ADAPTATION AND VALIDATION OF HOUSEHOLD CHAOS QUESTIONNAIRE FOR INDIAN PRESCHOOL CHILDREN

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CERTIFICATE

This is to certify that dissertation entitled "**Adaptation and validation of household chaos questionnaire for Indian preschool children"** is bonafide work submitted in part fulfilment for the degree of Master of Science (Speech-Language pathology) of the student with registration number 20SLP005. This has been carried out under the guidance of the faculty of the institute and has not been submitted earlier to any other university for the award of any other diploma or degree.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

1.1 Bronfenbrenner spheres

A person operates in four spheres of context, they are the microsystem, mesosystem, exosystem, and macrosystem as described by Bronfenbrenner (1999). The home environment is an ecological microsystem that can either foster or inhibit healthy child development (Evans & Wachs, 2010). And home is a place where a person lives permanently especially as a member of a family or a household (Obeta, 2014).

1.2 Home Environment

The surrounding of one's home is the home environment. This home environment is an aggregate of all internal and external conditions affecting the existence, growth, and welfare of an organism (Anene, 2005). The home environment is divided into physical, social, and abstract environments. The physical environment includes the people in the house like parents, siblings, and peers and the objects found in the home, school, or community. The social environment is the social life, societies, and clubs that affect the individual. The abstract environment is the reactions, feedback, and responses received on interactions with others. The environment, in general, can be divided into rural and urban environments (Anene, 2005). These environments are disrupted by the household chaos and create a problematic ecosystem for the child to grow in. Therefore, household chaos is the level of disorganization or home environmental confusion in the family home.

1.3 Household chaos

The household chaos represents a high level of background stimulation, lack of family routines, absence of predictability, the fast pace of family life, and structure in daily activities (Wachs & Evans, 2010; Ackerman & Brown, 2010). Household chaos

as an environmental construct is typically invoked to describe the physical and temporal organization of the home environment, with high chaos levels identified by high amounts of household clutter and by the absence of structured, stable routines (Wachs & Evans, 2010). Although it may be difficult to determine to what extent household chaos is the cause or the product of individual and/or dysfunctional family processes, theoretical accounts of household chaos view it as playing a central role in shaping family processes and child development (Dumas et al., 2005).

1.4 Effects of chaos

Many research has linked household chaos and family characteristics to poorer language development in children. Distal risk characteristics, including young maternal age, family size, poverty, and especially low maternal education have been linked to poorer language development in young children in a variety of research studies (Brody & Flor, 1998; Brooks-Gunn & Duncan, 1997; Hoff, 2003; Pan, Rowe, Spier, & Tamis-Lemonda, 2004; Westerlund&Lagerberg, 2008). The literature on chaos and child development has included a variety of specific features of household chaos in examining links to poorer parenting and child outcomes. These chaos indicators cut across the instability and disorder constructs. For instance, ambient noise in the home/neighbourhood, watching TV in the home, household crowding, and disorganized family routines have been used to index disorganization, while household moves, number of people moving in and out of the home, and changes in parent figures in the home have been used to index instability (Adam, 2004; Evans, Maxwell, & Hart, 1999; Johnson, Martin, Brooks-Gunn, & Petrill, 2008; Matheny, Wachs, Ludwig, & Phillips, 1995).

The construct of household chaos has been associated with a diverse range of adverse childhood outcomes, including poorer social-emotional functioning, cognitive

development, academic achievement, and behavioural problems (Aiello, Nicosia & Thompson, 1979; Boles et al., 2016; Coldwell, Pike & Dunn, 2006; Deater-Deckard et al., 2009; Johnson et al., 2008; Martin, Razza& Brooks, 2012; Wachs& Chan, 1986). Although households with more chaos are disproportionately likely to be socio-economically disadvantaged, chaos is associated with poorer developmental outcomes for all children, regardless of socio-economic status (Deater-Deckard et al., 2009; Evans, Gonnella, Marcynyszyn, Gentile, &Salpekar, 2005; Hart, Petrill, Deater-Deckard, & Thompson, 2007). Specifically, children living in chaotic home environments have been found to exhibit poorer academic, socio-emotional, and self-regulatory outcomes (Evans, 2006).

1.5 Need of the study

Limited research is conducted by researchers on household chaos and its effects on various aspects of a child's life. Available literature talks about the possible links between household chaos and executive function, internalizing and externalizing behaviour, cognitive development, socio-emotional development, learning habits, academic performance, and family outcomes. Each of these domains is again not extensively researched. Only a handful of literature is available documenting household chaos and its effects on speech and language development internationally. These research projects indicate a possible link between household chaos and poor speech and language skills (Martin, Razza, & Brooks in 2012; Feagans et.al, 2010). Increasing the awareness among Indian families about the effects of household chaos may bring about a better developing environment for the child and consequently reduce any effect that household chaos might bring about in the speech and language and other developmental aspects of the child.

1.6 Aim and hypothesis

Currently there are no tools available in India to our knowledge to assess household chaos. Hence this present study culturally adapts the CHAOS questionnaire (Confusion, Hubbub, and Order Scale CHAOS, Matheny et al., 1995) to Indian context which subsequently helps in understanding if household chaos has any effect on the vocabulary and pragmatic skills of preschool children in India and ultimately open the scope of research in the area. I hypothesise that household chaos and socioeconomic status of a child does affect a child's language development.

In the Indian scenario household chaos and its effects are not well known by the general population or researched about extensively. For the present study The CHAOS questionnaire is adapted, and categorical aspects of chaos developed by Martin, Razza, & Brooks in 2012 are considered.

The aim of the present study is to adapt the CHAOS questionnaire (Confusion, Hubbub, and Order Scale CHAOS, Matheny et al., 1995) scale and find the possible links between household chaos and vocabulary and pragmatic development in preschool children.

1.7 Objectives of the study

1. To develop the CHAOS by adapting from Confusion, Hubbub, and Order Scale CHAOS (Matheny et al., 1995) to suit the Indian context.

2. To determine the content validity of the constructed assessment questionnaire.

3. To identify the chaotic household environment in preschool children and study its positive or negative effect on the vocabulary and pragmatic development of a preschool child.

CHAPTER II

REVIEW OF LITERATURE

The dissertation will provide an in depth understanding of household chaos and how it affects the development of a young child which in turn affects the development of language abilities and further academic issues. The review of literature will focus on various literature that validate the use of the confusion, hubbub, and order scale across the globe. Through review of relevant household chaos literature, the notion of household chaos as one of the primary causes for poorer language development will be examined.

2.1 Household chaos

Many studies have examined chaos by broadly dividing chaos in two dimensions. These dimensions include household disorganisation chaos and household instability. Household disorganisation was the primary dimension being studied in various research. Household disorganization denotes the ambient noise such as neighbourhood noise, TV noise, as well as fast-paced TV, linking this chaos indicator to poorer attention and regulatory behaviors (Blankson, O'Brien, Leerkes, Calkins, & Marcovitch, 2015; Lillard, Drell, Richey, Boguszewski, & Smith, 2015). These aspects of chaos are usually experienced daily by family members and children. Thus, it has been this dimension or key aspects of this dimension that most research has examined in relation to negative child outcomes (Eisenberg, Olson, Neumark-Sztainer, Story, & Bearinger, 2004; Evans, Lepore, Shejwal, & Palsane, 1998). Household instability refers to frequent changes in the household composition and home resident environment, including frequent moving of an entire household to a new residence, changes in the mother or father figure in the family, and general changes in the people

who live in the household. Instability has been used as a separate indicator of chaos or has been coupled with disorganization in a few studies (Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999; Evans, Gonnella, Marcynyszyn, Gentile, & Salpekar, 2005; Vernon-Feagans, Garrett-Peters, Willoughby, Mills-Koonce, & The Family Life Project Key Investigators, 2012). Instability is likely not experienced daily by children, although repeated instances of instability even a few times a year have been related to poorer child outcomes, especially for school-age children (Tiesler et al., 2013; Tucker, Marx, & Long, 1998).

An operational definition of chaos encompasses two main constructs: instability/turbulence and disorder. Instability/ turbulence reflects changes in settings and relationships in the home and the unpredictability of routines. Disorder includes noise, crowding, clutter, and lack of structure (Sameroff, 2010).

Various scholars have described household chaos in a variety of ways. Instability in the family, unpredictability, disorganisation, high levels of noise and confusion, congestion, and a lack of routines are all classic definitions of chaos. Household chaos was defined by Adam and Chase Lansdale (2002) as family instability (especially parental separations) and family mobility. Household chaos, as defined by Bada et al. (2008), is unpredictability in the home environment. A chaotic household, according to Billows, Gradisar, and Dohnt, is one that is "disorganised and unstructured." Household chaos, according to Coldwell, Pike, and Dunn (2006), is "an environment that is high in noise and crowding but lacking in regularity and routines". Household chaos is defined by "noise levels, crowding and 'traffic' (people coming and going all the time), lack of predictability, and family" routines, according to Deater-Deckard, Mulluineaux, Beckman, Petrill, Schatschneider, and Thompson (2009). Household chaos, according to Dumas, is "high levels of confusion and agitation in the

home, as well as a sense of rush, disorganisation, and time pressure in everyday tasks." Chaos was defined in 2005 by Evans, Gonnella, Marcynyszyn, Gentile, and Salpekar as "frenetic activity, lack of structure, and unpredictability, in conjunction with extreme background stimulation." A chaotic household, according to Mokrova, O'Brien, Calkins, and Keane (2010), is one with a lot of background noise and crowding but low in structure and routine. Shamama-tus-sabah, Gilani, and Wachs in 2011 provided the most accurate account of household chaos. They defined household chaos as a microsystem context such as a home, day care centre, or school that is characterised by high noise levels, high densities or crowding, high traffic patterns (many people coming and going), and a lack of physical and temporal structure, that is, there are few regularities or routines in the environment, little is scheduled, and nothing has its place.

2.2 Cause of Household chaos and the effect of socioeconomic status

Though chaos exists in households of all socioeconomic levels, low-income households may face higher degrees of turmoil due to variables such as difficult life events, shifting work schedules, single parenting, and a lack of resources (Bronfenbrenner & Evans, 2000; Vernon-Feagans, Garrett-Peters, Willoughby, & Mills-Koonce, 2012). Financial insecurity can lead to instability by causing families to relocate (e.g., moving in and out of homeless shelters) and by necessitating additional people to live in the home in order to support the family. Irregular work patterns raise the demand for childcare, which may necessitate family members relying on others in the home. Longitudinal research on low-income families' adaptation shows that the demands of daily living are linked to more chaos, such as household overcrowding and instability in the home composition, and changes in parenting partners (Lichter & Jensen, 2002; Tubbs, Roy, & Burton, 2005). Furthermore, low-income families' disorder indicators are rising at a faster rate than middle-income families', and poverty-

related chaos limits upward socioeconomic mobility (Evans et al., 2005). Parents from low-income families are more likely to work in lower-paying service-sector employment. Work hours are frequently erratic and variable, making it difficult to develop regular, planned family routines (Vernon-Feagans et al., 2012b). Low-income families also have limited access to larger, better-quality housing quarters. As a result, individuals are more likely to encounter situations that are heavily populated, louder, and disorganised on average (Evans, 2004; Evans & English, 2002).Low-income children are also more likely to experience higher levels of household transience, when people enter and depart the household (Vernon-Feagans et al., 2012).Household chaos is also associated with negative parenting behaviours (i.e. low responsivity and harsh or inconsistent parenting; Coldwell et al., 2006; Corapci & Wachs, 2002; Dumas et al., 2005; Matheny, Wachs, Ludwig, & Phillips, 1995; Nelson, O'Brien, Blankson, Calkins, & Keane, 2009; Pike, Iervolino, Eley, Price, & Plomin, 2006; Valiente, Lemery-Chalfant and Reiser, 2007).

Despite the fact that household chaos has been linked to poverty (Evans et al., 2005; Evans, Eckenrode, & Marcynyszyn, 2010; Lichter & Wethington, 2010), it is not a coincidence. Poverty is most likely a marker variable for processes occurring at home and elsewhere that may be the more proximal causal mechanisms underlying the negative child outcomes associated with poverty (Bronfenbrenner & Evans, 2000; Vernon-Feagans, Garrett-Peters, Willoughby, et al., 2012). Household chaos is one of the proximal mechanisms in the home that could assist explain how poverty affects parenting and children's behavioural and academic performance. Although disorder exists in non-poverty households, it occurs more frequently and with greater intensity in poor households, because poverty-related issues such as irregular work hours, single parenthood, and a lack of home resources have been linked to chaotic households

(Valiente, Lemery-Chalfant, & Reiser, 2007; Vernon-Feagans, Garrett-Peters, De Marco, &Bratsch-Hines, 2012).

In 2019, Micalizzi examined the link between household chaos, socioeconomic status, and school readiness. Household chaos, according to the researcher, may: 1) moderate the direct link between SES and school readiness, such that high household chaos amplifies the negative effects of low SES on school readiness; 2) moderate the indirect link between SES and school readiness through executive function (i.e., high chaos may amplify the negative effects of SES and low chaos may mitigate adverse effects of SES); or 3) directly impact school readiness, such that high chaos is associated with high school readiness.

2.3 Household chaos and cognition

Various studies have found possible links between household chaos and a child's cognitive development. Wachs' early chaos studies, published in 1986, focused on environmental unpredictability and looked at the connections between chaos and early cognitive development. He theorised that a lack of family routines hampered children's ability to internalise social conventions and parents' ability to meaningfully interact with their children. Environmental unpredictability was defined in this seminal work as the regularity of the children's daily schedule, the amount of time the television was on in the house, and the number of individuals entering and exiting the house. Toddlers and pre-schoolers who scored higher on a composite measure of chaos had lower cognition and achievement one year later, according to earlier studies (Hart et al., 2007; Pike et al., 2006). There is apparently a link between certain aspects of chaos and the cognitive development of young infants, according to research. For example, overcrowding in the household throughout childhood has been linked to lower cognitive and communicative abilities (Evans et al., 2010; Wachs & Chan, 1986).

Important proximal processes that are crucial for the development of self-regulation are likely to be disrupted by household chaos. Children may be overstimulated in chaotic surroundings, leading to overarousal, and impeding the development of self-regulation abilities (Evans et al., 2005; Hoffman, 2000, Wachs & Evans, 2010). In environments with unpredictable routines and changeable expectations, controlling thoughts, emotions, and behaviours is more difficult (Evans et al., 2010). Limit setting and scaffolding have been proven to have a significant impact on the development of self-regulatory skills (Lengua et al., 2007).

Inconsistent, unpredictable surroundings obscure the link between actions and outcomes, and it is more difficult for children to internalise the regulation of activities without a thorough awareness of action-outcome contingencies (Grolnick & Farkas, 2002; Skinner, Johnson, & Snyder, 2005).

Marsh et al. published a systematic scoping review in 2020 that covered research from very early life to late adolescence, albeit the majority were undertaken in young children (under the age of 5 years). Executive function, Intelligent Quotient, general cognitive capacity, and a variety of academic indicators, such as reading comprehension, academic accomplishment, study skills, and learning, were all tested. Household chaos was found to be consistently linked to poor cognitive and academic outcomes. After controlling for SES, there was also evidence of a negative influence of household chaos on outcomes. They also discovered that the bulk of the studies they looked at investigated the link between household chaos and socio-emotional and behavioural outcomes. Both younger toddlers and teenagers were found to have negative results when their homes were chaotic. Responses to challenges, social skills/competence, emotion regulation, risky behaviours, attention, aspirations,

aggression, conduct problems, and callous-unemotional qualities were among the outcomes measured.

Crespo et al. investigated children's self-regulation skills as a mitigating factor in the relationship between household instability and behaviour problems in a study published in 2019. Children's self-regulation and behaviour issues were studied longitudinally in a low-income, diverse group of families. The initial objective was to look at the strength and consistency of links between family chaos and children's externalising and internalising issues during their early years. At both 24 and 36 months, household chaos was substantially correlated with externalising and internalising issues, confirming previous studies. Self-regulation was also discovered to be a moderator of the link between household chaos and behavioural problems. There was no link between household chaos and externalising difficulties for children who displayed stronger self-regulation during the waiting tasks, implying that self-regulation served as a protective factor for these children. Internalizing problems revealed the same pattern of findings.

Cecily discovered in a 2012 study that self-regulation modulates the relationship between chaos in the home and parenting and children's externalising difficulties. Positive behaviour support, in particular, promoted the development of self-regulatory skills, whereas household chaos hampered the development of self-regulatory skills over time. Furthermore, as expected, poor self-control was linked to an increase in externalising difficulties over time.

Berry et al in 2016 tested whether relations between household chaos across infancy and early childhood and children's social and cognitive development at age five were mitigated by their experiences in childcare that is its quantity, type, and the caregiver responsivity. They also tested to see whether the conditional relations

between household chaos and social and cognitive development were explained by links between household chaos and less optimal executive functioning. They found fairly consistent interaction between household disorganization and children's hours in non-parental childcare, across multiple measures of children's cognitive and social development. For children experiencing low levels of disorganization at home across infancy and early childhood, greater hours of weekly childcare were largely not associated with children's cognitive or social development. In contrast, for children experiencing highly disorganized households over this period, they found consistent evidence of a dose-response relation between greater hours of childcare per week and comparatively more optimal cognitive and social outcomes. For those attending little to no childcare, household disorganization was predictive of less effective executive functioning, smaller receptive vocabularies, and more problematic social behaviour. However, consistent with the idea that children's childcare experiences may buffer them against the detrimental effects of chaos experienced at home, the respective associations between household disorganization and each of these outcomes was attenuated for those spending more time in childcare per week. In each case, the effect of household disorganization was attenuated to the point of statistical non-significance for children attending full-time childcare (i.e., 35 hours per week). They also discovered that (conditional) links between household disorganisation and executive functioning mediated the respective conditional relations between household disorganisation and children's subsequent receptive vocabulary and social problems. In the context of low hours of childcare, high levels of household disorganisation were linked to less effective executive functioning and, as a result, smaller receptive vocabularies, worse academic success, and more problematic social behaviour in children under the age of five. However, no indirect connections were found in the setting of longer childcare hours.

They discovered that while the findings for family disorganisation were rather constant, the relationships between their second measure of chaos—household instability—and the outcomes were restricted and inconsistent. They reasoned that this outcome was due to the fact that movements in and out of the home are rather unusual events. They found that early children's exposure to household chaos and childcare was linked to a variety of developmental outcomes, frequently with magnitudes similar to those seen in parenting. They discovered that a 0.26 standard deviation difference in executive functioning was associated with a standard deviation difference in parental sensitivity. The standardised effect of family disorder was 0.29 for those who attended minimal hours of day-care (i.e., 5 per week). These unusual links between household chaos and children's cognitive and social development were in line with the theoretical literature on environmental chaos, which suggested that chaos has a direct impact on children's ability to regulate attention and modulate arousal.

Larsen et al. examined child routines as a mediator in the relationship between household chaos and child externalising behaviour in 2019. The findings revealed that family routines (as well as general child routines) mediated the connection between household chaos and child externalising behaviour independently. Bedtime routines also mediated the link between household instability and bedtime resistive behaviour, implying that family routines (as well as general child routines) are mechanisms by which household chaos is linked to externalising behaviour. And bedtime routines are a way by which household chaos is linked to bedtime resistance. Although both routines collectively mediated the association between household chaos and child behaviour problems in the parallel mediation models, neither routine was determined to be a significant mediator on its own, possibly due to the high degree of shared variance between constructs. Overall, these findings suggest that developing frequent daily

routines for preschool-aged children living in chaotic households may be a viable intervention to investigate, since routines may help to minimise concurrent or future externalising behaviours (Fiese and Winter 2010). Separately, the direct impacts of household chaos on externalising behaviour and bedtime resistance persisted. This suggested that there are additional elements or mechanisms at work that could help to explain the link between household chaos and externalising behaviour, and that these should be investigated more empirically. Negative parenting practises, according to the researchers, could be a potential mediator because they are representative of joint parent-child interactions such as daily routines. Negative parenting practises (poor monitoring/supervision, harsh and inconsistent discipline) have been linked to increased household chaos (Mokrova et al. 2010), fewer daily routines (Bater and Jordan 2016), and more externalising behaviours (Eisenberg et al. 2005), making it a possible additional mediator. Another possible mediator has been identified by parental distress and depression, which have both been associated to increased household chaos, less daily routines, and increased child behaviour difficulties (McLoyd et al. 2008; Pike et al. 2006). As a result, it's critical to comprehend different mechanisms that could explain the link between household chaos and externalising behaviours, as they could be targeted for intervention.

In 2009, Deater-Deckard et al examined the relationships between parent-reported chaos and six other family and home environment variables, as well as whether parent-rated chaos provided independent statistical prediction of child IQ and conduct problem scores beyond the effects of the other environment variables. Parents in more chaotic households were found to be less educated and to have lower IQ scores, to provide less optimum literacy environments, to show less warmth and more negativity toward their children, to report more stressful occurrences, and to live in poorer housing

conditions. Even after other home environment factors were statistically controlled, chaos accounted for significant variance in child IQ and conduct difficulties. These findings suggested that, while parent-rated chaos is conceptually related to other family environment factors, when it comes to statistically predicting variance in child IQ and conduct problems, parents' perceptions of chaos are empirically unique from other environmental factors.

2.4 Household chaos and language development

Children who are exposed to noise on a regular basis have lower reading and language skills than matched controls, possibly because they learn to filter out auditory stimuli, including those that are beneficial (Evans, 2006; Haines, Stansfeld, Job, Berglund, & Head, 2001; Maxwell & Evans, 2000). Having synchronicity between visual and auditory information improves infants' language development (Hollich, Newman, & Jusczyk, 2005), which is less likely in families with regular background noise, such as that created by television. Furthermore, early exposure to television has been linked to both short- and long-term attention issues (Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004; Landhuis, Pouton, Welch, &Hancox, 2007).

There is also evidence that children who grow up in chaotic household circumstances are less conducive to language development. In general, this could mean that parents are simply less sensitive and effective because of the chaos, but Matheny et al. (1995) and Evans, Lepore, Shejwal, and Palsane (1998) have argued that household chaos can directly influence children's development, particularly early cognitive and language development, by overstimulating them. As a result, both publications theorized that children may cope with overstimulation in the household by filtering out and retreating from it. Because of the many ambient distractions, a small child in a home with a lot of background noise and a lot of people coming in and out of

the house might not be able to absorb the language that is intended for him/her. Instead of trying to focus on the language addressed at the youngster, the toddler may turn away and shift their gaze away from the overstimulation. The youngster may play alone or engage in an activity that blocks off the stimulation, such as pounding a hammer or singing to himself. Children's capacity to engage in joint-attentional activities and other parent-child interactions that support language development would certainly be harmed because of this retreat. There are some literatures that support the hypothesis of overstimulation, which examined the relationship of ambient noise and overcrowding to language and literacy, for example Evans et al. (1998) discovered that residential congestion was negatively related to children's language, even after controlling for socioeconomic status and also the exposure to chronic noise in the neighbourhood is negatively associated with children's preschool language development with reference to Maxwell and Evans (2000). Further research found a relationship between family and school density (crowding) and inferior language/literacy and academic achievement in older children (Evans, 2006; Evans, Kliewer, & Martin, 1991; Evans et al., 1998; Maxwell, 2003). These studies examining measures of crowding/noise, which are frequently associated with disorganisation, may be linked to children's inferior language.

Early language development, particularly early word learning, has been shown to be faster and more efficient when children participate in joint-attention activities with their mothers or other caregivers (Tomasello & Farrar, 1986) and caregivers respond to their young children's attention and vocalisations (Tamis-LeMonda, Bornstein, Kahana-Kalman, Baumwell, & Cyphers, 1998; Tomasello& Todd, 1983). Better word learning and language development are promoted by adult language that helps the child comprehend the relationships between spoken words and what they represent in the

environment, as well as sustained conversational discourse between the adult and the child (Arterberry, Midgett, Putnick, & Bornstein, 2007; Brooks & Meltzoff, 2008; Watt, Wetherby, & Shumway, 2006). For word learning and grammatical development, the parents with lower educational levels have been demonstrated to be less receptive to their children's language and provide a less ideal environment (Hoff, 2009; Raviv et al., 2004).

Less effective parenting has mediated a link between accumulated chaos experiences and early language. Chaos, according to Bronfenbrenner and Evans (2000), could impair critical proximal processes between parent and child, especially in households under stress due to poverty and other circumstances. According to researchers, this disturbance in parenting could be due to the stress that chaos creates in the house, which leads to parental insensitivity and a decreased desire to actively connect with their children (Corapci & Wachs, 2002; Evans et al., 1999; Johnson et al., 2008; Matheny et al., 1995). Greater chaos, as judged by the parent report CHAOS scale, was linked to more parental verbal interference, less object offering, and more disregarding of the child's attempts to communicate, according to Matheny et al. (1995).

Therefore, chaos can also be quantified as a function of its constituent aspects, such as instability and disorganization, and there are links between chaos and cognition. Vernon-Feagans et al. (2012) used composite measures of household instability and disorganization based on largely observer ratings and discovered that higher levels of household disorganization (but not instability) in early childhood were associated with lower levels of receptive and expressive vocabulary at the age of three. Home crowding and broad measures of children's cognitive development in early childhood (Evans et al., 2010), as well as household instability and behaviour issues in adolescence, have similar relationships (Marcynyszn, Evans, &Eckenrode, 2008). Overstimulation, which

may be mediated by children's overworked attentional and executive systems, may make it difficult for young children to encode, process, and comprehend language information (Evans, Maxwell, & Heart, 1999).

In a systematic scoping review conducted by Marsh et al in 2020 included a total of six manuscripts investigating the link between household chaos and communication, all of which were conducted in the early childhood setting. Outcomes assessed included non-verbal abilities, receptive and expressive language, and phonological awareness. It was found that Household chaos was consistently linked with adverse effects on communication outcomes across all six analyses. After controlling for all other measures of household chaos, lack of routines was significantly associated with lower receptive vocabulary scores in 5 year olds, and in an analysis that controlled for 13 covariates, including maternal education and poverty, household disorganisation was associated with significant decreases in both receptive and expressive language in 3-year-old children (n = 1145). Finally, when investigating the heritability of cognitive abilities as a function of the child's early environment, household chaos, which is classified as a proximal environmental determinant, had stronger effects than distal environmental determinants (e.g. SES) on the heritability of verbal ability.

Household chaos had concurrent and predictive relations with children's language in a study by Bridget Maria Gaertner in 2012. In her correlational analyses, mother reports of chaos at each time point were negatively related to children's expressive (albeit marginally) and receptive language assessed in the laboratory at 54 months of age. In the longitudinal path model that accounted for other factors that had direct relations with language—including family SES and children's prior vocabulary size—chaos at 42 months had unique negative relations with later language. These

findings were in concordance with the results of a number of other investigations that have demonstrated similar links between aspects of environmental chaos and poorer language, pre-literacy, and literacy skills in preschool and school-aged children (Evans & Maxwell, 1997; Haines et al., 2001; Maxwell & Evans, 2000; Pike et al., 2006).

Julie Trapani's study in 2014 revealed that children from more chaotic environments performed worse on language and sequence learning measures. Children in homes with excessive phone use performed worse on Grammaticality Judgment and showed decreased ERP amplitudes of sequence learning in the central posterior region. Likewise, children in chaotic homes performed worse with vocabulary and Grammaticality Judgment. Finally, children who spent more time watching television showed worse sequence learning as measured by reaction-time.

Household chaos has been also correlated with excessive screentime in many households. Emond et al in 2018 found greater household chaos was positively associated with weekly screen use ($P = 0.03$) and use of screens within one hour of bedtime ($P < 0.01$) in a dose-dependent manner. Such an Excessive screentime has shown to have a negative effect on the language development of a child. Mcarthur et al in 2021 found that 2-3y old children using screens for 2 hours or 3 hours a day had an increased likelihood of reported behavioural problems, delayed achievement of developmental milestones and poorer vocabulary acquisition. Duch et al in 2013 found that infants and toddlers who watched more than 2 hours of television a day had increased odds of low communication scores concurrently and longitudinally, even after controlling for gender and maternal education

2.5 Household chaos and childhood speech and language disorders

Iwinski et al (2019) studied the Interrelationships Between Household Chaos, Children's Attention Deficit Hyperactive Disorder (ADHD) Tendencies, and Diet

Quality among 4- and 5-year-olds. They found CHAOS to be positively and significantly related to inattention tendencies (r = .24, P = .04), hyperactivity tendencies (r = .31, P = .01), and total raw scores (r = .31, P = .01). Using partial correlations while controlling for age, sex, income, and gender, they found that household chaos was positively and significantly related to hyperactivity tendencies (r = .28, P = .03) and total raw scores (r = .28 P=.03). These findings suggested that children's tendencies of hyperactivity and inattention are associated with commotion in the household environment.

Kraft et al (2014) examined the interaction of stuttering severity, children's temperament, their home environment, and the presence of major life event. They studied 69 children with stuttering out of which there were 21 girls and 48 boys, between the ages of 26 and 69 months and their mothers. They found that There were significant correlations between CHAOS scores and Negative affectivity, CHAOS scores and Effort control, and CHAOS scores and mother severity rating however chaos did not contribute to severity in early childhood stuttering.

2.6 Review of validation of Confusion Hubbub and Order scale

After literature search it was observed that The Confusion, Hubbub, and Order Scale (CHAOS) designed by Matheny, Wachs, Ludwig, and Phillips (1995) was the most frequently used assessment tool to measure chaos. Other studies used questionnaires developed specifically for the study, for example Martin et al., in 2011 introduced 5 measures of Chaos which highlighted the family instability, lack of routine, television being on generally, crowding, and noise in the home environment. However, variables in these questionnaires do not talk about child's speech and language development directly or indirectly and purely only measures the household chaos.

Eom et al in 2021 validated the use of CHAOS questionnaire in Korea by adapting the questionnaire to suit Korean contexts. In the scale adaptation process, a total of 14 items were used in the analysis, except for one item that was judged not to fit the Korean culture (our family spends a lot of time on the phone) to measure the confusion within the family. Descriptive statistics, correlation between item-total scores, and internal consistency index when items were removed were checked to confirm the item quality of 14 items of the household confusion scale. As a result, the mean, standard deviation, skewness, and kurtosis of the items were all good, and the correlation between the item and the total score was found to be acceptable based on the criteria of Gable & Wolf (1993) that was acceptable if the item-total score was higher than 20. When the items were removed, the internal consistency index was also stable for all items. Confusion within the home was developed as a single factor, so this study conducted a confirmatory factor analysis as a single factor. As the model fit index did not meet the criteria overall, the model was modified by linking the correlation between measurement errors by referring to Modification indices and Par Change. As a result, overall model fit was improved, and the results of confirmatory factor analysis were examined. As a result, item 1 with a factor loading value that was too lower than .5 was deleted. The result of calculating the internal consistency index was .881 to examine the reliability of the 13 items of confusion within the household, confirming that the items consistently measure the constructive concept.

Gabriela Sanchez-Mondragon and Luz Maria Flores Herrera in 2019 adapted and validated the CHAOS questionnaire in Spanish language. The 15 reagents scale was made up into nine items scale grouped into three factors that correspond to the environmental confusion, order, and lack of implementation of routines. It was found

that the questionnaire provided good internal consistency, and validity and hence proved to be a valid and reliable instrument with which confusion can be evaluated.

CHAPTER III

METHOD

3.1 Participants

A total of thirty typically developing children in the age range of 3-4 years were considered for the study. An equal gender ratio was maintained.

3.1.1 Criteria for inclusion

1. Child must be attending preschool

2. Child must be exposed to English language

3. Child must be typically developing based on Receptive expressive emergent language scale administration)

4. Must be willing and provide consent to participate in the study (AIISH consent forms will be provided to the participants)

3.1.2 Criteria for exclusion

1. Child belonging to a socioeconomically disadvantaged family (a score of 15 and below indicating that the child belongs to lower middle class/ upper lower class/ lower class on administration of modified Kuppuswamy socioeconomic status scale (Kumar. G et al, 2022)

2. Child with any disease or disorder affecting language (based on REELS administration)

Sociodemographic data of the participant was collected by the researcher such as participants name, age, sex, date of birth, address, contact numbers, socio-economic status, education, family details, income per capita, age of parents, marital status of parents, family size and socioeconomic status scale was administered by the researcher to exclude any socioeconomically disadvantaged participant. Receptive expressive

emergent language scale (REELS) was administered to rule out a possibility of a pre-existing language delay.

3.1.3 Source of the participants

Participants were selected by the researcher from preschools in and around Mysuru

3.2 Measures considered for the present study

3.2.1 Household chaos

For the entirety of the study household chaos was measured using the Confusion, Hubbub, and Order Scale (CHAOS) designed by Matheny, Wachs, Ludwig, and Phillips (1995) (Appendix A). The scale describes the environmental confusion that's seen in Bronfenbrenner's microenvironment called the physical environment. The questionnaire excludes any items that represent adequacy of the dwelling or quality of furnishings or imply unsanitary conditions and each item on the questionnaire reflects household characteristics that directly represent a chaotic home environment (Marsh et al., 2020). The questionnaire included statements about the routines, organization or disorganization confusion, and noise in the home environment which are to be indicated as true of false by the participant (yes/no).

The questionnaire is as follows

1. There is very little commotion in our home.

2. We can usually find things when we need them

3. We almost always seem to be rushed.

4. We are usually able to stay on top of things.

5. No matter how hard we try, we always seem to be running late.

6. It's a real zoo in our home.

7. At home we can talk to each other without being interrupted.

8. There is often a fuss going on at our home.

9. No matter what our family plans, it usually doesn't seem to work out.

10. You can't hear yourself think in our home.

11. I often get drawn into other people's arguments at home.

12. Our home is a good place to relax.

13. The telephone takes up a lot of our time at home.

14. The atmosphere in our home is calm.

15. First thing in the day, we have a regular routine at home.

3.2.2 Vocabulary assessment

The Peabody picture vocabulary test was administered on 30 typically developing 3–4-year-old children who were attending preschool. The child was asked point to the picture mentioned by the researcher from a picture plate of 4. The child was provided with enough time and cue if a wrong answer was stated to answer correctly. The starting point for the test was stated according to the age of the child being assessed. Since the children included in the research were all 3–4-year-old we started the test with plate number 15. All words before plate 15 was assumed to be correctly identified.

3.2.3 Pragmatic assessment

The Descriptive Pragmatics profile of Clinical Evaluation of Language Fundamentals (CELF) Preschool 2 was also administered on the 30 neurotypicals of the age 3-4 year attending preschool. The checklist consisted of 26 statements that describes a pragmatic behaviour. The statement was rated on a 4-point rating scale, 1-stating that the behaviour is never observed, 2-stating that the behaviour is observed sometimes, 3-stating that the behaviour is observed often and 4-stating that the behaviour is always observed. An option of "not applicable" is also provided if the behaviour stated does not stand true for the child.

3.3 Procedure

The study was conducted in two phases.

Phase 1: Construction by adaptation of CHAOS (Confusion, Hubbub, and Order Scale CHAOS, Matheny et al., 1995)

Phase 2: Field testing the assessment manuals on neurotypicals

3.3.1 Phase 1: Construction by adaptation of CHAOS (Confusion, Hubbub, and Order Scale CHAOS, Matheny et al., 1995)

Step I- Adaptation of CHAOS: The CHAOS statements were adapted to much suit the Indian context and language by the researcher.

Step II: Determining the content Validity: A preliminary scale was created by adapting the questions from the Confusion, hubbub and order scale and was rated by three professionals (one clinical psychologist and two speech language pathologists). The preliminary questionnaire was finalised after the content validation using validation form adapted from Manual for Non-fluent Aphasia Therapy (Goswami et al., 2012) and the suggestions provided by the validators were considered and hence a final scale was created.

3.3.2 Phase 2: Field testing the assessment manuals on pre-school children

Step I: Parents of the participants were interviewed by the researcher over a video communication application. The researcher used the CHAOS scale (Confusion, Hubbub, and Order Scale CHAOS, Matheny et al., 1995) which contains 15 dichotomously scored questions to be answered by the mother of the child being assessed.

Parents of the children included in the study answered the CHAOS. The 15 questions were divided into 3 groups based on the chaos factors: factor 1 denotes

questions based on confusion (question nos. 1, 6, 8, 9, 10, 11, and 13); factor 2 denotes questions based on order (question nos. 2, 7, 12, and 14); and, factor 3 denotes questions based on absence of implementation of routines (question nos. 3, 4, 5, and 15). Questions 3, 5, 6, 8, 9, 10, 11, and 13 were given a score of 1, if the answer was "yes" (positively scored), and questions 1, 2, 4, 7, 12, 14, and 15 were given a score of 1, if the answer was "no" (negatively scored). A greater score indicated the presence of chaos in the household.

Step II: To assess the vocabulary the researcher used Peabody picture vocabulary test 1 (Version) (Dunn and Dunn, 1968). Two variables were recorded from the Peabody picture vocabulary test. One is the raw score, which is the total number of correct responses, and the mental age that corresponds to the raw score. A child with poor vocabulary will show poorer raw scores corresponding to his/her age.

The pragmatic ability of the child was assessed using the Descriptive Pragmatics profile of CELF Preschool 2 (Version). These interviews were recorded with informed consent and documented. Socio demographic data with reference to the participants and their parents was obtained by the researcher on a semi-structured interview basis. This interview data provided details on participants' name, age, sex, date of birth, contact numbers, socio-economic status, education, income per capita, marital status of parents. The total score for each child was recorded from the pragmatic checklist. A lower score indicated that the child has poor pragmatic abilities.

Step III: The data obtained in Step I and Step II facilitated studying the relationship between the CHAOS and vocabulary development and pragmatics in typically developing children and was subjected for further statistical analysis.

After individual evaluation of Step I and Step II scores, statistics for chaos score, vocabulary score and pragmatic score a series of statistical evaluation were conducted to find the correlation between the three domains.

3.3 Statistical analysis

Statistical analysis was carried out to find the relationship between household chaos and vocabulary development, household chaos and language development of children aged 3-4 years attending preschool. Each variable was statistically analysed to find the frequency data. All children included in the study fulfilled the inclusionary and the exclusionary criteria stated for the purpose of the study.

Descriptive Statistics for the scores of CHAOS and vocabulary development and pragmatics.

The chaos score and the pragmatic score were first correlated. A parametric Pearson's correlation test was conducted.

Next the chaos score and the vocabulary raw score was also correlated. A nonparametric spearman's correlation test was conducted.

Further the corresponding age documented from the raw score of the vocabulary test was correlated with the chronological age of the child. A nonparametric spearman's correlation test was conducted.

The chronological age of the child was also correlated with the pragmatic score of the child using the parametric Pearson's correlation test.

To understand the relations among the chaos, vocabulary, and pragmatic even further, a deeper statistical analysis was conducted. The chaos scores were divided into groups based on the median chaos score that is 4. All values below the median value were given a rank of 1 and all values above the median value were given a rank of 2

hence creating two groups, group 1 with lower chaos score and group 2 with higher chaos score.

Mann-Whitney U test was performed to compare the relation between the groups based on the vocabulary score and the pragmatic score and the chronological age.

CHAPTER IV

RESULT

Study participants included thirty typically developing children who fulfilled the inclusion and the exclusion criteria of the study. Details of the characteristics of the participants are presented in Table 1.

Table 1

Socio-demographic variables of the sample (N=30)

Participant details			N	%	Missing Data (%)	M	SD
Gender	Male		12	40			
	Female		18	60			
Age			30	100		41.47	4.032
*Education	Father	P/H	13	43.3			
		G	17	56.7			
*Occupation		LSOM	6	20			
		P	24	80			
*Monthly income (Rs)					12 (40)		
		9K-27K	1	3.3			
		46K-68K	4	13.3			
		68K-92K	2	6.7			
		92K-1.8L	1	3.3			
		≥1.8L	10	33.3			
*Socioeconomic status	Upper middle	16-26	13	43.3			
	Upper	26-29	11	36.6			

Note. N= Number, P/H=Profession or honours; G=Graduate; LSOM=Legislators, Senior Officials & Managers P=Professionals, * Kuppu swamy's SES scale variables

Phase 1: Adaptation of Confusion, Hubbub, and Order Scale (CHAOS, Matheny et al., 1995)

The CHAOS was adapted to suit the Indian context. The adapted scale is as follows.

1. There is very little commotion in our home.

2. We can usually find things when we need them.

3. We almost always seem to be in a hurry.

4. We are usually able to remain in control of things in our home.

5. No matter how hard we try, we always seem to be running late.

6. We are always confused and disorganised in the house.

7. At home we can talk to each other without being interrupted.

8. There is often unnecessary concern about things at our home.

9. No matter what our family plans, it usually doesn't seem to work out.

10. You can't hear yourself think in our home.

11. I often get drawn into other people's arguments at home.

12. Our home is a good place to relax.

13. The telephone takes up a lot of our time at home.

14. The atmosphere in our home is calm.

15. First thing in the day, we have a regular routine at home.

The adapted CHAOS was subjected to content validation by 3 psychologists and 2 speech language pathologists working in All India Institute of Speech and Hearing, Mysuru, India. The final CHAOS (Appendix B) thus created is as follows:

1. There is very little <mark>disturbance</mark> in our home.

2. We can usually find things when we need them.

3. We almost always seem to be in a hurry.

4. We are usually able to remain in control of things in our home.

5. No matter how hard we try, we always seem to be running late.

6. We are always confused and disorganised in the house.

7. At home we can talk to each other without being interrupted.

8. There is often unnecessary worry/concern about things at our home.

9. No matter what our family plans, it usually doesn't seem to work out.

10. You can't hear yourself think in our home.

11. I often get drawn into other people's arguments at home.

12. Our home is a good place to relax.

13. The telephone takes up a lot of our time at home.

14. The atmosphere in our home is calm.

15. First thing in the day, we have a regular routine at home.

Phase 2: Field testing CHAOS on neurotypical children

Step 1

Parents of the children included in the study answered the CHAOS. Table 2 denotes the frequency and percentage of the responses.

It was observed that questions pertaining to confusion (factor 1) and absence of routines (factor 3) had the highest scores (questions 1, 13, 3, and 5) as shown in Table 2. The mean, median and standard deviation values for CHAOS Total Score are mentioned in Table 3. Out of the 30 participants, 11 had a score above the median value and 19 had a score below the median value.

Table 2

CHAOS response score

Question	N	%
1. There is very little disturbance in our home.	**13**	**43.3**
2. We can usually find things when we need them	9	30
3. We almost always seem to be in a hurry.	**12**	**40**
4. We are usually able to remain in control of things in our home.	1	3.3
5. No matter how hard we try, we always seem to be running late.	**13**	**43.3**
6. We are always confused and disorganised in the house.	2	6.7
7. At home we can talk to each other without being interrupted.	8	26.7
8. There is often unnecessary worry/concern about things at our home.	9	30
9. No matter what our family plans, it usually doesn't seem to work out.	6	20
10. You can't hear yourself think in our home.	8	26.7
11. I often get drawn into other people's arguments at home.	4	13.3
12. Our home is a good place to relax.	1	3.3
13. The telephone takes up a lot of our time at home.	**13**	**43.3**
14. The atmosphere in our home is calm	8	26.7
15. First thing in the day, we have a regular routine at home.	3	10

Table 3

Measures of central tendencies for CHAOS Total Score

Statistic	M	Mdn	SD
CTS	3.67	4.00	2.279

Note. CTS= CHAOS Total Score; Mdn= median

Step 2

The Peabody Picture Vocabulary Test and Descriptive Pragmatic profile of the Clinical Evaluation of Language Fundamentals was performed on 30 neurotypical children (3-4 years), who were attending preschools, to know their level of vocabulary and pragmatic development. The data was subjected to statistical analysis and results obtained are documented in Table 4.

Table 4

Measures of central tendencies for individual variables

Measures	Mean	Median	Minimum	Maximum	Standard Deviation
PPTS	84.30	84.50	66	103	10.168
PPVTRS	39.07	40.50	28	47	4.989
PPVTM	45.77	46.50	35	57	5.399

Note. PPTS= Pragmatic Profile Total Score; PPVTRS= Peabody Picture Vocabulary Test Raw Score; PPVTM=age according to Peabody Picture Vocabulary Test in months.

The mean raw score on Peabody Picture Vocabulary Test was 39.07 (SD=4.989) and the corresponding age was 45.77 (SD=5.399) months. The highest raw score was 47 while the maximum age score was 57 months. The least raw score was 28 and the least age score was 35 months. 8 out of the 30 participants performed poorly for their age on the vocabulary test with a delay greater than 3 months. The highest pragmatic score achieved by a child was 103 and the least was 66. The mean pragmatic score was 84.3 (SD=10.168).

On correlation (Table 5), it was found that the CHAOS score and the pragmatic score showed a negative correlation (r= -0.281, *p*=0.132).

Table 5

Correlation between CHAOS Total Score and Pragmatic profile total score

			CTS	PPTS
Pearson correlation	CTS	Correlation Coefficient	1.000	-.281
		Sig. (2-tailed)		.132

Note. CTS= CHAOS total score; PPTS= pragmatic profile total score

It was also found (Table 6) that the CHAOS Total Score and the vocabulary score had a low correlation (r=0.017, p=0.928)

Table 6

Correlation between CHAOS Total Score and Peabody picture vocabulary test raw score

			CTS	PPVTRS
Spearman's rho	CTS	Correlation Coefficient	1.000	.017
		Sig. (2-tailed)	.	.928

Note. CTS= CHAOS total score; PPVTRS= Peabody picture vocabulary test raw score.

Chronological Age and the age based on the vocabulary score of the child also had a low correlation (r=0.254, *p=0.175*) (Table 7).

Table 7

Correlation between age according to Peabody Picture Vocabulary Test and chronological age

			PPVTM	Age in month
Spearman's rho	PPVTM	Correlation Coefficient	1.000	.254
		Sig. (2-tailed)	.	.175

Note. PPVTM= Peabody Picture Vocabulary Test age in months

Correlation of pragmatic score and the chronological age was found to have a significant positive correlation (r=0.639, *p=.000*) (see Table 8).

Table 8

Correlation between total pragmatic checklist score and chronological age

			PPTS	Age in month
Pearson correlation	PPTS	Correlation coefficient	1.000	.639[**]
		Sig. (2-tailed)	.	.000

**. Correlation is significant at the 0.01 level (2-tailed).

Note. PPTS= pragmatic profile total score

Table 9

Comparison of vocabulary score and pragmatic profile total score by CHAOS groups (Low Vs High)

CHAOS	1 (low chaos) N=19		2 (high chaos) N=11		Total	
	Mean	SD	Mean	SD	Mean	SD
PPVTRS	38.16	5.984	40.64	1.859	39.07	4.989
PPTS	85	8.551	83.09	12.872	84.3	10.168

Note. PPTS= Pragmatic Profile Total Score; PPVTRS= Peabody Picture Vocabulary Test Raw Score

A median split was used on the CHAOS Total Scores to turn them into dichotomous variables. 19 had a score below the median value (Low CHAOS group) and 11 had a score above the median value (High CHAOS group). On comparing means of CHAOS groups (Low Vs High) High CHAOS group had a higher vocabulary score but a lower pragmatic score as compared to Low CHAOS.

In Mann Whitney Test showed no difference between the chronological ages of both the groups. Similarly, the vocabulary score [$U (19,11) =88$, $Z=-0.715$, $p>0.001$] and the pragmatic scores [$U (19,11) =93.5$, $Z=-0.475$, $p>0.001$] for both the groups

showed no significant no difference (Table 11). However, the average ranks for the vocabulary score and the pragmatic score in both the groups indicated that the High CHAOS group had a higher vocabulary score, but a lower pragmatic score as compared to Low CHAOS.

Table 10

Comparison between chaos groups based on the vocabulary score, pragmatic total score and chronological age using Mann Whitney U test statistic ranks

Measure	CHAOS (low vs high)	N	Mean Rank	Sum of Ranks
PPVTRS	1	19	14.63	278.00
	2	11	17.00	187.00
	Total	30		
PPTS	1	19	16.08	305.50
	2	11	14.50	159.50
	Total	30		
Age in month	1	19	15.55	295.50
	2	11	15.41	169.50
	Total	30		

Note. PPTS= Pragmatic Profile Total Score; PPVTRS= Peabody Picture Vocabulary Test Raw Score

Table 11

Mann Whitney U test statistic result

	PPVTRS	PPTS	Age in month
Mann-Whitney U	88.000	93.500	103.500
Wilcoxon W	278.000	159.50	169.500
Z	-0.715	-0.474	-0.044
Asymp. Sig. (2-tailed)	0.475	0.635	0.965
Exact Sig. [2*(1-tailed Sig.)]	0.497	0.641	0.966

Note. PPTS= Pragmatic Profile Total Score; PPVTRS= Peabody Picture Vocabulary Test Raw Score

CHAPTER V

DISCUSSION

Research in the field of household chaos has gained popularity in very recent years yet the amount of research available documenting chaos is also only a handful. The available literatures try to jot down the various relation chaos has with multiple variables. Most of the research does conclude to show an adverse outcome of chaos on these variables. As observed in the review of literature, cognition, communication, effortful control of a child all tends to be affected by chaos. However, the extent of the effect has not yet been thoroughly justified by research due to the limited work performed in the area.

Even though the west has accepted the various adverse effects of chaos, this awareness is still not prevalent in India. During our literature search on materials relating to chaos in India, we were unable to find any research that documents chaos and its effects in Indian households. Hence this study creates the path for further research on chaos and its effects on Indian household.

We chose a brief tool that can easily identify a chaotic household and hence help provide the necessary feedback to families to maintain a sense of peace in the house for the better development of their children. Since the tool was new to India, we wanted to make sure that the questions used in the scale were easily understood. Hence, we adapted the tool to much suit the Indian context and familiarity. The original scale had words such as commotion, zoo, in the questions which were not clearly understood by the Indian audience hence a simpler and more commonly used words such as confusion, disturbance was used instead. The adapted questionnaire showed to be simple to understand and convenient to administer. The content validation showed the

scale to be excellent in major domains of validation such as simplicity, relevancy and convenience.

Past studies of household chaos have found that it predicts lower cognitive scores and greater conduct problems in children of toddler and preschool age (Hart et al., 2007; Pike et al., 2006). Other studies have shown links between specific dimensions of chaos such as family instability, crowding, and noise and young children's behaviour problems and cognitive ability (Ackerman et al., 1999; Evans et al., 2010; Maxwell & Evans, 2000). Studies have also found strong correlations between household chaos and receptive and expressive vocabulary development. Hence the present study extended this line of research to India to find the relations between household chaos and vocabulary and pragmatic development of the child.

The questions on the CHAOS were divided into 3 factors- confusion, order, and lack of implementation of routines. It was found that confusion and absence of routines are the commonly observed chaos factors in an Indian household. The participants experienced greater degree of disturbance in their household, would generally be late for chores and has a greater dependency on telephone. A study by Martin et al (2012) indicated lack of routine to be major chaos indicating factor whereas our study showed lack of routine as well as confusion to be the major chaos factors.

The average chaos score achieved in our study was similar to previous studies measuring chaos (Hardaway et al 2012; Crespo. L. M et al,2019; Deater-Deckard et al 2009). However it is pertinent to note that all previous studies examined chaos in low socioeconomic households whereas our study focuses on measuring chaos in upper middle-class/upper class households.

On evaluation of vocabulary and pragmatic score of the children in the study it was observed that all children performed excellently in both the measures. However, 8 children performed poorly on the vocabulary test out of which 3 also showed greater chaos score. All children performed exceptionally on the pragmatic checklist creating a ceiling effect. Hence it will be difficult to directly associate the poor performance on the vocabulary test directly to the household chaos.

Household chaos scores and pragmatic scores showed insignificant weak correlation. However, the direction of relationship was negative indicating a possible unfavourable effect of chaos on pragmatic behaviour. As the household chaos increased, the pragmatic scores decreased. The low correlation might be due to the smaller sample with a narrow age and socioeconomic status range. There was no literature available to compare such relations between household chaos and pragmatic behaviours.

The household chaos scores, and the vocabulary scores showed no correlation. This finding is not in line with finding from a previous study by Martin et al. (2012) who studied 842 socioeconomically disadvantaged children in three waves, which indicated that lack of household routine was associated with a poorer vocabulary score. When this result was analysed comparing to our study it was observed that children who performed poorly on vocabulary test indicated household chaos in the lack of implementation of routine however the size of our sample is less to draw definitive conclusions.

When the sample was divided into two groups based on the presence or absence of chaos and further compared with respect to the vocabulary score and the pragmatic score it was observed that the groups did vary with the scores. As one would predict,

group with higher chaos scored low on pragmatics. However, the scores for vocabulary were higher, which was not replicated in any other literature available. Pace et al in 2016 studied the relationship of socioeconomic status with childhood learning process, Parent-child interaction, and availability of learning material at home. All these factors tended to be poorer in children who belonged to a lower socioeconomic background. Since our sample was on the higher socioeconomic background, the participants might have had better parent-child interactions, had greater availability of learning material at home and had better learning process because of which the vocabulary scores tended to be greater irrespective of the presence of chaos.

CHAPTER VI

SUMMARY and CONCLUSION

Research has proved that household chaos plays an important role in shaping child development (Dumas et al., 2005). Many household and family characteristics have been linked to poorer language development in children (Brody &Flor, 1998; Brooks-Gunn & Duncan, 1997; Hoff, 2003; Pan, Rowe, Spier, & Tamis-Lemonda, 2004; Westerlund & Lagerberg, 2008). Household chaos has shown to have adverse effects on the child's social functioning, cognitive development, academic achievement, and behaviours (Aiello, Nicosia & Thompson, 1979; Boles et al., 2016; Coldwell, Pike & Dunn, 2006; Deater-Deckard et al., 2009; Johnson et al., 2008; Martin, Razza& Brooks, 2012; Wachs& Chan, 1986). Since a tool to identify a chaotic household is not available in India and the effects of household chaos is not known in an Indian household, we aimed to adapt the Confusion, Hubbub, and Order Scale (CHAOS, Matheny et al., 1995) to suit the Indian context and use it to create awareness among Indians about the adverse effects of a chaotic household. It is not necessary that household chaos may only be present in socioeconomically disadvantaged family, it can be present even in upper middle- and upper-class families and have the same negative effect on the child's development. Hence, we aimed to observe such chaotic households in Indian society (Deater-Deckard et al., 2009; Evans, Gonnella, Marcynyszyn, Gentile, &Salpekar, 2005; Hart, Petrill, Deater-Deckard, & Thompson, 2007). We found that chaos is pertinent even in upper middle- and upper-class families. To further jot down the effects of the chaotic household we strived to find the relations between household chaos and vocabulary and pragmatic development. Even though

strong correlations were not achieved, we did create a foundation to show the adverse effects of household chaos.

6.1 Study strengths

The current study possessed multiple strengths. Even though the links between household chaos and language are established, the mechanisms underlying them are not clearly understood. Little research has been performed to study the links between household chaos and vocabulary or pragmatics. In India, the effect of household chaos is yet to receive researchers' attention. Most of the available research studied chaos in households from low socioeconomic status and not in households from middle or upper middle-class society. The present study examined the relation between household chaos and vocabulary (and pragmatic) development in middle or upper middle-class Indian household. The adapted CHAOS will be very easy to administer and can detect a chaotic household in a few minutes.

6.2 Implications of study

This study helped us create a new tool to assess household chaos in India and helped us understand the possible relationship between household chaos and vocabulary and pragmatic development. We shed light on the scope of research in the association between household chaos and vocabulary and pragmatics development. It helped understand the need to raise awareness about the negative effects of household chaos and counsel about the same to parents of typically developing children and parents of communication disorders.

6.3 Study limitations

Even though the study has its strengths, its limitations must also be acknowledged. The major limitation to the study would be the sample. The sample size

chosen for the study was very small, due to which coming into a direct conclusion was difficult. The age range chosen for the study is also very narrow. Another limitation would be the mode of assessment. Due to the pandemic, the tests of the study were performed over a video conferencing application which may or may not have influenced the scores of the child.

6.4 Future directions

Further studies must be performed with bigger samples to find definite results about the effect of household chaos on a child's development. Awareness must be created with increased number of research to provide a peaceful environment for a child to grow effectively. In Indian context the study must also be performed in the lower socioeconomic background individuals to find the greater effects of household chaos on a child's development. All components of language must be studied in a developing child to see which aspect gets greatly effected by household chaos.

REFERENCE

Ackerman, B. P., & Brown, E. D. (2010). Physical and psychosocial turmoil in the home and cognitive development. https://psycnet.apa.org/doi/10.1037/12057-003

Ackerman, B. P., Kogos, J., Youngstrom, E., Schoff, K., & Izard, C. (1999). Family instability and the problem behaviors of children from economically disadvantaged families. *Developmental psychology*, *35*(1), 258. https://psycnet.apa.org/doi/10.1037/0012-1649.35.1.258

Adam, E. K. (2004). Beyond quality: Parental and residential stability and children's adjustment. *Current Directions in Psychological Science*, *13*(5), 210-213. https://doi.org/10.1111%2Fj.0963-7214.2004.00310.x

Adam, E. K., & Chase-Lansdale, P. L. (2002). Home sweet home (s): parental separations, residential moves, and adjustment problems in low-income adolescent girls. *Developmental psychology*, *38*(5), 792. https://psycnet.apa.org/doi/10.1037/0012-1649.38.5.792

Aiello, J. R., Nicosia, G., & Thompson, D. E. (1979). Physiological, social, and behavioural consequences of crowding on children and adolescents. *Child Development*, 195-202. https://doi.org/10.2307/1129056

Anene, G. U. (2005). Home economics and the academic performance of a child. *Journal of home economics research*, *6*(1), 99-103

Arterberry, M. E., Bornstein, M. H., Midgett, C., Putnick, D. L., & Bornstein, M. H. (2007). Early attention and literacy experiences predict adaptive

communication. *First Language*, *27*(2), 175-189. https://doi.org/10.1177%2F0142723706075784

Bada, H. S., Langer, J., Twomey, J., Bursi, C., Lagasse, L., Bauer, C. R., ... &Maza, P. L. (2008). Importance of stability of early living arrangements on behavior outcomes of children with and without prenatal drug exposure. *Journal of developmental and behavioralpediatrics: JDBP*, *29*(3), 173. https://doi.org/10.1097%2FDBP.0b013e3181644a79

Bater, L. R., & Jordan, S. S. (2017, April). Child routines and self-regulation serially mediate parenting practices and externalizing problems in preschool children. In *Child & Youth Care Forum* (Vol. 46, No. 2, pp. 243-259). Springer US. https://doi.org/10.1007/s10566-016-9377-7

Berry, D., Blair, C., Willoughby, M., Garrett-Peters, P., Vernon-Feagans, L., Mills-Koonce, W. R., & Family Life Project Key Investigators. (2016). Household chaos and children's cognitive and socio-emotional development in early childhood: Does childcare play a buffering role?. *Early childhood research quarterly*, *34*, 115-127. https://doi.org/10.1016/j.ecresq.2015.09.003

Blankson, A. N., O'Brien, M., Leerkes, E. M., Calkins, S. D., &Marcovitch, S. (2015). Do hours spent viewing television at ages 3 and 4 predict vocabulary and executive functioning at age 5?. *Merrill-palmer quarterly*, *61*(2), 264-289. https://doi.org/10.13110/merrpalmquar1982.61.2.0264

Boles, R. E., Halbower, A. C., Daniels, S., Gunnarsdottir, T., Whitesell, N., & Johnson, S. L. (2017). Family chaos and child functioning in relation to sleep problems among children at risk for obesity. *Behavioural sleep medicine*, *15*(2), 114-128. https://doi.org/10.1080/15402002.2015.1104687

Brody, H. B., &Flor, D. L. (1998). Maternal resources, parenting practices, and child competence in rural, single-parent African American families. *Child Development, 69*(3), 803–816. https://doi.org/10.1111/j.1467-8624.1998.tb06244.x

Bronfenbrenner, U., & Evans, G. W. (2000). Developmental science in the 21st century: Emerging questions, theoretical models, research designs and empirical findings. *Social Development, 9*, 115–125.

Brooks, R., & Meltzoff, A. (2008). Infant gaze following and pointing predict accelerated vocabulary growth through two years of age: A longitudinal, growth curve modelling study. *Journal of Child Language, 35,* 207–220. doi:10.1017/S030500090700829X

Brooks-Gunn, J., & Duncan, G. J. (1997). The effects of poverty on children. *The future of children*, 55-71. https://doi.org/10.2307/1602387

Christakis, D.A., Zimmerman, F.J., Digiuseppe, D.L., & McCarty, C.A. (2004). Early television exposure and subsequent attentional problems in children. *Paediatrics, 113*, 708–713. https://doi.org/10.1542/peds.113.4.708

Coldwell, J., Pike, A., & Dunn, J. (2006). Household chaos–links with parenting and child behaviour. *Journal of Child Psychology and Psychiatry*, *47*(11), 1116-1122. https://doi.org/10.1111/j.1469-7610.2006.01655.x

Corapci, F., &Wachs, T. D. (2002). Does parental mood or efficacy mediate the influence of environmental chaos upon parenting behaviour? *Merrill-Palmer Quarterly (1982-)*, 182-201. http://www.jstor.org/stable/23093762

Deater-Deckard, K., Mullineaux, P. Y., Beekman, C., Petrill, S. A., Schatschneider, C., & Thompson, L. A. (2009). Conduct problems, IQ, and household chaos: A longitudinal multi-informant study. *Journal of Child Psychology and Psychiatry*, *50*(10), 1301-1308. https://doi.org/10.1111/j.1469-7610.2009.02108.x

Duch, H., Fisher, E. M., Ensari, I., & Harrington, A. (2013). Screen time use in children under 3 years old: a systematic review of correlates. *International journal of behavioral nutrition and physical activity*, *10*(1), 1-10. https://doi.org/10.1186/1479-5868-10-102

Dumas, J. E., Nissley, J., Nordstrom, A., Smith, E. P,, Prinz, R. J., & Levine, D. W. (2005). Home chaos: Sociodemographic, parenting, interactional, and child correlates. *Journal of Clinical Child and Adolescent Psychology, 34,* 93-104. https://doi.org/10.1207/s15374424jccp3401_9

Dunn, L. M., & Dunn, L. M. (1968). *Peabody Picture Vocabulary Test—first Edition (PPVT-I)* [Database record]. APA PsycTests.

Eisenberg, M. E., Olson, R. E., Neumark-Sztainer, D., Story, M., & Bearinger, L. H. (2004). Correlations between family meals and psychosocial well-being among adolescents. *Archives of pediatrics& adolescent medicine*, *158*(8), 792-796. doi:10.1001/archpedi.158.8.792

Eisenberg, N., Zhou, Q., Spinrad, T. L., Valiente, C., Fabes, R. A., & Liew, J. (2005). Relations among positive parenting, children's effortful control, and externalizing problems: A three-wave longitudinal study. *Child development*, *76*(5), 1055-1071. https://doi.org/10.1111/j.1467-8624.2005.00897.x

Emond, J. A., Tantum, L. K., Gilbert-Diamond, D., Kim, S. J., Lansigan, R. K., & Neelon, S. B. (2018). Household chaos and screen media use among preschool-aged children: a cross-sectional study. *BMC public health*, *18*(1), 1-8. https://doi.org/10.1186/s12889-018-6113-2

Eom, M., Oh, H., & Lee, Y. (2021). A Validation Study on Korean Version of CHAOS (Confusion, Hubbub, and Order Scale). *The Journal of the Korea Contents Association*, *21*(2), 195-205. https://doi.org/10.5392/JKCA.2021.21.02.195

Evans, G. W., &Wachs, T. D. (2010). Chaos and its influence on children's development. *Washington, DC: American Psychological Association*.

Evans, G. W., Gonnella, C., Marcynyszyn, L. A., Gentile, L., &Salpekar, N. (2005). The role of chaos in poverty and children's socioemotional adjustment. *Psychological science*, *16*(7), 560-565. https://doi.org/10.1111%2Fj.0956-7976.2005.01575.x

Evans, G. W., Kliewer, W., & Martin, J. (1991). The role of the physical environment in the health and wellbeing of children. In H. E. Schroeder (Ed.), New directions in health psychology assessment (pp. 127–157). New York, NY: Hemisphere.

Evans, G. W., Lepore, S. J., Shejwal, B. R., &Palsane, M. N. (1998). Chronic residential crowding and children's well-being: An ecological perspective. *Child Development, 69*, 1514–1523. https://doi.org/10.1111/j.1467-8624.1998.tb06174.x

Evans, G. W., Maxwell, L. E., & Hart, B. (1999). Parental language and verbal responsiveness to children in crowded homes. Developmental Psychology, 35(4), 1020–1023. https://psycnet.apa.org/doi/10.1037/0012-1649.35.4.1020

Evans, G.W. (2006). Child development and the physical environment. *Annual Review of Psychology, 57*, 423–451. doi: 10.1146/annurev.psych.57.102904.190057

Fiese, B. H., & Winter, M. A. (2010). The dynamics of family chaos and its relation to children's socioemotional well-being. https://psycnet.apa.org/doi/10.1037/12057-004

G., Newman, R. S., &Jusczyk, P. W. (2005). Infants' use of synchronized visual information to separate streams of speech. *Child development*, *76*(3), 598-613. https://doi.org/10.1111/j.1467-8624.2005.00866.x

Gaertner, B. M. (2012). *The relations of household chaos to children's language development: The mediating roles of children's effortful control and parenting*. Arizona State University.

Grolnick, W. S., & Farkas, M. (2002). Parenting and the development of children's self-regulation. *Handbook of parenting*, *5*(2), 89-110.

Haines, M. M., Stansfeld, S. A., Job, R. S., Berglund, B., & Head, J. (2001). Chronic aircraft noise exposure, stress responses, mental health and cognitive performance in school children. *Psychological medicine*, *31*(2), 265-277. doi:10.1017/S0033291701003282

Hart, S. A., Petrill, S. A., Deckard, K. D., & Thompson, L. A. (2007). SES and CHAOS as environmental mediators of cognitive ability: A longitudinal genetic analysis. *Intelligence*, *35*(3), 233-242. https://doi.org/10.1016/j.intell.2006.08.004

Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. *Child Development, 74*, 1368–1378. https://doi.org/10.1111/1467-8624.00612

Hoff, E. (2009). *Language development (4th ed.).* Belmont, CA: Wadsworth/Cengage Learning.

Iwinski, S., Cannavale, C., Walk, A., Liu, R., McLoughlin, G., & Khan, N. (2019). Interrelationships Between Household Chaos, Children's ADHD Tendencies, and Diet Quality (P11-113-19). *Current developments in nutrition*, *3*(Supplement_1), nzz048-P11. https://doi.org/10.1093/cdn/nzz048.P11-113-19

Johnson, A. D., Martin, A., Brooks-Gunn, J., &Petrill, S. A. (2008). Order in the house! Associations among household chaos, the home literacy environment, maternal reading ability, and children's early reading. *Merrill-Palmer Quarterly, 54*(4), 445–472. https://doi.org/10.1353%2Fmpq.0.0009

Kraft, S. J., Ambrose, N., & Chon, H. (2014, May). Temperament and environmental contributions to stuttering severity in children: The role of effortful control. In *Seminars in Speech and Language* (Vol. 35, No. 02, pp. 080-094). Thieme Medical Publishers. DOI: 10.1055/s-0034-1371753

Kumar, G., Dash, P., Patnaik, J., & Pany, G. (2022). SOCIOECONOMIC STATUS SCALE-MODIFIED KUPPUSWAMY SCALE FOR THE YEAR 2022. *International Journal of Community Dentistry*, *10*(1), 1-6. https://doi.org/10.56501/intjcommunitydent.v10i1.26

Landhuis, C. E., Poulton, R., Welch, D., &Hancox, R. J. (2007). Does childhood television viewing lead to attention problems in adolescence? Results from a

prospective   longitudinal   study. *Pediatrics*, *120*(3),   532-537. https://doi.org/10.1542/peds.2007-0978

Larsen, K. L., & Jordan, S. S. (2020). Organized chaos: Daily routines link household chaos and child behavior problems. *Journal of Child and Family Studies*, *29*(4), 1094-1107. https://doi.org/10.1007/s10826-019-01645-9

Lengua, L. J., Honorado, E., & Bush, N. R. (2007). Contextual risk and parenting as predictors of effortful control and social competence in preschool children. *Journal of applied developmental psychology*, *28*(1), 40-55. https://doi.org/10.1016/j.appdev.2006.10.001

Lichter, D. T., & Jensen, L. (2002). Rural America in transition. *Rural dimensions of welfare reform*, *77*.

Lillard, A. S., Drell, M. B., Richey, E. M., Boguszewski, K., & Smith, E. D. (2015). Further examination of the immediate impact of television on children's executive   function. *Developmental   psychology*, *51*(6),   792. https://psycnet.apa.org/doi/10.1037/a0039097

Marcynyszyn, L. A., Evans, G. W., &Eckenrode, J. (2008). Family instability during early and middle adolescence. *Journal of Applied Developmental Psychology, 29*(5), 380–392. https://doi.org/10.1016/j.appdev.2008.06.001

Marsh, S., Dobson, R., & Maddison, R. (2020). The relationship between household chaos and child, parent, and family outcomes: a systematic scoping review. *BMC public health*, *20*(1), 1. https://doi.org/10.1186/s12889-020-08587-8

Crespo, L. M., Trentacosta, C. J., Udo-Inyang, I., Northerner, L., Chaudhry, K., & Williams, A. (2019). Self-regulation mitigates the association between

household chaos and children's behavior problems. *Journal of Applied Developmental Psychology*, *60*, 56-64. https://doi.org/10.1016/j.appdev.2018.10.005

Martin, A., Razza, R., & Brooks-Gunn, J. (2012). Specifying the Links Between Household Chaos and Preschool Children's Development. *Early child development and care*, *182*(10), 1247–1263. https://doi.org/10.1080/03004430.2011.605522

Matheny,A.,Wachs, T. D., Ludwig, J., &Phillips,K.(1995). Bringing order out of chaos: Psychometric characteristics of the Confusion, Hubbub, and Order Scale. *Journal of Applied Developmental Psychology, 16*, 429–444. https://doi.org/10.1016/0193-3973(95)90028-4

Maxwell, L. M., & Evans, G. W. (2000). The effects of noise on preschool children's prereading skills. *Journal of Environmental Psychology, 20*, 91–97. https://doi.org/10.1006/jevp.1999.0144

McLoyd, V. C., Toyokawa, T., & Kaplan, R. (2008). Work demands, work–family conflict, and child adjustment in African American families: The mediating role of family routines. *Journal of Family Issues*, *29*(10), 1247-1267. https://doi.org/10.1177%2F0192513X08320189

Mokrova, I., O'Brien, M., Calkins, S., & Keane, S. (2010). Parental ADHD symptomology and ineffective parenting: The connecting link of home chaos. *Parenting: Science and Practice*, *10*(2), 119-135. https://doi.org/10.1080/15295190903212844

N.,Wetherby, A. M., & Shumway, S.(2006). Prelinguistic predictors of language outcome at 3 years of age. *Journal of Speech, Language and Hearing Research, 49*, 1224–1237

Neville, R. D., McArthur, B. A., Eirich, R., Lakes, K. D., & Madigan, S. (2021). Bidirectional associations between screen time and children's externalizing and internalizing behaviors. *Journal of Child Psychology and Psychiatry*, *62*(12), 1475-1484. https://doi.org/10.1111/jcpp.13425

Obeta, A. O. (2014). Home environmental factors affecting students' academic performance in Abia State, Nigeria. In *Rural Environment. Education. Personality.(REEP). Proceedings of the International Scientific Conference (Latvia)*. Latvia University of Agriculture.

Pace, A., Luo, R., Hirsh-Pasek, K., & Golinkoff, R. M. (2017). Identifying pathways between socioeconomic status and language development. *Annual Review of Linguistics*, *3*, 285-308. 10.1146/annurev-linguistics-011516-034226

Pan, B. A., Rowe, M. L., Spier, E., & Tamis-Lemonda, C. (2004). Measuring productive vocabulary of toddlers in low-income families: Concurrent and predictive validity of three sources of data. *Journal of Child Language, 31*, 587–608. doi:10.1017/S0305000904006270

Petrill, S. A., Pike, A., Price, T., & Plomin, R. (2004). Chaos in the home and socioeconomic status are associated with cognitive development in early childhood: Environmental mediators identified in a genetic design. *Intelligence, 32*, 445–460. https://doi.org/10.1016/j.intell.2004.06.010

Raviv, T., Kessenich, M., & Morrison, F. J. (2004). A mediational model of the association between socioeconomic status and three-year-old language abilities:

The role of parenting factors. *Early Childhood Research Quarterly, 19*, 528–547. https://doi.org/10.1016/j.ecresq.2004.10.007

Sameroff, A. (2010). Dynamic developmental systems: Chaos and order. https://psycnet.apa.org/doi/10.1037/12057-016

Sánchez-Mondragón, G., & Flores Herrera, L. M. (2019). Adaptation and validation of Confusion, Hubbub, and Order Scale in Mexican parents. *Acta universitaria*, *29*. https://doi.org/10.15174/au.2019.1971

Shamama-tus-Sabah, S., Gilani, N., & Wachs, T. D. (2011). Relation of home chaos to cognitive performance and behavioral adjustment of Pakistani primary school children. *International Journal of Behavioral Development*, *35*(6), 507-516. https://doi.org/10.1177%2F0165025411406852

Skinner, E., Johnson, S., & Snyder, T. (2005). Six dimensions of parenting: A motivational model. *Parenting: Science and practice*, *5*(2), 175-235. https://doi.org/10.1207/s15327922par0502_3

Tamis-LeMonda, C. S., Bornstein, M. H., Kahana-Kalman, R., Baumwell, L., & Cyphers, L.(1998). Predicting variation in the timing of linguistic milestones in the second year: An events-history approach. *Journal of Child Language, 25*, 675–700. doi:10.1017/S0305000998003572

Tiesler, C. T., Birk, M., Kohlböck, G., Koletzko, S., Bauer, C., Wichmann, H., . . . Heinrich, J. (2013). Residential mobility and behavioural problems in children: Results from the GINIplus and LISAplus studies. Journal of Public Health, 21, 39 – 48. http://dx.doi.org/10.1007/s10389- 012-0522-y

Tomasello, M., & Farrar, M. J. (1986). Joint attention and early language. *Child Development, 57*, 1454–1463. https://doi.org/10.2307/1130423

Tomasello, M., & Todd, J. (1983). Joint attention and lexical acquisition style. *First Language, 4*(12), 197–211. https://doi.org/10.1177%2F014272378300401202

Trapani, J. (2014). The effect of home environment on sequence learning and language ability in children.

Tubbs, C. Y., Roy, K. M., & Burton, L. M. (2005). Family ties: Constructing family time in low-income families. *Family Process*, *44*(1), 77-91. https://doi.org/10.1111/j.1545-5300.2005.00043.x

Tucker, C. J., Marx, J., & Long, L. (1998). "Moving on": Residential mobility and children's school lives. *Sociology of Education*, 111-129. https://doi.org/10.2307/2673244

Valiente, C., Lemery-Chalfant, K., & Reiser, M. (2007). Pathways to problem behaviors: Chaotic homes, parent and child effortful control, and parenting. *Social development*, *16*(2), 249-267. https://doi.org/10.1111/j.1467-9507.2007.00383.x

Vernon-Feagans, L., Garrett-Peters, P., Willoughby, M., & Mills-Koonce, R. (2012). Chaos, poverty, and parenting: Predictors of early language development. *Early Childhood Research Quarterly, Vol. 27*, 339–351. https://doi.org/10.1016/j.ecresq.2011.11.001

Wachs, T. D., & Chan, A. (1986). Specificity of environmental action, as seen in environmental correlates of infants' communication performance. *Child Development*, 1464-1474. https://doi.org/10.2307/1130424

Westerlund, M., &Lagerberg, D. (2008). Expressive vocabulary in 18-month-old children in relation to demographic factors, mother and child characteristics, communication style and shared reading. *Child: Care, Health and Development, 34*(2), 257–266. https://doi.org/10.1111/j.1365-2214.2007.00801.x

APPENDIX A

Confusion hubbub and order scale

1. There is very little commotion in our home.

2. We can usually find things when we need them

3. We almost always seem to be rushed.

4. We are usually able to stay on top of things.

5. No matter how hard we try, we always seem to be running late.

6. It's a real zoo in our home.

7. At home we can talk to each other without being interrupted.

8. There is often a fuss going on at our home.

9. No matter what our family plans, it usually doesn't seem to work out.

10. You can't hear yourself think in our home.

11. I often get drawn into other people's arguments at home.

12. Our home is a good place to relax.

13. The telephone takes up a lot of our time at home.

14. The atmosphere in our home is calm.

15. First thing in the day, we have a regular routine at home.

APPENDIX B

<u>Adapted Confusion, Hubbub and Order Scale</u>

1. There is very little disturbance in our home.

2. We can usually find things when we need them.

3. We almost always seem to be in a hurry.

4. We are usually able to remain in control of things in our home.

5. No matter how hard we try, we always seem to be running late.

6. We are always confused and disorganised in the house.

7. At home we can talk to each other without being interrupted.

8. There is often unnecessary worry/concern about things at our home.

9. No matter what our family plans, it usually doesn't seem to work out.

10. You can't hear yourself think in our home.

11. I often get drawn into other people's arguments at home.

12. Our home is a good place to relax.

13. The telephone takes up a lot of our time at home.

14. The atmosphere in our home is calm.

15. First thing in the day, we have a regular routine at home.