

Preliminary Investigation of the Relationship between the Temperament of Young Children Who Stutter and the Temperament of Their Parents

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Abstract

Previous studies suggest temperamental differences between young preschool-age children who stutter and those who do not. It is also known that parental socialization plays a major role in the temperamental development of children. However, to-date, whether temperamental differences exist between parents of children who stutter and parents of those who do not is unknown. The nature of relational differences between parent-child temperament across talker groups is also unclear.

The present preliminary study examined the relationship between the temperament of parents and the temperament of children who stutter (CWS) and children who do not stutter (CWNS). It was hypothesized that the temperament of CWS would differ significantly from CWNS and that the temperament of parents of CWS would differ significantly from parents of CWNS. Participants included 16 CWS and 16 CWNS (ages of 36 to 64 months) matched for age and gender. The primary parent for each child completed the Children's Behavior Questionnaire (CBQ) and the Adult Temperament Questionnaire (ATQ) that assessed factors of the temperament of the child and parent, respectively. Data was subjected to a series of t-tests and correlational analyses.

Preliminary findings indicated no significant difference in the temperament of CWS and CWNS and no significant difference in the temperament of parents of CWS and parents of CWNS according to the ATQ. Relational differences were noted between some aspects of the CBQ and the ATQ scores for both talker groups. Preliminary findings suggest no temperamental differences between CWS and CWNS or their parents. However, findings do suggest relational differences in parental socialization of emotional development between CWS and CWNS. Results also suggest a need to make parents of children who stutter aware of the importance of modeling appropriate use of emotions in order to influence emotional development of their child.

Keywords: Stuttering; Temperament; Parent-report; Parental Socialization; Children

Introduction

Recent studies suggest a continued interest among researchers in the relationship between stuttering and temperament in children [1-6]. Findings complement others in suggesting differences in specific aspects of temperament (e.g., emotion reactivity, emotion regulation, attention regulation, behavioral inhibition) between children who stutter (CWS) and children who do not stutter (CWNS) or differences among sub-groups of CWS based on age or other characteristics of stuttering (e.g., disfluency type, presence of secondary behaviors) [1,7-11]. However, a systematic review of the literature suggests that not all children who stutter present with temperamental characteristics of high reactivity and inattention and may just affect a sub-group of children who stutter [1]. Thus, continued investigation of the role of temperament in stuttering for young children remains of importance.

Although some studies report differences based on behavioral observation, many employ methodology primarily based on parent-report in which the parent(s) completes a questionnaire detailing their account of their child's temperament [2,4,5,11-15]. Prior to discussing

these research studies in more detail, first we will consider a definition of temperament.

The debate among researchers on how best to define temperament is longstanding. Early definitions describe temperament as a genetic set of inherited personality traits that appear during infancy and in response to external stimuli [16,17]. According to Goldsmith, et al. [16] temperament is defined as individual differences in the probability of experiencing and expressing the primary emotions and arousal. Goldsmith also adds that temperament only includes behavioral factors, excluding cognitive and perceptual factors. This is because behavioral factors are most meaningful in social contexts. Thomas and Chess consider temperament to be best explained as the style in which a behavior is conducted. Their focus on temperament yielded nine distinct characteristics believed to comprise one's temperament [18]. Although the preceding authors have acceptable definitions of temperament, the present study adopted the definition of temperament as established by Rothbart, which is commonly referred to in other studies involving temperament [19,20]. Rothbart refers to temperament - in comparison to personality - as relatively stable, biologically based, and present at birth; however, personality develops from maturation and environmental influences [19].

With further consideration of describing temperament, there are aspects of temperament considered as contributing factors in theories explaining the development and/or maintenance of stuttering with young children [11]. Therefore, continued interest in investigating the role of temperament in childhood stuttering is ongoing. In most studies, temperament is based on parent-report methodology. For an early example, Lewis and Goldberg examined temperamental differences in children at risk for stuttering between the ages of 3 and 4 years of age using the Parent Childhood Temperament Questionnaire for 3-7 year olds, a parent report questionnaire [15]. This questionnaire developed by Thomas and Chess examines a child's temperament along nine dimensions of temperament based on their nine-dimensional temperament model [18]. For Lewis and Goldberg [15], when four dimensions of temperament (mood, adaptability, rhythmicity, and activity level) were analyzed together as a single variable, finding suggested a significant difference between the at-risk group and the control group. However, when the nature of the differences were examined for each variable, findings identified the children at-risk for stuttering as having less temperamental difficulty and being best fit as an 'easy child'.

In another parent-report study using the Behavior Style Questionnaire (BSQ), the temperament of children who stutter and children who do not stutter between the ages of 3 and 5 years was examined. The BSQ examines the temperament of children ages 3-7 years across nine dimensions of temperament based on parent-report [21,22]. The children who stutter were reported to be less adaptable to new situations and less distractible than their CWNS peers [8].

Karrass et al. also employed the BSQ to investigate temperamental differences in young CWS and CWNS ages 3-5 years of age in comparison to their typically fluent peers [11]. This study found that parents of CWS reported their children to have higher emotional reactivity and less emotional regulation in comparison to parent-reports of CWNS. Children who stutter were reported to be less adept at changing the focus of their attention than their nonstuttering peers.

Similar to the purpose of the BSQ, the Child Behavior Questionnaire (CBQ), also a parent-report questionnaire, has also been used to investigate temperament in young children who stutter [23]. For example, Eggers, De Nil, and Van den Bergh examined the temperament of two disordered groups (CWS and voice-disordered children) and a third typically developing group between the ages of 3 and 8 years using the Dutch version of the CBQ [24]. Findings indicated differences in mean scores, but similar underlying temperamental structures for all three groups. Eggers et al. continued their investigation of temperament and stuttering by a comparison of the temperament of 3-8 year old CWS and CWNS only [20]. Findings indicated lower scores in Inhibitory Control and Attentional Shifting, but higher scores in Anger/Frustration, Approach, and Motor Activation regardless of treatment or stuttering severity.

To summarize, there are empirical studies reporting temperamental differences between children who stutter and children who do not. However, the root of these differences remains unknown. Based on the implications of the previously discussed studies, temperamental differences could lead to difficulties with achieving speech fluency which may be due, in part, to an apparent influence of emotional reactivity and regulation on different areas of child development, including communication [11,25].

However, while the previously discussed findings are generally consistent in suggesting that the temperament of CWS is noticeably

different from CWNS, it is necessary to mention that others, similar to Lewis and Goldberg, have proposed just the opposite [15]. Specifically, Kefalianos, Onslow, Okoumunne, Block, and Reilly examined the temperament in a slightly younger age group (2-4 years of age) of nearly 200 children who stutter and over 1200 children who did not stutter using two parent-report temperament questionnaires [26]. Their findings indicated no between group differences in temperament and suggested that perhaps differences in temperament are manifested after the onset of stuttering. Kefalianos, et al. have continued investigation of temperament in young children with recent findings suggesting no association with stuttering severity and temperament in young children as well as stuttering behaviors and temperament [1].

There is sound evidence indicating that temperament is an inherited trait, which would suggest that parents – regardless of stuttering – would have similar temperaments to their child's temperament [12]. For example, a study of twins indicated both genetic and environmental influences on the temperaments of toddlers and preschool-aged children [16]. There is also research to support the notion that parents' socialization can affect aspects of temperament related to emotional expression in children [12]. Specifically, it is suggested that children learn to regulate and express emotions during social situations based on how their parents act and react. [12]. A recent report by Miller, Dunsmore, and Smith examined the association between parental socialization of emotions to effortful control in children between the ages of 18 months and 5 years [27]. Findings suggested a connection between parental socialization and aspects of effortful control.

Based on these findings, differences in parental socialization of CWS and CWNS could account for temperamental differences often reported in preschool-age CWS and CWNS. It could be the case that differing temperaments between CWS and CWNS result from inherited temperamental differences between parents of CWS and CWNS. It is also possible that temperamental differences between CWS and CWNS could be the result of influential talker-group differences in socialization between the parent and child. To the author's knowledge, to date, no study has considered the role of the parent's temperament and socialization and their impact on the temperament of CWS and CWNS.

To examine the temperament of adults, Rothbart and colleagues also created the Adult Temperament Questionnaire (ATQ; Evans & Rothbart, 2007) which is a self-report assessment with several similar factor scales and subconstructs similar to the CBQ. Although the CBQ has been studied more often, the ATQ has been utilized in reputable investigations of temperament in adults [28-30].

Purpose and Hypothesis

Assuming, based on previous findings [8,11,20], that temperamental differences do exist between preschool-age CWS and CWNS, the present preliminary study examines differences in the temperament of parents of children who stutter and parents of children who do not stutter. The present study also examines the relational difference between the temperament of parents to children across both talker groups (i.e., children who stutter and children who do not stutter). This, however, in no way suggests that parents cause stuttering in their children, but simply speculates that parental socialization may play a noticeable role in the reported temperamental differences between CWS and CWNS. If this is the case, one could speculate that differences in temperamental factors related to reactivity and

regulation for CWS are also present for parents of CWS, when compared to parents of CWNS. It could also be the case that the relationship between the temperament of CWS and their parents differs significantly in comparison to CWNS and their parents. Thus, the purpose of this preliminary investigation was three-fold: (1) to determine if CWS's temperament differs from CWNS's temperament; (2) to examine whether temperamental differences are present between parents of CWS (pCWS) and parents of CWNS (pCWNS); and (3) to examine the relationship between the temperament of CWS and their parents in comparison to the relationship between the temperament of CWNS and their parents.

It was hypothesized that (1) the temperament of CWS would differ significantly from CWNS and (2) the temperament of parents of CWS (pCWS) would differ significantly from parents of CWNS (pCWNS). Moreover, an exploration of the relationship between the temperament of CWS and pCWS and that of CWNS and pCWNS was explored.

Methods

Participants

Child participants consisted of 16 preschool-age CWS and 16 preschool-age CWNS, all of whom were native speakers of American English. All participants were involved in a series of empirical studies through the James Madison University Stuttering Research Laboratory. Each child participant's race was ascertained by parental report. All CWS participants were Caucasian. Of the CWNS group, 12 participants were Caucasian, 1 was African American, and 3 were Biracial.

Participants were between the ages of 36-64 months: CWS, $M=46.81$ months, $SD=9.45$; CWNS, $M=47.25$ months, $SD=9.16$. There was no statistically significant group difference in chronological age, $t(30)=-0.13$, $p=0.90$. Both talker groups consisted of 11 boys and 5 girls.

Parents consisted of one monolingual, English speaking adult per each CWS and CWNS. All parents completing the surveys were female and self-selected as the primary parent. The primary parent was defined at the beginning of the questionnaire by instructing the parent(s) to have the primary parent of each participant complete both surveys. The primary parent was defined as the parent spending the majority of the week with the child.

All participants were recruited from the local community and were compensated for their participation. None of the 32 children had previously received or was currently receiving formal/structured intervention for stuttering or any other communication disorder. Additionally, participants had no known hearing, neurological, developmental, academic, intellectual, or emotional concerns, as reported by the parent/guardian. The protocol for this study was approved by the Institutional Review Board of James Madison University (Harrisonburg, Virginia). A parent or guardian of each participant signed an informed consent and each child assented.

Excluded participants

From an initial group of 58 CWNS, 1 was excluded due to scoring below the 16th percentile on a speech-language assessment and 1 was excluded for failing the hearing screenings, and, therefore, they did not meet the inclusion criteria for this study. Of the remaining 56 CWNS, 2 were excluded because of incomplete questionnaire data and 40 were excluded because there were no CWS to match them to. From the

initial group of 18 CWS, 1 was excluded due to having a chronological age >3 standard deviations above the mean for the talker group, and 1 was excluded for failing the hearing screenings. Finally, 3 participants were excluded because they did not meet the fluency classifications for CWS or CWNS.

Classification

CWS

Talker group classification for the purposes of this study was determined using criteria outlined in Johnson, Walden, Conture and Karrass [31] and used by others [4,32]. A child was considered a CWS if he or she (a) exhibited three or more stuttering-like disfluencies (SLD; i.e., sound/syllable repetitions, whole-word repetitions, audible or inaudible sound prolongations) per 100 words of conversational speech based on a 300-word sample [33-35] and (b) received a total score of 11 or above (an SSI-4 score of 11 or above is the severity equivalent of at least "mild" for preschool children) on the Stuttering Severity Instrument-4 (SSI-4) [36]; CWS had a mean score of 17.06, $SD=4.09$).

CWNS

A child was considered CWNS if he or she (a) exhibited two or fewer SLD per 100 words of conversational speech (based on a 300-word sample) and (b) received a total score of 8 or below (an SSI-4 score of 0-8 is the severity equivalent of "very mild" for preschool children) on the SSI-4 (CWNS had a mean score of 4.25, $SD=3.42$).

Standardized Speech-Language Tests and Hearing Screening

To participate in the present study, each participant scored at the 16th percentile or greater (approximately 1 SD below the mean) on the (a) Sounds in Words subtest of the Goldman Fristoe Test of Articulation (2nd ed) [37]; (b) Peabody Picture Vocabulary Test (3rd ed; PPVT-III A or B) [38]; (c) Expressive Vocabulary Test (EVT) [39]; (d) Test of Early Language Development – Version 3 (TELD-3) [40]. These four standardized assessment tools measure articulation abilities, receptive and expressive vocabulary, as well as receptive and expressive language skills, respectively. The 1 SD criterion was employed, given its common use in identifying children with clinically significant language impairment [41]. Additionally, each participant – with the exception of 1 CWNS – passed a bilateral pure-tone hearing screening [42]. This 1 CWNS did not respond to 4000 Hz in one ear, but, was not excluded from the study since he responded to all other frequencies bilaterally, presented with a normal tympanometric screening bilaterally (Type A), and met the standardized speech-language assessment criteria for the study. These measures were administered to each child during a visit to the Stuttering Research Laboratory.

Procedure

Prior to participating in a single campus visit, the parent(s) of each participant were instructed via email to complete both questionnaires (CBQ and ATQ) via secure web link to Qualtrics. Qualtrics is online survey software used as a tool for research. The consent form for the study followed by the instructions on completing the questionnaires were provided to the parent via Qualtrics immediately prior to beginning each questionnaire. At that time, the definition of primary

parent was provided. As previously stated, the primary parent was “the parent spending the majority of the week with the child”.

The Children’s behavior questionnaire (CBQ)

The CBQ is a parent report measure that assesses temperament in children ages three to seven years old. Parents complete the questionnaire by deciding how true or untrue a statement about their child is based on a seven point scale (1=extremely untrue of your child, 2=quite untrue of your child, 3=slightly untrue of your child, 4=neither true nor false of your child, 5=slightly true of your child, 6=quite true of your child, and 7=extremely true of your child). The CBQ has 195 items that assess fifteen dimensions of temperament which are then grouped into three factor scales: Negative Affect, Surgency, and Effortful Control. Cronbach’s Alphas for the fifteen dimensions ranged from 0.72 to 0.96 in the present sample, indicating adequate to excellent reliability of measurement.

The adult temperament questionnaire (ATQ)

The ATQ is a self-report measure of temperament that has 177 items. Like the CBQ, the ATQ assesses both general constructs (factor scales) as well as smaller subconstructs (scales). The adult (the parent, in this study’s case) answers questions about his or her own behavior based on the same seven-point scale that the CBQ uses, ranging from extremely untrue to extremely true. The ATQ’s dimensions group into four factors: Negative Affect, Extraversion, Effortful Control, and Orienting Sensitivity. Reliability of the ATQ dimensions in the present study ranged from $\alpha=0.75$ to $\alpha=0.94$.

Data Analysis

For the present study, several data analyses were completed. For the first hypothesis, t-tests investigated temperamental differences with talker group as the independent variable (CWS or CWNS) and CBQ factor scales (Surgency, Negative Affectivity, and Effortful Control) as the dependent variables. The second hypothesis was assessed similarly

by using a t-test, with parents separated by their child’s talker group served as the independent variable (pCWS or pCWNS) and ATQ factor scales (Negative Affect, Surgency, Effortful Control, and Orienting Sensitivity) serving as the dependent variables. Finally, the third exploration was investigated by calculating correlation coefficients between CWS and CWNS as well as pCWS and pCWNS dimensions of temperament.

Results

Descriptive Measures

Stuttering/speech disfluencies: As expected, there were statistically significant differences between the CWS and the CWNS in total disfluencies, stuttering-like disfluencies, and the SLD/TD ratio. Moreover, the variance in these three measures was unequal. Means, standard deviations, t-values, degrees of freedom, and p-values are presented in Table 1. As expected, CWS displayed more total disfluencies, more stuttering-like disfluencies, and a higher ratio of SLDs to TDs than CWNS. Moreover, CWS scored higher on the SSI than CWNS.

Speech and language abilities: Based on participation selection criteria described above, all 32 participants in this study exhibited scores at or above the 16th percentile (less than 1 S.D. below the mean on the following standardized speech tests: PPVT-2, EVT-2, TELD-3, and GFTA-2). Independent samples t-tests revealed no significant between-group differences on any of the four measures (Table 1).

Experimental Measures

To measure differences within the Child Behavior Questionnaire (CBQ), three independent samples t-tests were conducted with talker group as the independent variable and the temperament factors as the dependent variables. No statistically significant group differences were found in Negative Affect, Surgency, or Effortful Control (Table 1).

	CWS	CWNS	t (df)	p	
	M (SD)	M (SD)			
Speech-language tests					
PPVT-III	116.81 (11.05)	115.44 (12.59)	0.33 (30)	0.75	
EVT	117.69 (11.34)	116.81 (12.86)	0.20 (30)	0.84	
TELD-3					
	Expressive	106.75 (11.87)	109.81 (11.87)	-0.73 (30)	0.47
	Receptive	116.56 (15.25)	119.44 (9.17)	-0.65 (30)	0.52
GFTA-2	109.06 (8.78)	107.94 (10.42)	0.33 (30)	0.74	
Fluency Measures					
% SLD	7.8% (5.0%)	1.0% (1.0%)	5.37 (15.9)	0.001	
% TD	11.4% (5.3%)	4.1% (2.5%)	5.06 (21.4)	0.001	
SLD/TD Ratio	65.7% (13.4%)	28.8% (28.5%)	4.70 (21.3)	0.001	
SSI	17.06 (4.09)	4.25 (3.42)	9.62 (30)	0.001	

Temperament Factors					
Child Surgency	4.67 (0.54)	4.78 (0.49)	-0.61 (30)	0.55	
Child Negative Affect	4.35 (0.34)	4.23 (0.58)	0.70 (30)	0.49	
Child Effortful Control	5.19 (0.46)	5.11 (0.37)	0.52 (30)	0.61	
Parent Negative Affect	4.32 (0.59)	4.01 (0.61)	1.48 (30)	0.15	
Parent Effortful Control	4.54 (0.71)	4.50 (0.69)	0.20 (30)	0.85	
Parent Orienting Sensitivity	4.95 (0.57)	4.61 (0.68)	1.53 (30)	0.14	
Parent Extraversion	4.49 (0.72)	4.75 (0.76)	-1.00 (30)	0.33	

Table 1: Means and standard deviations by talker group (CWS and CWNS) for speech-language tests, disfluency measures, and child and parent temperament factors.

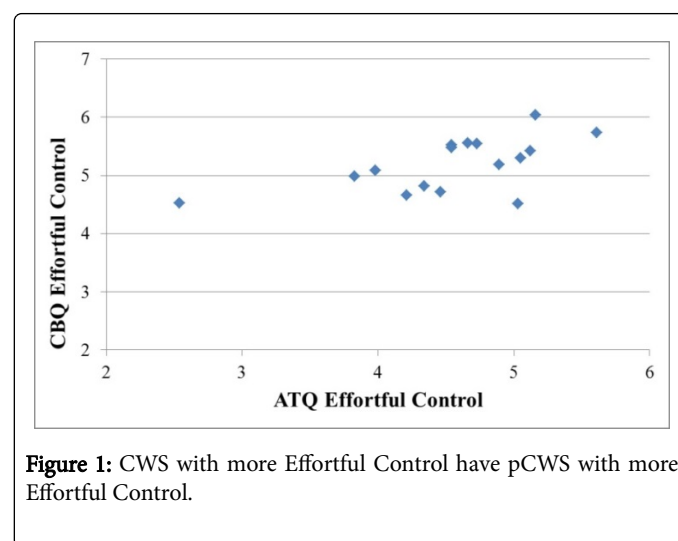
To measure differences within the Adult Temperament Questionnaire (ATQ), four independent samples t-tests were conducted to test for talker-group differences on the four adult temperament factors: Negative Affect, Extraversion, Effortful Control, and Orienting Sensitivity. As with the CBQ factors, no statistically significant group difference were found (Table 2).

	Child		
	Surgency	Negative Affect	Effortful Control
CWS			
Parent			
Negative Affect	0.3	0.39	-0.34
Effortful Control	-0.35	-0.29	0.60*
Orienting Sensitivity	0.23	0.03	0.19
Extraversion	0.23	0.14	0.37
CWNS			
Parent			
Negative Affect	0.41	0	0.35
Effortful Control	-0.09	-0.19	-0.25
Orienting Sensitivity	0.39	0.36	0.56*
Extraversion	-0.4	0	0.22
**=p<0.05			

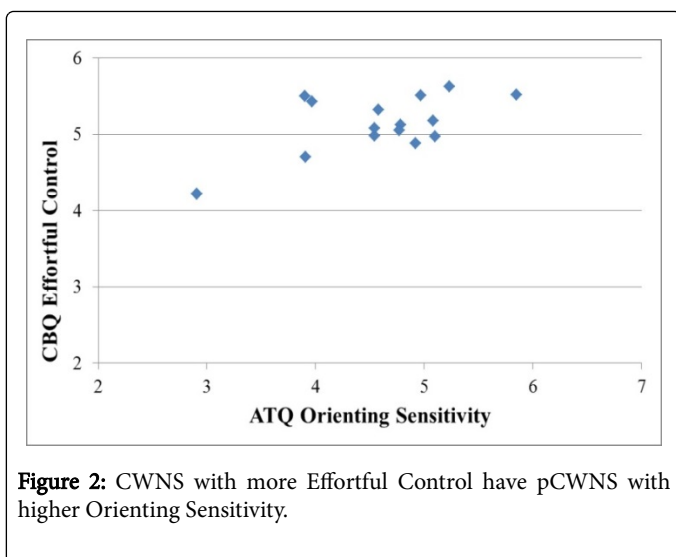
Table 2: Correlations between CBQ and ATQ factor scores for CWS/pCWS and CWNS/pCWNS separately.

To examine the relationship between the temperament of CWS and their parents, Pearson's correlations were used to determine the strength of the relationship between the temperament of CWS and the temperament of their parent (pCWS). Correlations were calculated based on the CBQ and ATQ big factors for CWS and pCWS,

respectively. In considering the relationship between CBQ scores of CWS and ATQ scores of pCWS, results indicated a significant positive correlation between the Effortful Control factor from the CBQ and the Effortful Control factor from the ATQ, $r=0.60$, $p=0.02$ (Figure 1). No other CBQ factors correlated significantly with other factors of the ATQ with non-significant p-values ranging from 0.14 to 0.91.



To examine the relationship between the temperament of CWNS and their parents, as with CWS, Pearson's correlation was used to determine the strength of the relationship between CWNS and their parent (pCWNS). Correlations were calculated based on the CBQ and ATQ big factors for CWNS and pCWNS, respectively. In considering the relationship between CBQ scores of CWNS and ATQ scores of pCWNS, Effortful control from the CBQ correlated positively with Orienting Sensitivity from the ATQ, $r=0.56$, $p=0.03$ (Figure 2). No other factors were statistically significant with p-values ranging from 0.12 to 0.99.



Discussion

This preliminary study resulted in three main findings. First, in response to the first hypothesis, there were no statistically significant differences between CBQ scores of CWS and CWNS. Secondly, in response to the next hypothesis, there were no differences between CBQ scores of pCWS and pCWNS. Lastly, in response to the third hypothesis, present findings indicate that the relationship between the temperament of CWNS and their parents is indeed different from the relationship between the temperament of CWS and their parents. The discussion of each finding is below.

Based on the present findings, there were no differences in the temperament of CWS and CWNS. Perhaps the lack of temperamental differences reported in the present study is because there are no actual temperamental differences in the population of CWS and CWNS. However, this interpretation is unlikely given the strong support of previous studies that have reported temperamental differences based on larger sample sizes with similar questionnaire data [8,11,15,20]. Furthermore, studies based on behavioral data contradict findings from the present study by also suggesting temperamental differences between CWS and CWNS [13,31].

Another possible explanation for the lack of differences in temperament scores for CWS and CWNS could be parental bias with parent-report questionnaire data. Previous studies have indicated an issue with parent-report questionnaire indicating that parents project their biased opinion of their child's behavior rather than reporting facts [22]. However, contradicting studies suggest just the opposite - that parents do not project their own feelings onto the questionnaire when filling it out [43].

Perhaps a lack of group of differences for CWS and CWNS could be due to the present findings being based on a smaller sample size. Although, one study with a larger sample size (N=116) indicated significant differences in temperament in CWS and CWNS [20], the present study with a considerably smaller sample size (N=28) showed no difference between talker groups. On the other hand, perhaps considering their own temperaments close in time to their children's temperament affected how the parents rated their children. This issue will be discussed further in the Caveats section.

Based on the questionnaire data, there is no difference in the temperaments of pCWS and pCWNS. As with CWS and CWNS, one possible explanation is that there is in fact no difference in the temperament of parents of CWS and parents of CWNS. This explanation would suggest that temperamental differences in CWS and CWNS reported in other empirical studies [8,11,31] are not necessarily linked to a direct difference in their parents. This means that perhaps the differing temperament between talker groups lies with the child and parents' temperament does not directly affect the temperament of their children.

It is important to note that although none of the mean differences in ATQ scores reached statistical significance, the tests for differences in Parent Negative Affect and Parent Orienting Sensitivity both had t-values >1.0, suggesting potentially meaningful differences could be found in a larger sample.

Based on the literature, children appear to develop their temperament through parental socialization. Parental coping strategies appear to have a strong effect on children's emotional responses. Results of one study in particular showed that parental distress influenced the way children responded to emotions. This study concluded that children tend to express emotions in more intense ways when their parents use harsh coping strategies [12].

For CWS, CBQ Effortful Control was correlated with pCWS Effortful Control from the ATQ. This finding is worthy of discussion due to the nature of the factor itself. The definition of Effortful Control is the ability to inhibit a dominant response in order to perform a subdominant response [44]. It is a combination of the following sub factors: Low Intensity Pleasure, Inhibitory Control, Attentional Focusing, and Perceptual Sensitivity. Some examples of an individual's Effortful Control are easily stopping an activity when told no or if a child has strong concentration during an activity such as coloring. It is possible that Effortful Control is either learned from parental behavior or that children have a predisposition to have influence on Effortful Control based on observation of their parents.

As previously stated, CWNS Effortful Control was positively correlated with pCWNS Orienting Sensitivity. Based on previous studies, parental socialization should have an influence on the child's temperament [12]. Although the child's temperament may not directly mimic the parent's temperament, there should be some influence or relationship, which the present study found.

Caveats

As expected, there were some limitations to this study. Each limitation will be discussed below.

Sample size

The sample size of this study was limited (CWS, N=16; CWNS, N=16) which could have resulted in a type II error—incorrectly accepting the null hypothesis of no between group differences when there could in fact be a difference in the population. Other studies that have reported between group differences have ranged in sample sizes from 56 CWS to 116 CWS [13,20]. The present sample did not include 31 CWNS since there were no CWS who could be matched to their data. Future studies would benefit from having a larger scale study.

Age-range of participants

The age range of the participants spanned from 3-5 year olds. This could be considered a large age range to investigate a behavior in young children given that development occurs quickly and constantly at this age. However, the CBQ was designed and deemed reliable/valid for a larger range of preschool children ages 3-7 years than used in the present study. Similarly, other published studies investigating similar research questions have used the same age range [8,11,31] or greater [11,20,31,45] Eggers, De Nil, Van den Bergh, 2013). One explanation for this wide range is that temperament is stable over time. Also, using a range of 3-5 year olds allows for investigation of stuttering in young children closer to the onset of the behaviors and allows comparisons to be made with other similar studies.

Parent report data

As previously discussed, there have been some contradicting reports of the reliability of parent-report data. A caveat could be that this study was based on parent-report which some may conclude as biased data. However, other studies based on parent-report have suggested differences between the two groups and appear to support behavioral data [8,9,31].

Using questionnaires, particularly parent-report questionnaires, as a means of investigating one's behavior has become a popular topic of discussion in the area of temperament. The drawbacks often discussed include how much parents' temperaments and personalities influence the ratings of their children and the validity of assessments based on whether or not mothers and fathers agree when filling out questionnaires [43]. Another issue raised is the inability to assess temperamental characteristics that appear directly after infancy.

On the other hand, several benefits of collecting data through questionnaires have been reported. Two of the most important benefits of using questionnaires are the ease of obtaining information and the objectivity of the method. Studies have been completed in order to refute the thoughts that questionnaires provide invalid information. One such study investigated the possibility that parents could use ideas of their own personalities and temperaments while rating their children. No evidence was found proving that parents project their own temperament on their children while answering questions about their child's temperament [43].

Suggestions for Future Studies

Given that present findings differ from previous findings, this inconsistency suggests the need for continued examination of the connection between temperament of young children who stutter and their parents. Future replication of this study should be based on a larger sample size and consider the role of gender. It may be the case that comparisons of temperament in parent-child dyads differs depending on whether or not there is a gender difference between the parent and the child.

Another suggestion for future studies is to explore ways to utilize the CBQ in clinically-based research. For example, it would be of interest to know whether the parent-report of children who stutter differs on some aspects of the CBQ pre- and post-treatment for stuttering. Although temperament is stable, there could be some components measured by the CBQ that vary.

Conclusion

Overall, despite the present findings, previous studies have shown that there seems to be a difference in aspects of temperaments in CWS and CWNS [8,11,20,31]. Although the present study showed no significant difference, there is sufficient reason to suggest a differing parental influence for CWS in comparison to CWNS. Present findings indicate that CWS have a weaker relationship or influence from their parent's temperament, which could explain the less than developed temperament often reported in other studies. Regardless of no group differences, present findings do provide substantial reasoning for further investigation.

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