CHALLENGE AND THREAT APPRAISALS
OF PRESCHOOL-AGE CHILDREN WHO STUTTER

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by

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Many researchers subscribe to the idea that emotions play a crucial role in childhood-onset stuttering (e.g., Choi et al., 2016; A. Smith & Weber, 2017). However, researchers have not explicitly investigated the emotion-related role of appraisal behaviors in the onset, maintenance, and exacerbation of developmental stuttering. The purpose of this investigation was to evaluate whether preschool-age children who stutter (CWS) differ in their appraisal of tasks that vary in context (i.e., nonspeech, speech) as well as degrees and types of stress, compared to preschool-age children who do not stutter (CWNS). Sixteen CWS and 16 CWNS (3–5 years old) engaged in four tasks, including a stressful speech task, a nonstressful speech task, a stressful nonspeech task, and a nonstressful nonspeech task. Measures of challenge appraisal and threat appraisal were obtained from self-report, coding of facial emotion, and parent report. CWS and CWNS did not significantly differ in behavioral measures of appraisal during the experimental tasks. However, CWS, compared to CWNS, did score significantly higher on parent-report measures of temperament associated with threat appraisal. Open-ended responses for the rationale of choice of the Control Speech Task were also significantly different, with CWS more often indicating a preference for a task that was "Not a Challenge/Difficult," whereas the rationale from CWNS was related to "Like/Want To" of the task. Findings from this study were mixed, with questionnaire and preference data indicating preschool-aged CWS may be more likely to make threat appraisal rather than challenge appraisals when compared to CWNS.

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Ben—for following me to Ohio, making me laugh and take breaks, encouraging me when I needed it, and challenging me to be productive when I asked.

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CHAPTER I

INTRODUCTION

Stuttering can be a stress-inducing communication condition that affects approximately 5% to 8% of children and is a persistent communication condition for approximately 1% (68 million) adults worldwide (for review, see Yairi & Ambrose, 2013). Importantly, an individual's *appraisal,* with influence from personality and environmental variables, determines if a stressful experience is perceived as a challenge or a threat (Lazarus & Folkman, 1984). Appraisal also plays an important role in determining individuals' emotional responses. Inferences from previous study findings regarding emotional responses support the notion that appraisal may be relevant to stuttering (e.g., Choi et al., 2016; Johnson et al., 2010; Jones, Conture, et al., 2014; Schwenk et al., 2007; Snyder & Arnold, 2022). However, researchers have yet to specifically investigate the potential significance of appraisal in relation to stuttering.

In the following sections, I introduce stuttering and provide rationale for the choice of children as the target population of interest in this study. Then I discuss theories that support the focus of this study. I also review what we know about the emotion-related processes of children who stutter (CWS) compared to children who do not stutter (CWNS), where the gap in our understanding lies, and how appraisal may address this issue. Lastly, I explain the concept of appraisal as it relates to stressful stimuli, how appraisal can be measured, factors that may influence appraisal, and psychosocial implications associated with appraisal. This review serves as the premise of my dissertation research and is followed by an overview of the specific aims.

CHAPTER II

LITERATURE REVIEW

Defining Stuttering

Stuttering has often been defined from a listener's perspective, with an emphasis on stuttering as involuntary disruptions in a speaker's forward flow of intentional speech (e.g., Yairi & Seery, 2023, p. 8). Based on this definition of stuttering, overt disruptions can include core disfluencies as well as accessory disfluencies. Core disfluencies, also referred to as stuttering-like disfluencies (SLDs), get their name because they are what one may typically think of as being more "stuttering-like." SLDs include dysrhythmic phonations (i.e., blocks), single-syllable whole-word repetitions, and part-word repetitions. Accessory disfluencies, also referred to as nonstuttering-like disfluencies (NSLDs), are described as less "stuttering-like" and commonly occur in the speech of typically fluent speakers. NSLDs can include phrase repetitions, multi-syllable whole-word repetitions, revisions, and interjections. Table 1 includes examples of SLDs and NSLDs (adapted from Yairi & Seery, 2023, p. 10).

Recent research involving qualitative exploration of speakers' experiences of stuttering supports the notion to understand and develop a definition of stuttering from the speakers' perspective, rather than focusing solely on the experience of the listener (e.g., Tichenor & Yaruss, 2019; Tichenor & Yaruss, 2018). Findings from a qualitative exploration and analysis of the moment of stuttering for adults who stutter (AWS) suggest the SLDs that listeners observe are only a part of stuttering. Based on the findings of Tichenor and Yaruss (2018), occurrences of stuttering often start with anticipation (i.e., awareness or fear that a disruption in speech might arise) and involve a feeling of losing control. Stuttering can also include physical aspects (e.g., tension), cognitive components (e.g., anxiety), and emotional factors (e.g., fear). Importantly,

Table 1

Types of Disfluencies

Stuttering-Like Disfluencies (SLDs)	Examples
Dysrhythmic Phonations (i.e., block)	Mo—mmy — Mommy
Single-Syllable Word Repetition	And-and-and
Part-Word Repetition	Bu-bu-but

Nonstuttering-Like Disfluencies (NSLDs)	Examples
Phrase Repetition	I like to – I like to…
Multi-Syllable Word Repetition	Summer—summer—summertime
Revision	It was, I mean…
Interjection	Uh, well, um, er

Note. Adapted from Yairi, E., & Seery, C. H. (2023). *Stuttering: Foundations and clinical applications* (3rd ed.). Plural Publishing.

these findings highlight the broad experience and definition of stuttering beyond what can be observed by listeners—that is, stuttering is much more than a disruption in the forward flow of speech. Tichenor and Yaruss (2019) proposed a change to the definition of stuttering that includes not only listeners' observations of speech disruptions, but also the impact that stuttering has on individuals' lives.

Stuttering Research: Emphasis on Adults or Children?

Research exploring speakers' experiences and definitions of stuttering has focused on adults (e.g., Tichenor & Yaruss, 2019; Tichenor & Yaruss, 2018). However, the type of stuttering we are interested in for our study, also referred to as developmental or childhood-onset stuttering, usually begins during the preschool-age years (Yairi & Seery, 2023, p. 17). Researchers investigating the relations between emotion-related factors and stuttering have

justified their focus on preschool-age CWS, rather than AWS, because young children have not had as extensive of experiences with stuttering (Ntourou et al., 2013). As such, young CWS, compared to AWS, are less likely to have developed learned reactions to stuttering. Ntourou and colleagues (2013) discussed the potential difficulties that can arise in studies about the nature of stuttering relative to emotion-related factors with AWS due to the potential influence of prior stuttering experiences on emotional responses. To limit the amount of potentially confounding variables, we made preschool-age children the target population of our study as well.

The Multifactorial Nature of Stuttering

Stuttering has been described as a neurodevelopmental communication condition influenced by motor, linguistic, and emotional factors (A. Smith & Weber, 2017; Starkweather, 1987; Walden et al., 2012). According to the Multifactorial Dynamic Pathways Theory of Stuttering, motoric, language, and emotional factors interact and contribute to the onset and progression of stuttering from preschool-age years into later life (A. Smith & Weber, 2017). We chose to ground our study in the Multifactorial Dynamic Pathways Theory of Stuttering and are particularly interested in the emotional piece of this model. As mentioned in Chapter 1, we would like to know more about the emotional component of this model—particularly the potential relevance of appraisal, an emotion-related process, in stuttering.

Stuttering and Emotion-Related Processes

Many researchers have compared preschool-age CWS and CWNS based on measures of emotional reactivity (e.g., Johnson et al., 2010; Ntourou et al., 2013; van der Merwe et al., 2011; Walden et al., 2012; Zengin-Bolatkale et al., 2015) and regulation (e.g., Conture & Kelly, 1991; Eggers et al., 2013, 2018; Kraft et al., 2014; Ntourou et al., 2013). Researchers have also investigated the potential connection between stuttering severity and emotional reactivity and

regulation (e.g., Choi et al., 2016; Jones, Conture, et al., 2014) as well as other measures of emotion-related processes (e.g., effortful control; Kraft et al., 2014).

Emotional reactivity refers to arousability relative to changes in the environment that are significant to a person's goals and well-being, whereas emotion regulation refers to processes that modulate emotional reactions to accomplish goals and benefit one's well-being (Eisenberg et al., 1997; Eisenberg et al., 2001; Rothbart et al., 1994). Emotional reactivity and emotion regulation have a joint relationship, meaning they can act in tandem with one another (Eisenberg et al., 1997; Eisenberg et al., 2001; Rothbart et al., 1994). It is worth mentioning that both positive and negative events or stimuli can elicit changes in emotional processes (Rothbart et al., 2001).

Examples of changes in the environment that may elicit fluctuations in emotion-related processes of children could include the approach of a stranger, the arrival of a present, or the desire to win a game. Changes in emotional reactivity could include the onset of anger/frustration (i.e., the amount of negative affect related to interruption of ongoing tasks or goal blocking), approach (i.e., the amount of excitement and positive anticipation for expected pleasurable activities), or fear (i.e., the amount of negative affect, including unease, worry or nervousness related to anticipated pain or distress, and/or potentially threatening situations). Given the interconnected nature of emotional reactivity and emotion regulation, it is logical that these events or stimuli may also coincide with changes in emotion regulation, like soothability (i.e., rate of recovery from peak distress, excitement, or general arousal; Putnam & Rothbart, 2006) and inhibitory control (i.e., capacity to stop, moderate, or refrain from a behavior when instructed; Putnam & Rothbart, 2006). However, the interwoven relationship between emotional

reactivity and emotion regulation can make it challenging to determine the root cause of changes in emotion-related processes (Berntson et al., 1991).

An example of the complexities with differentiating between emotional reactivity and regulation can be observed from a 2007 study, in which researchers compared preschool-age CWS and CWNS based on measures reflective of emotion-related reactivity and regulation (i.e., attention and adaptation) relative to audible camera movements during play (Schwenk et al., 2007). Notably, Schwenk and colleagues described the dependent measures, including the frequency and duration of shifts in visual attention, and reaction time from stimulus to visual shift, as indicators of reactivity *and* regulation. Based on the higher frequency of shifts in visual attention, preschool-age CWS, compared to CWNS, were described as significantly more reactive and distractible (i.e., greater reactivity) as well as slower to habituate (i.e., lower regulation). However, it remains unclear whether this difference between CWS, compared to CWNS, was due to weaknesses in regulation (e.g., lack of habituation to noise), a higher predisposition to reactivity (e.g., greater sensitivity when the noise occurred), or some combination of these factors. This lack of clarity illustrates the problem related to the intertwined nature of emotional reactivity and regulation. With the complexity of these variables in mind, we acknowledge that some measures of emotional reactivity in studies summarized below may be alternatively understood as evidence of emotional regulation, and vice versa.

Stuttering and Emotion-Related Factors: Findings

Existing evidence regarding emotion-related processes of CWS and CWNS comes from three different types of studies: parent report (e.g., J. D. Anderson et al., 2003; Eggers et al., 2010; Rocha et al., 2019), behavioral observation (e.g., Eggers et al., 2018; Johnson et al., 2010; Ntourou et al., 2013; Schwenk et al., 2007; Snyder & Arnold, 2022; Walden et al., 2012), and

physiological (Arnold et al., 2011; Jones, Buhr, et al., 2014; Salvo & Arnold, 2022; Walden et al., 2012; Zengin-Bolatkale, Conture, Key, et al., 2018; Zengin-Bolatkale, Conture, Walden, et al., 2018b). Findings based on these methodological designs are discussed below.

Parent-Report Studies

Findings from parent reports of emotion-related processes suggest CWS are higher in emotional reactivity (e.g., Eggers et al., 2010; Rocha et al., 2019) and lower in emotion regulation (e.g., J. D. Anderson et al., 2003; Eggers et al., 2010; Rocha et al., 2019) compared to CWNS. In the study by Eggers et al. (2010), the measures of emotional reactivity included composite scores for extraversion/surgency (i.e., positive emotional reactivity) and negative affect. The CWS, compared to CWNS, were significantly higher on subscales within the composite scores of extraversion/surgency and negative affect, including anger/frustration, approach (i.e., excitement and positive anticipation for expected pleasurable activities), and motor activation. These parent-report findings are similar to those of Rocha et al. (2019), who found that CWS, compared to CWNS, scored significantly higher on subscales of anger/frustration, impulsivity, and sadness. For parent-report measures of emotion regulation, Eggers et al. (2010) utilized the composite score of effortful control; CWS, compared to CWNS, scored significantly lower in subscales contributing to effortful control, including inhibitory control and attentional shifting. Rocha et al. (2019) reported similar outcomes based on parent-report measures, with CWS, compared to CWNS, scoring significantly lower on subscales of attention/focusing, perceptual sensitivity, and soothability/falling reactivity. Likewise, J. D. Anderson et al. (2003) found that CWS, compared to CWNS, scored significantly higher on hypervigilance and non-adaptability to change.

Researchers have also reported associations between parent-report measures of emotional processing and stuttering severity (Choi et al., 2016; Tumanova et al., 2020). For example, Choi and colleagues (2016) investigated whether parent-report measures of emotional reactivity emotional stress were associated with stuttering severity. The researchers reported a significant association between higher parent-report scores of surgency (i.e., an index of positive emotionality based on an average of the subscales scores for activity level, high-intensity pleasure, impulsivity, and shyness as a negative contribution) and greater percentages of SLDs during narratives following positive, negative, and neutral emotion-inducing conditions (Choi et al., 2016). The researchers interpreted these findings to suggest CWS who present with greater surgency (i.e., positive emotional reactivity) produce more SLDs than CWS with lower surgency.

Tumanova et al. (2020) also compared preschool-age CWS and CWNS based on parent-report measures of temperament. However, the variable of interest in their study was behavioral inhibition. Tumanova et al. (2020) found that higher parent-report measures of behavioral inhibition, indexed via the *Children's Behavior Questionnaire Short Form (CBQ-SF,* Putnam & Rothbart, 2006; Rothbart et al., 2001) shyness score, were associated with lower SLDs produced (Tumanova et al., 2020). In other words, CWS who were described as higher in shyness by their parents had lower measures of stuttering severity, compared to CWS who were described as less shy by their parents. This raises a question about whether CWS who are described as less shy might have a higher stuttering severity because they are engaging and perhaps talking more than their shy counterparts. The researchers considered this as well and found that for CWS, higher behavioral inhibition was associated with less complex utterances, shorter mean length of utterances (MLUs), fewer words voiced during conversation with an unfamiliar adult examiner,

and lower stuttering severity. These findings highlight the importance of parent-report measures like behavioral inhibition and how emotion-related factors may affect CWS.

The significant differences between CWS and CWNS on these parent-report measures of temperament and emotion-related processes relevant to appraisal, as well as the associations between parent-report measures of emotion-related processes and stuttering severity, suggest emotion-related processes may be pertinent to explore to better understand the nature of stuttering.

Behavioral Studies

Findings from behavioral studies support the notion that there are significant differences in the emotional processes of CWS and CWNS, such that these factors may be relevant to the nature of stuttering (e.g., Eggers et al., 2018; Johnson et al., 2010; Ntourou et al., 2013; Schwenk et al., 2007; Snyder & Arnold, 2022; Walden et al., 2012). For example, Johnson and colleagues (2010), compared the emotion regulation of CWS and CWNS based on the children's positive and negative expressive nonverbal behaviors when receiving a desired gift and a disappointing gift. CWS expressed significantly more negative nonverbal behaviors than CWNS after receiving the disappointing gift. Interestingly, the CWS and CWNS did not differ in the amount of positive nonverbal behaviors expressed after receiving the desired gift; however, CWS were significantly more disfluent after receiving the desired gift compared to the disappointing gift. In a recent study, Snyder and Arnold (2022) compared CWS and CWNS based on their use of emotion-related regulation strategies during *The Forbidden Toy*—a resistance to temptation task. Dependent variables included coded observations of verbal, behavioral, and attentional regulation. The CWS, compared to the CWNS, were significantly more likely to refrain from

touching the toy. Consistent with these findings, the CWNS, compared to CWS, spent significantly more of their time during the task moving toward the forbidden toy.

A particularly interesting but unintended finding of this behavioral study was that nearly a quarter of the CWS showed signs of distress (i.e., crying, calling for help) that required early termination of the experiment (Snyder & Arnold, 2022). On the other hand, none of the CWNS required experimental intervention due to distress. The authors stated that this unintended, observable difference between groups is especially noteworthy because *The Forbidden Toy* task was not meant to elicit emotional responses. In their discussion, Snyder and Arnold suggested that the unintended emotion responses exhibited by CWS, compared to the lack of distress expressed by CWNS, could be explained by appraisal. More specifically, the authors questioned whether CWS, compared to CWNS, may be more likely to experience threat appraisal relative to difficult situations.

Although this was not the primary aim of the study by Snyder and Arnold, it provides support for future studies to investigate the appraisal of stress in young CWS. Overall, the results of these studies highlight the complex but important role that emotion-related processes, like appraisal, may have in stuttering. Additionally, they provide support for behavioral investigations of the association between appraisal and stuttering.

Physiological Studies

Results from psychophysiological studies also indicate CWS, compared to CWNS, may be more emotionally reactive (e.g., Jones, Buhr, et al., 2014) and less effective in emotion regulation (e.g., Jones, Conture, et al., 2014). Findings from longitudinal psychophysiological studies also support the notion that emotional reactivity may be relevant to the nature and progression of stuttering (Zengin-Bolatkale, Conture, Walden, et al., 2018). Lastly, outcomes

from a recent study suggest that preschool-age CWS, compared to preschool-age CWNS, may have a predisposition for higher levels of emotional arousal at rest (Salvo & Arnold, 2022). Details regarding a few of these studies are provided below.

In 2018, Zengin-Bolatkale, Conture, Key, and colleagues conducted a longitudinal study of young children (36 to 83 months) separated into three groups: CWS and persisted (CWS), children who recovered from stuttering (CWSR), and CWNS. The researchers measured the children's tonic skin conductance levels (i.e., a physiological index of emotional reactivity) during a baseline condition and a stress-inducing picture-naming task; these measures were collected at three different time points over a two-year timespan. Findings from this study indicated a significant association between heightened emotional reactivity (i.e., higher tonic skin conductance levels) during a stressful picture naming task and stuttering persistence (i.e., the continuation of stuttering; Zengin-Bolatkale, Conture, Key, et al., 2018). These findings support the notion that emotional reactivity is relevant to the nature and persistence of stuttering.

Zengin-Bolatkale, Conture, Key, and colleagues (2018) published results from another study involving young (48 to 83 months) CWS and CWNS based on psychophysiological measures of emotional reactivity during different emotion-inducing conditions. For this project, the researchers used scalp-recorded event-related potentials—specifically late positive-potential (LPP)—as their dependent measures of emotion-related processes. LPP occurs soon after stimulus onset and allows researchers to measure rapid changes in emotional reactivity and regulation processes. LPP is measured via amplitude, with increases in amplitude being indicative of increased attention to emotional stimuli deemed motivationally relevant. The experimental conditions in this study included experimental manipulation of emotional reactivity and emotion regulation. Conditions within the experimental manipulation of emotional reactivity

included the viewing of neutral pictures ($n = 30$, e.g., book, cup), pleasant pictures ($n = 30$, e.g., kittens, smiling child eating watermelon), and unpleasant pictures ($n = 30$, e.g., shark, snake, spider). Conditions within the experimental manipulation of emotion regulation included the viewing of unpleasant pictures with positive reappraisal (e.g., "Next is a picture of a snake that is completely harmless. It doesn't even have teeth.") and the viewing of unpleasant pictures with neutral reappraisal (e.g., "Next, you will see a picture of an animal in nature. It has thick brown fur.").

Zengin-Bolatkale, Conture, Key, and colleagues' (2018) findings indicated CWS, compared to CWNS, exhibited significantly higher measures of LPP amplitude when viewing the unpleasant pictures (without any type of reappraisal). These findings suggest the CWS, compared to the CWNS, may be significantly more emotionally reactive or exhibit significantly less emotion regulation relative to negative stimuli (Zengin-Bolatkale, Conture, Key, et al., 2018). Zengin-Bolatkale, Conture, Key, and colleagues (2018) emphasized the fact that it is not possible to parse out how the emotion-related process of emotional reactivity and emotion regulation account for these between-group differences. These findings support the notion that emotion-related processes are important factors that may contribute to the occurrence of stuttering and that more research is needed to better understand the association between emotion-related processes and stuttering.

In another recent study, Salvo and Arnold (2022) compared preschool-age CWS and CWNS based on electrodermal response (EDR) amplitude, a psychophysiological measure reflective of emotional reactivity. The researchers obtained EDR measures during (a) a control task, (b) a child-friendly Stroop Task Paradigm, and (c) two pre-task conditions. The day-night Stroop task was chosen to serve as a cognitive-linguistic stressor that would elicit increases in

emotional reactivity by requiring the children to quickly name pictures of a sun and a moon counterintuitively (i.e., see a sun, say "night;" see a moon, say "day"). The control task was meant to act as a neutral experiment that did not result in significant increases in emotion-related processes. During the control task, the children named images of a bow and a net as they appeared (i.e., see a bow, say "bow;" see a net, say "net"). The pre-task conditions served as a reference for emotion-related activity and a comparison point to check for changes in emotional reactivity from pre-task conditions to experimental conditions. During the pre-task conditions, the children sat quietly and watched an age-appropriate video for five minutes.

Several interesting findings from this study support the aims of the current research project. First, findings from the study by Salvo and Arnold (2022) showed that the child-friendly day–night Stroop task, compared to the bow-net Control task, was not an effective cognitive-linguistic stressor, as evidenced by the lack of significant increases in psychophysiological measures of emotional reactivity in preschool-age children. However, the EDR measures during both tasks were significantly higher than the baseline measures. These findings highlight the importance of evaluating the effectiveness of experimental tasks, especially when researchers are interested in measuring changes in emotion-related processes. If tasks are not effective in eliciting targeted changes in emotion-related processes, comparisons between groups and conditions may be futile.

Second, CWS, compared to CWNS, presented with significantly greater measures of emotional reactivity (i.e., greater EDR amplitudes) during the pre-task conditions (i.e., sitting quietly and watching a child-friendly video; Salvo & Arnold, 2022). It is also worth noting that the CWS exhibited very little change in EDR amplitude from pre-task baselines to conditions— that is, the CWS had consistently elevated, comparable measures of EDR amplitude across

pre-task conditions and experimental tasks. This differed from CWNS, who had visible changes (although not significant) in EDR amplitudes, with lower measures during pre-task conditions and higher measures in experimental task conditions. These findings suggest that CWS, compared to CWNS, may have a higher predisposition for heightened emotional responses, particularly in a nonspeaking, neutral state. However, it is unclear whether CWS, compared to CWNS, have a heightened predisposition for heightened emotional responsivity because they are more emotionally reactive, less efficient in emotion regulation, or some combination of these emotion-related processes. These findings emphasize the importance of pursuing a better understanding of the emotion-related processes of CWS. Given the intertwined nature of emotional reactivity and emotion regulation that was previously discussed, it may be beneficial to consider alternative measures of emotion-related processes that inform emotional reactivity and emotion regulation, like appraisal. The concept of appraisal is discussed in detail in a specific subsection to follow.

Stuttering and Emotion-Related Processes: Equivocal Findings

Contrary to the aforementioned results, some researchers report equivocal findings when comparing the emotional responses of CWS and CWNS (Arnold et al., 2011; Eggers et al., 2010; van der Merwe et al., 2011; Zengin-Bolatkale et al., 2015). For example, some parent-report findings indicate no significant differences between CWS and CWNS based on measures reflective of emotional reactivity (J. D. Anderson et al., 2003; Eggers et al., 2010). Researchers also report a lack of significant differences between groups based on the expression of positive emotion (Johnson et al., 2010) as well as emotion regulation, measured via response inhibition resulting from external stimuli (Eggers et al., 2018). Consistent with these findings, some researchers have reported no significant differences between preschool-age CWS and CWNS

based on salivary cortisol measures (van der Merwe et al., 2011) or tonic skin conductance levels (Zengin-Bolatkale et al., 2015)—both of which are psychophysiological measures of emotional reactivity. Further, although findings from one study indicated that 3-year-old CWS, compared to 3-year-old CWNS, exhibited significantly higher tonic skin conductance levels, the researchers did not find significant differences between groups of 4-year-old or 5-year-old CWS and CWNS (Zengin-Bolatkale et al., 2015). It is possible that the differences in research findings could be attributed to variability in study elements, like the selection of experimental tasks, choice of dependent variables, as well as the measurement of dependent variables. Based on the equivocal findings that exist, the relationship between emotional processes and stuttering remains unclear, and further investigations of this topic are needed.

Further paradoxes about the role of emotion-related processes in stuttering are shown in findings from studies comparing preschool-aged CWS and CWNS that reported varied results regarding associations between emotional responses and stuttering severity (Choi et al., 2016; Johnson et al., 2010). For example, Johnson et al. (2010) found CWS, compared to CWNS, exhibited significantly more *negative* emotional expressions after receiving a disappointing gift. However, neither the CWS nor the CWNS exhibited significant increases in disfluencies following the *negative* emotion-inducing task of receiving a disappointing gift (Johnson et al., 2010). Similarly, Choi et al. (2016) did not find a significant association between higher parent reports of negative emotional reactivity and higher stuttering frequency. If negative emotions were relevant to the nature of stuttering, wouldn't we expect there to be an increase in stuttering severity that coincides with significantly more negative emotional expressions?

Johnson et al. (2010) reported stark differences in their findings regarding positive emotions compared to negative emotions. More specifically, the researchers reported CWS and

CWNS were not significantly different in their amount of *positive* emotional expressions after receiving a desired gift. However, the CWS were significantly *more* disfluent following the positive emotion-inducing tasks (i.e., receiving a desired gift; Johnson et al., 2010). Similarly, findings based on parent reports showed CWS with greater positive emotional reactivity stuttered more than children with lower positive emotional reactivity (Choi et al., 2016). These outcomes match what would be expected if emotion-related processes were associated with stuttering—that is, increases in positive emotion-related processes were associated with greater stuttering severity.

Overall, these findings raise questions about the potential relationship between emotional reactivity, emotion regulation, and stuttering (e.g., Choi et al., 2016; Eggers et al., 2018; Johnson et al., 2010; Zengin-Bolatkale et al., 2015). First, what accounts for the divergent findings summarized above regarding emotional reactivity and regulation in CWS? Second, if CWS and CWNS are classified according to speech fluency characteristics, wouldn't we expect the emotion-related measure for which they significantly differ (e.g., negative emotion expression) to be significantly associated with stuttering severity? It is worth thinking about the common measurements of emotion-related processes, which are often interpreted on scales involving descriptors, such as "positive" and "negative" with reference to emotions, as well as "increase" and "decrease" in emotion-related activity. Based on the complex interactions of emotion-related processes, the simplicity of these constructs may not be sufficient for comparing the emotional responses of CWS and CWNS. In this study, we propose an alternative approach to the study of emotion-related processes and their relevance to the nature of stuttering. Rather than concentrating on measures of emotional reactivity and regulation, future studies involving emotion-related processes of CWS and CWNS would benefit from considering the construct of appraisal.

Appraisal

Appraisal refers to the evaluation of a situation, including the level of personal

significance and one's resources to cope with a situation. Figure 1 depicts a theoretical

schematization of stress and appraisal (Bonanno & Mayne, 2001; Coifman, forthcoming). As

shown in Figure 1, appraisal, with influence from personal and environmental variables, is the

mediating process between an event, a stimulus, or a stressor and an individual's immediate

response, including thoughts, behaviors, emotions, and physiological activity (Herrald &

Tomaka, 2002; Lazarus, 1991; Mak et al., 2004; Scherer & Moors, 2019; Sillars & Davis, 2018;

Thompson et al., 2014). The immediate effects of appraisal can be associated with long-term

outcomes related to health and well-being, which may parallel the long-term effects of stressors

associated with stuttering over time. As discussed later, inferences from study findings regarding

Figure 1

A Model of Stress, Appraisal, Emotion, and Long-Term Effects
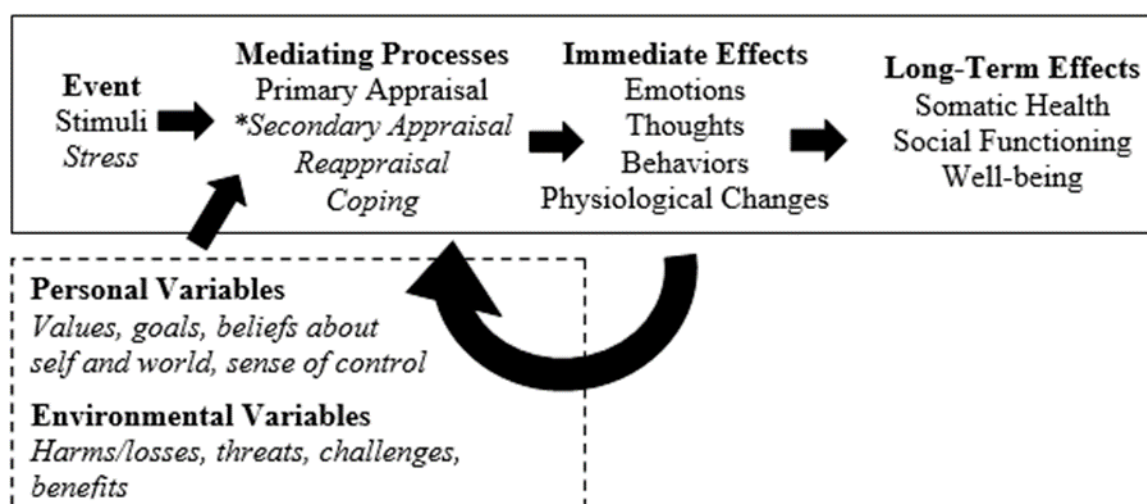
Note. Mediating processes, like secondary appraisal, reappraisal, and coping, occur over time with influence from immediate effects (i.e., emotions, thoughts, behaviors, physiological changes; Bonanno & Mayne, 2001; Coifman, forthcoming)

emotional processing of CWS support our theory that appraisal may be relevant to stuttering (Choi et al., 2016; Johnson et al., 2010; Jones, Conture, et al., 2014; Schwenk et al., 2007). More specifically, appraisal could account for the reported differences in the emotion-related process of CWS and CWNS. As such, appraisal may also be an important factor in the nature and progression of stuttering. However, researchers have not investigated the potential significance of appraisal in relation to stuttering.

Appraisal of Stress

Two common types of appraisals that occur in relation to stress are challenge appraisal and threat appraisal. Challenge appraisal occurs when a situation is appraised as significant or goal-relevant, and the demands are appraised as being within their resources or abilities to cope (Lazarus, 1984). On the other hand, threat appraisal occurs when a situation is appraised as significant or goal-relevant, *but* an individual appraises the demands as exceeding their resources or capabilities of coping (Lazarus, 1984). Challenge and threat appraisals have been of significant interest in past research on emotion, and they are important because they represent how individuals perceive and ultimately inform how individuals respond to stressful situations (for review, see Elliot et al., 2013; Sander et al., 2018). Individuals' appraisals can result in different immediate effects, including physiological changes, thoughts, behaviors, and emotions (Lazarus, 1991; Sander et al., 2018).

Appraisal and Emotions

The concept of appraisal was developed to explain how emotions could differ across individuals relative to the same event (Moors et al., 2013, p. 123). Given the proposed connections between emotions and appraisal, it is not surprising that dimensions differentiating emotions and central appraisal themes overlap (for review, see Harmon-Jones et al., 2003, 2017;

Lazarus, 1991; Moors et al., 2013). Reasonably so, researchers have also shown that differences

in dimensions of appraisal can correspond with different emotional responses (for review, see

Lerner & Keltner, 2000; C. A. Smith & Ellsworth, 1985; So et al., 2015).

For preschool-age children, a typical scenario that could be stressful and elicit different

negative valence (i.e., low pleasantness) emotional responses that serve specific functions is

learning to write letters of the alphabet. As a stressor, this task can elicit challenge or threat

appraisals, resulting in various discrete emotional responses. As an example, a child who

perceives the task of writing letters as significant and manageable may appraise the experience as

a challenge. This child may express frustration and demonstrate persistence by making multiple

attempts. Whereas a child who perceives the novelties of trying to write letters as significant but

unmanageable may appraise the situation as a threat. This child may be resistant or unwilling to

attempt the task.

As an example of how emotions can differ relative to appraisal of stress, consider anger

and fear. Anger and fear are both negative valence (i.e., low pleasantness) emotions. However,

anger and fear differ in the central appraisal themes of certainty and control. Certainty is the

degree to which a stimulus seems predictable and comprehensible (high) versus unpredictable

and incomprehensible (low). Control is the degree to which a stimulus seems to be attributed to

individual agency (high, i.e., self) or situational agency (low, e.g., another person, interpersonal

circumstances). As shown in Table 2, anger is characterized by a sense of high certainty and high

control, whereas fear is defined by perceived uncertainty and low control (Lerner & Keltner,

2000, 2001; C. A. Smith & Ellsworth, 1985). Overall, the central themes of appraisal resulting in

anger are associated with perceptions of low risk. On the other hand, the central themes of

appraisal resulting in fear are associated with perceptions of high risk.

Table 2

An Illustration Comparing Anger and Fear Based on Central Appraisal Themes

Central Appraisal Themes	Anger	Fear
Certainty	*High*	*Low*
Pleasantness	Low	Low
Attentional Activity	Medium	Medium
Anticipated Effort	Medium	High
Control	*High*	*Low*
Responsibility	High	Medium
Appraisal Tendency	Perceive negative events as predictable, under human control, & brought about by others	Perceive negative events as unpredictable & under situational control
	Influence on Risk Perception	
Influence on Relevant Outcome	Perceive low risk	Perceive high risk

Note. Adapted from Lerner, J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology*, *81*(1), 146–159. https://doi.org/10.1037//0022-3514

Based on the information provided above, it is evident that specific emotions are associated with specific types of appraisals. For the purposes of this study, we utilized anger as an index of challenge appraisal the fear as an index of threat appraisal.

Appraisal and Mindset

Research investigating the challenge and threat appraisals of preschool-age children using these specific terms is limited (e.g., Sillars & Davis, 2018). However, there are studies involving young children that assess mindset (e.g., Cain & Dweck, 1995; Smiley & Dweck, 1994) as well as persistence (e.g., He, Xu, & Degnan, 2012; Lam et al., 2022). Mindset, or implicit theories, refers to core assumptions individuals hold about themselves (e.g., intelligence, personality,

athletic ability) and processes in the world, as well as whether these factors can change or are fixed (for review, see Dweck, 2006; Gucciardi et al., 2014). Mindset, regardless of accuracy, can influence how individuals appraise and respond to situations (Burhans & Dweck, 1995; Gucciardi et al., 2014; Kilby & Sherman, 2016; Reich & Arkin, 2006; Smiley & Dweck, 1994). Mindset can also enhance or undermine individuals' abilities to function in relation to stress (Crum et al., 2017; Crum et al., 2013; McGonigal, 2015; E. N. Smith et al., 2020). In fact, mindset about stress has been shown to impact areas of life, including academic performance, well-being, and health (for review, see McGonigal, 2015; E. N. Smith et al., 2020). For the purposes of this study, we are interested in how findings from research of mindset in young children can translate well to concepts associated with challenge and threat appraisals.

When children have a growth mindset, they typically believe they can take action to change their abilities for the better. A growth mindset parallels the concept of challenge appraisal, which is characterized by a perception of control and certainty. In contrast, children who have a fixed mindset tend to think they have a set capacity for abilities and that there is nothing they can do to change their abilities. A fixed mindset parallels the concept of threat appraisal, which is characterized by a perceived lack of control and uncertainty. However, caution should be taken when interpreting actions of non-persistence, as they may not always be indicative of threat appraisals. For example, a child may not be persisting in a task because they find it insignificant or uninteresting. In this scenario, the child's lack of persistence would not be attributed to threat appraisal. Given the parallels between stress appraisal concepts and mindsets, literature involving appraisal and mindset was included in the literature review and development of this research.

Measurement of Appraisal

Researchers have found associations between appraisals and several variables, including emotions, mindset, and aspects of temperament. The association between these variables supports their use as inferential measures of appraisal. In this section, I discuss the different variables that can be used as direct or inferential measures of appraisal. These measures fit into three broad categories: emotions (Camras et al., 2002; Camras et al., 1998; He, Xu, & Degnan, 2012; Keltner & Ekman, 2000; Lerner & Keltner, 2000; Lerner & Keltner, 2001; Lerner et al., 2003; Sillars & Davis, 2018), mindset (Cain & Dweck, 1995; Lam et al., 2022; Smiley & Dweck, 1994), and aspects of temperament (Lengua & Long, 2002; Parrish et al., 2021; Thompson et al., 2016).

Inferential Measures of Appraisal: Emotions

Researchers have investigated differences in challenge and threat appraisals using a self-report measure of emotions with adults (Lerner & Keltner, 2001; Lerner et al., 2007; Lerner et al., 2003) as well as measures of emotion-related processes in individuals across the lifespan (ages 3–26 years-old; Sillars & Davis, 2018). Facial coding of emotions is an example of a valid and reliable tool commonly used in the field of psychology (e.g., Camras et al., 1998, 2002; D. J. Keltner & Ekman, 2000; Scherer et al., 2018; Veijalainen et al., 2021). Research supports the notion that discrete emotional expressions are universal (Ekman, 1992; Ekman & Cordaro, 2011; Ekman & Friesen, 1971; Matsumoto et al., 2010; Scherer & Wallbott, 1994), facial expressions can be accurate indicators of individuals' true emotional experiences (Ekman, 1992; Lerner et al., 2007; for review, see Matsumoto et al., 2010), and individuals are able to reliably recognize basic emotions (Elfenbein & Ambady, 2002; Scherer et al., 2011).

Researchers can measure emotions based on aspects of facial expression, including emotion-specific facial muscle movements (i.e., actions units, AU) in adults (e.g., Facial Action Coding Scoring [FACS] Technique; Ekman et al., 1971) and infants (Baby FACS; Scherer 2004). Lerner and colleagues (2007) also found that during difficult lab tasks, biological measures consistent with challenge and threat appraisals were also associated with facial muscle movements consistent with anger and fear, respectively. However, this type of measurement can be costly, both in terms of price and time. As an example, Lerner and colleagues (2007) reported their coders spent approximately 22 minutes coding one minute of muscle movement.

Observational rating scales, compared to measures of muscle movement, are a more efficient way to measure facial expressions of emotion. A recent study from Scherer (2018) provides strong support for individuals' abilities to recognize emotions using observational ratings. In this study, researchers generated synthesized facial expressions using FACSGen, a computer program that creates realistic 3D facial expressions in avatar form based on FACS action unit combinations. Results confirmed that individuals could accurately recognize emotions. Others have utilized Likert-scale ratings to measure emotions, including valence (e.g., positive emotion, negative emotion; Coifman et al., 2016; Coifman et al., 2018; M. C. Shields et al., 2015), as well as basic emotions (e.g., sadness, fear; Coifman et al., 2016; Eisenberg et al., 1988; Eisenberg et al., 1992).

Self-report measures of emotions have also been used as inferential measures of appraisal. Researchers have reported significant associations between threat appraisals and self-report measures of fear as well as challenge appraisals and self-report measures of anger (Lerner & Keltner, 2001; Lerner et al., 2003). In another study, Sillars and Davis (2018) found that challenge appraisals, described as scenarios a person reported feeling like they could handle

(i.e., high control), were associated with self-reports of anger-eliciting events significantly more often than events that elicited sadness or fear. In contrast, threat appraisals, described as scenarios where a person reported feeling like they could not handle (i.e., low control), were associated with events that elicited sadness and fear (Sillars & Davis, 2018). Evidence regarding associations between observational measures of emotions and appraisal, as well as self-report measures of emotions and appraisal, support the use of negative emotions (i.e., fear, anger) as inferential measures of appraisal.

Inferential Measures of Appraisal: Mindset

Researchers have gained insight into young children's appraisals of difficulties with the concept of mindset using behavioral observation (Cain & Dweck, 1995; Smiley & Dweck, 1994) and self-report measures (Cain & Dweck, 1995; Lam et al., 2022; Smiley & Dweck, 1994). In an example that informed our research paradigm, researchers studying preschool-age children gave participants four puzzles to complete, three of which were unsolvable and one that was easy (Smiley & Dweck, 1994). After each puzzle attempt, the researchers asked the children to rate how they felt (i.e., affect) using a five-faces Likert scale during the puzzle task. Following all four puzzle attempts, the researchers asked the children several questions that probed their beliefs about personal attributes and future performance. Additionally, the researchers asked the children which activity they would like to attempt again and why.

Using the children's responses to questions about attributes and future performance, the researchers classified the children into two groups: "persisters" and "non-persisters." After attempting all four puzzles, children who chose to repeat the more challenging puzzles were classified as persisters; choosing to repeat a more difficult task implied they made a challenge appraisal relative to those tasks. In contrast, children who chose to repeat the easier puzzle, rather

than the challenging puzzle, were labeled as non-persisters. Behaviors of non-persisters could be

interpreted as choosing to avoid tasks that they appraised as too difficult to cope with (e.g.,

threat) or perhaps uninteresting or unmotivating. To verify the categorization based on responses,

the researchers also classified the children's rationale for which task they chose to reattempt by

persistence and non-persistence (Smiley & Dweck, 1994). The researchers found that children

whose rationale conveyed low confidence (comparable to low certainty and control—parallel to

threat appraisal) were most susceptible to being classified as non-persisters (Smiley & Dweck,

1994). Furthermore, the researchers interpreted their findings to suggest preschool-age children

may fall into two groups: (a) children interested in pursuing difficult tasks as an opportunity to

increase ability or enjoyment and (b) children oriented toward avoiding difficult tasks, with a

preference for tasks they feel certain and capable of completing (Smiley & Dweck, 1994). The

categorization of children based on their mindset regarding difficult tasks parallel concepts of

challenge and threat appraisal, meaning these categorizations based on mindset may be useful as

inferential measures of appraisal.

In another study that was similar in design, Cain and Dweck (1995) found that for

school-age children classified as non-persisters, responses included avoidance of difficult tasks

as well as increased expression of negative affect during failure. As a reminder, fear and anger

are both categorized as negative affect emotions. Notably, for first graders, the youngest children

in the study, non-persistence was accompanied by negative ability attributions (low control) and

low expectations for future success (low certainty). Recall that fear, an emotion consistent with

threat appraisals, is also characterized by negative affect, low control, and low certainty.

Although the descriptors "persister" and "non-persister" used in these studies of mindset are not

the specific dependent measures of interest in our study, it is reasonable to infer that the terms

"persister" and "non-persister" when describing findings about mindset parallel the terminology of "challenge appraisal" and "threat appraisal" respectively. To verify classifications, researchers like ourselves can also collect self-report ratings of affect and code responses to questions about preferences as well as confidence relative to each task. Because research suggests that mindset can be influenced by socialization and feedback (for review, see Haimovitz & Dweck, 2017), this may be an area to target in therapy. Overall, the connection between mindset, persistence, and appraisal supported the use of past investigative methods proposed in the current study of appraisal.

Inferential Measures of Appraisal: Temperament

Although we are interested in self-report and behavioral measures, we acknowledge that these methods may not be practical for speech-language pathologists (SLPs) to implement in clinical settings if they are interested in assessing children's appraisals of difficulties. Additionally, one may argue that self-report and behavioral measures based on observation provide a limited view of children's appraisal within a specific context and timeframe. One way to address these concerns was to consider aspects of temperament that may be used as inferential measures of appraisal. According to Bates and colleagues, temperament is a set of hypothetical constructs or traits used to describe individual differences in reactivity and regulation (for review, see Bates et al., 2010, p. 486). Emotional reactivity and emotion regulation play important roles in individuals' responses to situations that elicit stress (e.g., Davidson, 1998; Eisenberg et al., 1995; Eisenberg & Zhou, 2000; Mastromatteo et al., 2021). Research findings support the notion that suggest components of temperament, including emotional reactivity and regulation, are associated with appraisals of stress (e.g., Lengua & Long, 2002; Parrish et al., 2021; Thompson et al., 2016).

Various versions of *The Children's Behavior Questionnaire—Short Form* (*CBQ- SF;* Rothbart et al., 2001) have been commonly used in research of appraisal (Lengua & Long, 2002; Parrish et al., 2021; Thompson et al., 2016) and research of CWS (Eggers et al., 2009, 2010; Kraft et al., 2014; Kraft et al., 2019; Tumanova et al., 2020; Zengin-Bolatkale, Conture, Key, et al., 2018). The *CBQ-SF* has been useful as an efficient, reliable, and valid measure of aspects of temperament, which have been found to be associated with challenge and threat appraisal (Lengua & Long, 2002; Parrish et al., 2021; Thompson et al., 2016). Research supporting the association between appraisal and temperament is discussed in more detail in a specific subsection below. Based on past literature, we utilized *CBQ-SF* to compare CWS and CWNS on inferential measures of appraisal in daily life. Utilization of the *CBQ-SF* was beneficial because it allowed us to consider children's appraisals in daily life with input from their parents/caregivers who are most familiar with their child. Furthermore, *CBQ-SF* is a tool that may be available and practical for SLPs to administer in an assessment session.

Appraisal and Influential Factors

In the following sections, we discuss factors that can affect appraisal, including personal as well as environmental influences.

Personal Factors That Influence Appraisal in Children

Appraisal can be influenced by a variety of factors, including age, sex, and aspects of temperament (Lengua & Long, 2002; Parrish et al., 2021; Richmond & Stocker, 2007; Sillars & Davis, 2018; Thompson et al., 2014; Veijalainen et al., 2021). In this section, we review the literature findings regarding these variables and their connection to appraisal in children that may be important to consider in our study. Within these subsections, we also discuss if these variables are important to consider when conducting research with preschool-age CWS.

Age and Appraisal in Children

Researchers have investigated how appraisals may differ relative to age (Lengua & Long, 2002; Richmond & Stocker, 2007; Sillars & Davis, 2018). In 2018, Sillars and Davis reported interviews of individuals between the ages of 3-to-26 years old about past scenarios during which they felt very sad, very scared, and very angry. Participants were separated into age groups for comparisons to be made. The researchers found that the odds of making a challenge appraisal increased significantly between the youngest (3–5 years old) and middle childhood (6–8 years old) groups, as well as the middle and late childhood groups (9–11 years old). Given the binary coding of challenge and threat appraisals, these findings could also be interpreted as the odds of threat appraisal significantly decreasing between the youngest and middle childhood groups as well as between the middle and late childhood groups (Sillars & Davis, 2018).

In a longitudinal study, researchers investigated how school-age children's threat appraisals related to marital discord changed over time (Richmond & Stocker, 2007). The researchers found that threat appraisal significantly declined from childhood to adolescence and then leveled off in adolescence (Richmond & Stocker, 2007). In a study of school-age children, Lengua and Long (2002) found that younger children, compared to older children, exhibited significantly higher measures for threat appraisals.

Sillars and Davis (2018) speculated that developmental changes in areas of executive functioning (e.g., cognitive flexibility, effortful control) could account for the significant differences in appraisal across age groups. Similarly, Richmond and Stocker (2007) suggested that development related to cognition and coping may explain some of the decline in threat appraisals from school-age years into adolescence. Overall, the findings from these studies support the notion that age may be an important factor to consider when investigating the

appraisals of young children because, in both studies, younger children, compared to older children, tended to have more threat appraisals.

Age is often an important factor to consider in stuttering research as well due to changes in measures of prevalence that occur across age groups. More specifically, stuttering is most common in preschool-aged children, with stuttering onset typically occurring between the ages of 2 to 6 years old. Data suggest stuttering will affect approximately 5–8% of children. However, due to natural recovery, which usually occurs by age seven, stuttering persistence affects approximately 1% of the adult population (for review, see Yairi & Ambrose, 2013). Based on this information, along with the findings regarding the potential connection between appraisal and age, the variable of age should be considered in research involving appraisal and stuttering.

Sex and Appraisal in Children

Some researchers have compared boys and girls based on direct measures of appraisal (e.g., self-report measures of threat, Richmond & Stocker, 2007; Sillars & Davis, 2018). Other researchers have compared boys and girls on indirect measures of appraisal (e.g., emotional responses, fear, anger) to difficult situations (Veijalainen et al., 2021).

Overall, the findings regarding associations between appraisal and gender are mixed. In a previously mentioned study by Sillars and Davis (2018), researchers investigated potential differences in appraisals of individuals between the ages of 3 to 26 years old. Participants were separated into age groups, and comparisons were made between genders within age groups. Responses from the early childhood group (3–5 years old) showed that young girls, compared to young boys, had significantly greater odds of making challenge appraisals. More specifically, young girls, compared to young boys, were significantly more likely to describe difficult situations that they recalled as being something they felt they "could handle." Based on the

binary coding of challenge and threat appraisal, the young boys, compared to young girls, had significantly greater odds of making threat appraisals. This means young boys, compared to young girls, were significantly more likely to describe difficult situations that they recalled as being "just too much" to handle.

The findings of Sillars and Davis (2018) differ from those of Veijalainen and colleagues (2021), who reported that boys, compared to girls, expressed significantly more negative emotions consistent with challenge appraisals (i.e., anger, frustration), though the authors reported minimal expressions of the threat-appraisal-related emotion of fear in both girls and boys. Importantly, Veijalainen and colleagues were interested in comparing boys and girls (13–83 months) on the expression of emotions, but they were not investigating appraisal specifically. Their findings were important to review because they compare boys and girls based on negative emotions that are associated with challenge appraisal and threat appraisal. However, the differences in research aims, methods, and sample population may account for the differences in findings between studies. Richmond and Stocker (2007) did not find any significant differences in the challenge and threat appraisals of school-age and adolescent boys and girls. Their measures were focused on the perception of threat related to a specific topic (i.e., marital discord), and their target population was much older than those included in the study by Sillars and Davis (2018).

The variability in findings regarding the connection between appraisal and sex could be due to differences in the ages of children compared as well as the methodologies relative to the studies. It is possible that differences in appraisal related to sex are present in early childhood but diminish during the school-age years or as less evident in specific contexts. If researchers are interested in studying the appraisal of young children similar in age to those in the study by

Sillars and Davis (2018), it would be reasonable to consider the importance of sex in their

investigation.

Based on the variability of significant differences found between young girls and boys

similar in age to the participants in our own study, it is worth checking for significant

correlations between emotion-related measures of appraisal and sex when investigating the

appraisal of stress for preschool-age children. This decision is further supported by research

involving individuals who stutter, which shows there are sex-related differences within the

population. Historically, researchers have reported differences in the incidence of preschool-age

boy-to-girl ratios for stuttering, ranging from 1.3:1 to 2.3:1 (for review, see Briley et al., 2022;

Craig et al., 2002; Yairi & Ambrose, 2013). However, differences between the boy-to-girl ratios

for stuttering prevalence become more pronounced, ranging from 4:1 to 5.3:1, in the late

school-age years and into adulthood (for review, see Craig et al., 2002; Yairi & Ambrose, 2013).

These changes in boy-to-girl ratios for stuttering show that boys are more likely to persist in

stuttering, whereas girls are more likely to recover. Based on this information, along with the

findings regarding the potential connection between appraisal and sex, the variable of sex should

be considered in research involving appraisal and stuttering.

Temperament and Appraisal in Children

As mentioned previously, we used the broad description of temperament from Bates and

colleagues, which suggests temperament is a set of hypothetical constructs or traits used to

describe individual differences in reactivity and regulation (for review, see Bates et al., 2010, p.

486). Again, emotional reactivity and emotion regulation are important in individuals' responses

to situations that elicit stress (e.g., Davidson, 1998; Eisenberg & Zhou, 2000; Eisenberg et al.,

1995; Mastromatteo et al., 2021). For the purposes of this study, we are particularly interested in

research findings that suggest components of temperament, including emotional reactivity and

regulation, are associated with appraisals of stress (e.g., Lengua & Long, 2002; Parrish et al.,

2021; Thompson et al., 2016). Although research has not focused on the appraisal of difficult

tasks by preschool-age CWS, studies comparing preschool-age CWS and CWNS have reported

significant differences between groups based on parent-report measures of temperament relevant

to appraisal (Ambrose et al., 2015; Cangi & Erim, 2021; Eggers et al., 2010; Kraft et al., 2014;

Kraft et al., 2019; Ntourou et al., 2020). In the following section, we review what is known about

associations between aspects of temperament and appraisal. We also discussed findings about

aspects of temperament associated with appraisal for CWS compared to CWNS. Finally, we

discuss the questions raised from a review of the literature regarding appraisal and aspects of

temperament in CWS.

Appraisal and Temperament

Research has shown that for preadolescents, threat appraisals were associated with

greater impulsivity (Thompson et al., 2014). Additional studies have reported lower threat

appraisals were associated with greater effortful control (Parrish et al., 2021; Thompson et al.,

2014) and self-regulation (Lengua & Long, 2002). These findings suggest that specific aspects of

temperament may be used to gain insight into children's appraisals of stress.

As was previously mentioned, threat appraisal has been associated with fear (e.g., Lerner,

2001; Lerner et al., 2003; Lerner et al., 2007; Sillars & Davis, 2018), which creates a case for

also considering the temperament characteristic of behavioral inhibition. Behavioral inhibition, a

correlate of shyness, is defined as *fear* and inhibition relative to social novelty and/or situations

perceived to involve social evaluation (for review, see Poole & Schmidt, 2019; Rubin et al.,

2009). Ekman (2016) added further support for considering the possible association between

behavioral inhibition/shyness and threat appraisals. In their study, most emotion researchers agree specific personality traits, like shyness, are related to specific emotions, like fear. If (a) fear and threat appraisals are associated, and (b) fear and shyness are associated, it stands to reason that we may also consider an association between (c) threat appraisal and shyness/behavioral inhibition. Although research regarding the association between threat appraisal and behavioral inhibition was not found during a review of the literature, behavioral inhibition could be an important aspect of temperament to consider as a possible reflection of threat appraisal for use in our study.

A review of the literature suggests research about challenge appraisal and temperament is more limited than research about threat appraisal and temperament. Findings from a study of preadolescent children showed greater occurrences of challenge appraisal, compared to threat appraisal, were associated with higher effortful control (Parrish et al., 2021). As was previously mentioned, the emotion of anger has been reported to be associated with challenge appraisal (Lerner et al., 2007; Sillars & Davis, 2018), which provides additional support for considering the temperamental characteristic of anger/frustration.

Appraisal, Temperament, and Children who Stutter

CWS, compared to CWNS, have been reported to score higher on aspects of temperament associated with threat appraisal, including higher measures of impulsivity (Cangi & Erim, 2021), fear (Ambrose et al., 2015), and behavioral inhibition (Ntourou et al., 2020). For example, parent-report measures indicated school-age CWS, compared to CWNS, scored significantly higher in impulsivity (Cangi & Erim, 2021). In a study comparing children with persistent stuttering, and CWNS, parents reported children with persistent stuttering as significantly more fearful (Ambrose et al., 2015). CWS, compared to CWNS, have also been

rated significantly higher in behavioral inhibition by their parents (Ntourou et al., 2020), which is likely associated with threat appraisal. Lastly, lower parent-report measures of lower effortful control were associated with greater clinician ratings of stuttering severity ratings (e.g., Kraft et al., 2014; Kraft et al., 2019). This is noteworthy because greater effortful control has been associated with lower threat appraisal (Parrish et al., 2021; Thompson et al., 2014), suggesting there may be a connection between threat appraisals, effortful control, and stuttering severity. What we know about aspects of temperament and appraisal, as well as the evidence of group differences between CWS and CWNS based on aspects of temperament, provides support for our interest in the appraisals of CWS and CWNS.

Appraisal, Temperament, and Stuttering: Equivocal Findings

Despite what is known about appraisal and temperament, as well as the temperament of young CWS compared to CWNS, mixed findings lead to some uncertainty about what we might expect for temperament and correlates of appraisal with CWS, compared to CWNS. In addition to evidence linking CWS to temperament characteristics associated with threat appraisals, as summarized previously, CWS have also been reported to have some temperament characteristics associated with challenge appraisals. CWS, compared to CWNS, have also been reported to be higher in measures of fear *and* anger, with fear being associated with threat appraisal and anger being associated with challenge appraisal. Preschool-age CWS, compared to CWNS, have also scored significantly higher in parent-report measures of negative affect (Eggers et al., 2010; Ambrose et al., 2015); this raises questions about whether the differences in negative affect expressed by CWS, which could include fear and anger, would be consistent with challenge or threat appraisals.

Appraisal, Temperament, and Impact of Stuttering

Researchers have also reported associations between survey-based measures of temperament and the impact of stuttering (Eggers et al., 2021; Tichenor et al., 2022). The measures used have been associated with challenge and threat appraisal. For this reason, relevant findings from these studies are discussed below.

Eggers et al. (2021) investigated whether aspects of temperament were associated with adverse impact of stuttering for older CWS (9–14 years old). Aspects of temperament were measured via parent-report and self-report on the *Early Adolescent Temperament Questionnaire—Revised* (*EATQ-R*; Ellis & Rothbart, 2001), which includes four subscales: Surgency, Negative Affect, Effortful Control, and Affiliativeness. A higher Surgency score means a person is more extroverted and less fearful/shy. A higher score for Negative Affect suggests a person is more irritable or frustrated. A higher effortful control score means a person is better able to self-regulate. Lastly, a higher score for Affiliativeness suggests a person experiences pleasure relative to closeness with others and low-intensity activities. The functional impact of stuttering was indexed via the *Overall Assessment of the Speaker's Experience of Stuttering-School-Age* (*OASES-S*, Yaruss et al., 2016a, participants 9–12 years old) and the *Overall Assessment of the Speaker's Experience of Stuttering-Teenage* (*OASES-T*, Yaruss et al., 2016b, participants 13–15 years old). Higher scores on the *OASES-S* and *OASES-T* indicate a more negative impact of stuttering. The *OASES-S and OASES-T* include an overall score as well as scores for subtopics, including (a) General Information: the child's view of the amount of stuttering, how much they know about stuttering, and perspectives of being CWS; (b) Reactions to Stuttering: emotional, physiological, and cognitive components of stuttering; (c) Communication in Daily Situations: amount of difficulty talking and participating in speaking

situations; and (d) Quality of Life: how negatively stuttering affects and interferes with the child's life.

Eggers et al. (2021) found that school-age CWS who scored higher on self-report measures of extroversion and lower on fear/shyness (i.e., higher in surgency: positive reactivity) experienced a significantly lower negative impact of stuttering for several *OASES* subscales, including Reactions to Stuttering, Communication in Daily Situations, and Quality of Life, as well as Overall Impact. Likewise, mothers' reports of higher surgency scores for their CWS were significantly associated with lower scores for negative impact of stuttering based on Quality of Life and Overall Impact measures. On the other hand, higher self-reports of irritability and anger/frustration (i.e., higher negative affect: negative reactivity) from CWS were significantly associated with a higher negative impact of stuttering, as evidenced by higher scores on several *OASES* subscales, including General Information, Reactions to Stuttering, and Quality of Life, as well as Overall Impact (Eggers et al., 2021).

In another study, researchers assessed whether parent-report measures of emotion regulation in preschool-age children were associated with adverse impact of stuttering (Tichenor et al., 2022). To measure emotion regulation of CWS, the researchers had parents respond to the *Emotion Regulation Checklist* (*ERC*, A. Shields & Cicchetti, 1997); higher scores on the ERC represented better emotion regulation. The researchers also asked parents to respond to a draft version of the *Early Childhood OASES Response Form for Parents* (*OASES-E-P*; ages 3–6 years) in order to evaluate how parents thought stuttering affected the lives of their CWS. The researchers found that higher scores on the *ERC*, indicative of better emotion regulation, were significantly associated with less adverse impact of stuttering, as evidenced by lower scores on the *OASES-E-P*, whereas lower scores on the *ERC* were associated with more adverse impact of

stuttering, as shown by higher scores on the *OASES-E-P* (Tichenor et al., 2022). Overall, these findings suggest emotion regulation may be associated with the impact of stuttering and may be a topic for further exploration.

As was briefly mentioned, and is discussed in further detail later, aspects of temperament that appear to be relevant to stuttering have also been associated with certain stress appraisals of children in the general population (Lengua & Long, 2002; Parrish et al., 2021; Thompson et al., 2016). It is interesting that aspects of temperament associated with appraisals are also associated with the adverse impact of stuttering—and that these differences can be observed in young CWS. Based on the associations between appraisal and aspects of temperament, as well as the meaningful associations between aspects of temperament and impact of stuttering on daily life, it seems reasonable to explore the interconnectedness of these variables and their potential relevance to stuttering. Research of this nature may help better inform understanding of stuttering and provide support for therapy approaches targeting emotion regulation in an effort to reduce the negative impact of stuttering from an early age and into adulthood.

Appraisal, Temperament, and Stuttering: Summary

The various findings regarding temperamental factors and emotions of CWS compared to CWNS support the notion that these groups may differ in terms of dimensions of temperament (e.g., behavioral inhibition) and emotions (e.g., fear) relevant to appraisal. These findings also support further investigation into the potential implications of appraisal—that is, the mediating process for emotion-related responses to stimuli – in relation to stuttering for young children. Lastly, studies of appraisal (Lengua & Long, 2002; Parrish et al., 2021; Thompson et al., 2014) and stuttering (Ambrose et al., 2015; Cangi & Erim, 2021; Ntourou et al., 2020) have utilized

parent-report measures of temperament, meaning parent-report measures may be potential tools to consider using to assess appraisal via temperament in our own study.

Personal Factors and Appraisal: Summary

As discussed in this section, personal factors may be associated with children's appraisals of stressful events and situations. The associations of particular temperament characteristics with appraisals support their use as indirect measures of appraisal in young children.

Environmental Variables and Appraisal in Children

Similar to the effects of personal variables, appraisal can also be influenced by a variety of environmental factors, including social referencing and parent modeling (de Rosnay et al., 2006; Dubi et al., 2008; Gerull & Rapee, 2002), coaching (Eisenberg et al., 1992; Qu & Lim, 2016), and contextual pathways (Aktar, 2018; Neil et al., 2022; Siffert & Schwarz, 2011), as well as situational contexts (Dennis et al., 2009). Many studies have shown a connection between environmental influences and appraisal as well as resultant emotional responses. Environmental variables do appear to influence children's appraisal of stressors, including perceived significance and manageability (for review, see Kliewer & Fearnow, 1996; Power, 2004). Although we were not interested in the impact of environmental variables for our study specifically, it is important to briefly acknowledge that these factors can influence children's appraisal of stress. Furthermore, this information was used to diminish the potential effects of these variables in our study design and methodology (e.g., parent instructions) as well as the interpretation of our results. For this reason, the following sections include a review of the literature regarding these variables and their connection to appraisal in children that may be important to consider in our study.

Social Referencing and Parent Modeling

Social referencing refers to the process in which one uses their perception of how others (e.g., parents, caregivers, peers, friends) interpret situations to inform their own understanding and actions (for review, see Feinman, 2019). Social referencing, a process that emerges in infancy, plays an important role in how children appraise stimuli and events in daily life (for review, see Feinman, 2019). Children use social referencing to weigh the potential risks versus benefits of actions prior to execution, which can be observed in children's "looking behaviors" starting between six to twelve months of age. According to Power (2004), modeling is when an individual influences appraisal through example (p. 282).

Findings from several studies in the early 2000s support the association between social referencing, parent modeling, and young children's development of appraisal (de Rosnay et al., 2006; Dubi et al., 2008; Gerull & Rapee, 2002). In these studies, infants (12–14 months, de Rosnay et al., 2006) and toddlers (15–20 months, Dubi et al., 2008; Gerull & Rapee, 2002) exhibited significantly more fear, an emotion associated with threat appraisal (Lerner & Keltner, 2001; Lerner et al., 2007; Lerner et al., 2003), when their mothers reacted negatively to stimuli compared to when their mothers reacted positively. Fear also persisted during checkpoints, both one minute and ten minutes after the mothers' initial reactions (Dubi et al., 2008; Gerull & Rapee, 2002). These results are noteworthy because they provide support for the impact of social referencing and parental modeling on appraisal, as well as the resultant emotional reactions of children at a young age.

Coaching

Parents can use coaching to influence children's emotional responses, which stem from appraisal. With coaching, parents provide specific instructions about how one should perceive

and manage a stressor (Power, 2004, p. 282). In one study, researchers investigated whether mothers could influence their school-age children's emotional responses. While viewing a video together, the mothers would link what they were viewing together on the video to their children's past experiences (e.g., "Remember when you hurt your leg?"). The researchers found that mothers' attempts to link experiences were correlated with children's emotional responses, including sadness and sympathy (the intended emotion) as well as distress (an unintentional result; Eisenberg et al., 1992). These findings provide additional evidence regarding how parents can influence children's appraisals with coaching.

Parents are not the only ones able to influence young children's appraisal of situations via coaching. In one study, Qu and Lim (2016) investigated whether a researcher's coaching of a staged scenario (i.e., accidentally "breaking" a toy) could influence the kindergarten-age children's appraisal and feelings about the event, as well as appraisal and feelings on a subsequent, unrelated game (Qu & Lim, 2016). Results indicated that the adult experimenters were able to influence the children's appraisals of their current as well as future tasks. More specifically, if an experimenter reacted in a negative way, the children were significantly more likely to report negative appraisals of the experience. In contrast, if the experimenter responded in a positive way, the children were significantly more likely to appraise the experiences as positive. Overall, Qu and Lim (2016) interpreted these findings to suggest that through coaching, adults can influence children's appraisals. Although this study is focused on positive and negative appraisals, rather than challenge and threat appraisals, it is worth noting how coaching can inform children's perception of events.

Contextual Pathways

Parents can influence their children's appraisals through contextual pathways, which refer to the ways that parents create a family context wherein coping behaviors are learned and adopted (for review, see Power, 2004, p. 282). When reviewing the literature for this study, several potential contextual pathways emerged, including parental social anxiety disorder (Aktar, 2018), conflict resolution styles (Siffert & Schwarz, 2011), maltreatment (Neil et al., 2022), and situational contexts. For example, Aktar (2018) reported that children (aged 2.5-years-old to 4.5-years-old) with parents who had more severe lifelong forms of social anxiety disorder had a more significant increase in fear, an emotion associated with threat appraisal (Lerner & Keltner, 2001; Lerner et al., 2007; Lerner et al., 2003; Sillars & Davis, 2018). Additionally, Siffert and Schwarz (2011) found that higher parent reports of negative parental conflict resolution styles, whereas lower reports of negative parental conflict resolution styles, were significantly correlated with school-age children's increased self-report of threat appraisals. Neil and colleagues (2022) reported that school-age and adolescent children who had experienced maltreatment, compared to peers who had not, were significantly more likely to appraise unfamiliar faces as untrustworthy. This propensity toward an appraisal of untrustworthiness, which could be associated with a sense of a lack of control and uncertainty, may imply that experiences of maltreatment contribute to threat appraisal tendencies. These findings show the potential implications of environmental influences and contextual pathways on the development of appraisal.

Finally, situational contexts can also influence emotional responses reflective of appraisal with preschool-age children (Dennis et al., 2009). In this study, children engaged in two different tasks: the Waiting Task and the Transparent Box Task. During the Waiting Task, the children

received a broken toy to play with and had to wait until their mothers finished their paperwork (8 minutes) before they could open a wrapped prize. In the Transparent Box Task, the children were left alone in a room for three minutes with a locked box that contained a desired toy and, unbeknownst to them, a ring of incorrect keys. Although both scenarios delayed the children's gratification and forced them to wait, the children's emotional reactions differed relative to the situational contexts. Although the children who had to wait for their mothers to finish their paperwork had to wait longer, they also expressed happiness the most. On the other hand, the children who were left alone and ultimately had to wait for the correct key expressed anger the most (Dennis et al., 2009). It is possible that the Waiting Task elicited more happiness because there was not a seemingly insurmountable obstacle preventing them from obtaining the prize that they knew they would receive eventually. In contrast, the Transparent Box Task posed an unexpected difficulty that was unsolvable. This study's findings emphasize the impact situational contexts can have on appraisal and resultant emotional responses of young children.

Environmental Variables and Stuttering

Given the multifactorial nature of stuttering, it is not surprising that environmental variables have been shown to impact stuttering, both from a fluency standpoint and a psychosocial lens. In fact, parent education and training about ways to adjust environmental variables is often one of the first approaches practitioners recommend when working with young CWS (for review, see Yairi & Seery, 2023, p. 359). The Palin Parent-Child Interaction (Palin-PCI) Therapy Approach and the RESTART- Demands and Capacities Model (RESTART-DCM) are examples of programs that focus heavily on the adjustment of environmental variables. Environmental changes can include adjustments like creating daily routines, following the child's lead, slowing one's rate of speech (e.g., adding pauses/chunking

phrases), and decreasing communication demands (e.g., eliminating time pressure, eliminating interruption, facilitating turn-taking; for review, see Yairi & Seery, 2023, pp. 369–374). If a child demonstrates awareness of stuttering, parents may also work on acknowledging, rather than ignoring or responding negatively, to a child's disfluencies (e.g., "That got a little stuck. I'm so glad you kept trying and shared that with me;" for review, see Yairi & Seery, 2023, p. 373). Therapy approaches for older CWS, TWS, and AWS can also include a focus on adjustments to environmental variables. Individuals may develop Situational Fear Hierarchies (for review, see Yairi & Seery, 2023, p. 199), with consideration to environmental variables, to address difficult speaking situations. Individuals may also develop disclosure statements, as they can foster self-empowerment (e.g., McGill et al., 2018). Research has shown that making good disclosure decisions (e.g., with whom, how, when, and why to disclose) can reduce communicative barriers in the environment and improve the quality of life for PWS (Boyle & Gabel, 2020). Overall, the theories and research about stuttering suggest environmental variables should be considered in research with individuals who stutter.

Environmental Variables and Appraisal: Summary

In this section, we've briefly discussed different environmental factors that can impact appraisal tendencies of young children. Although these variables are not key interests in our study, they are important to acknowledge given their potential influence on appraisals of stress. Additionally, these factors may be important to consider in our discussion of the results.

Potential Psychosocial Implications of Challenge and Threat Appraisal

Research findings support the potential importance of appraisal for CWS relative to emotion-related processes (e.g., Schwenk et al., 2007; Snyder & Arnold, 2022). However, the psychosocial implications of appraisal relative to stuttering are an additional motivator for this

study that has not been discussed until now. Psychosocial implications refer to potential psychological and/or social consequences associated with certain variables (de Oliveira et al., 2013; O'Daniel, 2013). For the purposes of this study, we are referring to the potential psychological and/or social effects individuals may experience in relation to challenge and threat appraisals. As mentioned at the start of this chapter and depicted in Figure 1, appraisal informs immediate effects, like emotions, thoughts, behaviors, and psychological changes, as well as long-term effects, like somatic health, social functioning, and well-being (Bonanno & Mayne, 2001; Coifman, forthcoming). Topics covered in this section will include the potential psychosocial benefits of challenge appraisals, research findings about the associations between threat appraisal and anxiety as well as adjustment problems for people in general, and what we know about anxiety as well as adjustment problems relative to people who stutter (PWS).

Benefits of Challenge Appraisal

There are noteworthy psychosocial implications of certain appraisal tendencies and long-term outcomes for the public. For example, researchers found that school-age children may use challenge appraisal as a compensatory strategy when they perceive themselves as having lower levels of social support in daily life events. Additionally, challenge appraisal during major life events may be used to protect against maladjustment in the future (Y. Jackson & Warren, 2000) and to reduce anxiety relative to situations (Hale & Whitehouse, 1998). These findings highlight the importance of challenge appraisal in the adjustment and function of young children in daily life. Furthermore, these results provide support for the potential benefits of therapeutic approaches aimed at fostering challenge appraisal in young CWS.

Threat Appraisal, Anxiety, and Adjustment Problems

Research suggests there are parallels between the psychosocial implications of certain appraisal types relative to stress and long-term outcomes in the general public that reflect trends we also see with research findings from studies of individuals who stutter. For example, higher reports of threat appraisal have been associated with higher measures of anxiety and somatic problems (Siffert & Schwarz, 2011). Studies involving school-age children have also reported significant associations between higher measures of threat appraisal and increased depressive symptoms/depression (Lengua et al., 1999; Sheets et al., 1996; Siffert & Schwarz, 2011). For school-age children, greater perceived threat has been a significant mediator of negative emotionality (i.e., fearfulness and irritability subscales) and avoidant coping (Lengua & Long, 2002; Lengua et al., 1999). In contrast, greater reports of challenge appraisal have been correlated with higher measures of active coping, including cognitive decision making, control, direct problem-solving, optimism, and seeking understanding (Lengua & Long, 2002).

Although research on appraisal in PWS is limited, researchers have compared PWS and PWNS based on some of the aforementioned psychosocial implications related to appraisal (Bernard et al., 2022; Blood & Blood, 2007; Blood et al., 2007; Briley et al., 2021; Davis et al., 2007; Eggers et al., 2022; Iverach et al., 2016; McAllister et al., 2015; Mulcahy et al., 2008; Ortega & Ambrose, 2011; K. A. Smith et al., 2017; van der Merwe et al., 2011). These findings are discussed below.

Anxiety and Stuttering

Some researchers have reported a lack of significant differences in cortisol, a physiological biomarker commonly used to measure anxiety, when comparing small groups of preschool-age CWS and CWNS (van der Merwe et al., 2011) as well as school-age CWS and

CWNS (Ortega & Ambrose, 2011). However, others have reported school-age and adolescent CWS, compared to same-aged nonstuttering peers, were significantly higher in measures of anxiety (Blood & Blood, 2007; Blood et al., 2007; Davis et al., 2007; Iverach et al., 2016; Mulcahy et al., 2008; K. A. Smith et al., 2017). School-age CWS, compared to population data, are also reported to be at increased risk for meeting clinically significant thresholds for separation anxiety disorder (McAllister et al., 2015), as well as social anxiety disorder and generalized anxiety disorder specifically (Iverach et al., 2016; McAllister et al., 2015). Adolescents who stutter, compared to typically fluent peers, have also been reported to have significantly higher levels of trait anxiety (i.e., a relatively stable tendency for anxiety response), state anxiety (i.e., a temporary emotional state that can fluctuate), and social anxiety (Mulcahy et al., 2008; Eggers et al., 2022).

Depression and Stuttering

Findings regarding the occurrence of depression in PWS, compared to PWNS, are mixed. Some have reported adolescents/teens who stutter (TWS) and adults who stutter (AWS), compared to nonstuttering peers, have significantly elevated symptoms of depression (Briley et al., 2021). A recent meta-analysis reported higher mean depression scores for PWS, compared to PWNS, in 80% of the studies (Bernard et al., 2022). Bernard and colleagues (2022) highlighted the need for additional studies regarding stuttering and depression, with emphasis on the risk for comorbidity of anxiety and depression within the public.

Negative Emotionality and Stuttering

There are many studies comparing the emotional reactivity of CWS and CWNS (e.g., Ntourou et al., 2013; Salvo & Arnold, 2022). However, studies investigating negative emotionality relative to stuttering impact are limited to adults. Tichenor and Yaruss (2020) found

that for AWS, higher levels of self-reported negative emotionality were associated with significantly higher levels of repetitive negative thinking and higher levels of adverse stuttering impact. In contrast, self-reports of lower levels of negative affectivity were related to significantly lower levels of repetitive negative thinking and lower levels of adverse stuttering impact. Given the relationship between the negative emotionality and threat appraisal, as well as the association between negative emotionality and adverse impact of stuttering, these findings highlight the importance of considering the appraisal of difficult situations in daily life relative to PWS.

Avoidant Coping and Stuttering

Appraisal is a mediating process for emotion-related processes, including coping. When it comes to research involving stuttering and coping behaviors, most findings are based on studies involving AWS (E. S. Jackson et al., 2015, 2019; Plexico et al., 2019; Plexico et al., 2009a, 2009b; Tichenor & Yaruss, 2020). Common themes reported in studies of AWS included fear, shame, helplessness, and avoidance (Corcoran & Stewart, 1998; Plexico et al., 2009a, 2009b). However, a recent study provides some insight into the coping behaviors of school-age CWS, TWS, and AWS (ages 9–63 years old, E. S. Jackson et al., 2019). In a two-part study, researchers conducted in-depth interviews with AWS to learn about their tendencies for coping related to stuttering (Plexico et al., 2009a, 2009b). AWS reported feelings of threat and anxiety which negatively impacted their feelings of control over stuttering and resulted in a desire to escape or avoid negative communication experiences for themselves and their communication partners (Plexico et al., 2009a). In fact, eight of the nine AWS reported using methods of escape (i.e., avoidant coping) for immediate relief and control. However, the AWS also reported that avoidance could have negative long-term consequences, including the risk of isolation,

frustration, and emotional suffering (Plexico et al., 2009b). Using avoidant coping also contributed to a limited perception of options in future scenarios that involve coping with their perceptions of stuttering as a threat (Plexico et al., 2009b). In their discussion, Plexico and colleagues (2009a) stated, "numerous negative responses to the experience of stuttering found in this study, as well as others (e.g., Corcoran & Stewart, 1998; Plexico et al., 2005), indicate that stuttering is appraised as a highly stressful and threatening experience" (Plexico et al., 2009a, p. 100).

In a study by E. S. Jackson and colleagues (2019), researchers investigated the responses of CWS, TWS, and AWS to questions on the *Stuttering Anticipation Scale* (*SAS*; Jackson et al., 2018). The researchers reported three main themes in response to anticipation of stuttering, including physical change, approach, and avoidance. Of the 25 commonly reported action responses in anticipation of stuttering, physical change (4 of 25) and approach (4 of 25) accounted for nearly a third of the reported actions, while avoidance comprised more than half of the reported actions (17 of 25). Jackson and colleagues (2019) discussed the risks associated with avoidant coping in anticipation of stuttering, which parallel the findings of Plexico and colleagues (2009a) as well as the insights of Elliot (2006). E. S. Jackson et al. (2019) stated that acts of avoidance can be safety behaviors that "relieve the speaker of stress in that situation but may also increase stress the next time that the speaker is in a similar speaking situation." (p. 7). Whether it's changing a word, using an interjection, or refraining from a situation that involves verbal communication altogether, the negative impact of avoidance immediately and over time is important for personal well-being (Elliot, 2006).

Insights from PWS about the common utilization of avoidant coping (E. S. Jackson et al., 2015, 2019) and the potential long-term implications that avoidance can have relative to

stuttering are compelling. However, we do not know whether these avoidant coping behaviors reported by school-age CWS, TWS, and AWS were present at stuttering onset, were shaped by experiences, or resulted from a combination of these factors. For this reason, the coping tendencies of older PWS cannot be generalized to preschool-age CWS.

Psychosocial Implications of Appraisal and Stuttering

Although it is not a central research question of this study, our review of the literature supports the notion that researchers would benefit from studying the appraisal tendencies of individuals who stutter closer to the age of onset (i.e., preschool-age CWS). As the research stands, it is unknown whether preschool-age CWS, who have not yet had as many aversive life experiences related to stuttering, would present with the same appraisal tendencies and potential resultant psychosocial difficulties. The research involving AWS and AWNS does not address this question. We are specifically interested in knowing whether CWS and CWNS differ in appraisal of stress in general, not just relative to stuttering. Research of this nature may provide insight as to whether appraisal tendencies differ between CWS and CNWS before these responses are influenced by life experiences and could highlight whether it would be beneficial to address appraisal in therapy at a young age.

<div align="center">

Summary

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In Chapter 2, we reviewed what is known about stuttering with regard to emotion-related processes, with a particular emphasis on measures of emotional reactivity and regulation. Overall, the evidence is in support of the Multifactorial Dynamic Pathways Theory of Stuttering and the idea that emotion-related processes are relevant to the nature of stuttering. However, we also discussed the potential confusion that may stem from results based on measures of emotional reactivity and regulation, given the interconnected nature of these processes. We

explained how our understanding of the association between emotion-related processes and stuttering could be improved by considering the construct of appraisal. As was mentioned, appraisal is influenced by personal factors as well as environmental factors, which were described and considered in the development of this study.

Purpose

The primary objective of this study was to compare preschool-age CWS and CWNS on measures of challenge appraisal and threat appraisal. As previously discussed, past research findings based on between-group comparisons of CWS and CWNS have reported variable findings regarding emotional reactivity and regulation, which raise questions about the potential relationship between emotional processing and stuttering. Past studies have also incorporated a variety of tasks (i.e., speech, nonspeech), different types of stressors (e.g., time pressure, inhibitory control challenges, distracting stimuli), as well as different emotion-inducing contexts (e.g., positive, negative, frustration, disappointment, excitement/joy). Past studies' variability in stimuli, measures, and contexts may account for the differences between study findings. For these reasons, the current study includes tasks that vary systematically in contexts as well as stress-level, including a stressful speech task, a nonstressful speech task, a stressful nonspeech task, and a nonstressful nonspeech task.

Research Questions and Hypotheses

Research Question 1 is: Were the "Stressful" Tasks significantly more stressful than the "NonStressful" Tasks? As a manipulation check of our research paradigm, which was adapted for virtual implementation, we hypothesized that our tasks that were meant to induce stress, compared to our tasks that were meant to serve as controls, would result in (a) shorter length of

time before task disengagement, (b) higher observational Likert-scale ratings of frustration, and (c3) lower self-report ratings of affect (scale of 1–5, negative to positive) post-tasks.

Research Question 2 is: Did CWS, compared to CWNS, exhibit significantly higher measures of threat appraisal during the experimental tasks? Additionally, did CWS, compared to CWNS, present with significantly lower measures of challenge appraisal during the experimental tasks? We hypothesized that CWS, compared to CWNS, would present with significantly higher observational Likert scale ratings reflective of threat appraisal and significantly lower measures observational Likert scale ratings of challenge appraisal. More specifically, we hypothesized CWS, compared to CWNS, would exhibit significantly higher measures of observational Likert scale ratings of fear, the emotional responses correlated with threat appraisal, during speech tasks that varied in degrees of stress. We also hypothesized CWS, compared to CWNS, would exhibit significantly higher observational Likert scale ratings of fear during nonspeech tasks that varied in degrees of stress. Regarding challenge appraisal, we hypothesized that CWS, compared to CWNS, would exhibit significantly lower observational Likert scale ratings of anger, an emotion correlated with challenge appraisal, during speech tasks and nonspeech tasks that varied in degrees of stress.

Research Question 3 is: Did *CBQ-SF* subscale measures correlate with the observational Likert scale ratings of anger and fear (i.e., measures of challenge appraisal and threat appraisal)? We hypothesized that aspects of temperament, measured via parents'/caregivers' responses to the *CBQ-SF* questionnaire, would be significantly associated with the measures of appraisal described in Hypothesis 2. More specifically, the *CBQ-SF* subscale of Fear would be correlated with the measures of threat appraisal based on observational Likert scale ratings of fear.

Additionally, the *CBQ-SF* subscale of Anger/Frustration would be correlated with the measures of challenge appraisal based on observational Likert scale ratings of anger.

Research Question 4 is: Did CWS, compared to CWNS, have significantly higher parent-report measures of temperament associated with threat appraisal? We hypothesized that CWS, compared to CWNS, would exhibit significantly higher *CBQ-SF* subscale measures associated with threat appraisal, including Fear, Impulsivity, and Behavioral Inhibition (i.e., Shyness). We also hypothesized that CWS, compared to CWNS, would exhibit significantly lower measures of *CBQ-SF* subscale measures consistent with threat appraisal, including self-regulation (i.e., Inhibitory Control).

Clinical Implications

Our hypothesized findings have the potential to improve our body of knowledge about the nature of stuttering. Furthermore, our results have the potential to identify important factors to consider in assessment and therapy, influencing the assessment and treatment procedures of future practitioners working with young CWS.

CHAPTER III

METHODS

Participants

Participants included 16 CWS between the ages of 3;0 and 5;11 (years;months,

equivalent to 37 to 68 months) and 16 CWNS between the ages of 3;0 and 5;11 (equivalent to 36

to 67 months). Chi-square analyses and *t*-tests indicated that there were no significant differences

between CWS and CWNS based on age [$t(30) = .00$; $p = 1.00$] or gender [$\chi^2(1) = 0$, $p = 1.0$].

Participants spoke English as their primary language and had no history of receiving

speech-language therapy intervention[1]. Socioeconomic status (SES), indexed by the mother's

highest level of education using a 7-point scale developed by Hollingshead (1975), was not

significantly different [$t(26.427) = .90$; $p = .38$]. Demographic information for each talker group

is shown in Table 3.

The children were required to have no history of neurological impairment per parent

report and examiner observation. Children were expected to present with typical hearing

abilities, as evidenced by caregiver reports on the *Children's Home Inventory for Listening*

Difficulties (*C.H.I.L.D.*, K. L. Anderson & Smaldino, 2011). The results of the caregiver report

were supported by the children scoring within or above the typical range for standardized

assessment of auditory comprehension.

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[1] The parent of one CWS reported a history of therapy but clarified that this was a single, parent-centered session focused on environmental changes aligned with the Lidcombe program that occurred months before their child's participation in the current study. Based on the parent interview, this was interpreted as a consultative appointment rather than a therapeutic intervention session and the child was still included in the research study.

Table 3

Descriptive Statistics of Demographic Data for Children Who Do Not Stutter (CWNS) and Children Who Stutter (CWS)

Variable	CWNS		CWS		
Demographics	M	SD	M	SD	
Chronological age (in months)	50.94	9.08	50.94	9.93	
Maternal years of post-secondary education[a]	6.75	.58	6.53	.74	
Sex	# CWNS		# CWS		Percentage
Boys	9		9		56.25%
Girls	7		7		43.75%
Ethnicity[a]					
Black/African American	0		1		3.23%
Black/African American & Hispanic/Latino	0		1		3.23%
Asian/Pacific Islander	1		0		3.23%
White/Caucasian	12		10		70.95%
White/Caucasian & Black/African American	1		0		3.23%
White/Caucasian & Asian/Pacific Islander	1		0		3.23%
White/Caucasian & Hispanic/Latino	0		2		6.45%
Other	1		1		6.45%

[a] One parent of a CWS girl did not complete the survey for demographic information. All demographic measures, except chronological age (in months) and sex, were based on CWNS = 16 and CWS = 15.

All CWNS scored within the 16th percentile or higher on all standardized speech and language assessments, which indicates typical speech-language development with the exception of speech fluency. Given the higher co-occurrence of concomitant speech-language disorders with CWS (Arndt & Healey, 2001; Blood et al., 2003; for review, see Bloodstein et al., 2021; A. Smith et al., 2012), two CWS with speech sound production skills below the normal range were still included in the study. A multivariate analysis of variance (MANOVA) showed that CWS and CWNS were not significantly different on non-fluency-related standard scores for speech-language assessments (*GFTA-3:* $t(30) = 1.82$, $p = .19$; *TACL-3:* $t(30) = 1.27$, $p = .27$;

EVT-3: t(30) = 1.38, *p* = .25). However, CWS and CWNS were significantly different on

measures of speech-fluency standardized assessment outcomes [CWS *M* = 20.37, SD = 6.10,

CWNS *M* = 5.88, SD = 2.66; *t*(30) = 76.51, *p* < .001], which was to be expected. Details about

the speech-language skills of each participant are included in Table 4.

Table 4

Speech-Language Assessment Scores

Variable	Group	Mean	Standard Deviation	*p*	Cohen's *d*
TACL-4 Standard Score	CWNS	105.38	10.32	.14	.39
	CWS	101.63	9.10		
GFTA-3 Standard Score	CWNS	102.88	8.99	.07	.54
	CWS	96.19	14.89		
EVT-3 Standard Score	CWNS	114.13	6.91	.18	.33
	CWS	110.63	13.20		
C.H.I.L.D. Hearing Score	CWNS	7.05	.73	.26	-.25
	CWS	7.22	.69		
SSI-4 Standard Score	CWNS	5.88	2.66	< .001	-3.08
	CWS	20.38	6.10		
*Stuttering Frequency (%)	CWNS	0.78	0.81%	< .001	-1.87
	CWS	7.57	5.08%		

Note. CWNS is children who do not stutter, and CWS is children who stutter. *TACL-4 = Test for Auditory Comprehension of Language–Fourth Edition*; *EVT-3 = Expressive Vocabulary Test–Third Edition*; *PPVT-4 = Peabody Picture Vocabulary Test–Fourth Edition*; *GFTA-3 = Goldman-Fristoe Test of Articulation–Third Edition*; C.H.I.L.D. Hearing Score = Children's Home Inventory for Listening Difficulties; *SSI-4 = Stuttering Severity Instrument–Fourth Edition*. * Indicates significant at the *p* < .001 level.

Recruitment

The parents/guardians of potential participants learned about the study through phone

calls, emails, social media posts, flyers, and referrals from other parents, speech-language

pathologists, or preschool and daycare centers (see Appendix A for recruitment materials). The

parents/guardians indicated their interest in the study, provided informed consent, and responded

to questions about their children's eligibility (see Appendix B). If their child was deemed eligible

for the study after completion of the standardized assessments, the parents/guardians responded

to a second Qualtrics survey, which included additional questions seeking more specific details

about the child (e.g., demographics, speech-language development, temperament; see Appendix

C).

Sample Size

We conducted an a priori power analysis with G*Power 3.1 (Buchner et al., 2019). To

determine the sample size needed to investigate group differences in facial coding of emotions,

we used the analyses of covariance (ANCOVAs) fixed effects, main effects, and interactions

statistical test. The analysis included the independent variable of talker group ($n = 2$, CWS and

CWNS), dependent variables of threat and challenge (for both control and experimental tasks

within each condition, $n = 4$), as well as two covariates, age and gender (e.g., Sillars & Davis,

2018). Based on the results, 24 total participants—12 per group—were needed to detect

statistically significant results ($p < .05$) at a power of 95% with a large effect size ($f = 1.00$). To

address the possibility of attrition (e.g., children not meeting study criteria or failing to follow

through with the study), we increased our targeted numbers by 25%. Therefore, the target

population for the proposed study included 15 preschool-age children in each talker group

(CWNS, CWS). To reduce possible effects related to age and gender, the CWS and CWNS were

matched for age (± three months) and sex.

Talker-Group Classification

In line with past methodologies of studies involving preschool-age CWS and CWNS

(e.g., Tumanova & Backes, 2019), children were classified as CWS if (a) their parent/guardian

reported concern about their child's speech fluency in their Qualtrics survey responses; (b) the

child exhibited three or more stuttered disfluencies (i.e., sound/syllable repetitions, sound

prolongations, or monosyllabic whole-word repetitions) per 100 words of conversational speech

with a minimum 300-word sample (Conture, 2001; Yaruss, 1998); and (c) received a total overall

score of 11 or greater (i.e., severity of at least "mild") on the *Stuttering Severity Instrument-Fourth Edition* (*SSI-4;* Riley, 2009). Children were classified as CWNS if (a) their parent/guardian reported no concern about their child's speech fluency in their Qualtrics survey responses and (b) the child exhibited fewer than three stuttered disfluencies (i.e., sound/syllable repetitions, audible or inaudible sound prolongations, or monosyllabic whole-word repetitions) per 100 words of conversational speech sample with a minimum 300-word sample (Conture, 2001; Yaruss, 1998), and (c) received a total overall score of 10 or below (i.e., severity of less than "mild") on the *SSI-4* (Riley, 2009). If there was disagreement between reports of parent concern, disfluency count measures, and/or *SSI-4* (Riley, 2009) scores relative to whether the child exhibited clinically significant stuttering, the child was disqualified from participating in the study (*n* = 2).

Procedures

Given constraints to in-person data collection due to the COVID-19 pandemic, all data were collected remotely through (a) Qualtrics (Qualtrics, 2020), a secure, online software system for survey distribution; and (b) Zoom, Version 5.05 (Zoom Video Communications, 2020), a secure, online communication platform that allows people to connect with audio, video, and chat. Per the recommendations of other researchers (Archibald et al., 2019), we aimed to reduce any potential technical difficulties by providing detailed instructions for participation to the parents via email prior to the visits (see Appendices D and E). These instructions asked parents to remain in the same room as their child during the sessions to oversee their children's participation and to provide technical assistance as needed. The parent instructions also highlighted key requirements for the session, such as limiting distractions, ensuring their child was seated so that their face was visible on the screen during the activities, and that there was adequate lighting in the room.

However, to limit possible environmental influences on appraisal, parents were instructed to refrain from providing any sort of feedback (e.g., smiling, nodding, commenting). Refer to Appendices E and F for additional details regarding parent instructions.

Children participated in three to four sessions, each estimated to take approximately one hour to complete. During the first session, the children completed the standardized speech-language testing. If the child had a difficult time completing all the assessment procedures in one sitting, and a substantial portion of the assessment remained, an additional assessment session was scheduled. However, if very few pieces of the assessment needed to be completed, the remaining portion of the assessment was completed at the end of an experimental task session.

The children completed the experimental tasks during the remaining two sessions. The experiments, described in greater detail in the Experimental Tasks section, included speech and nonspeech tasks, each with a stressful condition and a low-stress, control condition. The speech-based experimental tasks included a rapid-picture naming task (i.e., stressful condition) and a control, self-paced naming task (i.e., low-stress condition). The nonspeech-based experimental tasks included the impossibly perfect circle task (i.e., stressful condition) and a prompted picture-drawing task (i.e., low-stress condition). All four tasks were presented in a counterbalanced order, with the only limitation to randomization being participants could not receive two stressful-condition tasks in a row.

Speech-Language Assessments

After scheduling the children's sessions, the lab personnel sent the parents/guardians an email with instructions for the first session. Lab personnel also sent the parents an email with a link to a second Qualtrics survey, which included the parent portions of the assessment process,

including the *Child Behavior Questionnaire–Short Form* (*CBQ-SF*; Rothbart et al., 2001). The primary investigator asked the parents to complete this survey after the assessment session and provided reminders at the end of each experimental session.

At the beginning of the first session, research lab personnel obtained child assent by reading the IRB-approved assent script (Appendix F). The researcher provided a visual schedule for the session, with gold stars as rewards for the completion of each assessment subtest. To ensure that the children's speech and language skills were typically developing aside from stuttering, a certified speech-language pathologist (SLP) or a graduate student clinician under the supervision of a certified SLP administered four standardized, norm-referenced speech and language tests, including the *Expressive Vocabulary Test–Third Edition* (*EVT-3*, Williams, 2019), the *Test for Auditory Comprehension of Language-Fourth Edition* (*TACL-4*, Carrow-Woolfolk, 2014), the *Goldman-Fristoe Test of Articulation–Third Edition* (*GFTA-3*, Goldman & Fristoe, 2015), and the *Stuttering Severity Instrument-Fourth Edition* (*SSI-4*; Riley, 2009). These tests assessed expressive vocabulary, receptive language, articulation, and stuttering severity, respectively. The SLP or SLP graduate student trained in speech disfluency measurement also collected a 300 to 600-syllable conversational speech sample. These disfluency counts were also used in the completion of the *SSI-4* (Riley, 2009). The primary researcher reviewed and discussed the children's assessment results with their parents/guardians at the end of their final session. Parents also received a summary of their child's assessment results (Appendix G) via email within one week of completing all assessment and experimental visits.

Experimental Tasks

At the start of the first experimental session, the children were familiarized with the five-faces Likert scale (Figure 2, from Mouw et al., 2019) by being asked, for example, "How would you feel if you got a big ice cream cone—very sad, a little sad, in the middle, a little happy, or very happy?" and "How would you feel if you dropped your big ice cream cone—very sad, a little sad, in the middle, a little happy, or very happy?" These methods are modeled after Smiley and Dweck's study in 1994. Then the children responded to questions about their overall naming or drawing abilities ("Are you good at knowing what things are called and naming them or not so good at knowing what things are called and naming them?" and "Are you good at drawing or not so good at drawing?"). The questions they answered corresponded with the tasks they were completing that day. As with the assessment session, the researcher provided a visual schedule for the experimental session, with virtual gold stars as rewards for the completion of each portion of the experimental task.

Figure 2

Visual for Self-Report Ratings of Affect on a Five-Faces Likert Scale
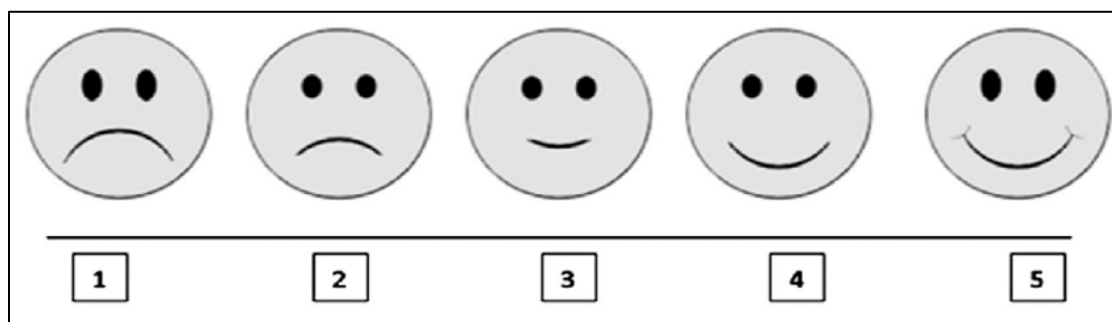
Next, the children completed a rest period during which they viewed images and listened to the primary researcher's narration of one of four text-free picture books by Mercer Mayer. The

four text-free picture books with recorded narration included the following, which are part of a series: (a) *Frog, Where are You?* (Mayer, 1969), (b) *Frog Goes to Dinner* (Mayer, 1974), (c) *Frog on His Own* (Mayer, 1973), and (d) *One Frog Too Many* (Mayer, 1977). The researchers obtained scripts for these text-free picture books from Systematic Analysis of Language Transcripts (SALT; *Systematic Analysis of Language Transcripts*, 2020), allowing for consistency in the narrations across participants.

Following the rest period, the children completed the control or stress-inducing portion of an experimental speech task (i.e., rapid-picture naming and control, self-paced picture naming) or a nonspeech experimental task (i.e., impossibly perfect circle task and prompted drawing task), which were counterbalanced across children. After each task, the children were shown the five-faces Likert scale (Figure 2) and prompted to provide a self-report rating of their emotions related to each task; for example, "How did you feel when you were drawing a perfect circle— very sad, a little sad, in the middle, a little happy, or very happy?"

After reporting how they felt completing the task, the children provided a narrative retelling of the text-free picture book they viewed during the most recent rest period. Following their completion of the narrative retelling, the children engaged in another rest period, during which they viewed a new text-free picture book narrated by the primary investigator. This rest period was followed by completion of the remaining control or stress-inducing portion of an experimental speech task (i.e., rapid-picture naming or control, self-paced picture naming) or a nonspeech experimental task (i.e., impossibly perfect circle task or prompted drawing task), which were counterbalanced across children. Again, the children were shown the five-faces Likert scale (Figure 2) and prompted to provide a self-report rating of their emotions related to

each task; for example, "How did you feel when you were drawing the different shapes—very sad, a little sad, in the middle, a little happy, or very happy?"

When the children had completed all the experimental tasks for the session, they were asked a series of questions (Appendix H) to assess their task-specific expectations for future success, post-task self-perceived naming and drawing abilities, and task preferences.

Rapid Picture-Naming Task

The rapid picture-naming task, modeled after Zengin-Bolatkale et al. (2015), was selected to elicit temporal, communicative, and interpersonal stress, similar to what children may experience in different communication situations in daily life. This type of speech task has also proven to be an effective stress-inducing task for preschool-age CWS and CWNS, as evidenced by significant increases in tonic skin conductance levels from pre-task baseline to task (e.g., Zengin-Bolatkale et al., 2015).

In the current study, the investigators screen-shared a PowerPoint slideshow with 30 novel pictures from Form A of the *Peabody Picture Vocabulary Test–Fourth Edition* (*PPVT-4;* Dunn & Dunn, 2007). To ensure that this task was stressful, the participants were assigned a PowerPoint with a set of images one year higher than their age-equivalent score on the *EVT-3,* which was administered during the assessment. For example, if a five-year-old child received an age-equivalent score of 5;1 on the *EVT-3*, they were presented with 30 pictures from the 6;0-6;11 range on the *PPVT-4*.

The investigator told the children, "For the next three minutes, I will show you a picture, and I want you to tell me what it is as fast as you can! Remember, I want you to name the pictures soon as you see them. Let's practice!" The children were then given two practice images, during which feedback was given as needed. For example, the researcher may have told

the children they could say one word as fast as they could rather than a whole sentence or to remember to say the name of the picture as soon as they saw it. After the practice images, the children were asked if they were ready to start the game for real.

During the experimental task, the investigators encouraged the children to "go fast, fast, fast" and "go faster" at fixed intervals paired with a visual cue of a green stick figure running and the words "Go Faster!" (i.e., after slides 5, 11, 16, 22, and 28) but provided no other feedback. Immediately after a child named an image, the investigator proceeded to the next slide. If a child looked at an image for more than approximately 10 seconds without responding, the investigator proceeded to the next slide. The investigator redirected the child if they began to talk about a tangential topic while completing the task (e.g., "Oh neat. Keep going!"). After answering the self-report questions about the task, the investigator thanked the children for completing the activity (e.g., "Thank you for playing that game with me") and gave them a gold star on their visual schedule.

Self-Paced Naming Task

The self-paced naming task was created as a control for the rapid-picture naming task described by Zengin-Bolatkale et al. (2015). The primary investigator screen-shared a PowerPoint slideshow with 30 novel pictures from Form B of the *PPVT-4* (Dunn & Dunn, 2007). Similar to the rapid-picture naming task, stimuli were selected with reference to chronological age for each child, meaning there will be unique sets of 30 images for children ages 3;0 to 3;11, children ages 4;0 to 4;11, and children ages 5;0 to 5;11. However, to reduce the potential stress of this control task, the children named images from sections of the *PPVT-4* (Dunn & Dunn, 2007) that were within their chronological age range.

The investigators told the children, "For the next three minutes, I will show you a picture, and I want you to tell me what it is. This is not a race. I simply want you to name the pictures as you see them. Let's practice!" The children were then shown two practice images, during which feedback was given as needed. For example, if the child named the image quickly, the researcher may have reminded the child that it was not a race. After the practice images, the children were asked if they were ready to start the game for real.

During the experimental task, the investigator continued to each slide at a leisurely pace (i.e., silently counting two seconds) to reduce the potential for rapid naming of images. The investigators provided nonspecific positive feedback (e.g., "nice," "okay," "alright") intermittently during the task, irrespective of correctness. The investigator redirected the child if they began to talk about a tangential topic while completing the task (e.g., "Oh neat. Let's keep going."). After answering the self-report questions about the task, the investigators thanked the children for completing the activity ("Alright, thank you so much for playing that game with me!") and gave them a gold star on their visual schedule.

Impossibly Perfect Circle Task

The Impossibly Perfect Circle task comes from the *Laboratory Temperament Assessment Battery* (*LabTAB*, Goldsmith & Rothbart, 1996) and can be used to evoke frustration as well as to measure children's persistence when given negative criticism from adults. Past studies have used this task to elicit negative affect as well as specific negative emotions (e.g., anger, frustration, sadness; Dennis, 2006; Durbin et al., 2007). We selected this nonspeech task to elicit stress that provides insight into appraisal tendencies during frustrating tasks involving external criticism. Investigators selected the whiteboard function in Zoom and showed the children how to draw on the screen using a mouse or trackpad. The individual variability in past experience

and ability to use a mouse or trackpad may have made the task more or less difficult for some children. However, given that children's drawing performance on the task was not the subject of this study, this variability was considered acceptable.

Given the young age of the children and the fact that most lacked familiarity with using a computer mouse, many children needed caregiver support to complete the drawing tasks. Parent/caregiver support included specific instruction and hand-over-hand practice drawing lines and scribbles at the beginning of the task. Some children required hand-over-hand support from their parents during the drawing tasks as well. As an example of hand-over-hand, parents held the mouse and clicked the button down while their child's hand rested on top and guided the mouse's movement. Notably, three CWS and one CWNS experienced technical difficulties with the Zoom drawing function that were not able to be resolved. Data from these four children and their matched partners were removed for analyses involving the nonspeech tasks. Removal of the matched pairs was implemented to reduce any possible effects of unbalanced ages or gender.

During the Impossibly Perfect Circle Task, the investigator held up a picture of a circle and told the children, "For the next three minutes, I need you to try to draw a perfect circle. Could you draw it for me? I need the perfect circle." The investigators critiqued each circle the children drew in a neutral voice and then told the children to draw another one. Critiques were specific but did not include any information on how to remedy the problem. Some examples of critiques: "That one is too pointy (indicating a point on a circle). Let's try again," "That one is too flat, draw another one," "That one is too skinny, too small, too large, lopsided, is an oval, is not round, not quite right." When the three minutes had passed, the investigator asked the children how they felt while trying to draw a perfect circle. The investigator then returned to the children's drawings of the circles and, while adding eyes and a smile to the circle, said,

"Drawing circles can be hard, huh? But look we can turn them into smiley faces." The investigator then thanked the children for completing the activity and gave them a gold star on their visual schedule. This concluded the impossibly perfect circle task.

Prompted Drawing Task

The self-paced, prompted drawing task was created as a control for the Impossibly Perfect Circle Task. The investigators told the children, "For the next three minutes, I will show you a shape, and I want you to try to draw it." Prior to these sessions, the investigator shuffled an assortment of five flashcards depicting simple shapes (i.e., square, triangle, heart, rectangle, diamond); circles and stimuli like circles (e.g., ovals) were excluded from these stimuli. The investigator provided nonspecific prompts after each drawing (e.g., "nice," "okay," "alright"). When the three minutes had passed, the investigator thanked the children for completing the activity and gave them a gold star on their visual schedule. This concluded the prompted drawing task.

<div align="center">

Dependent Variables

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The following sections include descriptions of the dependent variables of interest when assessing the difficulty of the various experimental tasks.

Task Difficulty

To ensure the Impossibly Perfect Circle task and Rapid Picture-Naming task were sufficiently stressful compared to the control counterparts, the investigators compared the tasks based on measures that indicated the difficulty of the task for the children. The measures for levels of difficulty included the number of seconds engaged in each task before child-initiated interruption (e.g., stops, protests, asks to withdraw, Dennis, 2006), observational Likert scale

ratings of frustration (Figure 3; Dennis, 2006), and the children's self-reported ratings of affect

(Figure 2, from Mouw et al., 2019) related to each task.

Figure 3

Observational Likert Scale Rating of Frustration

Please rate how **<u>frustrated</u>** this person is during the task						
1	2	3	4	5	6	7
Clear facial, verbal, and/or behavioral signs of frustration		Moderate facial, verbal, and/or behavioral signs of frustration		Mild facial, verbal, and/or behavioral signs of frustration		No signs of frustration

Facial Expression of Emotions

To collect measures of challenge appraisal and threat appraisal, six research assistants,

blind to study details, viewed muted recordings of the participants completing each experimental

task. After each clip, the coders rated the participants on facial expressions of emotion using

7-point Likert scales (see Appendix I). For this study, observational Likert scale ratings of fear

were indicative of threat appraisal, and observational Likert scale ratings of anger were

representative of challenge appraisal (e.g., Lerner & Keltner, 2001).

Task Choice

The participants were asked about their preferences for completing tasks again three

separate times. After completing the speech tasks, we utilized visual stimulus of images

representing the tasks and asked the children, "If you could play one of these games again, which

would you choose—the naming the pictures at an easy speed game, or the naming the pictures

quickly game?" Following completion of the nonspeech tasks, we utilized visual stimulus of

images representing the tasks and asked the children, "If you could play one of these games

again, which would you choose—the drawing the different shapes game, or the drawing the

perfect circle game?" (for review, see Burhans & Dweck, 1995; Smiley & Dweck, 1994). At the

end of the final experimental session, when all four tasks were completed, we also presented

visual stimuli and asked the children, "If you could play one of these games again, which would

you choose—the naming the pictures at an easy speed game, the naming the pictures very

quickly game, the drawing the different shapes game, or the perfect circle game?" Selection of

an easier task (i.e., Self-Paced Picture Naming task, and the Prompted Drawing task) were coded

with a "0." In contrast, choosing to re-attempt a more challenging task (i.e., the Rapid-Picture

Naming task and the Impossibly Perfect Circle task) were coded with a "1."

Task Choice Rationale

As an additional indicator of appraisal, we also asked the children for rationale regarding

their choice of a task to repeat (open-ended response, "That's a good choice. Why did you pick

that one?" (for review, see Smiley & Dweck, 1994). All self-reports of rationale were transcribed

and coded by one of two undergraduate students who were trained based on the categorization

criteria in Table 5. The main researcher also independently coded all of the transcribed rationales

for task selection so the reliability of classification could be assessed.

Table 5

Categorization of Children's Rationales for Their Choice of Task to Repeat

Numerical Value	Category	Example of Response
1	No Reason	"I don't know. Just because."
2	No Challenge	"It was easy."
3	Want/Like	"I like drawing."
4	Challenge	"I want to try again."

Note. Adopted from Smiley, P. A., & Dweck, C. S. (1994). Individual differences in achievement goals among young children. *Child Development*, *65*(6), 1723–1743.

Children's Behavior Questionnaire–Short Form

To measure appraisal based on parent-report of temperament, we incorporated *The Children's Behavior Questionnaire–Short Form* (*CBQ- SF;* Rothbart et al., 2001), a standardized parent-response questionnaire used to measure dimensions of temperament. The *CBQ-SF*, which includes three broad dimensions and 15 total subscales, takes approximately 30 minutes to complete, and the results are based on parent responses to 94 questions. Per Rothbart et al. (2001), the *CBQ-SF* has good construct validity based on mean parental agreement at age five [r (145) = .41, $p < .05$] and average consistency from age five to age seven [r (114) = .69, $p < .05$]. The *CBQ-SF* also has adequate internal consistency estimates for children between the ages of four and five-years-old [coefficient alphas for all fifteen scales range from .64 to .93, mean r (228) = .73].

To investigate whether the behavioral measures of challenge appraisal and threat appraisal were correlated with parent-report measures of temperament, the investigators utilized the *CBQ-SF* subscales of Anger/Frustration and Fear. Based on the literature review, which indicated potential connections between types of stress appraisals and aspects of temperament, the investigators also compared CWNS and CWS based on *CBQ-SF* subscale measures, including Anger/Frustration, Fear, Impulsivity, Behavioral Inhibition (i.e., Shyness), and self-regulation (i.e., Inhibitory Control). Statistical analyses and results will be discussed in the following sections.

<div align="center">

Statistical Analyses

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The sections below include details about the analytical plans to address the research questions of interest.

Question 1. Manipulation Check of Experimental Task Difficulty

As a manipulation check of our research tasks, which were adapted for virtual implementation, we conducted several repeated-measures analyses of variance (ANOVAs) to see if our tasks that were meant to induce stress, compared to our tasks that were meant to serve as controls, were more stressful. The independent variables were the experimental tasks, and the dependent variables included (a) length of time before task disengagement, (b) observational Likert-scale ratings of frustration, and (c) self-report ratings of affect post-tasks. Based on these analyses, we investigated whether there were significant differences between the conditions intended to serve as stressful and nonstressful tasks.

Prior to completing the repeated-measures ANOVAs, the investigator conducted several other analyses involving time before task disengagement and observational Likert scale ratings of frustration (e.g., inter-judge reliability, correlations). Details regarding these additional analyses are discussed in the following sections.

Time Before Task Disengagement

Inter-judge reliability for the length of time engaged in the tasks was calculated for each child within each task. Thirty-one percent of participant data (i.e., 10 randomly selected participants out of the 32 total) were coded by two coders who were blind to participant talker group classifications. The investigator planned to conduct an inter-class correlation coefficient (ICC) to check the reliability of the coders' results.

Observational Likert Scale Ratings of Frustration: Inter-Rater Reliability

The researcher conducted statistical analyses to evaluate whether the observational Likert scale ratings of frustration met suitable inter-judge reliability standards (Cronbach's $\alpha > 0.70$; Coifman & Bonanno, 2010; M. C. Shields et al., 2015). Coders who lacked sufficient variability

in ratings to be included in the analyses (e.g., ratings of anger for all participants were "1") were removed, along with anyone who did not fit the inter-judge reliability standards. The investigator averaged the remaining coders' observational Likert scale ratings for frustration for each child within each task. Scores were averaged across all three remaining coders by participant to increase reliability. The result was each participant had one score for frustration relative to each experimental task.

Observational Likert Scale Ratings of Frustration: Age and Sex Correlations

It was important to evaluate whether chronological age (in months) and/or sex needed to be considered as covariates in the repeated-measures ANOVAs. First, the investigator ran Kendall's tau-b correlations to check for any significant correlations between chronological age in months and observational Likert scale ratings of frustration. Then the investigator conducted a Cramer's *V* test of association to check any significant associations between sex and observational Likert scale ratings of frustration (Lomax & Hahs-Vaughn, 2012).

Observational Likert Scale Ratings of Frustration: Group Comparisons

If the correlational analyses *were* significant ($\alpha > 0.50$, $p < .05$; Lomax & Hahs-Vaughn, 2012), the investigator planned to conduct repeated-measures analyses of covariance (ANCOVAs) for observational Likert scale ratings of frustration by task, with gender and/or age as covariates (Sillars & Davis, 2018). However, if the correlational analyses were *not* significant ($\alpha \leq 0.50$, $p > .05$; Lomax & Hahs-Vaughn, 2012), the investigator conducted repeated-measures ANOVAs to compare for observational Likert scale ratings of frustration between tasks without the inclusion of covariates.

Question 2. Appraisal of Experimental Tasks

  The investigator conducted repeated-measures ANOVAs to investigate whether CWS, compared to CWNS, presented with significantly higher measures of fear (i.e., threat appraisal) and significantly lower measures of anger (i.e., challenge appraisal) during the experimental tasks. Talker-group served as the independent variable, and dependent variables included observational Likert scale ratings of anger and fear. Based on the count within the cells, the investigator planned to run chi-square tests of independence (cell count ≥ 5) or Fisher's Exact tests (cell count < 5; Freeman & Campbell, 2007) to assess whether there were significant relationships between the talker groups and the type of tasks chosen to repeat. The investigator also planned to conduct chi-square tests of independence or Fisher's Exact tests to see if there were significant relationships between talker groups and rationales for the choices of tasks to repeat.

  Prior to conducting the main statistical analyses of interest, the investigator conducted a few other analyses involving facial expressions of emotion and rationale for choice of task (e.g., inter-rater reliability, correlations). Details regarding these additional analyses are discussed below.

Observational Likert Scale Ratings of Emotion: Inter-Rater Reliability

  The investigator conducted statistical analyses to evaluate whether the judges' facial coding of emotions met suitable inter-judge reliability standards (Cronbach's $\alpha > 0.70$; Coifman & Bonanno, 2010; M. C. Shields et al., 2015). As with the observational Likert scale ratings of frustration, coders who lacked sufficient variability in ratings to be included in the analyses were removed, along with anyone who did not fit the inter-judge reliability standards. To increase reliability, the investigator averaged the remaining three coders' ratings for emotional responses

reflective of threat appraisal (i.e., fear) and challenge appraisal (i.e., anger) for each child within each task. This means that each participant had one score for anger and one score for fear relative to each experimental task.

Observational Likert Scale Ratings of Emotion: Age and Sex Correlations

To assess whether age was significant and needed to be considered a covariate in later analyses, the investigator conducted Kendall's tau-b correlations to check for any significant correlations between chronological age (in months) and (a) observational Likert scale ratings of anger as well as (b) observational Likert scale ratings of fear (Lomax & Hahs-Vaughn, 2012, p. 276). Then the investigator conducted a Cramer's *V* test of association to check for any significant associations between sex and (a) observational Likert scale ratings of anger as well as (b) observational Likert scale ratings of fear (Lomax & Hahs-Vaughn, 2012, p. 276).

Observational Likert Scale Ratings of Emotion: Group Comparisons

If the correlational analyses *were* significant ($\alpha > 0.50$, $p < .05$; Lomax & Hahs-Vaughn, 2012), the investigator planned to conduct repeated-measures ANCOVAs for (a) observational Likert scale ratings of anger and (b) observational Likert scale ratings of fear by talker group, with gender and/or age as covariates (Sillars & Davis, 2018). However, if the correlational analyses were *not* significant ($\alpha \leq 0.50$, $p > .05$; Lomax & Hahs-Vaughn, 2012), the investigator planned to conduct repeated-measures ANOVAs to compare the observational Likert scale ratings of anger and fear between talker groups, without the inclusion of covariates.

Task Rationale

The investigator conducted a Cohen's kappa to determine if there was appropriate agreement between the coders' and investigator's classifications of rationales. Cohen's kappa

was deemed most appropriate because it is commonly used for assessing inter-rater agreements on a nominal scale (Warrens, 2015).

Question 3. Correlations Between Facial Expressions of Emotion and CBQ-SF Subscales

In order to determine if parent-report measures on the *CBQ-SF* could be a valid way for clinicians to measure challenge appraisal and threat appraisal tendencies of preschool-age children, the investigator conducted a correlation coefficient analysis to assess whether there was a significant relationship between facial expression reflective of threat appraisal (i.e., fear) and *CBQ-SF* subscale scores associated with threat appraisal (i.e., Fear). The investigator conducted an additional correlation coefficient analysis to determine if there was a significant relationship between facial expression reflective of challenge appraisal (i.e., anger) and *CBQ-SF* subscale scores associated with challenge appraisal (i.e., Anger/Frustration). As a note, one parent of a CWS (girl) did not complete the CBQ-SF, resulting in this child not being included in the analyses; her CWNS match was also excluded from these analyses to maintain gender and age matching. For analyses involving the nonspeech tasks, these two participants' data were excluded, along with the four children who could not complete the drawing tasks via Zoom and their matched pairs. The exclusion of matched pairs was implemented to maintain age and sex matching.

Question 4: Appraisal and CBQ-SF Subscale Measures of Temperament

The investigator conducted independent sample *t*-tests to investigate whether CWS and CWNS significantly differed on aspects of temperament possibly associated with threat appraisal and/or challenge appraisal. Dependent variables of interest included *CBQ-SF* subscales of Anger/Frustration, Fear, Impulsivity, Behavioral Inhibition (i.e., Shyness), and self-regulation (i.e., Inhibitory Control). As with research question three, one parent of a CWS (girl) did not

complete the *CBQ-SF*, meaning this child's data was not included in the analyses; her CWNS

match was also excluded from these analyses to maintain gender and age matching.

CHAPTER IV

RESULTS

Question 1. Manipulation Check of Experimental Task Difficulty

The following sections include details about the findings of Research Question 1. Results regarding coders' reliability for measures and potential covariates are included before the summary of findings for the dependent measures of interest. As a reminder, the dependent measures of interest for assessing task difficulty included length of time before task disengagement, observational Likert-scale ratings of frustration, and self-report ratings of affect post-tasks.

Time Before Task Disengagement

The investigator planned to conduct an inter-class correlation coefficient analysis to check the coders' reliability of measures (ICC). However, due to limited variability within tasks (e.g., some tasks did not elicit any attempts to withdraw), these reliability measures could not be determined. For this reason, the percent agreement within tasks was calculated (Hayes & Krippendorff, 2007, p. 80). The percent agreement between coders for the amount of time before task disengagement was 89% (agreement for 32 of 36 samples).

There was no significant difference in time before task disengagement between the Control Speech Task ($n = 32$, $M = 180$, $SD = 0.0$) and the Stressful Speech Task ($n = 32$, $M = 180$, $SD = 0.0$); in fact, none of the CWS or CWNS exhibited signs of disengagement from either speech task before the end time of 180 seconds. There was also no significant difference in the time before task disengagement between the Control NonSpeech Task ($n = 24$, $M = 174.08$, $SD = 28.99$) and the Stressful NonSpeech Task ($n = 24$, $M = 160.96$, $SD = 46.49$) [$F(1, 22) = 1.22$, $p = .28$, $\eta^2 = .19$]. These findings suggest that the Stressful Speech Task and Stressful

Nonspeech Task, compared to their Control Task counterparts, were not significantly shorter in time spent engaging in the task.

Observational Likert Scale Ratings of Frustration: Inter-Rater Reliability

Inter-rater reliability for observational Likert scale ratings of frustration was satisfactory (average ICC = .71, range: .52–.86), and scores were averaged across all three coders by participant for each task to increase reliability (e.g., Coifman & Bonanno, 2010; Coifman et al., 2016; M. C. Shields et al., 2015). The result was that each participant had one score for observational Likert scale ratings of frustration for each experimental task.

Observational Likert Scale Ratings of Frustration: Age and Sex Correlations

There were no significant correlations between chronological age (in months) and observational Likert scale ratings of frustration for the Control NonSpeech Task ($\tau_b = .235$, $p = .13$), Stressful NonSpeech Task {$\tau_b = .174$, $p = .26$), Control Speech Task ($\tau_b = .094$, $p = .48$), or Stressful Speech Task ($\tau_b = .020$, $p = .88$). There were also no significant correlations between sex and observational Likert scale ratings of frustration for the Control NonSpeech Task ($V = .637$, $p = .46$), Stressful NonSpeech Task ($V = .540$, $p = .64$), Control Speech Task ($V = .498$, $p = .44$), Stressful Speech Task ($r = .498$, $p = .34$). Based on these results, there did not appear to be any associations between observational Likert scale ratings of frustration and chronological age (in months) or sex. For this reason, chronological age and sex were not used as covariates in the repeated-measures ANOVAs involving observational Likert scale ratings of frustration.

Observational Likert Scale Ratings of Frustration: Groups Comparisons

As indicated in Question 1, we wanted to know whether the Stressful Tasks, compared to the Control Tasks, elicited significantly higher observational Likert scale ratings of frustration. There was no significant difference in observational Likert scale ratings of frustration between

the Control Speech Task ($M = 5.97$, $SD = .74$) and the Stressful Speech Task ($M = 6.02$, $SD = .70$) [$F(1, 30) = .11$, $p = .74$, $\eta^2 = .004$]. There was also no significant difference in the observational Likert scale ratings of frustration between the Control NonSpeech Task ($M = 5.46$, $SD = 1.24$) and the Stressful NonSpeech Task ($M = 5.25$, $SD = 1.36$) [$F(1, 22) = .49$, $p = .43$, $\eta^2 = .02$]. These findings suggest that the Stressful Speech Task and Stressful Nonspeech Task were not significantly more frustrating than their Control Task counterparts.

Children's Self-Reported Ratings of Affect

There was no significant difference in children's self-reported ratings of affect between the Control Speech Task ($M = 4.22$, $SD = 1.21$) and the Stressful Speech Task ($M = 4.16$, $SD = 1.27$) [$F(1, 30) = .05$, $p = .83$, $\eta^2 = .002$]. There was also no significant difference in children's self-reported ratings of affect (scale of 1-5, negative to positive) between the Control Nonspeech Task ($M = 3.71$, $SD = 1.43$) and the Stressful NonSpeech Task ($M = 3.42$, $SD = 1.61$) [$F(1, 22) = .68$, $p = .42$, $\eta^2 = .03$]. These findings suggest that the children did not rate their affect as significantly more negative or positive during the Stressful Tasks compared to the Control Tasks.

Question 1: Summary for Manipulation Check of Experimental Tasks Difficulty

Based on the outcomes of these analyses involving these three different variables, there were no significant differences between the control and stressful tasks in terms of time until disengagement, frustration, or self-reported affect. The lack of significant differences between the NonStressful and Stressful Tasks across multiple measures suggests that these virtual adaptations of tasks may not have been different enough in terms of level of difficulty to elicit varied stress responses.

Question 2. Appraisal of Experimental Tasks

The sections below include details about the results of Research Question 2. Results regarding coders' reliability for measures and potential covariates are included before the summary of findings for the dependent measures of interest. The dependent measures of interest for assessing children's appraisal of the experimental tasks observational Likert-scale ratings of anger and fear.

Observational Likert Scale Ratings of Fear and Anger: Inter-Rater Reliability

Coder reliability was assessed for anger (average ICC = .62, range: .52–.71) and fear (average ICC = .47, range: .35–.66). Scores were averaged across three coders by participant for each task to increase reliability (e.g., Coifman & Bonanno, 2010; Coifman et al., 2016; M. C. Shields et al., 2015). The result was that each participant had one score for observational Likert scale ratings of anger and one score for observational Likert scale ratings of fear for each experimental task.

Observational Likert Scale Ratings of Fear and Anger: Age and Sex Correlations

To assess whether chronological age (in months) was significant and needed to be considered as a covariate in later analyses, the investigator conducted Kendall's tau-b correlation analyses between the dependent variables (i.e., observational Likert scale rating of fear and anger during each task) and chronological age (in months; Lomax & Hahs-Vaughn, 2012, p. 276). Kendall's tau-b correlation analyses indicated there were no significant correlations between chronological age (in months) and observational Likert scale rating of fear for any of the experimental conditions. However, there were significant correlations between chronological age (in months) and observational Likert scale rating of anger for two of the four experimental conditions (see Table 6).

Table 6

Kendall's Tau-b Correlation Analyses for Chronological Age (in months) and Observational Likert Scale Ratings of Fear and Anger

	Fear	Anger
Control NonSpeech Task	$\tau_b = .027, p = .87$	$\tau_b = .395, *p = .01$
Stressful NonSpeech Task	$\tau_b = .000, p = 1.00$	$\tau_b = .251, p = .10$
Control Speech Task	$\tau_b = .016, p = .91$	$\tau_b = .098, p = .48$
Stressful Speech Task	$\tau_b = .041, p = .77$	$\tau_b = .333, *p = .02$

* Significant at the p < .05 level

To assess whether sex was also significantly correlated with observational Likert scale ratings of fear and anger and needed to be considered as a covariate in later analyses, the investigator conducted Cramer's *V* correlation analyses between the dependent variables (i.e., observational Likert scale rating of fear and anger during each task) and sex (Lomax & Hahs-Vaughn, 2012, p. 276). There were also no significant correlations between sex and observational Likert scale ratings of fear for the Control NonSpeech Task ($V = .244, p = .70$), Stressful NonSpeech Task ($V = .408, p = .41$), Control Speech Task ($V = .380, p = .47$), Stressful Speech Task ($r = .336, p = .61$). There were also no significant correlations between sex and observational Likert scale ratings of anger for the Control NonSpeech Task ($V = .506, p = .63$), Stressful NonSpeech Task ($V = .514, p = .71$), Control Speech Task ($V = .344, p = .71$), Stressful Speech Task ($V = .292, p = .74$). Based on these analyses, chronological age was used as a covariate in repeated-measures ANCOVAs involving observational Likert scale ratings of anger. However, sex was not used as a covariate in the repeated-measures ANOVAs involving observational Likert scale ratings of anger. Furthermore, chronological age and sex were not used as covariates in the repeated-measures ANOVAs involving observational Likert scale ratings of fear.

Observational Likert Scale Ratings of Fear and Anger: Group Comparisons

As described in Question 2, we wanted to know whether the CWS, compared to the CWNS, expressed significantly higher observational Likert scale ratings of fear (i.e., threat appraisal) and significantly lower observational Likert scale ratings of anger (i.e., challenge appraisal). Results from our ANOVAs indicated CWS and CWNS were not significantly different in their appraisal of threat, as measured by observational Likert scale ratings of fear during the speech tasks, $F(1,30) = 0.527$, $p = 0.47$, $\eta^2 = .02$ or the nonspeech tasks, $F(1,22) = .449$, $p = 0.51$, $\eta^2 = .02$. Means and standard deviations for observational Likert scale ratings of fear within conditions by talker group are depicted in Figure 4.

Figure 4

Means and Standard Deviations for Observational Likert Scale Ratings of Fear
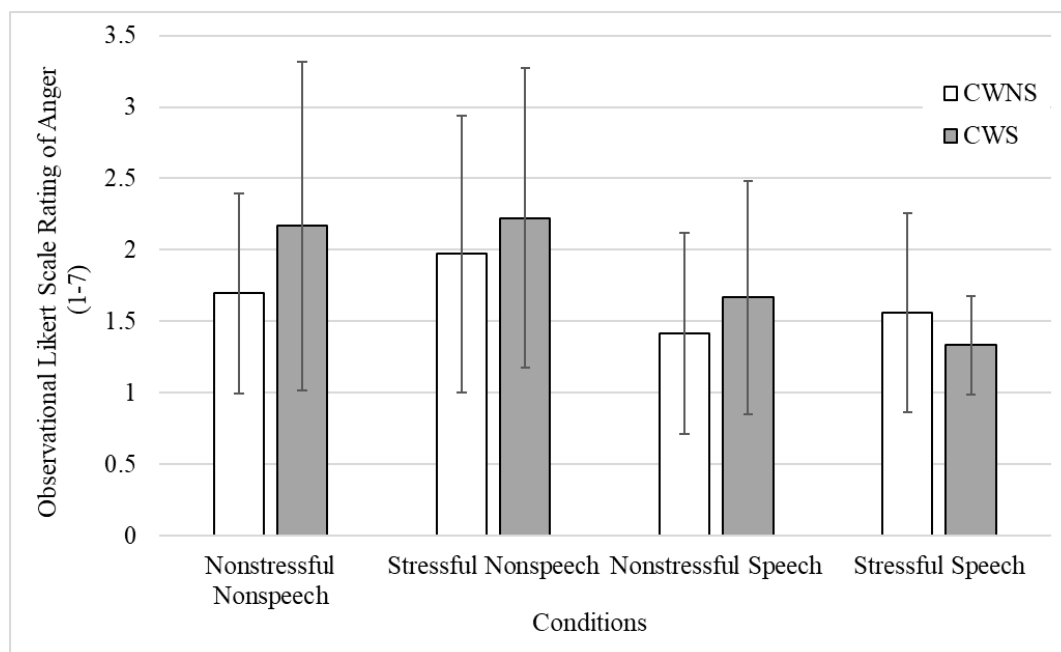
Note. CWNS refers to children who do not stutter, and CWS refers to children who stutter.

CWS and CWNS were not significantly different in their appraisal of challenge, as measured by observational Likert scale ratings of anger during the speech tasks, $F(1,29) = 2.90$, $p = 0.09$, $\eta^2 = .09$ or the nonspeech tasks, $F(1,21) = .305$, $p = 0.59$, $\eta^2 = .014$ with chronological age as a covariate. Figure 5 depicts the means and standard deviations for observational Likert scale ratings of anger within conditions by talker group.

Figure 5

Means and Standard Deviations for Observational Likert Scale Ratings of Anger
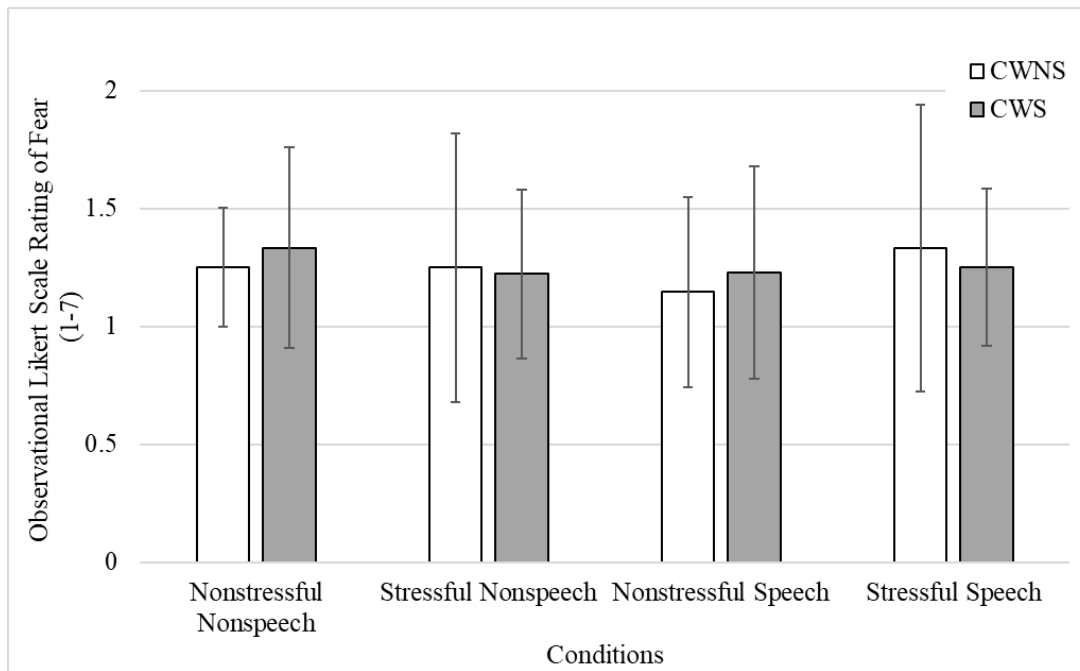
Note. CWNS refers to children who do not stutter, and CWS refers to children who stutter.

Choice of Task and Rationale

Reliability for categorization of children's self-report of rationale for tasks chosen to complete again indicated large agreement based on interpretation standards ($\kappa = 0.72$, $p < .001$). However, the coders and investigator met to discuss and resolve all discrepancies ($n = 14$) prior to conducting additional analyses.

Speech Tasks

When asked what Speech Task "game" they would like to "play" again, 21 children chose the Control Speech Task, and 11 children chose the Stressful Speech Task. See Table 7 for additional details based on talker group. Results from a chi-square test of independence indicated there was no significant relationship between the type of Speech Task chosen and talker group, X^2 (1, $N = 32$) = .14, $p = .71$.

Table 7

Choice of Speech Task to Repeat

	Children Who do Not Stutter	Children Who Stutter
Control Speech Task	10	11
Stressful Speech Task	6	5

Each child also answered a question about why they chose the Speech Task. As shown in Table 8, a majority of the CWS indicated their choice was based on the ease of the task ($n = 10$). In contrast, most of the CWNS said their selection was rooted in wanting or liking the task ($n = 10$). Four of the eight cells had a count less than five, meaning a Fisher's Exact test was most appropriate for assessing independence (for review, see Freeman & Campbell, 2007). Results from Fisher's Exact test indicated there was a significant relationship between the rationale given for the type of Speech Task chosen and talker group ($p = .03$).

Table 8

Rationale for Choice of Speech Task to Repeat

	Children Who do Not Stutter	Children Who Stutter
No Reason	1	2
Not a Challenge/Not Difficult	3	10
Want/Like	10	3
Challenge	2	1

NonSpeech Tasks

Before comparing the children's self-report for choice of NonSpeech Tasks to complete, the researcher removed data from the four children who were not able to complete the drawing tasks due to technical difficulties using the mouse and their matched pairs' data from the sample. From this sample ($n = 24$), eight children chose the Control NonSpeech Task, and 16 children chose the Stressful NonSpeech Task. See Table 9 for additional details based on talker group. Two of the four cells had a count of less than five, which meant a Fisher's Exact test was most appropriate for assessing independence (for review, see Freeman & Campbell, 2007). Results from Fisher's Exact test indicated there was no significant relationship between the type of NonSpeech Task chosen and talker group ($p = 1.00$).

Table 9

Choice of NonSpeech Task to Repeat

	Children Who do Not Stutter	Children Who Stutter
Control NonSpeech Task	4	4
Stressful NonSpeech Task	8	8

As with the Speech Tasks, the children were also asked why they chose a specific NonSpeech Task. As shown in Table 10, a majority of the CWS indicated a preference based on ease of the task ($n = 5$) or wanting/liking the task ($n = 5$). In contrast, most of the CWNS said their choice was due to a general preference of wanting or liking the task ($n = 7$). Results from Fisher's Exact test indicated there was no significant relationship between the rationale given for the type of NonSpeech Task chosen and talker group ($p = .30$).

Of those who chose the Stressful NonSpeech Task, six children (four CWS, two CWNS) gave a Not a Challenge/Not Difficult reason for their choice (e.g., "Because it's the only one [shape]," "Because it's the easiest"). This could suggest that for a quarter of the children, the Impossibly Perfect Circle task that was intended to be difficult was not interpreted as such. Overall, these findings raise concerns about the effectiveness of the Stressful NonSpeech Task.

Table 10

Rationale for Choice of NonSpeech Task to Repeat

	Children Who do Not Stutter	Children Who Stutter
No Reason	1	2
Not a Challenge/Not Difficult	2	5
Want/Like	7	5
Challenge	2	0

All Tasks

As with the comparison of NonSpeech Tasks, the researcher removed the data from the four children who were not able to complete the drawing tasks via Zoom due to technical difficulties with their mouse and their matched pairs' data from the sample before comparing the groups on their choice of task to complete when given all four options. The children were asked

which task they preferred, with *all four* tasks given as options. Table 11 includes additional information about the rationales for task choices based on talker group. Results from Fisher's Exact test indicated there was no significant relationship between the task choice and talker group ($p = .10$).

Table 11

Choice of All Four Tasks to Repeat

	Children Who do Not Stutter	Children Who Stutter
Control Speech Task	5	4
Stressful Speech Task	0	3
Control NonSpeech Task	2	4
Stressful NonSpeech Task	5	1

As shown in Table 12, a majority of the CWS indicated their rationale for their choice of task when given all four options was attributed to a lack of challenge or difficulty with the task ($n = 5$) or liking the task ($n = 5$). In contrast, most of the CWNS said their choice was due to a general preference of wanting or liking the task ($n = 7$). Six of the eight cells had a count less than five, meaning a Fisher's Exact test was most appropriate for assessing independence (for review, see Freeman & Campbell, 2007). Results from Fisher's Exact test indicated there was no significant relationship between the rationale given for the task chosen and talker group ($p = .38$).

When given all four choices, half of the children who chose the Stressful NonSpeech Task ($n = 3$) gave the rationale that they believed it was "Not a Challenge/Difficult." Additionally, two said they chose the Control NonSpeech Task because they wanted to try again, possibly indicating they were interested in the challenge of the task. The children's choices and

rationales for all four tasks align with what we would expect for the Speech Tasks but continue to raise questions about the effectiveness of the NonSpeech Tasks.

Table 12

Rationale for Choice of Task to Repeat With all Four Options

	Children Who do Not Stutter	Children Who Stutter
No Reason	0	1
Not a Challenge/Not Difficult	3	5
Want/Like	7	3
Challenge	2	3

Question 2: Summary for Appraisal of Experimental Tasks

Based on the outcomes of these analyses involving these three different variables, there were no significant differences between CWNS and CWS with regard to observational Likert scale ratings of fear and anger or choices of tasks to repeat. However, there were significant differences in the rationales given by CWS compared to CWNS when explaining their choice for which Speech Task to repeat.

Question 3. Correlations Between Facial Expressions of Emotion and *CBQ-SF* Subscales

There were no significant correlations between the *CBQ-SF* subscale of Anger/Frustration and observational Likert scale ratings of anger during the Control Speech Task ($r = .156$, $p = .41$), Stressful Speech Task ($r = .096$, $p = .62$), Control NonSpeech Task ($r = .251$, $p = .26$), or Stressful NonSpeech Task ($r = .162$, $p = .47$).

Similarly, there were no significant correlations between the *CBQ-SF* subscale of Fear and observational Likert scale ratings of fear during the Control Speech Task ($r = .027$, $p = .89$), Stressful Speech Task ($r = .125$, $p = .51$), Control NonSpeech Task ($r = .090$, $p = .69$), or Stressful NonSpeech Task ($r = -.061$, $p = .79$).

Based on the outcomes of these analyses, there does not appear to be significant correlations between *CBQ-SF* subscales of Fear and Anger/Frustration and observational Likert scale rating of emotions (i.e., fear, anger) thought to be potentially reflective of appraisal.

Question 4. Appraisal and *CBQ-SF* Measures of Temperament

The investigator conducted independent sample *t*-tests of significance, which showed that CWS, compared to CWNS, scored significantly higher on *CBQ-SF* subscale measures of temperament, including Fear ($t_{28} = -2.729$, $p = .005$, $d = -.99$) and Shyness ($t_{28} = -2.538$, $p = .008$, $d = -.93$). Additionally, CWS, compared to CWNS, scored significantly lower on the *CBQ-SF* subscale measure of Impulsivity ($t_{28} = 2.337$, $p = .013$, $d = .85$). Significant differences were not found for *CBQ-SF* subscales of Anger/Frustration ($t_{28} = -.794$, $p = .22$, $d = -.29$) or Inhibitory Control ($t_{28} = -.273$, $p = .39$, $d = -.10$). Means and standard deviations for the *CBQ-SF* subscales discussed above can be seen in Figure 6.

As hypothesized, CWS, compared to CWNS, were significantly higher in measures of temperament thought to be associated with threat appraisal, including fear and shyness. Interestingly, the CWS, compared to CWNS, were significantly lower in Impulsivity, which did not fit with our hypothesis. Significant differences for subscales thought to possibly be associated with challenge appraisal tendencies, including Anger/Frustration and Inhibitory Control, were not found.

Figure 6

Means and Standard Deviations for Parent Ratings of Children's Behavior Questionnaire–Short Form Subscales
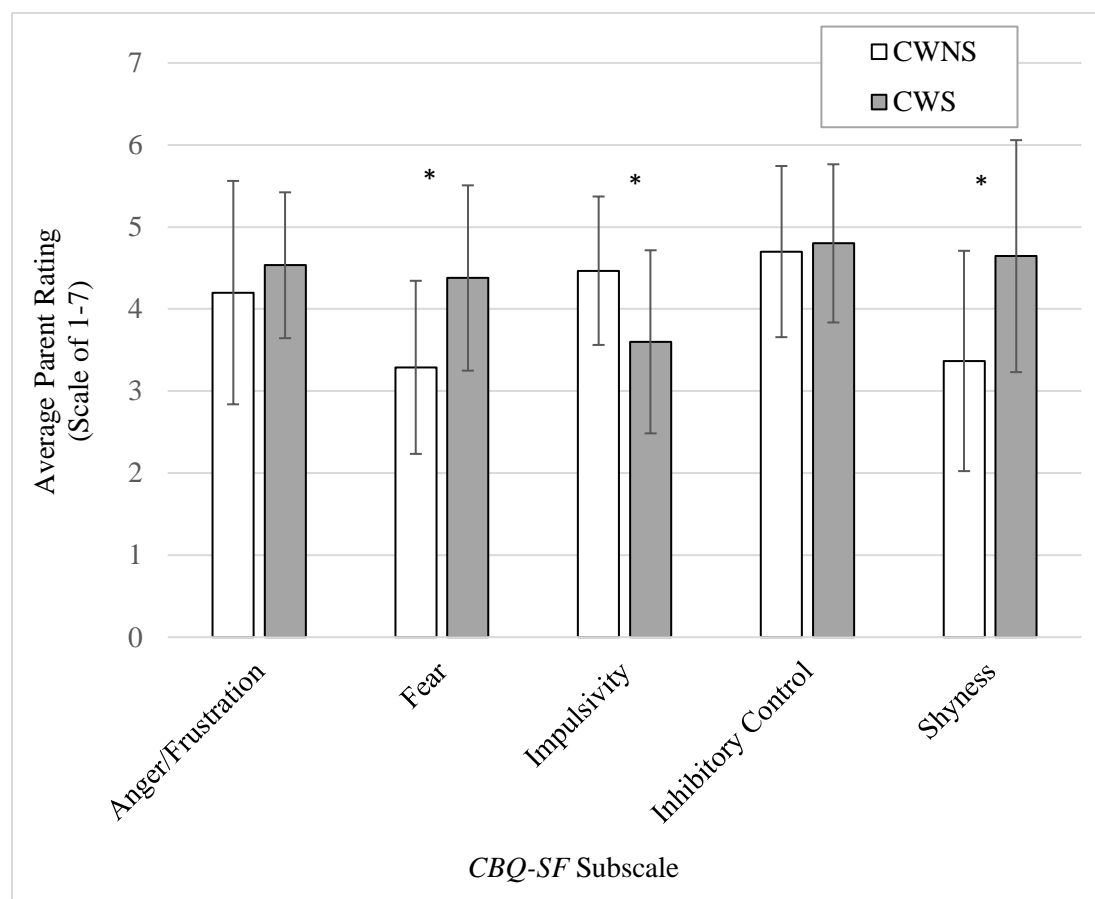
Note. CBQ-SF refers to the *Children's Behavior Questionnaire- Short Form* (Rothbart, 2001). CWNS refers to children who do not stutter, and CWS refers to children who stutter. * Indicates significant at the *p* < .05 level.

CHAPTER V

DISCUSSION

The purpose of this study was to investigate whether preschool-age CWS, compared to preschool-age CWNS, differ in their appraisal of tasks that vary in context (i.e., nonspeech, speech) as well as degrees of stress. Past studies of preschool-age CWS have considered behavioral (e.g., Ntourou et al., 2013; Schwenk et al., 2007; Snyder & Arnold, 2022) and psychophysiological measures of emotion-related processes (e.g., Jones, Buhr, et al., 2014; Jones, Conture, et al., 2014). However, to date, there is no research considering the potential role of appraisal in preschool-age stuttering. Rather than focusing on the end result, or emotion-related outcomes, we wanted to look at the root—that is, the appraisal of events or stimuli that result in emotion-related activity.

There were five main findings from this study. First, the experimental tasks that were intended to be difficult did not appear to be effective in eliciting significant increases in emotional arousal. Second, CWS, compared to CWNS, did not appear to significantly differ in their appraisal of the various tasks, as evidenced by the lack of significant group differences in observational Likert scale ratings of anger or fear. Third, CWS and CWNS did not significantly differ in their choices of tasks to repeat, their rationale for choice of nonspeech task, or their rationale for choice of all four speech tasks. However, CWS and CWNS significantly differed in their rationale for choosing the Control Speech Task. Finally, there were some significant differences between CWS and CWNS based on *CBQ-SF* subscale measures of temperament that have been associated with appraisal. Each of these findings are discussed further below.

Finding 1: Manipulation Check of Experimental Task Difficulty

The researchers sought to determine whether the "stressful" tasks were more difficult than their "nonstressful" control tasks. Our interest in the efficacy of our tasks was warranted, given that several studies involving comparisons of CWNS and CWS on emotion-related outcomes have reported a lack of significant differences between conditions (Arnold et al., 2011; Salvo & Arnold, 2022; Zengin-Bolatkale, Conture, Key, et al., 2018). The difference in the level of stress associated with the tasks was important for our study because we were interested in the children's appraisal of these difficult activities. If the "stressful" tasks we implemented were not difficult enough to elicit challenge appraisal or threat appraisal, our findings regarding group comparisons of appraisal might be limited.

Present findings suggest that the "Stressful" Nonspeech Task and "Stressful" Speech Task may not have been truly stressful compared to the Control Task conditions. Our data showed no significant differences in dependent variables for task difficulty, including time until disengagement, facial expression of frustration, or self-reported affect. Although findings suggest emotional reactions can be elicited by the Rapid Picture-Naming Task (Zengin-Bolatkale et al., 2015) and the Impossibly Perfect Circle Task (Dennis, 2006; Durbin et al., 2007), neither task had established control condition counterparts prior to this study. The Self-Paced Picture-Naming Task and the Prompted Drawing Task were developed as controls for this study specifically. Below I discuss potential rationales as to why we did not see significant differences between Control Tasks and Tasks intended to be stressful.

Our findings regarding the Simple Picture-Naming Task and Rapid Picture-Naming Task differed from the sources of the experiments that informed our choice of tasks. For example, Zengin-Bolatkale and colleagues (2015) found that a Rapid Picture-Naming Task, compared to a

pre-task baseline, was effective in eliciting significantly higher sympathetic arousal for CWS and CWNS. However, our dependent variables suggest that both the Simple Picture-Naming Task and the Rapid Picture-Naming Task were limited in the elicitation of stress. As an example, none of the CWS or CWNS exhibited signs of disengagement from either speech task. Additionally, both the Simple Picture-Naming Task and the Rapid Picture-Naming Task had comparable observational Likert scale ratings of frustration. Lastly, the average self-reported affect (scale of 1-5, negative to positive) of CWS and CWNS during these tasks were both on the higher end of the five-point scale ($M = 4.16$ to 4.22).

A key difference between Zengin-Bolatkale and colleagues' study and our own was the method of experimental task implementation. Zengin-Bolatkale et al. (2015) collected their data in person, with the experimenter "holding the next card above and then slapping it down on the table" and telling the children to "go faster." In our own study, we also instructed the children to go faster; however, given the virtual nature of the study, we were limited to flipping the pictures in our PowerPoint slideshow as soon as they were named. Nevertheless, it is possible that a Rapid Picture-Naming Task conducted in a lab, with an unfamiliar adult in an unfamiliar setting, may be more stress-inducing than the same task being completed from the comfort of one's own home with a caregiver nearby.

Similarly, our results regarding the Prompted Drawing Task and the Impossibly Perfect Circle Task differed from the sources of the experiments that informed our choice of tasks. The Impossibly Perfect Circle Task, adopted from the *Laboratory Temperament Assessment Battery* (*LabTAB*; Goldsmith & Rothbart, 1996), has been used to elicit negative affect as well as specific negative emotions, like anger, frustration, sadness (e.g., Dennis, 2006; Durbin et al., 2007). However, in our study, signs of disengagement from either speech task were limited.

Additionally, both the Prompted Drawing Task and the Impossibly Perfect Circle Task had comparable observational Likert scale ratings of frustration. Lastly, the average self-reported affect (scale of 1–5, negative to positive) of CWS and CWNS during these tasks were both in the middle of the five-point scale (M = 3.42 to 3.71).

As with the Rapid-Picture Naming Task, a major difference between these studies and our own was the task execution. The Impossibly Perfect Circle Task is typically completed in person, with paper and a marker or crayon. In our virtual study, the children were required to engage in the drawing task using the Zoom whiteboard and a mouse or trackpad. Although this method seemed like an appropriate adaptation based on the performance of pilot subjects, it was evident that many of the preschool-age children who engaged in the study lacked familiarity with using a computer mouse or trackpad. There were also irreparable technical difficulties with Zoom for four participants that made remote access to the whiteboard impossible, despite caregiver support and experimenter instructions to troubleshoot the issues. Lastly, many children needed caregiver support to complete both drawing tasks. Given the influence that parents and caregivers can have on children's appraisal (for review, see Power, 2004), it is possible that the support provided impacted their appraisal of the tasks. As an example, if parents were supporting their child by holding the computer mouse, the children may have felt a level of support that reduced challenge appraisal or threat appraisal; this could account for the low observational Likert scale ratings of anger and fear during both NonSpeech Tasks. Although we attempted to control for parent and caregiver influence by sending specific instructions about what they could do and what they should refrain from doing (Appendices D and E), there were limitations in the investigator's amount of control given the virtual nature of the research study.

Finding 2: Appraisal of Experimental Tasks: Facial Expression of Anger and Fear

Contrary to our hypotheses, CWS, compared to CWNS, did not exhibit significantly higher measures of threat appraisal, indicated by observational Likert scale ratings of fear, during any of the tasks. We also did not find any significant difference between groups for challenge appraisal, indicated by observational Likert scale ratings of anger, during any of the tasks.

This lack of significant differences in appraisal inferred from facial expressions of emotion aligns with results from other studies that do not report significant differences in emotional-related processes of CWS and CWNS (J. D. Anderson et al., 2003; Arnold et al., 2011; Eggers et al., 2010; van der Merwe et al., 2011; Zengin-Bolatkale et al., 2015). Our findings are consistent with the results of past studies, meaning it is possible that there are no differences to be found between CWS and CWNS when it comes to appraisal of stress. However, the results of Question 1 suggest that our virtual adaptations of experimental tasks were not effective stressors in comparison to the control tasks. This makes it difficult to determine the root cause behind the lack of significant differences between CWS and CWNS. This study would not be the first to report a lack of significant differences between CWS and CWNS that may be attributed to experimental tasks that are of insufficient strength to elicit significant changes in emotion-related processes (e.g., Arnold et al., 2011; Salvo & Arnold, 2022; Zengin-Bolatkale, Conture, Key, et al., 2018). Ultimately, it can be challenging to find tasks that are difficult enough to elicit measurable changes in emotion-related processes but are also deemed appropriate for use with preschool-age children.

Finding 3: Appraisal of Experimental Tasks: Task Choice and Rationale

Results for task choices and rationales varied in terms of alignment with our hypotheses. When looking at the descriptive data for the NonSpeech Tasks and All Tasks to repeat, there

were no significant differences between groups. There were also no significant associations between talker group and rationale for tasks chosen for either of these prompts. When asked which Speech Task they would want to repeat, both CWS and CWNS were most likely to choose the Control Speech Task. However, these groups differed in their rationale for choosing the Control Speech Task. CWS were more likely to give rationale consistent with "Not a Challenge/Difficult," whereas CWNS were more likely to report their choice was rooted in "Like/Want" to do the task again. It is interesting that the CWS preferred the Control Speech Task because it was easier, whereas the CWNS said they preferred the Control Speech Task simply because they wanted or liked it.

In a study by Smiley and Dweck (1994), the researchers found that preschool-age children may fall into two groups—children interested in pursuing difficult tasks as an opportunity to increase ability or enjoyment and children oriented toward avoiding difficult tasks, with a preference for tasks they feel certain and capable of completing. Based on our dependent variables of interest, our participants may have been choosing between tasks that were comparable in difficulty. If we consider the open-ended responses when giving rationales for their task choices, the CWS and CWNS do seem to have subtle differences. That is, the CWNS seem to have a propensity toward enjoyment, whereas the CWS seem to prefer avoidance of difficulties. Research comparing CWS and CWNS based on task choice preferences and rationales for choices relative to tasks that successfully vary in difficulty level may be worth exploring in future studies.

Finding 4: Appraisal and *CBQ-SF* Measures of Temperament

We hypothesized that the *CBQ-SF* subscale of Anger/Frustration would be significantly correlated with the observational Likert scale ratings of anger and that the *CBQ-SF* subscale of

Fear would be significantly correlated with the observational Likert scale ratings of fear. If our hypotheses were supported, we thought this might suggest these parent-report measures could be utilized for assessment of appraisal in young CWS in a clinical setting.

There was not a significant correlation between the *CBQ-SF* subscale of Anger/Frustration and the observational Likert scale ratings of anger. There was also no significant correlation between the *CBQ-SF* subscale of Fear and observational Likert scale ratings of fear. It is worth noting that the lack of significant correlations between *CBQ-SF* subscales and observational Likert scale ratings could be attributed to the low variability of ratings for facial expressions of anger and fear as well as the low ratings for facial expressions of anger and fear in general during the tasks.

Finding 5: Group Comparison for *CBQ-SF* Measures of Temperament

Our hypothesis that CWS, compared to CWNS, would exhibit significantly higher *CBQ-SF* (Rothbart et al., 2001) subscale measures consistent with threat appraisal was somewhat supported by our results. That is, CWS, compared to CWNS, did score significantly higher on *CBQ-SF* subscales of temperament thought to be associated with threat appraisal, including Fear and Shyness/Behavioral Inhibition (Lerner, 2001; Lerner et al., 2007; Lerner et al., 2003; Sillars & Davis, 2018). Our findings of CWS, compared to CWNS, scoring higher on the *CBQ-SF* subscales Fear aligns with the findings of Salvo and Arnold (2022). In this study, CWS, compared to CWNS, exhibited significantly higher physiological measures of arousal during baseline conditions, which were not intended to elicit emotional reactions (Salvo & Arnold, 2022).

Contrary to our expectations, CWS, compared to CWNS, scored significantly lower on the *CBQ-SF* subscale of Impulsivity—another aspect of temperament thought to be positively

associated with threat appraisal—albeit in adolescents (Thompson et al., 2014). However, our findings are consistent with studies that report higher levels of behavioral inhibition in preschool-age CWS compared to CWNS (Choi et al., 2013; Snyder & Arnold, 2022).

It is also possible that the lower levels of impulsivity found in our study are related to the heightened levels of fear and behavioral inhibition. Our findings regarding behavioral inhibition, fear, and impulsivity are consistent with the outcomes of another recent study (Snyder & Arnold, 2022). Snyder and Arnold (2022) found that CWS were significantly less likely to touch the Forbidden Toy (i.e., greater behavioral inhibition, lower impulsivity). However, CWS were also significantly more likely to experience distress that forced the experimental task to end early— which would fit with our findings of significantly higher measures of fear.

There were no significant differences between CWS and CWNS on the *CBQ-SF* subscale of Anger/Frustration. It is possible that CWS and CWNS do not differ in this measure, thought to be reflective of challenge appraisal. However, it is also important to consider the possible role of age in this outcome. More specifically, threat appraisal, which is associated with fear, tends to be more common in young children, whereas challenge appraisal, which is associated with anger, increases with age (e.g., Sillars & Davis, 2018). There is a significant increase in challenge appraisal from the preschool-age to middle childhood, which is thought to be related to developmental changes in executive functioning (e.g., cognitive flexibility, effortful control; Sillars & Davis, 2018), as well as cognition and coping (Richmond & Stocker, 2007). Based on this information, it is possible that these young children may not have demonstrated enough measurable challenge appraisal, particularly during the experimental tasks within our study. It would be interesting to compare older CWS and CWNS on these same measures to evaluate if there are any significant differences between groups that may be clearer with age.

Limitations and Future Directions

This is the first study to compare CWS and CWNS on appraisal of stress using a variety of measures and experimental tasks adapted for virtual implementation. The lack of stress associated with the tasks could be attributed to the virtual adaptation of the experiments. Due to the COVID-19 pandemic, virtual adaptations of tasks were the most feasible approach to this study at the time. Given the rise in virtual interactions since the onset of the COVID-19 pandemic (Avis et al., 2006; Hensen et al., 2021), there is much to be learned from investigating the translation of research tasks developed for in-person data collection to a virtual implantation protocol. In the future, researchers investigating whether CWS and CWNS differ in their appraisal of stress will want to ensure they are utilizing tasks that are significantly more stressful than the control tasks. With the rise in digital research studies, it may be possible to execute a similar study with virtual research tasks that are proven to elicit stress in preschool-age children, while also limiting the amount of caregiver support that may be needed. An additional option could be to implement these same tasks using an in-person data collection method; researchers will want to monitor the data to assess whether the experimental tasks are eliciting changes in emotions across children. In the future, researchers may wish to conduct a similar study using an in-person format to see if there are any differences in challenge appraisal and threat appraisal, with consideration to both task and group comparisons. Lastly, researchers may consider training a few coders to utilize observational Likert scale ratings of fear and anger and others to use a forced-choice paradigm (Scherer et al., 2018). According to Scherer et al. (2018), observational Likert scale ratings may be more susceptible to halo effects, which are general cognitive biases that stem from attributes and influence subsequent judgments (Forgas & Laham, 2016, p. 276). Scherer and colleagues say that a forced-choice paradigm may improve coders' discrimination

abilities of appraisal differences. As discussed in the literature review, observational Likert scale ratings are commonly used in studies of emotion-related processes (e.g., Camras et al., 2002; Camras et al., 1998; Keltner & Ekman, 2000; Scherer et al., 2018; Veijalainen et al., 2021). Researchers may be interested in comparing the results of coders who utilize observational Likert rating scales and coders who use a forced-choice coding method (e.g., indicating yes or no regarding whether an emotion is expressed or not) to assess whether the outcomes significantly differ. Research of this nature may inform methodological decisions for future studies involving appraisal.

Conclusions

This study explored the appraisal tendencies of preschool-age CWS and CWNS using self-report (indexed by task choice and rationale), behavioral (indexed by observational Likert scale ratings of anger and fear), and parent-report measures (indexed by *CBQ-SF* subscale measures). Findings indicated that both preschool-age CWS and CWNS had similar preferences in terms of tasks. In addition, preschool-age CWS and CWNS did not significantly differ in their appraisal of tasks as challenges or threats based on observational Likert scale ratings of anger and fear. One of the most interesting findings of this study was that CWS said they chose to repeat the Control Speech Task because it was "Not a Challenge/Difficult," whereas the CWNS said they preferred to repeat the Control Speech Task simply because they "Like/Want to." The mindset reflected in these open-ended responses suggests CWS may be more oriented toward certainty and control, which differs from the CWNS, whose responses seem to reflect a mindset orientation toward pleasantness. CWS, compared to CWNS, also showed a possible propensity for threat appraisal, as evidenced by significantly higher *CBQ-SF* subscale scores. Our findings support the pursuit of additional research regarding the appraisal of stress in preschool-age CWS.

If future studies report CWS have a significantly greater predisposition to threat appraisal, whereas CWNS have a significantly greater propensity for challenge appraisal, this could give rationale for the implementation of therapeutic approaches targeting the development of adaptive stress appraisal (for review, see Parrish et al., 2021). Some therapeutic approaches that may impact appraisal tendencies have been studied and recommended for use with school-age CWS (Caughter & Crofts, 2018; Kelman & Wheeler, 2015; Murphy et al., 2007; Rodgers et al., 2020) as well as AWS (Beilby et al., 2012; Gupta et al., 2016; Menzies et al., 2009; Palasik & Hannan, 2013). Overall, parent-report measures and children's self-report measures from our study support the notion that threat appraisals may be important to consider in young children who stutter.

APPENDICES

APPENDIX A

RECRUITMENT MATERIALS

Appendix A

Recruitment Materials

[Recruitment Social Media Post]

Researchers Seeking
Preschool-Age Children who Stutter
&
Preschool-Age Children who Do Not Stutter

to participate in a three-part study conducted by
Heather D. Salvo, M.S., CCC-SLP and Hayley S. Arnold, PhD., CCC-SLP

Study Title: Appraisal Behaviors of Preschool-age Children who Stutter
Approved by the Kent State University Institutional Review Board, 330-672-2704

To participate in the study, children *must*
- ❖ Be between 3 and 5-years old
- ❖ Speak English as their first language
- ❖ Have access to the internet as well as a laptop or desktop computer that is equipped with a camera and microphone.

Additional Details:
- ❖ Free speech-language testing and summary provided
- ❖ Families of eligible children will receive a $20 gift card
- ❖ This study spans three online sessions

Volunteer to participate: [INSERT LINK]
For more information, email: hsalvo@kent.edu

[Recruitment Email]

Hello!

We are recruiting preschool-age children who stutter to participate in an online study called: "Appraisal behaviors of preschool-age children who stutter." We hope that this study will help us better understand how appraisal behaviors in response to stress may contribute to stuttering in children so that better assessment and treatment can be developed for this communication disorder.

To participate in the study, children must speak English as their first language and have no history of receiving speech-language therapy. Children must also have access to internet as well as a laptop or desktop computer that is equipped with a camera, a microphone, and a mouse. This study spans three to four online sessions, depending on the child's need for breaks.

If you know of any preschool-age children between the ages 3 to 5-years-old who may qualify for our study, please share this information with their parents/guardians. Below is a link to the Intake Survey, where parents will provide consent and respond to questions that will determine eligibility.

Enrollment Survey Link: https://tinyurl.com/4e78sxpr

Our research protocol includes a free speech-language assessment, which will help to identify whether a child is stuttering, whether it is likely to resolve spontaneously, and/or whether it warrants further evaluation and treatment by a speech-language pathologist. Families will receive a summary and interpretation of their child's speech-language results, which may provide new insight about their child's communicative functioning. Children are also given a $20 gift card for participation in the study.

If you have any questions, feel free to contact our research personnel at 262-676-1322 or by email at hsalvo@kent.edu. A link to our study handout can be found here. This research project has been approved by the Kent State University IRB #20-488.

Thank you!
Heather D. Salvo, M.S., CCC-SLP
Doctoral Candidate
Department of Speech Pathology and Audiology
Kent State University

Hayley S. Arnold, Ph.D., CCC-SLP
Assistant Professor
Department of Speech Pathology and Audiology
Kent State University

[Recruitment Flyer]

Does your child get "stuck" when talking? Do they repeat words or sounds often?

Speech-Language Pathology, Kent State University

Study Title: Appraisal behaviors of preschool-age children who stutter
Approved by the Kent State University Institutional Review Board

❖ We are looking for preschool-age children who stutter (ages 3-5 years old) to participate in a virtual study

❖ **Free** speech-language assessment provided.

❖ Families that participate will receive a **$20 Amazon eGiftcard**

❖ Children must speak English as their first language and have no history of receiving speech-language therapy.

❖ Children must also have access to internet as well as a computer that is equipped with a camera, a microphone, and a mouse.

❖ This study spans three to four online sessions, depending on the child's need for breaks.

❖ Enrollment Survey Link: **https://tinyurl.com/4e78sxpr**

❖ More information?

   ➤ Email hsalvo@**kent.edu**

   ➤ Or call (262) 676-1322

Or scan this QR code!

APPENDIX B

QUALTRICS SURVEY #1: CONSENT AND ELIGIBILITY

Appendix B

Qualtrics Survey #1: Consent and Eligibility

Informed Consent to Participate in a Research Study
Study Title: Appraisal Behaviors of Preschool-Age Children who Stutter
Principal Investigator: Hayley S. Arnold, PhD., CCC-SLP
Co-Investigator: Heather D. Salvo, M.S., CCC-SLP
Kent State University IRB Approval Number: 20-488

Your child is being invited to participate in a research study. This consent form will provide you with information on the research project, what your child will need to do, and the associated risks and benefits of the research. Your child's participation is voluntary. Please read this information carefully. It is important that you ask questions and fully understand the research in order to make an informed decision. You will receive a copy of this document via email.

Purpose The purpose of this study is to investigate how preschool-age children who stutter and children who do not stutter interpret and respond to stress. This study will further our understanding of stuttering and possibly result in better ways to help individuals who stutter.

Procedures You, the parent, will be asked to provide information about your child's communication development and other behavioral characteristics via Qualtrics surveys, which will take approximately 30 minutes. Your child's participation will require him/her to partake in three to four sessions online via Zoom. In order to participate, your child must be able to access a computer/laptop equipped with a keyboard and capable of audio/video communication. During the first part of this study, we will administer standardized tests for speech and language (approximately one hour). These tests will be used to see if your child's communication abilities are within the normal range for his/her age. The one-hour assessment session may be split into two separate 30–45-minute sessions if needed. The two experimental parts of the study are typically scheduled within two weeks of the assessments and will take approximately 30-45 minutes each. During the two experimental sessions, your child will be asked to participate in the experimental tasks ("games") that involve virtual drawing and picture naming. During the two experimental sessions, we will also ask your child to listen to and retell stories using child-oriented pictures shown on a computer screen.

Audio and Video Recording and Photography Audio-video recordings of your child will be taken during the speech-language testing and experimental procedures. Videos of the testing procedures will allow the speech-language clinician(s) to verify test responses for assessment purposes. Video and audio of the experimental procedures will allow the lab personnel to track speech behaviors such as stuttering and sentence length. Video recordings will be stored in a secure Kent State University data drive and labeled using a participant identification system, which allows for the confidentiality of the videos. The audio-visual information will be used in the present research project and archived for use in future projects. Only the research team will have access to these audio-visual data unless you grant permission to do otherwise (a separate consent form will be sent via email). The audio-visual recordings, and any still photography

derived from it, may also be used to illustrate the study's procedures at professional meetings.

Benefits This research will not benefit you or your child directly. However, you will receive a summary and interpretation of your child's speech-language results, which may provide new knowledge about the child's communicative functioning. Your child's participation in this study will help us to better understand how interpretations of stress contribute to stuttering in children. This knowledge will inform theory and clinical practice, with the potential of leading to improved methods of stuttering assessment and treatment.

Risks and Discomforts There are no anticipated risks beyond those encountered in everyday life.

Privacy and Confidentiality Identifying information will not be made available in the publications and/or presentations of the research data. Your child's study-related information will be kept confidential within the limits of the law. Identifying information will not be used to label your audio-visual recordings or electronic response records from the study. Any identifying information will be kept in a secure location and only the researchers will have access to the data. Research participants will not be identified in any publication or presentation of research results; only group-level data will be used. Your research information may, in certain circumstances, be disclosed to the Institutional Review Board (IRB), which oversees research at Kent State University, or to certain federal agencies. Your child's confidentiality may not be maintained if there is an indication that if he/she may harm themselves or others.

Compensation Your family will receive a $20 gift card for participation in the study.

Voluntary Participation Taking part in this research study is entirely up to you and your child. You and/or your child may choose not to participate or may discontinue their participation at any time without penalty or loss of benefits to which he/she is otherwise entitled. You will be informed of any new, relevant information that may affect your child's health, welfare, or willingness to continue participation in this study.

Contact Information If you have any questions or concerns about this research, you may contact Dr. Hayley Arnold at 330.672.0259. This project has been approved by the Kent State University Institutional Review Board (IRB). If you have any questions about your rights as a research participant or complaints about the research, you may call the IRB at 330.672.2704.

Consent Statement and Signature I have read this consent form and have had the opportunity to have my questions answered to my satisfaction. I voluntarily agree to grant permission for my child to participate in this study. By selecting "Yes, I consent" below, I indicate consent for my child to participate in this research study. If you are NOT interested in having your child participate in this study, please exit your browser.

◯ **Yes, I consent**

Would you like to receive a copy of this consent form information via email?

◯ Yes (include email address below)

_____

◯ No

End of Block: Block 1

Start of Block: Default Question Block

Contact information for scheduling sessions
Participants within the U.S. will be contacted by phone to schedule sessions.
Participants outside of the U.S. will be contacted via email to coordinate a Zoom call for scheduling sessions.

◯ Your First Name: _____

◯ Phone Number: (111) 111 – 1111 _____

◯ Email Address: _____

◯ Child's first name: _____

◯ Child's age: _____

◯ Child's birth date (mm/dd/yyyy): _____

What day(s) and times would you prefer we to call to schedule your child's virtual sessions? (Please include your time zone)
_____
_____
_____

My child lives in this country:
▼ United States of America (1) ... Zimbabwe (195)

If USA, what state?
▼ My child does not reside in the United States (1) ... Wyoming (53)

My child's sex is:

○ Male

○ Female

○ Other _____

I have concerns about my child in the following area(s):

	Yes	No	Unsure
Speech	○	○	○
Stuttering	○	○	○
Language	○	○	○
Hearing	○	○	○
Emotion	○	○	○
Social	○	○	○
Learning	○	○	○
Feeding	○	○	○
Behavioral	○	○	○
Sleep	○	○	○
Other	○	○	○

Does your child have any family members with a history of stuttering?
If yes, please specify in the textbox below

○ Yes _____

○ No

How long ago did notice your child's stuttering?
▼ Less than 6 months ago (1) ... Not applicable (4)

How old was your child when you first noticed their stuttering? *We recommend thinking about holidays or events and asking yourself "Did I notice them stuttering then?" This can help narrow down when your child's stuttering began.* If you do not think your child stutters, please type NA

_____

Has your child received speech-language therapy in the past?

○ Yes

○ No

If your child has received speech and/or language therapy in the past, please indicate the following

If your child has not received speech and/or language therapy in the past, please type NA or leave blank

○ Where? _____

○ By whom? _____

○ For how long? _____

○ Focus of therapy: _____

○ Therapy results: _____

Is your child currently receiving speech and/or language therapy?

○ Yes

○ No

If your child is currently receiving speech and/or language therapy, please indicate the following
If your child is not currently receiving speech and/or language therapy, please type NA or leave blank

○ Where? _____

○ By whom? _____

○ For how long? _____

○ Focus of therapy? _____

○ Therapy results so far? _____

End of Block: Default Question Block

Start of Block: CHILD Hearing Screener

Try the following situations with your child or recall how your child has responded under these various situations. Everyone has some difficulty hearing clearly and understanding in some situations. Choose the level on the Understand-O-Meter you think describes your child's abilities most closely and place this number in the blank at the end of each question. This can be very difficult but try to estimate the child's listening abilities as best you can.

1. Sit next to your child and look at a book together or talk about something in front of you using familiar words and a normal conversational manner. Talk in a quiet place and sit so your child is not looking at your face as you talk together. How difficult does it seem for your child to hear and understand what you say?

Select your response ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

2. Gather your family together for a meal at home or in a fairly quiet restaurant. Sit across the table from your child and ask some questions about a familiar topic or event. How difficult does it seem to be for your child to hear and understand?

Select your response ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

3. When your child is in his or her bedroom playing quietly, walk into the room and tell or ask the child something. Do not say the child's name or try to get their attention first. How difficult does it seem for your child to hear and understand?

Select your response ▼1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

4. Watch a TV show or video (not cartoons) with your child. Ask questions about what was said or events in the show that were understood by listening to the dialogue. How difficult does it seem for him or her to hear and understand what people are saying on the TV show? (Show is seen for the first time and not closed captioned).

Select your response   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

5. Observe your child playing inside with a friend, brother or sister. Watch for the other child to ask him or her to do something. How easy does it seem to be for your child to hear and understand other children when they talk?

Select your response   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

6. When your child is watching TV or playing with a noisy toy, walk into the room and talk to him or her without first getting the child's attention. How difficult does it seem for your child to hear and understand the person when the noise from the TV or toy is on?

Select your response   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

7. Call your child's name from another room when he or she is not able to see you. How difficult does it seem for him or her to hear and realize you are calling?

Select your response   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

8. Use a clock radio or alarm when it is time for your child to get up. How difficult does it seem to be for him or her to hear an alarm clock or clock radio go off? If no clock is used how difficult is it for him or her to hear your voice and wake up without having to be touched or shaken?

Select your response   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

9. Observe your child playing with a group of children inside a house. It's noisy (birthday party,

cub scouts, etc.) How difficult does it seem to be for your child to understand what the children are saying as they play as a group?

Select your response   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

10. A grandparent, family member or friend wants to talk to your child on the phone. How difficult does it seem to be for him or her to hear and understand what is said over the phone?

Select your response   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

11. Observe your child playing outside with other children. How difficult is it for him or her to hear and understand what other children are saying when the children are outside and are not standing close to the child?

Select your response   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

12. Go to a crowded store or mall with your child. When you are standing behind the child and he or she is looking at something, ask a question. How difficult does it seem to be for your child to hear and understand what you say?

Select your response   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message ... 8 GREAT: Hears every word, Understands everything

13. Go into a large room with your child and speak to him or her from across the room. How well does he or she seem to hear and understand what you say?

Select your response (4)   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message (1) ... 8 GREAT: Hears every word, Understands

everything (12)

14. Travel in the car with your child in the backseat. From the front seat say something to your child or ask a question. How easy does it seem for him or her to hear and understand what is said?

Select your response (4)   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message (1) ... 8 GREAT: Hears every word, Understands everything (12)

15. Sit in a quiet place, face your child and have a conversation or ask questions. How difficult does it seem for him or her to hear and understand what you say?

Select your response (4)   ▼ 1 HUH?: Doesn't know that someone is talking, misses all of the message (1) ... 8 GREAT: Hears every word, Understands everything (12)

End of Block: CHILD Hearing Screener

Start of Block: Block 3

Would you like to be contacted for future research studies that your child and/or yourself may be eligible to participate in?

◯ Yes (1)

◯ No (2)

End of Block: Block 3

APPENDIX C

QUALTRICS SURVEY #2: ADDITIONAL INFORMATION

Appendix C

Qualtrics Survey #2: Additional Information

Start of Block: Welcome Message
Thank you for your willingness to participate in our research study!

The first part of this survey will allow us to learn more about your child. You will be asked to respond to questions about topics such as demographics, family life, and developmental history. In the first part of the survey, we will also ask you to complete an internet speed test so as to ensure connectivity for future sessions is sufficient.

The second part of this survey will include questions targeting an understanding of how your child's stuttering impacts you (their parent/guardian) as well as other family members. Please complete this portion, <u>even </u>if you believe your child does not stutter.

The third and final part of this survey will include an assessment that relies on parent/guardian responses in order to learn more about your child's temperament.

 You should be able to stop and start this survey on any device (e.g. phone, tablet, computer) without losing your progress. However, you may wish to complete this information while your child engages in their first virtual assessment session. This way, any questions can be addressed at the end of the assessment protocol. If you have any questions regarding this survey or any question items, please contact Heather Salvo M.S., CCC-SLP at hsalvo@kent.edu

Kent State University IRB Approval Number: 20-488
Start of Block: Background Information
Internet Speed Test
Because this study involves remote data collection via Zoom, we need our participants to complete a speed test of their internet.
Please run this speed test in the location that your child will complete their sessions (e.g., at home).

 To complete your internet speed test, please click the following link and select "Go": Internet Speed Test
Then input your results in the text boxes below

○ Download Speeds (in Mbps)

_____

○ Upload Speeds (in Mbps) _____

Page Break
Please input the unique code provided for you in your email:
_____

Demographic Information
Please note, your responses to these questions help inform our comprehensive assessment of your child. Importantly, you can choose to share or refrain from sharing information based on your level of comfort with each question.
My child's ethnicity is (check all that apply):

☐ White/Caucasian

☐ African American

☐ Hispanic/Latino (3)

☐ Native American or American Indian

☐ Asian/Pacific Islander

☐ Other _____

What language(s) does your child speak regularly?

☐ English

☐ Spanish

☐ German

☐ French

☐ Mandarin Chinese

☐ Japanese

☐ Korean

☐ Arabic

☐ Hindi

☐ Portuguese

☐ Russian

☐ Turkish

☐   Italian

☐   Other(s) _____

Which hand does your child *primarily* use?

○ Right

○ Left

Parent/Guardian #1's relationship to the child

○ Mother

○ Father

○ Other _____

Parent/Guardian #1's Marital Status
▼ Single ... Widowed

Parent/Guardian #1's Age
▼ 18 - 24 ... 85 or older

Parent/Guardian #1's highest educational degree completed
▼ High School Diploma/GED ... Doctoral

Parent/Guardian #1's number of years of post-secondary education? (beginning with college)
_____

Parent/Guardian #1's occupation

Parent/Guardian #1's estimated yearly income
▼ Less than $10,000... More than $150,

Parent/Guardian #2's Relationship to the child

○ Mother

○ Father

○ Other _____

Parent/Guardian #2's Marital Status

▼ Single ... Widowed
Parent/Guardian #2's Age
▼ 18 - 24 ... 85 or older
Parent/Guardian #2's Highest Educational Degree Completed
▼ High School Diploma/GED ... Doctoral

Parent/Guardian #2's number of years of post-secondary education? (beginning with college)
_____

Parent/Guardian #2's Occupation
_____

Parent/Guardian #2's Estimated Yearly Income
▼ Less than $10,000 ... More than $150,000

How many siblings does the child have?
 (please list the age(s) in the appropriate text box if applicable)

    ○ Not applicable

    ○ One _____

    ○ Two _____

    ○ Three   _____

    ○ Four   _____

    ○ Five or more   _____

Have parents or any other family members had speech, language, hearing, or learning problems?

    ○ Yes

    ○ No

If yes, please indicate the individuals' relationships to the child and the nature of the problem(s).
 If no, please leave blank or type NA
_____
[Page Break]

Medical History
Please note, your responses to these questions help inform our comprehensive assessment of your child. Importantly, you can choose to share or refrain from sharing information based on your level of comfort with each question.

Medical History (*please check all that apply*)

☐ Adenoidectomy

☐ Allergies

☐ Asthma

☐ Behavior issues

☐ Brain injury

☐ Breathing problems

☐ Cardiac issues

☐ Chicken pox

☐ Diabetes

☐ Ear infection(s)

☐ Ear tubes

☐ Encephalitis

☐ Frequent colds

☐ Hearing loss

☐ Hearing aids/Cochlear implants

☐ High fever

☐ Measles

☐ Meningitis

☐ Mumps

☐ Seizures

☐ Sensory issues

☐   Serious Accident (e.g., vehicle, falling)

☐   Sleep issues

☐   Tongue tie

☐   Tonsillectomy

☐   Vision issues

☐   Other _____

☐   Not applicable

Does your child take any medication? *If comfortable, please indicate the purpose of the medication*

○ No

○ Yes _____

○ Prefer not to respond

How was your child delivered?
▼ Vaginally ... Cesarean Section

Were there any illnesses or infections during pregnancy? *If comfortable, please provide additional information that may be relevant to completing a comprehensive assessment report for your child.*

○ No

○ Yes _____

Was there any unusual stress during the pregnancy? *If comfortable, please provide additional information that may be relevant to completing a comprehensive assessment report for your child.*

○ No

○ Yes _____

Were there any complications during delivery or birth? *If comfortable, please provide additional information that may be relevant to completing a comprehensive assessment report for your child.*

○ No

○ Yes _____

After how many weeks gestation was your child born?
▼ Typical (38-42 weeks) ... Premature (less than 24 weeks)

[Page Break]

Developmental History
 Please note, your responses to these questions help inform our comprehensive assessment of your child. Importantly, you can choose to share or refrain from sharing information based on your level of comfort with each question.

How old was your child when they said their first word?

☐ Younger than 12 months

☐ Between 13 -17 months old

☐ Between 18 and 23 months

☐ Older than 24 months

Does your child produce sentences of the following length?
 (*Please select all that apply*)

☐ 2 words

☐ 3 words

☐ 4 words

☐ 5+ words

Does your child have difficulty with any of the following?
 (*Please check all that apply*)

☐ Aggression

☐ Anger

☐ Answering simple questions

☐ Attention

☐ Completing tasks

☐ Following directions

☐ Frustration tolerance

☐ Loud noises

☐ Maintaining eye contact

☐ Remembering/Memory

☐ Transitions

☐ Understanding people

☐ Word retrieval

☐ None of the above

[Page Break]

History of Therapy

Please note, your responses to these questions help inform our comprehensive assessment of your child. Importantly, you can choose to share or refrain from sharing information based on your level of comfort with each question.

Please indicate any professionals your child has been <u>evaluated </u>by:

☐ Speech-Language Pathologist

☐ Audiologist

☐ Developmental pediatrician

☐ Neurologist

☐ Physical Therapist

☐ Occupational Therapist

☐ Behavioral Interventionist

☐ Psychologist/Psychiatrist

☐ Optometrist

☐ Other _____

☐ Not applicable

If applicable, please list any evaluation results and/or diagnoses you are comfortable sharing below:

_____

Please indicate any professionals your child has received therapy from:

☐ Audiologist

☐ Developmental pediatrician

☐ Neurologist

☐ Physical Therapist

☐ Occupational Therapist

☐ Behavioral Interventionist

☐ Psychologist/Psychiatrist

☐ Other _____

☐ None of the above

[Page Break]

Please select the response that best represents your child.

	Definitely true	Probably true	Neither true nor false	Probably false	Definitely false
My child has speech difficulties	○	○	○	○	○
I have difficulty understanding my child	○	○	○	○	○
Unfamiliar conversation partners have difficulty understanding my child	○	○	○	○	○
My child is child appears frustrated by his/her communication abilities	○	○	○	○	○

Do your think you child may stutter?

○ Yes

○ No

Qualtrics Survey Skip To: Q50 If Do your think you child may stutter? = Yes

Qualtrics Survey Skip To: End of Block If Do your think you child may stutter? = No

[Page Break]
How long ago did notice your child's stuttering?
▼ Less than 6 months ago ... More than 12 months ago

How old was your child when you first noticed their stuttering?
▼ Less than 24 months old ... Between 54 and 60 months old

What did your child's stuttered speech sounded like when it first began? (*Examples provided, please check all that apply*)

☐ Hesitations – Pauses as if thinking about what to say before or during speaking.

☐ Interjections – Adds sounds, syllables, or words when speaking. ("Well, I want to, um, well, go home.")

☐ Revisions of phrases or sentences; changes what is said. ("I want to... I'd like to go somewhere... can I go with you?")

☐ Phrase repetitions ("Can I, can I, have some candy?")

☐ One-syllable word repetitions ("Can I get, get, get some candy?")

☐ Part-word syllable repetitions ("I want a pu, pu, puppy." Or, " I want a pu, PUppy.")

☐ Sound repetitions, especially "uh". (M, m, m, mom, can I go?" or Uh, uh, can I, uh, go, uh, uh, home?")

☐ Prolongations – Stretching or holding onto a sound. ("MMMMMMMMom, I want that.")

☐ Increased muscle tension noted in the mouth, throat, or lips. (Child seems to press lips together tightly or force words out)

☐ Non-speech behaviors. (Blinks eyes, slaps body, bends body, or moves body in some way to get speech started.)

In the beginning, were you and/or the child's other immediate family members concerned or worried about your child's stuttering?

○ Yes

○ No

In the beginning, what was your reaction or the reaction of other close family members to your child's stuttering?

_____

Does your child ever indicate awareness or frustration with his/her stuttering?

○ Always

○ Most of the time

○ About half the time

○ Sometimes

○ Never

Qualtrics Survey Skip To: Q57 If Does your child ever indicate awareness or frustration with his/her stuttering? = Never

What does (s)he say that indicates they are aware or frustrated? (Example: "My words are stuck" or "I can't talk")

Do you and your child talk about their stutter?

○ Yes

○ No

Qualtrics Survey Skip To: Q68 If Do you and your child talk about their stutter? = No

If yes, what do you call your child's stuttering when talking about it with your child?
(*If no, type NA*)

_____

What does your child's stuttered speech sound like currently? (*Examples provided, please check all that apply*)

☐ Hesitations – Pauses as if thinking about what to say before or during speaking.

☐ Interjections – Adds sounds, syllables, or words when speaking. ("Well, I want to, um, well, go home.")

☐ Revisions of phrases or sentences; changes what is said. ("I want to... I'd like to go somewhere... can I go with you?")

☐ Phrase repetitions ("Can I, can I, have some candy?")

☐ One-syllable word repetitions ("Can I get, get, get some candy?")

☐ Part-word syllable repetitions ("I want a pu, pu, puppy." Or, "I want a pu, PUppy.")

☐ Sound repetitions, especially "uh". (M, m, m, mom, can I go?" or Uh, uh, can I, uh, go, uh, uh, home?")

☐ Prolongations – Stretching or holding onto a sound. ("MMMMMMMMom, I want that.")

☐ Increased muscle tension noted in the mouth, throat, or lips. (Child seems to press lips together tightly or force words out.)

☐ Non-speech behaviors. (Blinks eyes, slaps body, bends body, or moves body in some way to get speech started.)

Have you or other family members tried to help your child speak? If so, what have you tried?

_____

End of Block: Background Information

Start of Block: Children's Behavior Questionnaire- Short Form
Children's Behavior Questionnaire- Short Form Instructions

Please read carefully before starting. On the next few pages, you will see a set of statements that describe children's reactions to a number of situations. We would like you to tell us what your child's reaction is likely to be in those situations. There are of course no "correct" ways of reacting; children differ widely in their reactions, and it is these differences we are trying to learn about. Please read each statement and decide whether it is a "true" or "untrue" description of your child's reaction within the past six months. Use the following scale to indicate how well a statement describes your child:

1 Extremely untrue   2 Quite untrue 3 Slightly untrue   4 Neither true nor false
5 Slightly true   6 Quite true   7 Extremely true   Not applicable

If you cannot answer one of the items because you have never seen the child in that situation, select "Not applicable".

 For example, if the statement is about your child's reaction to your singing and you have never sung to your child, then select "Not applicable".   Please be sure to indicate a number or not applicable for every item.

_____

Use the following scale to indicate how well each statement describes your child.

	Extremely untrue (1)	Quite untrue (2)	Neither true or untrue (3)	Slightly true (4)	Quite true (5)	Extremely true (6)	Not applicable (7)
Seems always in a big hurry to get from	○	○	○	○	○	○	○

one place to another. (1)							
Gets angry when told s/he has to go to bed. (2)	○	○	○	○	○	○	○
Is not very bothered by pain. (3)	○	○	○	○	○	○	○
Likes going down high slides or other adventurous activities. (4)	○	○	○	○	○	○	○
Notices the smoothness or roughness of objects s/he touches. (5)	○	○	○	○	○	○	○
Gets so worked up before an exciting event that s/he has trouble sitting still. (6)	○	○	○	○	○	○	○
Usually rushes into an activity without thinking about it. (7)	○	○	○	○	○	○	○
Cries sadly when a favorite toy gets lost or stolen. (8)	○	○	○	○	○	○	○
Becomes quite uncomfortable when cold	○	○	○	○	○	○	○

and/or wet. (9)

Likes to play so wild and recklessly that s/he might get hurt. (10)

○　　○　　○　　○　　○　　○　　○

Use the following scale to indicate how well each statement describes <u>your child.</u>

	Extremely untrue (1)	Quite untrue (2)	Neither true or untrue (3)	Slightly true (4)	Quite true (5)	Extremely true (6)	Not applicable (7)
Seems to be at ease with almost any person. (1)	○	○	○	○	○	○	○
Tends to run rather than walk from room to room. (2)	○	○	○	○	○	○	○
Notices it when parents are wearing new clothing. (3)	○	○	○	○	○	○	○
Has temper tantrums when s/he doesn't get what s/he wants. (4)	○	○	○	○	○	○	○
Gets very enthusiastic about the	○	○	○	○	○	○	○

things s/he does (5)							
When practicing an activity, has a hard time keeping her/his mind on it. (6)	○	○	○	○	○	○	○
Is afraid of burglars or the "boogie man." (7)	○	○	○	○	○	○	○
When outside, often sits quietly. (8)	○	○	○	○	○	○	○
Enjoys funny stories but usually doesn't laugh at them. (9)	○	○	○	○	○	○	○
Tends to become sad if the family's plans don't work out. (10)	○	○	○	○	○	○	○
Will move from one task to another without completing any of them. (11)	○	○	○	○	○	○	○

Moves about actively (runs, climbs, jumps) when playing in the house. (12)	○	○	○	○	○	○	○
Is afraid of loud noises. (13)	○	○	○	○	○	○	○
Seems to listen to even quiet sounds. (14)	○	○	○	○	○	○	○
Has a hard time settling down after an exciting activity. (15)	○	○	○	○	○	○	○
Enjoys taking warm baths. (16)	○	○	○	○	○	○	○
Seems to feel depressed when unable to accomplish some task. (17)	○	○	○	○	○	○	○
Often rushes into new situations. (18)	○	○	○	○	○	○	○

Is quite upset by a little cut or bruise. (19)	○	○	○	○	○	○	○
Gets quite frustrated when prevented from doing something s/he wants to do. (20)	○	○	○	○	○	○	○
Becomes upset when loved relatives or friends are getting ready to leave following a visit. (21)	○	○	○	○	○	○	○
Comments when a parent has changed his/her appearance. (22)	○	○	○	○	○	○	○
Enjoys activities such as being chased, spun around by the arms, etc. (23)	○	○	○	○	○	○	○
When angry about something, s/he tends	○	○	○	○	○	○	○

to stay upset for ten minutes or longer. (24)							
Is not afraid of the dark. (25)	○	○	○	○	○	○	○

Use the following scale to indicate how well each statement describes <u>your child.</u>

	Extremely untrue (1)	Quite untrue (2)	Neither true or untrue (3)	Slightly true (4)	Quite true (5)	Extremely true (6)	Not applicable (7)
Takes a long time in approaching new situations. (1)	○	○	○	○	○	○	○
Is sometimes shy even around people s/he has known a long time. (2)	○	○	○	○	○	○	○
Can wait before entering into new activities if s/he is asked to. (3)	○	○	○	○	○	○	○
Enjoys "snuggling up" next to a parent or	○	○	○	○	○	○	○

babysitter. (4)						
Gets angry when s/he can't find something s/he wants to play with. (5)	○ ○ ○ ○ ○ ○ ○
Is afraid of fire. (6)	○ ○ ○ ○ ○ ○ ○
Sometimes seems nervous when talking to adults s/he has just met. (7)	○ ○ ○ ○ ○ ○ ○
Is slow and unhurried in deciding what to do next. (8)	○ ○ ○ ○ ○ ○ ○
Changes from being upset to feeling much better within a few minutes. (9)	○ ○ ○ ○ ○ ○ ○
Prepares for trips and outings by planning things s/he will need.. (10)	○ ○ ○ ○ ○ ○ ○

Use the following scale to indicate how well each statement describes your child.

	Extremely untrue (1)	Quite untrue (2)	Neither true or untrue (3)	Slightly true (4)	Quite true (5)	Extremely true (6)	Not applicable (7)
Becomes very excited while planning for trips. (1)	○	○	○	○	○	○	○
Is quickly aware of some new item in the living room. (2)	○	○	○	○	○	○	○
Hardly ever laughs out loud during play with other children. (3)	○	○	○	○	○	○	○
Is not very upset at minor cuts or bruises. (4)	○	○	○	○	○	○	○
Prefers quiet activities to active games. (5)	○	○	○	○	○	○	○
Tends to say the first thing that comes to mind, without stopping to	○	○	○	○	○	○	○

think about it. (6)							
Acts shy around new people. (7)	○	○	○	○	○	○	○
Has trouble sitting still when s/he is told to (at movies, church, etc.). (8)	○	○	○	○	○	○	○
Rarely cries when s/he hears a sad story. (9)	○	○	○	○	○	○	○
Sometimes smiles or giggles playing by her/himself. (10)	○	○	○	○	○	○	○

Use the following scale to indicate how well each statement describes your child.

	Extremely untrue (1)	Quite untrue (2)	Neither true or untrue (3)	Slightly true (4)	Quite true (5)	Extremely true (6)	Not applicable (7)
Rarely becomes upset when watching a sad event in a TV show. (1)	○	○	○	○	○	○	○
Enjoys just being talked to. (2)	○	○	○	○	○	○	○
Becomes very excited before	○	○	○	○	○	○	○

an outing (e.g., picnic, party). (3)						
If upset, cheers up quickly when s/he thinks about something else. (4)	○	○	○	○	○	○	○
Is comfortable asking other children to play. (5)	○	○	○	○	○	○	○
Rarely gets upset when told s/he has to go to bed. (6)	○	○	○	○	○	○	○
When drawing or coloring in a book, shows strong concentration. (7)	○	○	○	○	○	○	○
Is afraid of the dark. (8)	○	○	○	○	○	○	○
Is likely to cry when even a little bit hurt. (9)	○	○	○	○	○	○	○
Enjoys looking at picture books. (10)	○	○	○	○	○	○	○

Use the following scale to indicate how well each statement describes your child.

	Extremely untrue (1)	Quite untrue (2)	Neither true or untrue (3)	Slightly true (4)	Quite true (5)	Extremely true (6)	Not applicable (7)
Is easy to soothe when s/he is upset. (1)	○	○	○	○	○	○	○
Is good at following instructions. (2)	○	○	○	○	○	○	○
Is rarely frightened by "monsters" seen on TV or at movies. (3)	○	○	○	○	○	○	○
Likes to go high and fast when pushed on a swing. (4)	○	○	○	○	○	○	○
Sometimes turns away shyly from new acquaintances. (5)	○	○	○	○	○	○	○
When building or putting something together, becomes very involved in what s/he is doing, and works for long periods. (6)	○	○	○	○	○	○	○

Likes being sung to. (7)	○	○	○	○	○	○	○
Approaches places s/he has been told are dangerous slowly and cautiously. (8)	○	○	○	○	○	○	○
Rarely becomes discouraged when s/he has trouble making something work. (9)	○	○	○	○	○	○	○
Is very difficult to soothe when s/he has become upset. (10)	○	○	○	○	○	○	○

Use the following scale to indicate how well each statement describes your child.

	Extremely untrue (1)	Quite untrue (2)	Neither true or untrue (3)	Slightly true (4)	Quite true (5)	Extremely true (6)	Not applicable (7)
Likes the sound of words, such as nursery rhymes. (1)	○	○	○	○	○	○	○
Smiles a lot at people s/he likes. (2)	○	○	○	○	○	○	○

Dislikes rough and rowdy games. (3)	○	○	○	○	○	○	○
Often laughs out loud in play with other children. (4)	○	○	○	○	○	○	○
Rarely laughs aloud while watching TV or movie comedies. (5)	○	○	○	○	○	○	○
Can easily stop an activity when s/he is told "no." (6)	○	○	○	○	○	○	○
Is among the last children to try out a new activity. (7)	○	○	○	○	○	○	○
Doesn't usually notice odors such as perfume,	○	○	○	○	○	○	○

smoke, cooking, etc. (8)						
Is easily distracted when listening to a story. (9)	○	○	○	○	○	○	○
Enjoys sitting on parent's lap. (10)	○	○	○	○	○	○	○

Use the following scale to indicate how well each statement describes your child.

	Extremely untrue (1)	Quite untrue (2)	Neither true or untrue (3)	Slightly true (4)	Quite true (5)	Extremely true (6)	Not applicable (7)
Gets angry when called in from play before s/he is ready to quit. (1)	○	○	○	○	○	○	○
Enjoys riding a tricycle or bicycle fast and recklessly. (2)	○	○	○	○	○	○	○
Sometimes becomes absorbed in a picture book and looks at it for a long time. (3)	○	○	○	○	○	○	○

Remains pretty calm about upcoming desserts like ice cream. (4)	○	○	○	○	○	○	○
Hardly ever complains when ill with a cold. (5)	○	○	○	○	○	○	○
Looks forward to family outings, but does not get too excited about them. (6)	○	○	○	○	○	○	○
Likes to sit quietly and watch people do things. (7)	○	○	○	○	○	○	○
Enjoys gentle rhythmic activities, such as rocking or swaying (8)	○	○	○	○	○	○	○
Is full of energy, even in the evening. (9)	○	○	○	○	○	○	○

Please check back to make sure you have completed all the pages of the questionnaire. Thank you very much for your help!

End of Block: Children's Behavior Questionnaire- Short Form

Start of Block: Overall Assessment of the Speaker's Experience of Stuttering (Early Childhood– Parent)

The Overall Assessment of the Speaker's Experience of Stuttering Early Childhood (OASES-E, Yaruss & Yaruss, n.d.) is an assessment tool that is currently under development, meaning we have the unique opportunity to trial a pilot sample of this assessment. As part of our agreement to piloting this assessment tool, we will are asking permission to share non-identifying demographic information and non-identifying assessment results with the developers of this tool. The choice to contribute de-identified information to Stuttering Therapy Resources, Inc is entirely voluntary, and you may choose not to release any information to Stuttering Therapy Resources, Inc. without consequence. Your child can still take part in the study and consent to data use at Kent State University without providing consent for Stuttering Therapy Resources, Inc. If you have any questions you would like answered before responding to this question, please ask to speak with the individual conducting your child's assessment at the end of their first virtual visit.

○ I consent to share de-identified information relevant to the creation of the *OASES-E* with the developers at Stuttering Therapy Resources, Inc. I understand the information shared will include non-identifying demographic information (e.g. age, geographical location/state, gender, etc.), non-identifying assessment results (e.g., test scores for language), as well as de-identified responses from myself and my child to the *OASES-E* questionnaires. (1)

○ I do not consent to share de-identified information relevant to the creation of the *OASES-E* with the developers at Stuttering Therapy Resources, Inc. I will only allow the current research team at Kent State University access to this data (as indicated in my prior consent). (2)

○ I would like to discuss this with the researchers at Kent State University before deciding whether to share de-identified information relevant to the creation of the *OASES-E* with the developers at Stuttering Therapy Resources, Inc. (4)

[Page Break]

The Overall Assessment of the Speaker's Experience of Stuttering (Early Childhood– Parent/Caregiver) Response Form gathers information from parents and caregivers about **the impact of stuttering** on a young child's life. (Note: the rest of this form uses "your child," "they," or "their" to indicate the child in your life who stutters.) This Response Form includes four sections of questions that seek your opinion about different aspects of your child's experiences with speaking and stuttering.

As you answer the questions, please think about how stuttering is affecting your child's life **currently**, not at some prior point in time.

Read each question and select the answer that applies to your child. Please do your best to think about **your child's** apparent feelings, not your own. Try to answer every question. If you cannot answer a question, or if a question does not apply to your child, select "IDK" ("I don't know") or select "N/A" ("Not Applicable") if that is a choice, and move on to the next question.

For each item in this section, please mark the answer that you believe applies to your child. Please think about how your child is **currently** feeling, thinking, or speaking when answering each question. If you cannot answer a question, or if a question does not apply to your child, select "IDK" ("I don't know") or select "N/A" ("Not Applicable") if that is a choice, and move on to the next question.

	Always (1)	Most of the time (2)	Sometimes (3)	Not very often (4)	Never (5)	I don't know (0)
How often is your child able to speak fluently? (1)	○	○	○	○	○	○
How often does your child's speech sound "natural" (like the speech of other children their age)? (2)	○	○	○	○	○	○

| How often does your child appear to say exactly what they want to say, even if they might stutter? (3) | ○ | ○ | ○ | ○ | ○ | ○ |

How much do you think your child knows about stuttering?

- ○ Very much
- ○ A lot
- ○ Some
- ○ A little
- ○ Nothing
- ○ I don't know.

	Very positively (1)	Positively (2)	Neutral (3)	Negatively (4)	Very Negatively (5)	I don't know (0)	Not applicable (0)
How do you think your child feels about going to speech therapy? (If no speech therapy, select "N/A")? (1)	○	○	○	○	○	○	○

| Overall, how do you think your child feels about the way they talk? (2) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

For each item in this section, please mark the answer that you believe applies to your child. Please think about **your child's** apparent thoughts and feelings, rather than your own. Also, please think about how your child is currently feeling, thinking, or speaking. If you do not know the answer to a question, select "IDK" and move on to the next question. *If you do not believe your child stutters, please replace the terms stutter, stutters, or stuttering with the terms speech, speaks, or speaking ability.*

	Never (1)	Not very often (2)	Sometimes (3)	Most of the time (4)	Always (5)	I don't know (0)
When your child stutters, how often do they appear to feel mad or frustrated? (1)	○	○	○	○	○	○
When your child stutters, how often do they appear to feel worried or scared? (2)	○	○	○	○	○	○
When your child stutters, how often	○	○	○	○	○	○

do they appear to feel sad or upset? (3)

When your child stutters, how often do they appear to feel like they did something wrong? (4)

○   ○   ○   ○   ○   ○

When your child stutters, how often do they appear to feel embarrassed or ashamed? (5)

○   ○   ○   ○   ○   ○

When your child stutters, how often do they appear to tense their muscles (e.g., in the face or mouth)? (6)

○   ○   ○   ○   ○   ○

How often does your child appear to tense their muscles, even when

○   ○   ○   ○   ○   ○

not stuttering (speaking fluently)? (7)

When your child stutters, how often do they close their eyes, look away, or move parts of their body? (8) 　○　　　○　　　○　　　○　　　○　　　○

How often does your child appear to change words to keep from stuttering? (9) 　○　　　○　　　○　　　○　　　○　　　○

How often does your child appear to use filler words like "um" or "uh" to try not to stutter? (10) 　○　　　○　　　○　　　○　　　○　　　○

How often does your child appear to avoid talking (or ask you to talk for them) when they might stutter? (11) 　○　　　○　　　○　　　○　　　○　　　○

How often does your child appear to stop talking when they are stuttering? (12)	○	○	○	○	○	○
How often does your child appear to avoid activities (e.g., playing a game) because they might stutter? (13)	○	○	○	○	○	○
How often does your child appear to think about stuttering? (14)	○	○	○	○	○	○
How often does your child express that they are not good at talking or that they do not talk as well as other kids their age? (15)	○	○	○	○	○	○
How often does your child	○	○	○	○	○	○

	express that they do not want other people to hear their stuttering? (16)	

For each item in this section, please mark the answer that you believe applies to your child. The questions in this section focus on how hard the situation appears to be for your child, not how much they stutter or how fluent they are. If a question does not apply to your child, select N/A, and move on to the next question. If you do not know the answer to a question, select "IDK" and move on to the next question.

	Very easy (1)	Easy (2)	Not hard or easy (3)	Hard (4)	Very hard (5)	I don't know (0)	Not applicable (0)
How hard is it for your child to talk to you? (1)	○	○	○	○	○	○	○
How hard is it for your child to talk to their brother(s) or sister(s)? (If no brothers or sisters, select "N/A.") (2)	○	○	○	○	○	○	○
How hard is it for your child to talk to other people in the family (e.g., cousins, aunts and uncles, or grandparents)? (3)	○	○	○	○	○	○	○
How hard is for your child to talk with their friends	○	○	○	○	○	○	○

during social events (e.g., on play dates, sports, at the park)? (4)

How hard is it for your child to talk to other kids at daycare or school? (If no daycare/school, select "N/A") (5)

⚪ ⚪ ⚪ ⚪ ⚪ ⚪ ⚪

How hard is it to talk or ask a question during group time at daycare or school ? (If no daycare/school, select "N/A.") (6)

⚪ ⚪ ⚪ ⚪ ⚪ ⚪ ⚪

How hard is it for your child to talk to their teachers at daycare or school? (If no daycare/school, select "N/A") (7)

⚪ ⚪ ⚪ ⚪ ⚪ ⚪ ⚪

For each item in this section, mark the answer that you believe applies to your child. Please think about how your child is **currently** feeling, thinking, or speaking when answering each question. If you do not know the answer to a question, select "IDK" and move on to the next question. *If you do not believe your child stutters, please replace the terms stutter, stutters, or stuttering with the terms speech, speaks, or speaking ability.*

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Very much (5)	I don't know (0)	Not applicable (0)

How much do you think it bothers your child when they stutter? (1)	○	○	○	○	○	○	○
How much do you think your child is bothered by other people's reactions to their stuttering? (2)	○	○	○	○	○	○	○
How much do you think stuttering interferes with your child's relationships with family? (3)	○	○	○	○	○	○	○
How much do you think stuttering interferes with your child's interactions at daycare or school? (If no daycare/school, select "N/A.") (4)	○	○	○	○	○	○	○
How much do you think stuttering interferes with your child's ability to play with friends? (5)	○	○	○	○	○	○	○

How much do you think stuttering interferes with your child's self-esteem or self-confidence? (6)

○   ○   ○   ○   ○   ○   ○

How much do you think stuttering interferes with your child's overall outlook on life? (7)

○   ○   ○   ○   ○   ○   ○

How much do you think stuttering interferes with your child's health and physical well-being? (8)

○   ○   ○   ○   ○   ○   ○

How much do you think stuttering interferes with your child's ability to do what they want to do? (9)

○   ○   ○   ○   ○   ○   ○

End of Block: Overall Assessment of the Speaker's Experience of Stuttering (Early Childhood–Parent)

Start of Block: Overall Assessment of the Speaker's Experience of Stuttering (Family) Response Form

The Overall Assessment of the Speaker's Experience of Stuttering (Family) Response Form gathers information about the **impact of a child's or teen's stuttering on their parents, caregivers, guardians, siblings, or other family members**. (Note: the rest of this form uses "your child," "they," or "their" to indicate the child or teen in your life who stutters.) This Response Form includes four sections of questions that ask about different ways that your child's stuttering may affect your life. Please think about how your child's stuttering or difficulty

speaking is affecting your life **currently**, not at some prior point in time. Read each question and select the answer that applies to you. Think about **your own** feelings and experiences, not your child's feelings or experiences. Try to answer every question. If a question does not apply to you, skip that item or mark not applicable "N/A" if that is an option.

For each item in this section, mark the answer that matches your response. Please think about how you are **currently** feeling or thinking when answering each question. If a question does not apply to you or your child, please skip that item continue to the next question.
How **knowledgeable** are you about...?

	Extremely (1)	Very (2)	Somewhat (3)	A little (4)	Not at all (5)
Stuttering in general (1)	○	○	○	○	○
The causes of stuttering (2)	○	○	○	○	○
Factors that make your child stutter more or less often (3)	○	○	○	○	○
What happens with your child's speech when they stutter (4)	○	○	○	○	○
Appropriate ways to respond when your child is stuttering (5)	○	○	○	○	○
Treatment options for children who stutter (6)	○	○	○	○	○
Self-help or support organizations for children	○	○	○	○	○

who stutter
and their
families (7)

How **knowledgeable** are you about...?

	Extremely (1)	Very (2)	Somewhat (3)	A little (4)	Not at all (5)
Stuttering in general (1)	○	○	○	○	○
The causes of stuttering (2)	○	○	○	○	○
Factors that make your child stutter more or less often (3)	○	○	○	○	○
What happens with your child's speech when they stutter (4)	○	○	○	○	○
Appropriate ways to respond when your child is stuttering (5)	○	○	○	○	○
Treatment options for children who stutter (6)	○	○	○	○	○
Self-help or support organizations for children who stutter and their families (7)	○	○	○	○	○

Overall, how do you feel about...?

	Very positively (1)	Somewhat positively (2)	Neutral (3)	Somewhat negatively (4)	Very negatively (5)	Not applicable (0)
Your child's speaking ability... (1)	○	○	○	○	○	○
Your child's ability to communicate (i.e., to get their message across regardless of stuttering) (2)	○	○	○	○	○	○
The way your child sounds when they speak (3)	○	○	○	○	○	○
The techniques your child has learned in speech therapy (If your child has not had speech therapy, mark "N/A.") (4)	○	○	○	○	○	○
Your child's ability to use the techniques they have learned in speech	○	○	○	○	○	○

therapy (If your child has not learned such techniques, mark "N/A.") (5)						
The speech therapy that your child received most recently (If no speech therapy, mark "N/A.") (6)	○	○	○	○	○	○
The fact that your child is a person who stutters (7)	○	○	○	○	○	○
The fact that other people notice or know that your child is a person who stutters (8)	○	○	○	○	○	○
Variations in your child's speech fluency in different situations (9)	○	○	○	○	○	○
Self-help or support organizations for people who stutter and their families (10)	○	○	○	○	○	○

For each item in this section, mark the answer that applies to you. Please think about how you are **currently** feeling or thinking when answering each question. *If you do not believe your child stutters, please replace the terms stutter, stutters, or stuttering with the terms speech, speaks, or speaking ability.*

When you think about your child's stuttering, how often do **you** feel...?

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)
Helpless (1)	○	○	○	○	○
Angry (2)	○	○	○	○	○
Ashamed (3)	○	○	○	○	○
Lonely (4)	○	○	○	○	○
Anxious (5)	○	○	○	○	○
Depressed (6)	○	○	○	○	○
Defensive (7)	○	○	○	○	○
Embarrassed (8)	○	○	○	○	○
Guilty (9)	○	○	○	○	○
Frustrated (10)	○	○	○	○	○

How often do **you**...?

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)
Feel physically tense when your child stutters (1)	○	○	○	○	○
Feel physically tense when	○	○	○	○	○

your child speaks fluently (is not stuttering) (2)					
Exhibit facial expressions or body movements when your child stutters (3)	○	○	○	○	○
Break eye contact or look away when your child stutters (4)	○	○	○	○	○
Avoid certain situations or certain people if you think your child might stutter (5)	○	○	○	○	○
Leave a situation because your child stuttered or because you think that your child might stutter (6)	○	○	○	○	○
Speak for your child (e.g., finish their sentences) when they are stuttering or	○	○	○	○	○

when you think that they might stutter (7)					
Tell your child to slow down, to think about what they are saying, to take a breath, etc., in an attempt to help them not stutter (8)	○	○	○	○	○
Tell your child to stop stuttering (9)	○	○	○	○	○

How much do you agree or disagree with the following statements?

	Strongly disagree (1)	Somewhat disagree (2)	Neutral (3)	Somewhat agree (4)	Strongly Agree (5)
"I think about my child's stuttering nearly all the time." (1)	○	○	○	○	○
"Other people's opinions about me or my child are based primarily on how my child speaks." (2)	○	○	○	○	○
"If my child did not stutter, they would be better able to achieve their	○	○	○	○	○

goals in life." (3)					
"I do not want people to know that my child stutters." (4)	○	○	○	○	○
"When my child stutters, there is nothing I can do to change it." (5)	○	○	○	○	○
"My child should do everything they can to keep from stuttering." (6)	○	○	○	○	○
"My child should not engage in school activities or pursue a career that requires a lot of speaking." (7)	○	○	○	○	○
"My child does not speak as well as most other people." (8)	○	○	○	○	○
"I cannot accept the fact that my child is a person who stutters." (9)	○	○	○	○	○

"I do not have confidence in my child's abilities as a speaker" (10)

| ○ | ○ | ○ | ○ | ○ |

In this section, indicate how **difficult** these situations are for you. This difficulty can reflect your level of concern or discomfort, challenges with turn-taking, or other problems in initiating or maintaining a conversation. If a question does not apply to you or your child, please mark "N/A" and move on to the next question. *If you do not believe your child stutters, please replace the terms stutter, stutters, or stuttering with the terms speech, speaks, or speaking ability.*
How difficult is it for you to **talk** with your child ...?

	Not at all difficult (1)	Not very difficult (2)	Somewhat difficult (3)	Very difficult (4)	Extremely difficult (5)	Not applicable (0)
When they are stuttering (1)	○	○	○	○	○	○
When they are speaking fluently (not stuttering) (2)	○	○	○	○	○	○
When you are in a hurry or under time pressure (3)	○	○	○	○	○	○
In a small group of people (4)	○	○	○	○	○	○
In a large group of people (5)	○	○	○	○	○	○
On the telephone	○	○	○	○	○	○

or on the
computer
(6)

How difficult is it for you to **listen** to your child when they are...?

	Not difficult at all (1)	Not very difficult (2)	Somewhat difficult (3)	Very difficult (4)	Extremely difficult (5)	I don't know (0)	Not applicable (0)
Talking with their friends (1)	○	○	○	○	○	○	○
Talking with adults you know well (2)	○	○	○	○	○	○	○
Talking with adults you do not know well (3)	○	○	○	○	○	○	○
Telling a joke or a story (4)	○	○	○	○	○	○	○
Talking on the telephone or on the computer (5)	○	○	○	○	○	○	○
Talking at social events (6)	○	○	○	○	○	○	○
Ordering food at a restaurant (7)	○	○	○	○	○	○	○

| Talking with other family members (8) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

For each item in this section, mark the answer that applies to you. Please think about how **you are currently** thinking or feeling when answering each question. *If you do not believe your child stutters, please replace the terms stutter, stutters, or stuttering with the terms speech, speaks, or speaking ability.*

How much is **your** quality of life negatively affected by...?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Completely (5)
The fact that your child is a person who stutters (1)	○	○	○	○	○
Your child's reactions to their stuttering (2)	○	○	○	○	○
Your own reactions to your child's stuttering (3)	○	○	○	○	○
Other people's reactions to your child's stuttering (4)	○	○	○	○	○

How much does stuttering interfere with **your own**...?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Completely (5)
Satisfaction with your communication with your child (1)	○	○	○	○	○
Relationships with your	○	○	○	○	○

partner/spouse/child's other caregiver (2)					
Relationships with your extended family (3)	○	○	○	○	○
Relationships with friends (4)	○	○	○	○	○
Ability to function on a daily basis (5)	○	○	○	○	○
Sense of self-worth or self-esteem (6)	○	○	○	○	○
Outlook on life (7)	○	○	○	○	○
Confidence in yourself as a parent (8)	○	○	○	○	○
Health and physical well-being (9)	○	○	○	○	○
Stamina or energy level (10)	○	○	○	○	○
Sense of control over your life (11)	○	○	○	○	○

End of Block: Overall Assessment of the Speaker's Experience of Stuttering (Family) Response Form

[Page Break]

You have reached the end of the survey. Please take this time to decide whether you would like to submit your answers or return to previous pages to review your answers.

○ Yes, I would like to submit my responses at this time.

APPENDIX D

PARENT INSTRUCTIONS FOR ASSESSMENT SESSIONS

Appendix D

Parent Instructions for Assessment Sessions

Subject: Session 1 Instructions

Hello!

Thank you for your willingness to participate in our research study. During the first session, your child will complete a variety of assessment protocols to test their speech and language skills. These tests will take approximately 2-hours to complete. If your child is having a difficult time completing the assessments in a single two-hour session, we may need to adjust the timeline and complete the tests across two sessions that fit within a 1-2 week timeframe. To ensure these assessment results are truly representative of your child's speech and language abilities, we request the following steps be taken <u>before</u> and <u>during</u> the session.

<u>**Before the Session**</u>
1. **Seating**. Make sure your child is comfortably seated in a straight-back chair at a desktop or laptop computer. We want to make sure your child is attentive and remains visible (e.g., not slouching, not sinking into a chair/couch) throughout the session.

2. **Environment**. Limit any visual (e.g., television) and auditory distractions (e.g., siblings, pets) in the child's environment. Distractions can negatively affect assessment results and also increase the length of time the assessments will take.

3. **Lighting and Camera.** Ensure the lighting and camera placement are set up so that we can clearly see your child's face.

4. **Hide Self View.** At the start of the session, we will ask that you change your Zoom settings to "Hide Self View," making it so your child cannot see themselves. By implementing "Hide Self View," we aim to reduce any distractions related to seeing oneself on video (e.g., making silly faces).
   We are happy to help walk you through these steps at the start of the session if needed. In addition, here are some written instructions as well as a visual.
   - To hide self, hover over the top right corner of your image
   - Select the square with three circles that appears.
   - Select "Hide Self View"
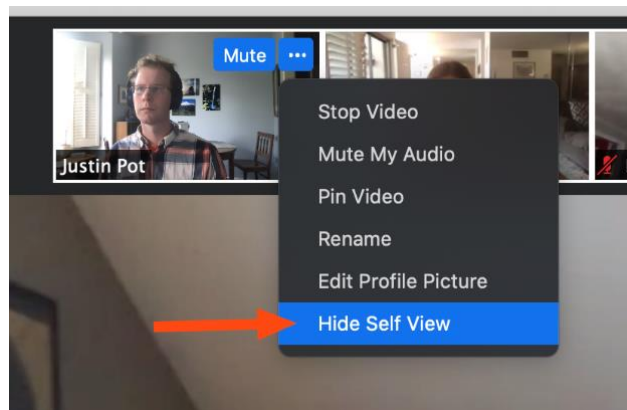
During the Session

1. **Stay nearby** (e.g., seated in the room) in case your child needs help with the technological aspects of the session.

2. **Do not provide any feedback, repetition questions, or answers**, unless asked to do so by the speech-language pathologist (SLP). It is important that your child complete the assessments independently, meaning only the SLP conducting the testing should provide feedback or answer questions.

3. **Keep Busy.** During this time, it may help to have something you can do to stay busy (e.g., reading a book). Keeping busy may reduce your child's attempts to interact with you (e.g., request help or answers). Please refrain from engaging in tasks that will limit your ability to hear the instructions/interactions (e.g., wearing headphones) or distract your child from the tasks (e.g., watching a video with audio enabled or looking at something interesting within the child's field of vision).

If you have any questions or concerns regarding these instructions, please feel free to reach out to us via email (hsalvo@kent.edu) or phone (262) 676-1322.

Thank you!
Heather D. Salvo, M.S., CCC-SLP

[Note: Anything highlighted may be adjusted depending on how much time the child needs to complete the assessments]

APPENDIX E

PARENT INSTRUCTIONS FOR EXPERIMENTAL SESSIONS

Appendix E

Parent Instructions for Experimental Sessions

Subject: Session <mark>2</mark> Instructions

Hello!

Thank you for your continued willingness to participate in our research study. During the <mark>second</mark> session, your child will complete a variety of tasks, including naming items, drawing, and retelling stories. These tasks will take approximately 1 hour to complete.
To ensure these activities are completed to the best of your child's abilities, we ask that the following steps be taken <u>before</u> and <u>during</u> the session.

<u>Before the Session</u>

5. **Seating**. Make sure your child is comfortably seated in a straight-back chair at a desktop or laptop computer. We want to make sure your child is attentive and remains visible (e.g., not slouching or sinking into a chair/couch) throughout the session.

6. **Environment**. Limit any visual (e.g., television) and auditory distractions (e.g., siblings, pets) in the child's environment. Distractions can negatively affect task completion and also increase the length of time the tasks will take.

7. **Lighting and Camera.** Ensure the lighting and camera placement are set up so that we can clearly see your child's face. This extremely important because our data is largely dependent on facial expressions.

8. **Hide Self View.** At the start of the session, we will ask that you change your Zoom settings to "Hide Self View," making it so your child cannot see themselves. By implementing "Hide Self View," we aim to reduce any distractions related to seeing one's self on video (e.g., making silly faces).
   We are happy to help walk you through these steps at the start of the session if needed. In addition, here are some written instructions as well as a visual.
   - To hide self, hover over the top right corner of your image
   - Select the square with three circles that appears.
   - Select "Hide Self View"
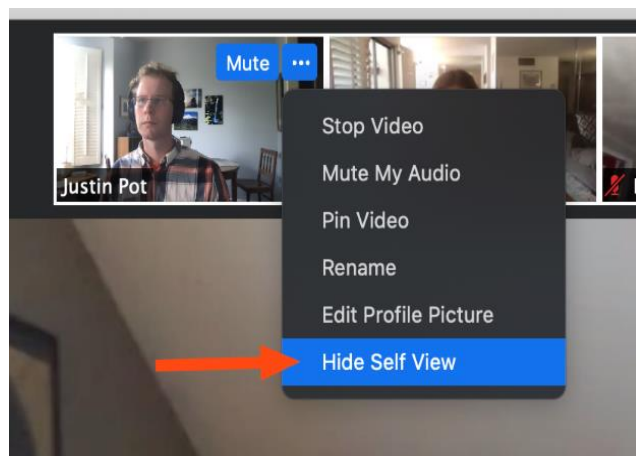
During the Session

4. **Stay nearby** (e.g., seated in the room) in case your child needs help with the technological aspects of the session.

5. **Do not provide any feedback** unless asked to do so by the speech-language pathologist (SLP). It is important that your child complete the tasks independently, meaning only the SLP conducting the tasks should provide feedback or answer questions.

6. **Keep Busy.** During this time, it may help to have something you can do to stay busy (e.g., reading a book). Keeping busy may reduce your child's attempts to interact with you (e.g., request help or answers). Please refrain from engaging in tasks that will limit your ability to hear the instructions/interactions (e.g., wearing headphones) or distract your child from the tasks (e.g., watching a video).

If you have any questions or concerns regarding these instructions, please feel free to reach out to us via email (hsalvo@kent.edu) or phone (262) 676-1322.

Thank you!
Heather D. Salvo, M.S., CCC-SLP

[Note: Anything highlighted may be adjusted depending on how much time the child needs to complete the assessments]

APPENDIX F

ASSENT SCRIPT

Appendix F

Assent Script

Hello!

My name is _____, and I am trying to learn more about how children feel about playing different games.

> *Session 1:* I would like you to do a few activities with me, including looking at pictures and answering questions.

> *Session 2:* I would like you to do a few activities with me, including playing a few games, listening to stories, and talking about some pictures.

Will you do this with me? [*If the child does not indicate affirmative agreement, you cannot continue with this child*].

Do you have any questions before we start? [*Clarify if necessary*].

If you want to stop at any time, just tell me.

APPENDIX G

TEMPLATE FOR SUMMARY OF ASSESSMENT RESULTS

Appendix G

Template for Summary of Assessment Results

Summary Sheet of Speech-Language Testing

Participant Code: Participant's Age:
Date:

Goldman-Fristoe Test of Articulation – Second Edition   **Descriptive Term**
Tests ability to pronounce speech sounds
          Standard Score: Percentile Rank:

Peabody Picture Vocabulary Test – Fourth Edition   **Descriptive Term**
Tests ability to understand words
          Standard Score: Percentile Rank:

Expressive Vocabulary Test – Second Edition   **Descriptive Term**
Tests ability to use words in spoken language
          Standard Score: Percentile Rank:

Structured Photographic Expressive Language Test – Preschool   **Descriptive Term**
Tests ability to use words important for grammar in spoken language
          Standard Score: Percentile Rank:

Test of Auditory Comprehension of Language – Third Edition **Descriptive Terms**
Vocabulary - Tests ability to understand words
          Standard Score: Percentile Rank:
Grammatical Morphemes - Tests ability to understand words important for grammar
          Standard Score: Percentile Rank:
Elaborated Phrases and Sentences - Tests ability to understand complex grammatical structures
          Standard Score: Percentile Rank:
Overall Test Score - Reflects ability to understand language
          Standard Score: Percentile Rank:

Disfluency Count Results (based on 600 word/syllable sample) Descriptive Terms
Percent Speech Disfluencies per Total Words/Syllables
Percent Stuttered per Total Words/Syllables
Percent Stuttered per Total Disfluencies/Syllables

Overall Assessment of the Speaker's Experience of Stuttering Early Childhood
Descriptive Terms
Child Response Form
Measures the impact of stuttering on a young child's life from a child's perspective.
          Overall Impact Score
Parent Response Form

Measures the impact of stuttering on a young child's life from a parent's perspective.
        Overall Impact Score
Family Response Form
Measures the impact of a child's or teen's stuttering on their parents, caregivers, guardians,
        siblings, or other family members.
        Overall Impact Score
Comments: [Indicating whether the child's speech-language and hearing skills are within, below, or above normal limits.]
Recommendations: [If child demonstrates speech-language or hearing skills that are below normal limits, families will be provided with recommendations to seek related services and applicable referrals.]
Please let Heather Salvo or Dr. Hayley Arnold know if there are any questions.

Heather Salvo, M.S., CCC-SLP
(262) 676-1322
hsalvo@kent.edu

Hayley Arnold, Ph.D. CCC-SLP
330-672-0259
harnold5@kent.edu

APPENDIX H

SELF-REPORT QUESTIONS FOR CHILD PARTICIPANTS

Appendix H

Self-Report Questions for Child Participants

Participant ID: _____

<u>**START OF SESSION QUESTIONS**</u>
1. How would you feel if you got a <u>*big*</u> ice cream cone – very sad, a little sad, in the middle, a little happy, or very happy?
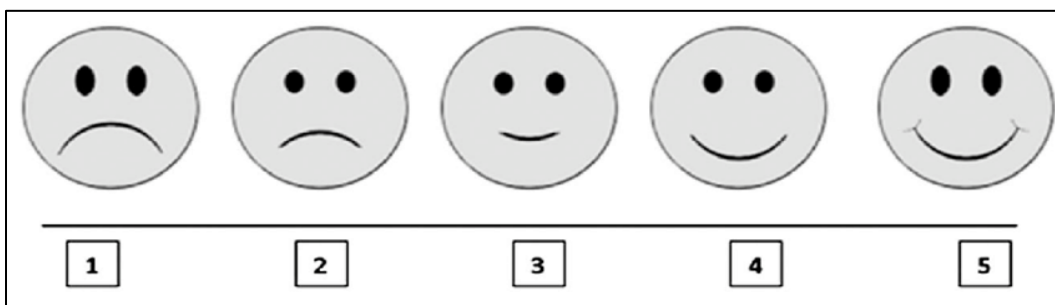
2. How would you feel if you <u>*dropped*</u> your big ice cream cone – very sad, a little sad, in the middle, a little happy, or very happy?
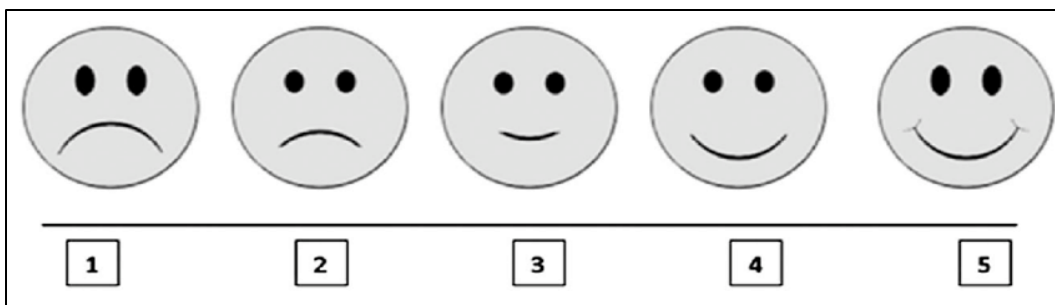
3. Are you good at drawing or not so good at drawing?

        Good   Not so Good

4. Are you good at knowing and saying the names of things or not so good at knowing and saying the names of things?
        Good   Not so Good

<u>**POST-TASK QUESTIONS**</u>
1. Are you good at drawing or not so good at drawing?

        Good   Not so Good

2. Are you good at knowing and saying the names of things or not so good at knowing and saying the names of things?

            Good   Not so Good

3. How did you feel when you were naming the pictures at an ***easy speed*** – very sad, a little sad, in the middle, a little happy, or very happy?
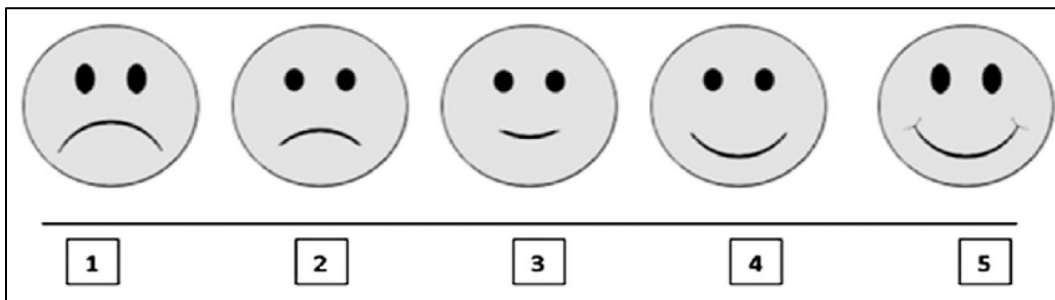

4. How did you feel when you were naming the pictures ***very quickly*** – very sad, a little sad, in the middle, a little happy, or very happy?


5. How did you feel when you were drawing the ***letters, shapes, and numbers*** – very sad, a little sad, in the middle, a little happy, or very happy?

6. How did you feel when you were drawing a **_perfect circle_** – very sad, a little sad, in the middle, a little happy, or very happy?
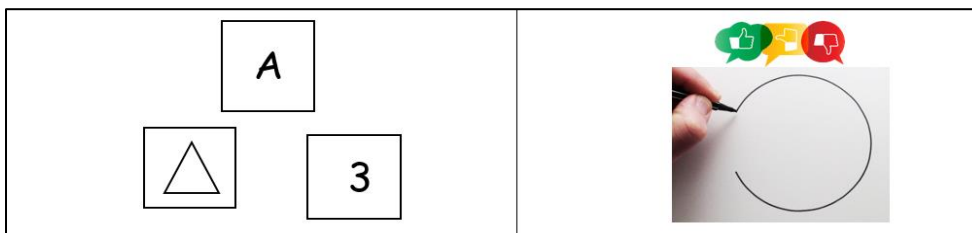

7. If you could play one of these games again, which would you choose – naming the pictures at an **_easy speed_** game (highlight or point to the related picture) or naming the naming pictures **_very quickly_** (highlight or point to the related picture) game?
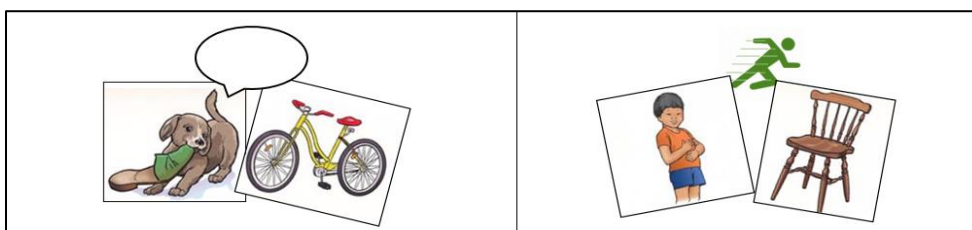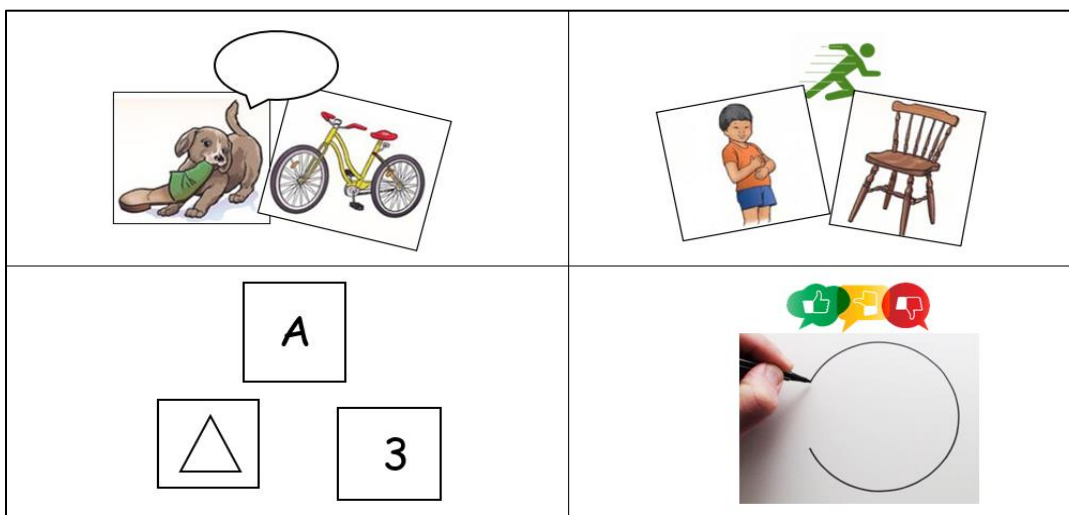

8. Good choice. Why would you pick the (**_insert choice_**: naming the pictures at an easy speed game/naming the pictures very quickly game)?

9. If you could play one of these games again, which would you choose – the **_simple drawing_** game or the **_perfect circle_** game?

10. Good choice. Why would you pick the (***insert choice***: simple drawing game/perfect circle game)?

_____

11. If you could play one of these games again, which would you choose – the naming the pictures at an ***easy speed*** game, the naming the pictures ***very quickly*** game, the ***simple drawing*** game, or the ***perfect circle*** game?

12. Good choice. Why would you pick the (***insert choice***: simple drawing game/perfect circle game/ naming the pictures at an easy speed game/naming the pictures very quickly game)?

_____

13. If you tried again, do you think you could draw a perfect circle?

      I think so   I don't think so

14. If you tried again, do you think you could draw the letters, shapes, and numbers?

      I think so   I don't think so

15. If you tried again, do you think you could name all of the pictures at an easy speed?

      I think so   I don't think so

16. If you tried again, do you think you could name all of the pictures very quickly?

      I think so   I don't think so

APPENDIX I

OBSERVATIONAL LIKERT SCALE RATINGS OF EMOTION-RELATED

RESPONSES

Appendix I

Observational Likert Scale Ratings of Emotion-Related Responses

Participant ID: _____   **Coder Name:** _____
Clip: ____
Please watch the clip carefully, then make the following ratings:

Please rate how much this person is expressing **negative** emotions:
Very little   Moderate   Extreme
1   2   3   4   5   6   7

Please rate how much this person is expressing **positive** emotions:
Very little   Moderate   Extreme
1   2   3   4   5   6   7

Please rate how much this person is **suppressing** how they are feeling:
Very little   Moderate   Extreme
1   2   3   4   5   6   7

Please rate how much this person is **expressing** how they are feeling:
Very little   Moderate   Extreme
1   2   3   4   5   6   7

Please rate how **engaged** this person is during the task

1	2	3	4
Gives up totally Clear resignation	Continues to work, but without interest Often averting gaze away from task	Mixed behavior Keeps focused on task but periodically averts gaze	Totally focused Expresses interest

Please rate how **frustrated** this person is during the task

1	2	3	4

Clear facial, verbal, and/or behavioral signs of frustration	Moderate facial, verbal, and/or behavioral signs of frustration	Mild facial, verbal, and/or behavioral signs of frustration	No signs of frustration

Participant ID: _____ **Coder Name:** _____

Clip _____ (Continued)

Now, imagine you are sitting and talking with the person in the video before you. What do their nonverbal behaviors, expressions, gestures tell you about what they are feeling right now?

	None		Mild		Moderate		Strong
1. Anger	1	2	3	4	5	6	7
2. Amusement	1	2	3	4	5	6	7
3. Disgust	1	2	3	4	5	6	7
4. Happiness	1	2	3	4	5	6	7
5. Guilt	1	2	3	4	5	6	7
6. Pride	1	2	3	4	5	6	7
7. Fear	1	2	3	4	5	6	7
8. Excitement	1	2	3	4	5	6	7
9. Sadness	1	2	3	4	5	6	7
10. Interest	1	2	3	4	5	6	7

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