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Toddler Characteristics and Attention

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Toddler Characteristics and Attention

Master of Research in Psychology, Seattle Pacific University

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Abstract

Individual differences have become increasingly relevant when addressing variability across child development. Literature bears evidence that these differences may impact a toddler's ability to respond to Joint Attention (JA). JA refers to a communicative gaze and pointing between a child and another individual. JA has been recognized as being a critical milestone, to the formation and cultivation of shared awareness and attention of an event or object. JA is a skill that is critical to the development of future language acquisition (Vaughan Van Hecke et al., 2007). The aim of this study is to measure whether child characteristics, such as their temperament, ability to self-regulate and interpersonal relationships; have an impact on their ability to respond to JA cues. Children's temperaments are strongly correlated to their ability to maintain fixation on an object and to sustain focused attention (Papageorgiou et al., 2014). Other studies have demonstrated how a toddler's ability to regulate their temperament, help them to better regulate their attention (Morrison et al., 2010). Salley (2016) was able to demonstrate that increased positive behaviors while engaged in play with caregivers; was associated with initiating JA (Salley et al., 2016). These studies help support the association between JA and child characteristics; little research has been done to understand if child characteristics impacts a toddler's ability to respond to JA. To assess these domains of a toddler's characteristics, I will use the Early Childhood Behavior Questionnaire (ECBQ) to measure the toddlers Temperament (Putnam, 2006) and Devereux Early Childhood Assessment (DECA) to look collect subscales for attachment/relationships, initiative, and self-regulation (Ogg et al. 2010). The results of this project will help to add to the literature on individual differences in child characteristics and its subsequent impact on toddler responses to joint attention.

Introduction

The ability to coordinate attention with another social partner is fundamental for the development of language and other forms of social learning. Suggesting that early development, may be highly dependent on social context and shared social environment. An important milestone during this period is Joint Attention (JA). In early child development, JA is understood as the ability to follow the attention, usually a gaze or point, of another person in a child's environment. Such as a parent pointing to a toy in the environment to evoke the toddler to look in the direction of the toy. The normative development of shared attention has been well studied and has helped to contribute to understanding the variability within early development. Yet, much of the research seeks to understand how JA impacts children and less is known about a child's ability to impact their learning of JA. Research has demonstrated that the use of JA during toddlerhood is related to social, behavioral, and cognitive development throughout childhood (Mundy & Newell, 2007). For example, increased levels of eye gaze following in 6 month old infants, is associated with higher parent reports of self-regulation at 24 months (Morales et al., 2005). The emergence of JA in infancy helps children bond with peers, recognize the environment around them and create higher order neurological connections (Brandes-Aitken et al., 2020). With much of the development that takes place in toddlerhood being reliant on social context and the interpersonal coordination between toddlers and their caregivers, there is a significant emphasis on the use and facilitation of JA in infancy.

Recently, research has speculated that children may vary in JA due to individual differences in child characteristics. A study looked at the pattern of parent report of child characteristics and ability to respond to joint attention. They found that children varied on ability to respond to joint attention, based on their different scores of toddler's characteristic measures

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(Frolli et al., 2021). Suggesting that children may respond differently to JA based on predisposed characteristic differences. It may be important to better understand what domains of a toddler's characteristics may be impacting their ability to use JA. The goal of this study is to see if domains of toddlers characteristics, such as temperament, self-regulation and exposure to health relationships, may impact a toddlers ability to respond to joint attention cues. I am interested in these variables due to literature demonstrating their association with early learning. Little is known if these domains of child characteristics specifically impact toddler's ability to respond to JA. My study will add to the literature on how child characteristics may impact JA responses.

Joint Attention

Within an infant's first few months of life, they begin to follow the gaze of others to learn about salient information in their environment (Todd & Dixon, 2010). Children are more likely to follow the attention of a person, rather than direct their attention to novelty toys (Gredebäck et al., 2010). Suggesting that even young children are driven by social interaction. JA is a means of nonverbal social communication, characterized as a form of attention sharing and is understood to integrate many social, emotional, and cognitive domains (Salley & Dixon, 2007). Importantly, results from a longitudinal study of joint attentional behaviors in 6-to-24-month infants.

Reported that responding to JA at 6, 8, 10, 12, and 18 months, positively predicted vocabulary development at 2 years (Bornstein & Putnick, 2012). JA also initiates several other socioenvironmental outcomes such as IQ, self-regulation, social skills, and language development (Gredebäck et al., 2010). JA has added to the literature the importance of shared attentional awareness and it's association to early learning.

JA encompasses two forms: Responding to Joint Attention (RJA) and Initiating Joint Attention (IJA). RJA refers to an individual's ability to follow the attention of another person,

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whether it's a gaze, point or another gesture. Compared to IJA, which refers to one's ability to direct the attention of another person by using a gaze, point or another form of gesture (Mundy & Newell, 2007). JA allows for young children to non-verbally communicate, before their ability to use speech. For example, if a toddler wants their parent to grab an item that is out of their reach, they may IJA by looking, pointing, or reaching in the direction of the object, to evoke their parent to get the item for them. In that case, the parent would be RJA from the child. The literature has revealed infants who show high rates of RJA at 12 months, show decreased latency to shift their attention at 18 months and toddlers who had high rates of RJA at 12 months also demonstrate higher amounts of attention regulation during a delay of gratification task (Vaughan Van Hecke et al., 2012). Additionally, infants whose caregivers report high amounts of RJA at 12 months was associated with increased amounts of expressive language at 18 months (Mundy et al., 2007). These finding helps that variability within use of JA in toddlerhood is associated with variability of other forms of language and attentional awareness in early childhood. Furthermore, studies concerning child characteristics have found that this variability in JA may be accounted for by aspects of child temperament. Domains of soothability, emotionality and sensitivity in infancy, are correlated with measures of attentional awareness, such as attention focusing/shifting and inhibitory control (Salley & Dixon, 2007). Uniformly, studies seeking to better understand toddler's level of habituation report that fearful or distressed toddlers demonstrate significantly lower looking times, require more trials to attune, take longer to meet learning stands, and forget more after a delay than less negative toddlers (Rieser-Danner, 2003). There is no question that JA serves an important role in the development of many social, behavioral, and cognitive aspects of an individual. The current literature suggests if we seek to better understand variation in joint attention abilities- aspects on child characteristics. such as

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temperament, a toddler's ability to regulate their temperament and exposure to health relationships; may account for this variation.

Temperament

Temperament impacts early childhood development. Temperament is defined as the predisposed biological characteristics of an individual that include the integration of reactive and self-regulatory processes (Posner & Rothbart, 2007). In other words, temperament is the combination of an individual's natural reactivity to stimuli and their ability to regulate that reactivity. For example, consider an individual who is fearful of spiders. Every time they see a spider, they can be sure it will elicit feelings of fear and the behaviors associated (natural reactivity) but the more they develop, the more skills they gain to regulate the feeling and behaviors that are associated with fear (regulation)- this is how temperament integrates natural reactivity and regulation. Historically, researchers have generalized that toddler temperament, impacts their development. Distinctively, a toddler's temperament may impact their ability to engage with their environment in a way to generate learning.

Temperament in toddlerhood could be defined as Difficult or Easy. Difficult temperaments refer to children who are characterized by negative mood, withdrawal, low adaptability, high reactions to intensity, and low regularity (Hilton & Westermann, 2017). While children who demonstrate easy temperaments are characterized as encompassing high engagement, high levels of adaptability, positive mood, decreased distress to new experiences, etc. These temperamental differences help provide support that temperament may impact the way young children engage in joint attention behaviors.

Rieser-Danner (2003) model this by suggesting that temperament has a Direct and Indirect impact on early child development. The direct route refers to the fact that a child with a

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difficult temperament may simply be unable to process linguistically relevant information due to much of their cognitive system being overwhelmed by their temperamental difficulties. For instance- if we consider a 15-month-old who is exposed to a novelty toy. The direct route suggest toddlers with difficult temperaments, may have less moments of engagement with the toy due to the toy being new and unfamiliar. To demonstrate this, studies have shown that toddlers with difficult temperaments, such a toddler who express high instances of fear/sadness/anger, showed increased response to intensity, such as loud noises, and decreased tolerance for change, subsequently toddlers who expressed difficult temperaments also demonstrate shorter attention spans and had smaller vocabularies (Salley & Dixon, 2007). Similarly, toddlers who score high in difficult temperaments also show lower signs of gaze following (Todd & Dixon, 2010). Which is consistent with the notion that an overwhelmed cognitive control system impacts one's ability to access resources necessary for language acquisition, such as attention regulation strategies. Comparatively, the indirect way temperament impacts language, is by influencing the formation of the social engagement that are necessary for language acquisition. The indirect route suggests that if the 15-month-old with difficult temperament engages with the novelty today, their engagement is most likely going to be for a shorter duration and be less meaningful; limiting the opportunity to learn through play. This indirect interaction can be understood as the Quality and Quantity of interpersonal exchanges that a child with an easy temperament may enter compared to one with a difficult temperament (Rieser-Danner, 2003). For instance, many studies looking at the impact of shyness on social interactions help display the indirect role temperament plays on language learning. Shy children are recognized as children who demonstrate difficult temperamental behaviors (Crozier & Perkins, 2002). Non-shy children know more words, word roots and have longer mean length of

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utterances than children who were reported as shy (Crozier & Perkins, 2002). Concurrently, shy children overall responded to less questions by the examiner, used less words in responses and had decreased abilities to diversify speech. This correlation gives evidence to the indirect relationship with attention and later language development because the child's difficult temperament is impacting if a toddler engages with something and how they decide to engage. Temperament is moderating the quality of interaction and its association to learning, by reducing or increasing the likelihood of JA learning (Rieser-Danner, 2003). Another study found that shyness and bias to novelty are negatively correlated to word learning in two-year-olds (Kucker et al., 2021). The consensus is that children who demonstrate easy temperaments; also tend to be more advanced linguistically (Salley & Dixon Jr., 2007). This consensus raises the possibility that children with easy temperaments, are on average, socially skilled. This is because their easy temperaments make toddlers well positioned to engage in high-quality social interactions that would place them at a linguistic advantage (Vaughan et al., 2003). Moreover, negative emotions may compete for a toddler's attention, limiting the availability to engage meaningfully in subsequent tasks.

Interestingly, Vaughan et al (2003) highlights the relationship between temperament and attention in a unique way. They found that an infant's ability to IJA at 9 months was positively associated with smiling and laughing at 9 months. They also found that 9-month distress to novelty was associated with IJA at 12 months. To account for this finding, Vaughan suggests that children who demonstrate wariness in the presence of novel items or environments may be more likely to demonstrate bids of joint attention in order to gather information with hopes of alleviating stress. This is an important finding because it suggests that the use of JA can help elevate stress for toddlers who demonstrate difficult temperaments. Vaughan's findings

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demonstrate that difficult temperaments, do not mean a child is less likely to use JA behaviors. Instead, a toddler's ability to regulate their temperament may support the facilitation and use of JA. In other words, a toddler's ability to direct and regulate their temperament may help moderate the correlation between temperament and joint attention.

Self-Regulation

Temperament and self-regulation interrelate in development. The two serve one another in early learning. Temperament addresses two aspects, individual's reactivity to stimuli and their regulation of their reactivity. Self-Regulation is concerned with a toddler's ability to regulate their reaction to stimuli. Self-Regulation is defined as an individual's ability to adapt their behavior in the context of other factors that may be impacting their environment or cognition (Posner & Rothbart, 2007). It involves a range of processes that allow for infants to regulate their attention, emotion, and arousal to manage behaviors (Morrison et al., 2010). To expand upon my spider example- an individual's fear of spider could impact the way they engage with their environment if they know there is a possibility of spider. Someone's ability to regulate these feelings of fear would help to support continued meaningful engagement, even within the fact that they're fearful of spiders. This is how self-regulation supports temperament in a way to drive learning. A toddler's ability to regulate their temperament, would allow for them to have more instances of meaningful engagement.

Rothbard et al., (2007) model of temperament helps conceptualize how self-regulation serves temperament, in early learning. They suggest that temperament has three higher order factors and how self-regulation supports the facilitation of these factors. The first factor consists of Surgency/Extraversion, which refers to an infant's behaviors regarding sociability, impulsivity, and enjoyment of pleasure. Negative Affectivity is the second factor, regarding an

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infant's fear, anger, discomfort, and sadness. The third factor is Inhibitory Control which refers to an infant's ability to focus and shift attention and their level of pleasure and sensitivity to stimuli of low intensity (Rothbart et al., 2007). Dixon et al 2008 summarize these factors as 'Early Attentional Systems' and demonstrates that they work together by; integrating behavior (Surgency/Extraversion factor), under conflicting constraints (Negative Affectivity factor) and the ability to selectively prioritize your attention to stimuli (Inhibitory Control). Seven-month-old infants who are easily able to be soothed and have increased moments of smiles and laughs, also tend to have shorter latency when being cued to RJA (Dixon & Smith, 2000). In other words, this attentional system forms an overarching control system that helps to facilitate brain maturation and language acquisition. This is accomplished by working together to help infants direct their attention to important information in their environment (Surgency/Extraversion factor), with regards to their current state of emotionality (Negative Affectivity factor) while considering an infant's ability to regulate their attention across different emotionality's (Inhibitory Control).

It would make sense that toddlers who appropriately regulate their attention to increase meaningful learning, also demonstrate appropriate regulation of their emotions to simultaneously increase meaningful learning opportunities. Studies have found that low distress and high adaptability are associated with better attentional focusing. For instance, while initiating a Stroop Task, children who score high in anger, discomfort and sadness also exhibit an increased difficulty to filter out non relevant information (Kucker et al., 2021). Supporting Rothbart et al (2007) and Dixon et al (2008) findings that one's ability to regulate their emotions, plays a role in their ability to regulate their attention. Consistently, research has found an association between children engaging in joint attention dyads with caregivers and their ability to regulate attention

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away from novelty objects. They found that children who engaged in higher levels of RJA while interacting with caregivers, also implemented more emotional regulation coping strategies in the task where they are delayed a gratifying object, such as finding another toy to play with during the delay (Morales et al., 2005). These findings help to suggest that toddlers who demonstrate attentional regulation, also demonstrate emotional regulation. The current literature lacks evidence to the extent toddler emotional regulation, impacts their attentional regulation.

Temperament addresses an individual's reactivity to stimuli, while self-regulation encompasses the avoidance, approach and attention that serve to regulate their reactivity to the stimuli. This ability to be flexible in response to social, emotional, and cognitive demands in particular situations create a major task for toddlers. Studies that focus on parent-infant dyads, shed light on how parents can help elevate some of these tasks by helping to direct toddler's attention to what is important. To regulate one's emotionality is difficult within itself, but for infants to incorporate higher order functioning to direct their attention while under emotional constraints, requires a lot of regulation. Parents can therefore help decrease the work children have to do to regulate their attention and importantly, by directing the toddler's attention to important activities that will increase learning opportunities.

Sensitive parenting practices are practices that demonstrate health relationships in a toddler's life. Sensitive parenting refers to behaviors, such as promptly responding and attending to the child's emotional cues, being positively engaged with child, etc., and are associated with improved attention, regulation, and behavior in toddlers (Lengua et al., 2014). Research has shown that children who receive more sensitive parenting are more likely to interact with a stranger during a learning activity (Lütkenhaus et al., 1985). This finding further suggests that children who are exposed to healthy relationships, are more likely to be engaged and notice

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opportunities to engage in meaningful learning. As mentioned earlier, social interaction is an important facilitator of early learning and the regulation of temperament correlate with the quality of their social interactions. Parents engaging in social play with their infants, supporting and creating a health learning environment, is associated with effortful control skills that address areas of attention and inhibitory control (Lengua et al., 2014). Emotion regulation is not something toddlers can learn for themselves, therefore weight bears on the caregivers to create and modify a child's behaviors to encourage meaning learning opportunities.

Healthy relationships

Most learning in toddlerhood, is dependent on the caregiver providing ways to regulate toddlers' attention. Most regulation is dependent on the caregiver providing ways to control toddlers' reactivity (Posner & Rothbart, 2007). This important relationship helps toddlers to better recognize opportunities for learning in their environment by using adults as references. Child development is recognized as a developmental period where children learn through experience. Fahrenheit is a common example for how people learn through experience. Individuals experience different levels of Fahrenheit to assess their own ideals around what is hot and what is not. For that reason, young children don't learn a hot stove is something to not be touched by an adult explaining to them the concept of Fahrenheit; they generally learn by touching something that an adult has referenced as 'hot'. Young children lack verbal language abilities, therefore a common way young children learn is through experience.

When toddlers demonstrate that they are exposed to health environments/relationships, it has been associated with impacting their language development. Markus and Mundy (2000) are well known for their findings suggesting that the amount of time children spend sharing attention with others predicts their later language vocabulary development and subsequent IQ scores

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(Markus et al., 2000). When 4-month-old infants engage in more smiling during social engagement with their caregiver, they showed higher levels of IJA at 12 months (Salley et al., 2016). Similarly, Posner and Rothbart (2007) demonstrated when toddlers are induced with distress, attentional orienting by the caregiver can help decrease distress. Furthermore, children who responded quicker to attention distraction by parents, were also quicker to shift attention to a different form of stimuli. Parents and caregivers play a large role in facilitating JA. Practicing the act of JA and creating a relationship where the child can confidently navigate their environment, increases opportunities for JA development and maturation (Markus et al., 2000). A study in 2020 looked at the impacts of sensitive parenting behaviors, specifically attuned caregiving, on JA. Sensitive parenting is understood as a caregiver's ability to attend effectively, correctly and promptly to the child's emotional cues and is a well-studied style of parenting that supports the facilitation healthy relationship in toddlerhood (Gerardi-Caulton, 2000). Sensitive parenting has been well established to be associated with early self-regulation in toddlers (Lengua et al., 2014). Sensitive parents help promote health relationships in toddlerhood, by caregivers facilitating health learning environments for children. Increasing the likelihood of meaningful learning interactions.

Attuned caregiving is a way of practicing sensitive parenting. Attuned caregiving is a relationship developed between parent and infant and is seen as developmental milestone that helps JA emerge in toddlerhood (Brandes-Aitken et al., 2020). This is completed when parents share emotional expressions of their infants and infants subsequently begin to try and mimic the expressions of their parents. When caregivers increased the amount attuned caregiving behaviors with their infants, this directly influenced the child's ability to respond and initiate joint attention in toddlerhood and executive functioning in later childhood (Brandes-Aitken et al., 2020). They

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additionally found this correlation to be strongest for families of low-income. This is a very important finding to highlight the importance of health relationships in early childhood. Income impacts a plethora of domains in one's life that consequently impact the development of children of low-income households. Results indicating that parents can play a role in mediating the negative impacts income; helps to emphasize the important role healthy relationships play in child development. The integration of healthy attachment behaviors provides toddlers a higher quality and increased quantity of early learning- coincidentally setting the foundation for higher order language acquisition. A caregiver being sensitive to the cues of an infant will likely help them to quickly and accurately contribute and guide their infant's attention, therefore shaping and promoting a meaning learning experiences.

Current Study

Hypothesis and aims

Although literature raises the possibility that temperament has an impact on development. The nature of how temperament impacts early joint attention without regard to their current environment, is an area of literature that is not well developed. The purpose of this study is to better understand if domains that make up a child's behavior characteristic, will be associated with their ability to respond to joint attention. I propose that child characteristics will impact the toddler's ability to respond to joint attention. This will be due to the integration of the attention controls system that'll impact how a toddler regulates their temperament while considering the role caregivers play to modify learning. The first aim of this study is to understand if a toddler's characteristic are associated with their ability to respond to joint attention. I hypothesize toddlers will vary within ability to respond to joint attention due to differences in toddler characteristics.

Method

Recruitment Efforts

We implemented multiple strategies to recruit our infant-caregiver dyads, and enhance ethnic and racial diversity in our samples. We used the UW Communication Studies Participant Pool, which provides a list of infants and children whose parents at childbirth indicated interest in participating in research studies. The UWCSPP has been an effective way for researchers at the University of Washington and Seattle Children's Center for Child Health, Behavior and Development to recruit local family for research. It allows for research to have targeted recruitment which can be filtered based on child age, address, and child characteristics (race, ethnicity, sex). We also included recruitment and outreach efforts specifically at: centers that provide family resource coordination (Head Start, Birth to Three), local community clinics that serve unrepresented minority populations (Seattle Children's Odessa Brown Clinic), pediatric specialty clinics (e.g., The Seattle Children's Autism Center and the Neurodevelopmental Clinic), Seattle Children's Community. We can place recruitment materials on Seattle Children's Twitter, Facebook, and newsletters.

Participants

These participants provided data for my study as part of a larger study being conducting. My study assessed 45 parent-infant dyads, with infants ranging between the ages of 18-30 months old. We focus on this age period as it reflects the period of development of JA (Morales et al., 2005; Dixon et al., 2006; Mundy & Newell, 2007; B.J. Salley & Dixon, 2007; Todd & Dixon, 2010; Gredebäck et al., 2010; Vaughan Van Hecke et al., 2012; B. Salley et al., 2016; Brandes-Aitken et al., 2019). Of note, we have chosen to focus on the 18–24-month age range as many infants' younger had little to no experience with interactive devices and were not able to

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operate the games independently. Participants were from the Greater Seattle Area. For all participants, assessment of inclusion/exclusion variables was done during screening via phone interview and online questionnaires. Infants were eligible for inclusion if they have age-appropriate gross and fine motor ability, this will ensure adequate fine (manual) motor skills. Our inclusion requirements are that toddlers have no known serious medical conditions, no known developmental concerns, born at 37 weeks' gestation or greater, born weighing 4lbs 7oz or greater, with vision and hearing in a typical range, and prior touchscreen media exposure. These inclusion requirements helped to validate our data and limit number of outliers. One legal guardian parent will be required to participate in the study with the infant. An additional parent was able to consent to participate, so that the family can have flexibility in who attends the study visit with the infant and who completes the study activities. The toddlers and caregiver all had fluency in English (with child planned exposure to English =50%).

Measures

Joint Attention

Early Social Communications Scale (ESCS) will be used to assess Joint Attention. The ESCS is a 20-min structured interaction that codes children's tendency to initiate and respond to joint attention with a tester. For this assessment, experimenter and child were seated facing each other at a small table, with the caregiver seated beside the infant. A set of different tasks will be introduced to the child, and they will be assessed on their ability to respond to the experimenters' initiations of joint attention. The examiner will prompt the child to respond to joint attention by looking at four different target points in the room. (Markus et al., 2000; Morales et al., 2005; Vaughan Van Hecke et al., 2007; Salley & Dixon, 2007; Brandes-Aitken et al., 2020)

Temperament

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Early Childhood Behavior Questionnaire (EBCQ) Participants will complete the Early Childhood Behavior Questionnaire (EBCQ) to assess temperament. The ECBQ (Putnam et al., 2012) is used to assess a parents report of temperament. Its items describe typical behaviors that take place during everyday events such as nap- time (e.g., "When told that it is time for bed or a nap, how often did your child [a] react with anger or [b] get irritable?") and peer interactions (e.g., "When approaching unfamiliar children playing, how often did your child [a] watch rather than join in, [b] approach slowly, or [c] seem uncomfortable?"). For each of the items, response options are ranged from 1 ("never") to 7 ("always"). ECBQ's parent report has been found to be a reliable means for the assessment of children's temperament (Dixon & Smith, 2000; Salley & Dixon, 2007; Vaughan Van Hecke et al., 2007; Papageorgiou et al., 2014; Stępień-Nycz et al., 2018; Kucker et al., 2021). Specifically, Kucker et al., (2021) reports Cronbach's alpha in the 16- to 30-month-olds was .67 to .85 for the scales. Stepien-Nycz et al (2018), report their Cronbach's Alpha at 26 to 30 months was .74 to .77. Our study reports their alpha value of ($\alpha = .43$) for the temperament measure.

Self-Regulation and Healthy Relationships

I will be implementing the Devereux Early Childhood Assessment (DECA) to assess domains of self-regulation and relationships. The DECA includes items asking about children's ability to control attention and inhibit responses (e.g., "How often did the child get easily distracted?," "How often did the child accept another choice when his/her first choice was unavailable?"), as well as children's ability to regulate their emotions ("How often did the child calm himself/herself down when upset?" or "How often did the child control his/her anger?"). The DECA assessment has shown high validity when assessing child temperament (Barbu et al., 2013; Crane et al., 2011; LeBuffe & Naglieri, 1999; Ogg et al., 2010; Sawyer et al., 2015). The

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DECA has shown to be a reliable measure to assess self-regulation and health relationships.

Kaminski et al., (2013) and team used the DECA assessment to assess self-regulation behaviors in toddlers. The authors reported Cronbach's α of 0.91 (protective factors) and 0.71 (behavioral concerns). Sawyer (2010) also used the DECA assessment to assess self-regulation and report a Cronbach's alphas of .86, .87, and .89. Oggel et al 2010 used the DECA to assess subscales of healthy relationships. Our study reports an alpha value of $\alpha = .94$, for self-regulation and an alpha value of ($\alpha = .10$).

Procedures

The visits will take place at Seattle Children's in the Behavior and Development Laboratory at the Center for Child Health, Behavior, and Development (BDL-CCHBD). All laboratory visits will be less than 60 minutes, with COVID-19 protocol approved by Seattle Children's Occupational Health. A developmental screening tool will be used to pre-screen for communication, gross motor, fine motor, problem-solving and personal-social skills. Each study visit will be videotaped, and audio recorded for later coding of child, parental, experimenter behavior and protocol fidelity. In addition to demographic information and child media usage, parents will provide data regarding: 1) child temperament (Early Child Behavior Questionnaire); (2) health relationships and self-regulation (DECA-T).

Conditions and design

Parent will consent at the Lab Visit or before the Lab Visit via Phone. After the parent consent, they will get sent the two assessments via email and prompted to complete them via internet. The day of the Lab Visit, the toddler participant, Primary Caregiver, and Experimenter will be seated at a trapezoid table with the infant between the experimenter and parent. The experimental protocol will include 4 conditions that are matched to have a similar target object:

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(1) play with a 3D object (farm house) (2) play with a 2D simulation app of puzzle, instrument, or drawing (3) passive viewing of a video of children playing with puzzles, an instrument (4) play with an app that involves a puzzle or instrument in the context of an aurally and visually stimulating app (ex. Fruit Ninja). Media programs will contain content specifically for toddlers (including age-appropriate visual information and language, and actions included are within the motor repertoire of the participant). The sequencing of the four conditions will be randomized for each study subject. Within each condition I will follow this protocol: After 2 minutes, the Examiner will place the toy or start the device/program and place it in front of the child. Phase 1a: The infant will interact with the materials; Parent/Examiner will not engage with the child unless the child initiates. Phase 1b: Concurrent with the child's interaction with the item, the Examiner will deliver JA prompts (name + point, name + look) toward one of 4 posters or 4 toys in the room (as in Gaze Following Task in ESCS). Phase 1c: The parent will be encouraged to engage the child in a naturalistic way. The experimenter will not initiate any interactions but can respond to the child with a nod and smile. The goal of this phase is to see how the child interacts with the stimuli in the presents of an engaged caregiver. Suggesting that increased engagement by caregiver will increase the child's interest in engaging with the stimuli presented during the current task. Phase 1d: The experiment will conclude the phase by asking for the child to give the item back to them ("give it to me" ; up to three prompts will be used. If the child refuses to comply, the experimenter will ask the parent to remove the item. After return of the item, the experimenter will engage in a brief calm interaction with the child for at least 2 minutes before starting the next condition. Breaks may be taken between conditions if needed. Phase 1/2/3/4 are the four condition (3d play, 2D app play, passive viewing, highly engaging app,) and include the same sub phases (a,b,c,d).

Results

Table 1 presents means and standard deviations, among variables within the study of toddler joint attention (n= 45). Correlations of the predictor variables and outcome variable can be found in table 2.

Means and standard deviations for our temperament measure reflected (M=13.06, SD=.92, $\alpha = .43$) with temperament and joint attentions correlation being negative ($r = -.11$, $p = .47$). The negative association between toddler characteristics and joint attention was not statistically significant.

Table 1

Descriptive Statistics

	N	Minimu m	Maximu m	Mean	Std. Deviation
SumJA	45	10.00	21.00	16.8889	2.67329
SumTemp	45	11.66	16.30	13.0692	.92021
SumSelfReg	45	12.00	23.00	17.0222	2.63274
SumHealRel	45	43.00	72.00	64.5778	6.87383
Valid N (listwise)	45				

Self-Regulation (M= 17.02, SD=2.6, $\alpha = .04$), self-regulation correlated positively to toddler joint attention ($r = .21$, $p = .17$). These findings are not statistically significant. Our health relationships measure (M=64.57, SD=6.88), had a negative association to toddler joint attention

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($r = -.010$, $p = .96$). The association for healthy relationships and toddler joint attention is not statistically significant.

Table 2

Coefficients^a

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant	19.490	7.287		2.674	.011
)					
	SumTemp	-.300	.440	-.103	-.682	.499
	SumSelfR	.258	.169	.254	1.525	.135
	eg					
	SumHeal	-.047	.065	-.122	-.733	.467
	Rel					

a. Dependent Variable: SumJA

A linear regression was run in SPSS to test the multivariate association between toddler characteristics and joint attention. The multivariate regression model between toddler characteristics and their ability to respond to joint attention suggest that toddler characteristics account for 6.6% of the variation in joint attention, and this finding was not statistically significant ($R^2 = .066$, $F(3,41) = .96$, $p = .42$).

We found that participant's ability to respond to joint attention decreased 0.30 for every 1 unit increase in temperament, this was not a statistically significant finding ($\beta = -.30$, $p = .135$,

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LLCI= -1.11, ULCI= .63). A toddler ability to respond to joint attention increased .26 for every 1 unit increase in Self-Regulation ($\beta = .26$, $p = .14$, LLCI= -.09, ULCI= .53). The association between toddler joint attention and self-regulation was not statistically significant. For every 1 unit increase in toddlers health relationship score, their ability to respond to joint attention decreases .05, this finding is not statistically significant ($\beta = .05$, $p = .47$, LLCI= -.17, ULCI= .06). All independent variables were not significant predictors of toddler Joint Attention.

Discussion

The purpose of this study was to better understand if toddler characteristics such as temperament, self-regulation and health relationships was associated with a toddler ability to respond to Joint Attention. The hypothesis that toddlers will vary within ability to respond to joint attention due to differences in toddler characteristics was not supported. This may be due to environmental challenges or study design. Attention throughout childhood is an impactful trait to encourage and develop in order to promote higher level learning. Although the regression result were not statistically significant. The study adds to the literature in addressing individual variability within early child development.

The assessments used in this study were the full versions of their form. For example, the Early Child Behavior Questionnaire (ECBQ) encompasses 3 domains and 18 subscales. While the Devereux Early Childhood Assessment (DECA) is composed of 3 domains. Little research has been done analyzing the entirety of these assessments. Salley (2007) and team used the ECBQ to measure toddler temperament and its association to joint attention. Yet, their team differed from this study due to not analyzing the assessments as sums. Instead, Salley's team looked at how each domain and their subscales, independently impacted Joint Attention.

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Specifically, Salley only found that the subscales, attentional focusing and shifting, were correlated with toddler initiating joint attention through gaze between a novelty object and an adult in their environment. While they found subscales of negative affect, such as perceptual sensitivity and frustration, to be related to initiating Joint Attention, yet all measures of the domain of negative affect, were not associated with Joint Attention (Salley & Dixon, 2007). These findings are important to highlight if you want to better understand how a toddler's temperament impacts their learning. It may be to one's utility to better understand how the subscales individually impact learning.

All participating toddlers in this study were born within November 2019 and November 2020. In February of 2020, a global pandemic began, and many communities went on isolation. Many organizations reduced hours, became remote and the population was encouraged to social distance from one another. Recent literature has demonstrated the impact the pandemic has had on the development of children born during the pandemic. Using a large on-going longitudinal study of child neurodevelopment, researchers were able to find that children born during the pandemic had significantly lower verbal, motor, and overall cognitive performance (Deoni et al., 2021). Compared to children born pre-pandemic. Specifically, researchers highlighted that the infection itself is not what impacts child development, more so the environmental changes associated with the pandemic. Considering the importance of social engagement during early childhood, it would be understandable to associate lack of social engagement with cognitive functioning.

It may be to some utility for researchers to explore the extent of variability of the temperaments impact on joint attention throughout early childhood. Past research highlights that

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joint attention is matured by the age of 18 months, suggesting that joint attention may not be a correct measure of attention capacity past the 18 months range (Mundy & Newell, 2007).

Limitations and Future Directions

The result of this study must be considered within the scope of its limitations. The recruitment period for this study was less than two years. Typically, studies seeking to better understand variability within child development typically have over 100 participants (Bornstein & Putnick, 2012; Meins et al., 2011). As well, attention literature highlights toddler variation in responding to joint attention is associated with the type of joint attention they are to respond to. For example, toddlers are more likely to turn when they are being initiated to respond to a point rather than a gaze (Mundy & Newell, 2007). The procedure of my study consistent of point, gazes and head turns. In the future, it may be important to understand the difference behind toddler variability within type of joint attention initiation behavior.

Conclusion

In conclusion, my study took a unique spin to better understand the impacts a toddler can have on their learning. Future studies should consider environmental factors and the implementation of their measures to better detect a statistically significant affect. I would like to acknowledge that my data was collected form a larger study being conducted at Seattle Children's Research Institute. I was able to utilize this data for my capstone in order to gain more research experience and as a member of the research team. The purpose of the study was become more knowledge around my field of interest, gain more knowledge in psychological research and increase skills in statistically analysis, this purpose with accomplished.

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References

- Annie Yoon, S., A. Kelso, G., Lock, A., & Lyons-Ruth, K. (2014). Mother–Infant Joint Attention and Sharing: Relations to Disorganized Attachment and Maternal Disrupted Communication. *Journal of Genetic Psychology, 175*(6), 494–510. Academic Search Complete.
- Barbu, O. C., Levine-Donnerstein, D., Marx, R. W., & Yaden, D. B. (2013). Reliability and Validity of the Devereux Early Childhood Assessment (DECA) as a Function of Parent and Teacher Ratings. *Journal of Psychoeducational Assessment, 31*(5), 469–481.
<https://doi.org/10.1177/0734282912467758>
- Bigelow, A. E., MacLean, K., & Proctor, J. (2004). The role of joint attention in the development of infants' play with objects. *Developmental Science, 7*(5), 518–526. Academic Search Complete.
- Bornstein, M. H., & Putnick, D. L. (2012). Stability of language in childhood: A multiage, multidomain, multimeasure, and multisource study. *Developmental Psychology, 48*(2), 477–491. APA PsycArticles. <https://doi.org/10.1037/a0025889>
- Brandes-Aitken, A., Braren, S., Gandhi, J., Perry, R. E., Rowe-Harriott, S., & Blair, C. (2020). Joint attention partially mediates the longitudinal relation between attuned caregiving and executive functions for low-income children. *Developmental Psychology, 56*(10), 1829–1841.
<https://doi.org/10.1037/dev0001089>
- Crane, J., Mincic, M. S., & Winsler, A. (2011). Parent–Teacher Agreement and Reliability on the Devereux Early Childhood Assessment (DECA) in English and Spanish for Ethnically Diverse Children Living in Poverty. *Early Education and Development, 22*(3), 520–547.
<https://doi.org/10.1080/10409289.2011.565722>

Toddler Characteristics and Attention

- Crozier, W. R., & Perkins, P. (2002). Shyness as a Factor when Assessing Children. *Educational Psychology in Practice, 18*(3), 239–244. Academic Search Complete.
- Deoni, S. C., Beauchemin, J., Volpe, A., D'Sa, V., & the RESONANCE Consortium. (2021). Impact of the COVID-19 Pandemic on Early Child Cognitive Development: Initial Findings in a Longitudinal Observational Study of Child Health. *MedRxiv*, 2021.08.10.21261846.
<https://doi.org/10.1101/2021.08.10.21261846>
- Dixon, W. E. J., & Smith, P. H. (2000). Links between early temperament and language acquisition. *Merrill-Palmer Quarterly, 46*(3), 417–440. Education Source.
- Dixon, W. E., Salley, B. J., Clements, A. D., & Dixon, W. E. J. (2006). Temperament, distraction, and learning in toddlerhood. *Infant Behavior & Development, 29*(3), 342–357. Academic Search Complete.
- Fernández, M., Wegerif, R., Mercer, N., & Rojas-Drummond, S. (2015). Re-Conceptualizing “Scaffolding” and the Zone of Proximal Development in the Context of Symmetrical Collaborative Learning. *Journal of Classroom Interaction, 50*(1), 54–72. ERIC.
- Frolli, A., Lombardi, A., Bosco, A., Di Carmine, F., & Mc, R. (2021). Temperamental patterns and infant joint attention in typical development. *Current Pediatric Research, 25*.
- Gerardi-Caulton, G. (2000). Sensitivity to spatial conflict and the development of self-regulation in children 24-36 months of age. *Developmental Science, 3*(4), 397–404. Academic Search Complete.
- Gredebäck, G., Fikke, L., & Melinder, A. (2010). The development of joint visual attention: A longitudinal study of gaze following during interactions with mothers and strangers Gustaf Gredebäck et al. The development of joint visual attention. *Developmental Science, 13*(6), 839–848. Academic Search Complete.

Toddler Characteristics and Attention

HILTON, M., & WESTERMANN, G. (2017). The effect of shyness on children's formation and retention of novel word-object mappings. *Journal of Child Language*, *44*(6), 1394–1412.

Cambridge Core. <https://doi.org/10.1017/S030500091600057X>

Kaminski, J. W., Perou, R., Visser, S. N., Scott, K. G., Beckwith, L., Howard, J., Smith, D. C., & Danielson, M. L. (2013). Behavioral and socioemotional outcomes through age 5 years of the Legacy for Children public health approach to improving developmental outcomes among children born into poverty. *American Journal of Public Health*, *103*(6), 1058–1066. APA

PsycInfo. <https://doi.org/10.2105/AJPH.2012.300996>

Karrass J & Braungart-Rieker JM. (2003). Parenting and temperament as interacting agents in early language development. *Parenting: Science & Practice*, *3*(3), 235–259. Academic Search Complete.

Kucker, S. C., Zimmerman, C., & Chmielewski, M. (2021). Taking parent personality and child temperament into account in child language development. *British Journal of Developmental Psychology*, *39*(4), 540–565. Academic Search Complete.

Lau, J. Y. F., & Eley, T. C. (2010). The Genetics of Mood Disorders. *Annual Review of Clinical Psychology*, *6*(1), 313–337. <https://doi.org/10.1146/annurev.clinpsy.121208.131308>

Lengua, L. J., Kiff, C., Moran, L., Zalewski, M., Thompson, S., Cortes, R., & Ruberry, E. (2014). Parenting Mediates the Effects of Income and Cumulative Risk on the Development of Effortful Control. *Social Development*, *23*(3), 631–649. Academic Search Complete.

Lütkenhaus, P., Grossmann, K. E., & Grossmann, K. (1985). Infant—Mother Attachment at Twelve Months and Style of Interaction with a Stranger at the Age of Three Years. *Child Development*, *56*(6), 1538. Academic Search Complete.

Toddler Characteristics and Attention

- Lyons-Ruth, K., & Alpern, L. (1993). Disorganized infant attachment classification and maternal psychosocial problems as predictors of hostile-aggressive behavior in the preschool classroom. *Child Development, 64*(2), 572–585. Academic Search Complete.
- Markus, J., Mundy, P., Morales, M., Delgado, C. E. F., & Yale, M. (2000). Individual Differences in Infant Skills as Predictors of Child-Caregiver Joint Attention and Language. *Social Development, 9*(3), 302–315. Academic Search Complete.
- Meins, E., Fernyhough, C., Arnott, B., Vittorini, L., Turner, M., Leekam, S. R., & Parkinson, K. (2011). Individual Differences in Infants' Joint Attention Behaviors With Mother and a New Social Partner. *Infancy, 16*(6), 587–610. Academic Search Complete.
- Morales, M., Mundy, P., Crowson, M. M., Neal, A. R., & Delgado, C. E. F. (2005). Individual differences in infant attention skills, joint attention, and emotion regulation behaviour. *International Journal of Behavioral Development, 29*(3), 259–263. Academic Search Complete.
- Morrison, F. J., Ponitz, C. C., & McClelland, M. M. (2010). Self-regulation and academic achievement in the transition to school. In *Child development at the intersection of emotion and cognition*. (pp. 203–224). American Psychological Association. <https://doi.org/10.1037/12059-011>
- Mundy, P., Block, J., Delgado, C., Pomares, Y., Van Hecke, A. V., & Parlade, M. V. (2007). Individual Differences and the Development of Joint Attention in Infancy. *Child Development, 78*(3), 938–954. APA PsycInfo. <https://doi.org/10.1111/j.1467-8624.2007.01042.x>
- Mundy, P., & Newell, L. (2007). Attention, Joint Attention, and Social Cognition. *Current Directions in Psychological Science, 16*(5), 269–274. <https://doi.org/10.1111/j.1467-8721.2007.00518.x>
- Nesheiwat, K. M., & Brandwein, D. (2011). Factors Related to Resilience in Preschool and Kindergarten Students. *Child Welfare, 90*(1), 7–24. Academic Search Complete.

Toddler Characteristics and Attention

Pickard, K., & Ingersoll, B. (2015). *Brief Report: High and Low Level Initiations of Joint Attention, and Response to Joint Attention: Differential Relationships with Language and Imitation.*

(Report No. 01623257; Issue 1, pp. 262–268). Springer Nature; Academic Search Complete.

<https://ezproxy.spu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip&db=a9h&AN=100301302&site=ehost-live>

Posner, M. I., & Rothbart, M. K. (2007). Research on Attention Networks as a Model for the Integration of Psychological Science. *Annual Review of Psychology*, 58(1), 1–23. Academic Search Complete.

Putnam, S. P., Gartstein, M. A., & Rothbart, M. K. (2006). Measurement of fine-grained aspects of toddler temperament: The Early Childhood Behavior Questionnaire. *Infant Behavior and Development*, 29(3), 386–401. <https://doi.org/10.1016/j.infbeh.2006.01.004>

Putnam, S. P., Helbig, A. L., Gartstein, M. A., Rothbart, M. K., & Leerkes, E. (2014). Development and Assessment of Short and Very Short Forms of the Infant Behavior Questionnaire–Revised. *Journal of Personality Assessment*, 96(4), 445–458.

<https://doi.org/10.1080/00223891.2013.841171>

Rieser-Danner, L. A. (2003). Individual Differences in Infant Fearfulness and Cognitive Performance: A Testing, Performance, or Competence Effect? *Genetic, Social & General Psychology Monographs*, 129(1), 41–71. Academic Search Complete.

Rothbart, M. K., Sheese, B. E., & Posner, M. I. (2007). Executive Attention and Effortful Control: Linking Temperament, Brain Networks, and Genes. *Child Development Perspectives*, 1(1), 2–7. Academic Search Complete.

Toddler Characteristics and Attention

- Salley, B. J., & Dixon, W. E., Jr. (2007). Temperamental and Joint Attentional Predictors of Language Development. *Merrill-Palmer Quarterly (Wayne State University. Press)*, *53*(1), 131–154. PubMed. <https://doi.org/10.1353/mpq.2007.0004>
- Salley, B., Sheinkopf, S. J., Tenenbaum, E. J., Tronick, E., Shankaran, S., Bauer, C., Hammond, J., Neal-Beevers, A. R., Miller-Loncar, C. L., Lagasse, L. L., Bada, H., Whitaker, T., & Lester, B. M. (2016). Infants' Early Visual Attention and Social Engagement as Developmental Precursors to Joint Attention. *Developmental Psychology*, *52*(11), 1721–1731. Academic Search Complete.
- Sawyer, A. C. P., Miller-Lewis, L. R., Searle, A. K., Sawyer, M. G., & Lynch, J. W. (2015). Is Greater Improvement in Early Self-Regulation Associated With Fewer Behavioral Problems Later in Childhood? *Developmental Psychology*, *51*(12), 1740–1755. Academic Search Complete.
- Tareen, R. S., & Tareen, A. N. (2015). Attachment and mental health issues in the newborn. *Journal of Alternative Medicine Research*, *7*(3), 203–214. Academic Search Complete.
- Todd, J. T., & Dixon, W. E. (2010). Temperament moderates responsiveness to joint attention in 11-month-old infants. *Infant Behavior & Development*, *33*(3), 297–308. Academic Search Complete.
- Tu, H.-F., Skalkidou, A., Lindskog, M., & Gredebäck, G. (2021). Maternal childhood trauma and perinatal distress are related to infants' focused attention from 6 to 18 months. *Scientific Reports*, *11*(1), 1–13. Academic Search Complete.
- Vaughan Van Hecke, A., Mundy, P., Block, J. J., Delgado, C. E. F., Parlade, M. V., Pomares, Y. B., & Hobson, J. A. (2012). Infant responding to joint attention, executive processes, and self-regulation in preschool children. *Infant Behavior & Development*, *35*(2), 303–311. PubMed. <https://doi.org/10.1016/j.infbeh.2011.12.001>