**‘Interaction on peak, child can speak: The relationship between Parent-Child Interaction and Child’s Language Development with the moderating role of Perceived Stress and Working at Home or on Location.’**

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**Abstract**

It is known that the interaction between parent and child plays an important role in the early and later language development of young children and that the perceived stress of parents can influence both aspects negatively. To determine if perceived stress can influence this relationship, this research investigates the moderating role of perceived stress of parents in the relationship between parent-child interaction and the language development of young children, looking at the difference between parents that work mostly at home and parents that work mostly on location. In a correlational research design, 224 parents of Dutch babies born during the first lockdown of the Covid-19 pandemic in the Netherlands and aged between 20 and 25 months old, completed a survey about the different subjects. The results show that parent-child interaction is related to child’s language development of children under the age of two. No effect is found for the moderating role of perceived stress. In addition, no effect is found for working at home or on location. As a result, it can be concluded that there is a relationship between parent-child interaction and a child’s language development. In order to clarify and counteract the negative consequences, follow-up research is recommended.

*Keywords*: language development, parent-child interaction, young children, perceived

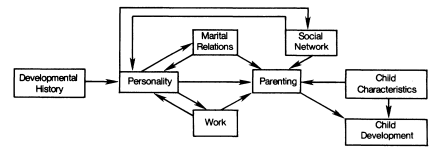
stress, Covid-19

A 2-year-old girl came to a psychologist because she hardly spoke. Despite good advice from the speech therapist, it didn't get better. After observations, the psychologist found out that the parent-child interaction was overinvolved. The mother was always on top of it because of her wish to get her daughter to talk. As a result, her child had so little space that she could hardly speak (Vakbladvroeg, 2017). Such examples are more often seen in families with young children. It shows that the way the parent interacts with the child can impact a child's development.

From a literary point of view, it is known that the interaction between parent and child plays an important role in the early and later development of the child. A high-quality interaction between parent and child can protect the child against possible negative influences and can contribute to the positive development of the child (van Bakel & Riksen-Walraven, 2002; Bernstein et al., 2005). High-quality parent-child interaction includes a high degree of sensitivity, responsiveness, warmth, eye contact, and physical presence (van Bakel & Riksen-Walraven, 2002; Bowlby, 1988). When these conditions are not sufficiently present, it can affect the development of the child negatively(Altman & Wohlwill, 1978; Beardslee, 1998; Breeuwsma, 2005; Coyne et al., 2007; Wai Wan & Green, 2009). Variables outside the direct parent-child interaction could also cause individual differences in a child’s early development. The model of parenthood presumes that parental functioning is multiply determined and describes different child and parent characteristics that can influence the development of the child, see Figure 1 (Belsky, 1984). According to this model, factors that influence parental functioning, like perceived stress, can also influence the relationship between parent-child interaction and a child's development.

**Figure 1**

*Model of Parenthood*



*Note*. Reprinted from “The determinants of parenting: A process model”, by J. Belsky, 1984, *Child Development,* 83-96.

An important part of a child's development is language development. It is known that language has a wider impact on people's lives than their linguistic system and use of it alone. Language delay can cause an increase in the risk of emotional and educational difficulties which can result in emotional distress, reduced participation in activities, problems affecting family life, isolation, and low-self-confidence (Snowling et al., 2001; Conti-Ramsden et al., 2001; Hilari et al., 2003). When looking at a child's development, language impairment has high rates of comorbidity with behavioral problems in children. Around half of the children with language impairment are diagnosed with at least one co-occurring behavioral disorder (Benner et al., 2002; Cohen, 2001; Tempel et al., 2009). Longitudinal investigations show that language impairments in early childhood tend to persist throughout late childhood, adolescence, and adulthood (Atkinson et al., 1999; Beitchman et al., 2008; Conti-Ramsden et al., 2001**).** When children have these persistent language impairments, they show problems  including poor literacy development, low educational attainment, lower IQ scores, poor-quality friendships, aggression, problematic interactions, attention deficits, and internalizing and externalizing behavioral problems (Beitchman et al., 1996; Beitchman et al., 2001; Durkin & Conti-Ramsden, 2007; Hart & Risley, 1995; Nation & Snowling, 2000; Snowling et al., 2001; Spackman et al., 2006; Tomblin et al., 2000). The persistence of language impairment and the negative consequences are of considerable importance to language development in early childhood and to focus on the risk and protective factors.

It is proven that environmental factors can influence the language development of children. Parent-child interaction is an important environmental factor. The quantity and quality of parent-child communication can predict vocabulary acquisition and language development (Huttenlocher et al., 1991**).** Early and consistent participation in learning activities with parent and child, such as reading stories, interacting about stories, and teaching vocabulary, provide children with a foundation for early learning, language growth, and emergent literacy (Saracho, 2002). In addition, the amount and style of language that parents use when conversing with their children are strong predictors of children's early language and learning. When adult speech is varied and rich in information about objects and events in the environment, it positively affects the child's language development (Evans et al., 1999; Tamis-LeMonda & Bornstein, 2002). If parents respond to their children's verbal and exploratory initiatives through verbal descriptions and questions, children tend to have more advanced receptive and productive language and phonological awareness (Silven et al., 2002; Tamis-LeMonda et al., 2001). Moreover, parents with a high amount of negative control strategies had children who used the shortest sentences and fewest grammatical word types, and a number of different word roots (Taylor et al., 2009). Due to the literature-supported relationship and the important consequences of parent-child interaction, the current study will focus on the relationship between parent-child interaction and child language development.

An important aspect of both parent-child interaction and child language development is the perceived stress by parents. According to the model of parenthood mentioned before, parental characteristics can influence the child’s development (Belsky, 1984). Previous research has shown that perceived stress by parents affects the parent-child interaction negatively (Anoil et al., 2004; Belsky, 1984; Farmer & Lee, 2011; Xu et al., 2005).Furthermore, previous research shows that parental stress is negatively linked to a child's language development (Deniz Can & Dilara, 2010; Noel et al., 2008).Stress therefore influences the parent-child interaction and is negatively related to the child's language development. However, most studies only focus on mothers (Farmer & Lee, 2011; Noel et al., 2008; Xu et al., 2005) and not specific on children under the age of two (Anoil et al., 2004; Belsky, 1984; Deniz Can & Dilara, 2010; Noel et al., 2008). Few research is available on how the relationship between parent-child interaction and child language development can be moderated by perceived stress by parents. The moderating role remains unclear and the studies about the relationship between stress and parent-child interaction, and stress and a child's language development are limited. Based on the model of Belsky (1984) mentioned before, it can be assumed that perceived stress by parents influences the relationship between parent-child interaction and child language development. Due to the important role of stress and the gap in the literature, the moderating role of stress in the relationship between parent-child interaction and child language development will be further investigated.

Perceived stress by parents can increase by stressful events like the Covid-19 pandemic. This recent pandemic has created stressors in many households. More than 40% of the people in the Netherlands work from home due to Covid-19 (Timmers et al., 2020). Parents have to juggle between homeschooling children, working remotely, or being unable to work at all, while worrying about possible financial and health concerns for the family (Cluver, 2020). Stress for parents increases, causing the parent characteristics to change which, according to the model of parenthood, influences the relationship between parent-child interaction and the child’s language development (Belsky, 1984). The sample used in the current study is part of large-scale research which was set up during the first lockdown of Covid-19.Therefore, it is interesting to look at the potential difference between home workers and on-location workers in the moderating role that stress has on the relationship between parent-child interaction and child language development.

The relationship between working from home or on-location and stress is unclear in the current literature. The inconsistency was found that fathers have lower stress levels and mothers have higher stress levels when working at home (Schneider & Ainbinder, 2004). Few studies have looked specifically at parents, but when looking at people in general, we also see a lot of inconsistency. Some research shows that office workers experience more stress than home workers due to, among other things, office politics and transport and traveling to work, and home workers experience less stress due to the perception of having control over the work (Hobbs & Armstrong, 1998; Montreuil & Lippel, 2003). One study shows conflicting results in which on the one hand office workers experience higher levels of stress, but home workers show more symptoms of stress (Mann & Holdsworth, 2003).This inconsistency is also reflected in other studies where some studies state that working from home reduces stress (Kröll et al., 2017; Thompson & Prottas, 2006), and other studies state that working from home increases stress (Timmers et al., 2020). The inconsistency and the fact that almost all studies are not specifically aimed at parents make further research important. Therefore, the difference in stress between home workers and on-location workers in the moderating role mentioned before will be investigated in the current study to gain more clarity on this topic.

Based on the current literature, the importance of child language development, parent-child interaction, and stress, the following hypotheses have been formulated. First, it is expected that parent-child interaction is positively related to the language development of Dutch children under the age of two. Second, it is expected that the perceived stress of parents has a moderating effect on the relationship between parent-child interaction and the child's language development of children under the age of two. Finally, it is expected that the moderation effect mentioned before, is stronger amongst parents who work from home compared to parents who work on location. Due to the interest in correlation and the fact that there is no comparison group, a correlational research design will be used including correlational and moderating analysis.

**Method**

**Participants**

The total group of participants consists of 224 Dutch babies and their parents who participated in the longitudinal Baby2020 Study from the NSDSK. All these babies were born during the first lockdown of the Covid-19 pandemic in the Netherlands in the spring of 2020. At the moment of data collection during wave three of the Baby2020 study, the 224 babies were between 20 and 25 months old (age in years: *M* = 22.69, *SD* = .911), among which 115 boys and 109 girls. The rest of the demographic data can be seen in Table 1. Besides the missing data on the question work mostly at home or on-location, there was no missing data. Notable is the skewed distribution between the 220 mothers that participated and the only four participating fathers. In addition, it is notable that only 41 participants work mostly at home and 142 participants work mostly on location.

**Table 1**  
*Demographic data participants (parents)*

|  |  |  |
| --- | --- | --- |
|  |  | *n* (%) |
| Sex | Father | 4 (1.8%) |
|  | Mother | 220 (98.2%) |
| Age | 24-29 years old | 15 (6.7%) |
|  | 30-39 years old | 128 (57.3%) |
|  | 40 - 45 years old | 14 (6.1%) |
|  | Other | 67 (29.7%) |
| Educational attainment | LBO/MAVO/VMBO | 3 (1.3%) |
|  | HAVO/VWO | 2 (0.9%) |
|  | MBO | 37 (16.5%) |
|  | HBO | 96 (42.9%) |
|  | University | 58 (25.9%) |
|  | Postgraduate | 28 (12.5%) |
| Nationality | Dutch | 221 (98.7%) |
|  | Other | 3 (1.3%) |
| Work mostly at home vs work mostly on location | Home | 41 (18.3%) |
| Location | 142 (63.4%) |
| Missing | 41 (18.3%) |

**Procedures**

This study was approved by the Ethics Review Board of the School of Social and Behavioral Sciences of Tilburg University (ERB) and by the Ethical Review Board of the Faculty of Social and Behavioral Sciences of Utrecht University (FERB).

         The Baby2020 Study, on which this paper is based, consists of multiple data waves of which the first wave started in the spring of 2020. This paper is based on wave three. For the first wave, the participants were recruited by social media and by flyers in Well baby clinics between June and September 2020. If they scanned the code or link, they were sent to the NSDSK website and on the website there was a link to the survey. The participants should be parents of children that were born during the first Covid-19 lockdown in the Netherlands. They also should be able to understand and read Dutch because the survey is written in Dutch. After the first and second waves, parents could indicate whether they wanted to participate in wave three. When they wanted this, they received an email with a link to Qualtrics. After they opened the link to the survey, they were first given an information letter and if they wanted to participate in the study, they gave informed consent. After the approval of the participant, the digital survey started. Out of the 550 parents who agreed to participate in wave two, 224 parents (40.7%) eventually participated in and agreed to wave three. At the beginning of the survey (see section Measures), first there were questions about the demographic data. Second, questions were asked about specifically the Covid-19 pandemic. Subsequently, questions were asked on several topics including child language development, parent-child interaction, and parental perceived stress. Participating in the study was voluntary, digital, and anonymous. The duration of the survey was between fifteen and 25 minutes. At the end of the survey, the participants were asked to participate again in the next wave.

**Measures**

An online survey was used to measure a child’s language development, parent-child interaction, and perceived stress of parents.

***Child’s language development***

The child’s language development was measured by a Dutch version of the LENA Developmental Snapshot (Gilkerson & Richards, 2008). This is a parent-completed measurement of infants’ and toddlers’ progress in acquiring language skills. This scale consists of 42 items. An example of an item is ‘Imitates your child sounds made by you or others?’. The answer options per item were ‘yes’ (1) or ‘not yet’ (2). All items were added together, and the sum score was used for the analyses. The intern consistency was good, with a Cronbach’s Alpha of *⍺* = .851.

***Parent-child interaction***

The parent-child interaction was measured by a Dutch version of the  Brigance Parent-Child Interactions scale (BPCIS) (Glascoe, 2002). The BPCIS is a surveillance tool designed to identify positive versus problematic parent-child interactions, well before delays emerge. This scale consists of 18 items. An example of an item is ‘I watch and read books with my child’. The answer options per item were based on a 5-point-Likert scale and varied from ‘(almost) never’ to ‘(almost) ever’. After item 3 and item 15 were reversed coded, all items were added together and the sum score was used for the analyses. The intern consistency was acceptable, with a Cronbach’s Alpha of *⍺*  = .752.

***Perceived stress of parents***

The perceived stress of the parents was measured by a Dutch version of the Perceived Stress Scale (Cohen et al., 1983; Cohen, 1988). This is the most widely used psychological instrument for measuring the perception of stress. This scale consists of 10 items. An example of an item is ‘In the past month, how often have you felt nervous and stressed?’. The answer options per item were based on a 5-point-Likert scale and varied from ‘never’ to ‘very often’. After item 4, 5, 7 and 8 were reversed coded, all items were added together and the sum score was used for the analyses. The intern consistency was excellent, with a Cronbach’s Alpha of *⍺ =* .911.

***Home vs location working***

First a question was asked about if the participant worked: ‘Do you currently have a paid job / work?’. Of all participants, 95.6% worked at that time. Subsequently, two questions were asked about working at home vs working on-location: ‘How many days a week do you work at home?’ and ‘How many days a week do you work on-location?’. To measure the difference between participants who work mostly at home and mostly on-location, the group was divided. Based on the group of working participants, two subgroups were created. The subgroups consisted of a home-working subgroup of participants who work more than 50% at home, and an on-location-working subgroup of participants who work more than 50% on-location.

**Data-analysis**

The raw data was exported from Qualtrics to SPSS. After reverse coding, sum scores were made of the items of the variables ‘child language development’, ‘parent-child interaction’ and ‘perceived stress of parents’. A data inspection was performed to determine if there were any missing values, outliers or other notable scores.

After reliability analyses and assumption testing, the hypotheses were tested. The hypothesis that parent-child interaction is related to a child’s language development of children under the age of two was tested using a Pearson correlation analysis. The hypothesis that stress has a moderating effect on this relationship and the hypothesis that this moderation effect is stronger amongst parents who work from home compared to parents who work on location, were tested using multiple regression analysis. All analyses were performed using the SPSS Statistics 28 program (IBM Corp, 2021).

**Results**

In the current study, the relationship between parent-child interaction and child’s language development and if perceived stress of parents acts as a moderating variable in this relationship was examined.

It was hypothesized that parent-child interaction is related to child’s language development of children under the age of two. A correlation analysis was carried out to test this hypothesis. This showed a positive significant relationship between parent-child interaction (*M* = 4.11 , *SD* = 0.30) and a child’s language development (*M* = 1.80 , *SD* = 0.10 ), *r* = .252 , *p* < .001, indicating an almost medium effect. This means that parent-child interaction is positivelyrelated to the language development of children under the age of two in this sample.

Furthermore, it was hypothesized that the perceived stress of parents has a moderating effect on the relationship between parent-child interaction and the child’s language development. A multiple regression analysis was carried out to test this hypothesis, see Table 2. Individually, parent-child interaction positively predicted a child's language development (*B* = 0.10, *SE* =.03, *p* < .001). On the other hand, perceived stress of parents (*M* = 2.37, *SD* = 0.64) was not predictive for child's language development, *p* = .400. The results also show that stress did not moderate the relationship between parent-child interaction and a child’s language development, *p* = .151. This means that no moderation effect was found. As a result, the found correlation between parent-child interaction and the child’s language development of children under the age of two does not become higher or lower because of stress in this sample.

Finally, it was hypothesized that this moderating effect would be stronger for parents who work mostly at home, compared with parents who work mostly on location. Besides that there was no moderating effect, there was also no effect of parents that work at home, *p* = .797. This means that there was no moderation effect and it was also not stronger for parents who work at home compared to parents who work on location.

**Table 2**

*Regression Analysis Summary for the dependent variable Child Language Development*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | B | SE | β | t | p |
| (Constant) | 1.79 | 0.01 |  | 231.63 | <.001 |
| Interaction | 0.10 | 0.03 | 0.28 | 3.78 | <.001 |
| Stress | - 0.01 | 0.01 | - 0.06 | - 0.84 | .400 |
| Work | 0.01 | 0.02 | 0.04 | 0.51 | .611 |
| Interaction\*Stress | - 0.70 | 0.05 | - 0.12 | - 1.44 | .151 |
| Interaction\*Stress\*Work | 0.04 | 0.14 | 0.02 | 0.26 | .797 |

*Note*. R² = 0.09

**Discussion**

This study was conducted to investigate the relationship between parent-child interaction and a child’s language development and to investigate if perceived stress by parents acts as a moderating factor in this relationship. Additionally, it was investigated if this moderating effect was stronger for parents who work at home compared to parents who work on location. Based on the results, it has been confirmed that there is a positive relationship between parent-child interaction and language development of children under the age of two. However, this relationship was not moderated by stress. There was also no difference found in this moderation for working at home.

The found relationship between parent-child interaction and a child’s language development was consistent with previous research (Evans et al., 1999; Huttenlocher et al., 1991; Saracho 2002; Silven et al., 2002; Tamis-LeMonda & Bornstein, 2002; Tamis-LeMonda et al., 2001; Taylor et al., 2009).Those studies show that interaction focused on early and consistent participation in learning activities, the amount, style, and variation of language, and answering by parents through verbal descriptions and questions are positively related to the language development of children around the two years old. These aspects result in for example a foundation for early learning, more advanced receptive and productive language, and more phonological awareness in children. Previous research examined the relationship through home visits and videotaping. The current study used a survey and, in contrast with the previous studies, took place in the Netherlands, making it an important contribution to the previous studies. Up to now, almost all previous studies have focused solely on mothers. Other studies show that there are several differences between mothers and fathers in the language input on their young children. For example, it shows that fathers’ language input on their children, like more diverse vocabulary in interactions, made a unique contribution and was related to the more advanced language development of their young children, such as more advanced communication skills and expressive language development (Pancsofar & Vernon-Feagans, 2006; Pancsofar et al., 2010; Rondal, 1980). The current study focuses on mothers and fathers, but only a few fathers participated. This skewed distribution between mothers and fathers may have influenced the results. Therefore, in future research it is important to focus on an equal distribution between mothers and fathers.

The fact that the perceived stress of parents did not have a moderating effect on the relationship between parent-child interaction and a child’s language development was in contrast to our expectation. Previous studies had not examined this moderating effect but they showedindividual relationships between stress and a child’s language development and between stress and parent-child interaction (Anoil et al., 2004; Belsky, 1984; Deniz Can & Dilara, 2010; Farmer & Lee, 2011; Noel et al., 2008; Xu et al., 2005). By reason of this and based on the model of parenthood, the moderating role of stress was expected (Belsky, 1984). One explanation why the result was not as expected is that the target group was different compared to previous studies. The current study focuses on children under the age of two, but most previous studies have not specifically focused on this group (Anoil et al., 2004; Belsky, 1984; Deniz Can & Dilara, 2010; Noel et al., 2008).In addition, it could be that the moderating role of stress becomes visible later in life (Dobbins et al., 2012). As a consequence of the fact that the children in this study were still very young, it is possible that it is too early to see the effects of stress. The Baby2020 study is a longitudinal study. This makes it possible to determine whether stress has a moderating role in this group of children later in life. Another explanation is the way stress was operationalized. In the previous studies, stress was always measured by the Parenting Stress Index – short form (Abidin, 1995). This questionnaire consists of the subscales Parental Distress, Parent-Child Dysfunctional Interaction, and Difficult Child. The current study specifically focused on perceived parental stress, which may explain the difference in outcomes. Moreover, perceived stress was in the current study measured at a general level but not specifically about perceived stress in raising children. It is possible that this could influence the results. Therefore, it is recommended for future research to use a measurement tool that focuses both on perceived stress at a general level and on perceived stress concerningraising children.

Lastly, the fact that the moderation effect was not stronger amongst parents who work from home compared to parents who work on-location was also in contrast to our expectations. Previous studies also showed inconsistent findings, but due to the increasing stressors in households during the Covid-19 pandemic, this result was not expected (Cluver, 2020; Timmers et al., 2020). However, this topic was until recently not examined and most previous studies were not specific about parents that work. A possible explanation for this contradicting result is that the sample consists of more parents that worked on location compared to parents that worked at home. This skewed distribution might have influenced the outcomes of the results.

The current research has several strengths. One strong point is that the chance of socially desirable answers has decreased because the survey was conducted online (Comley, 2003). Due to the fact that an online survey was used, no one was watching directly and the anonymity was greater, resulting in a decrease in socially desirable answers, making the results of this research more valid. Another strong point is that all the individual constructs in the survey have a strong internal consistency. All of the intern consistencies were acceptable or higher, indicating a high degree of reliability (Altman & Bland, 1997).

Besides the strengths of our study, there are some limitations to this research. One of the limitations is the relatively larger sample of the group of highly educated people in contrast to the group of low-educated people. In the Netherlands, only 30 percent of the people between the ages of fifteen and 75 are highly educated (Centraal Bureau voor de Statistiek, 2018). In our sample, this was over 80 percent. This makes our results less representative for the target group.

A second limitation is, as mentioned before, a skewed distribution in the number of fathers and mothers that participated in this study. This could have influenced the results. For example, the stress levels of working from home may differ between mothers and fathers (Schneider & Ainbinder, 2004). For future research, there should be more focus on an equal distribution of fathers and mothers participating in the study.

The last limitation is that this research was conducted digitally. Although there are also some advantages to this method, such as the reduced chance of socially desirable answers, there are also some disadvantages. As a consequence of the Covid-19 pandemic, this research could not take place through home observations, but only through surveys. Observational techniques provide a window on real behavior, including parent-child interaction. Where surveys are more likely to be affected by systematic personal biases, direct observations are more consistent and reliable, and invaluable tools for interaction (Gardner, 2000). It is recommended to use both surveys and real-life observations in future research.

This study reveals the importance of parent-child interactions in children’s language development and contributes to clarifying and understanding the children’s language development**.** It is recommended to repeat a similar study with both survey and real-life observations when the Covid-19 pandemic is completely over. Given the critical role that interaction between parent and child plays in their children’s language development, it is important to focus on this interaction when a child has a language delay. By teaching parents strategies to support language development, these strategies can form an effective early language intervention. Parent-implemented interventions including parental strategies have positive effects on children’s language outcomes (Roberts & Kaiser, 2011). Strategies such as child communication, balancing adult-child turns, and using language models showed an increase in receptive and expressive language skills, receptive and expressive vocabulary, and rate of communication in children. By focusing on these strategies and improving parent-child interaction in young children with language delays, language development can be improved in many children.

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