderately likely	Slightly likely	Neither likely nor unlikely	Slightly unlikely	Moderately unlikely	Extremely unlikely
Repetition of sounds, syllables, or short words	○	○	○	○	○	○	○
Eye blinking, averted gaze, or physical tension while speaking	○	○	○	○	○	○	○
Child frustration or embarrassment in speaking situations	○	○	○	○	○	○	○
Parent concern regarding speech fluency	○	○	○	○	○	○	○