Do Parental SES, Gender, and Practices matter?

The Influence of Parental Stress and Verbosity on the Relationship between the SES of Mothers and Fathers and the Early Social-Communicative and Social-Emotional Development of the Child

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Abstract

Previous studies state that parental social-economic status (SES) is negatively associated with the social-communicative and social-emotional development of the child (child outcomes). However, the processes that may explain this association are not well understood.

This study examines parental stress and verbosity (parental practices) as potential mediators in the relationship between parental SES and the social-communicative and social-emotional development of the child. Moreover, the study investigates whether parental gender moderates the association between parental SES and parenting practices. We hypothesized that parental SES and child outcomes would be significantly associated, parental stress and verbosity would at least partially mediate this association, and that there were no clear expectations for parental gender as a moderator. Data was used from the TRAILS-NEXT study, including a sample of 100 children and both biological parents. The variables were assessed using self-report questionnaires and observations. Simple mediation analyses and moderated mediation (conditional process) analyses were conducted to test the hypotheses. Surprisingly, the results indicated that there was no significant relationship between SES and the development of the child, parental practices did not significantly mediate the relationship between SES and child outcomes, and parental gender was not a significant moderator in this analysis. Even though no significant relationships were found, it is still important to further explore these associations since early childhood development is crucial for the further development and successes of children. Most importantly, future research should consider larger sample sizes when conducting similar studies.

Samenvatting

Eerdere studies stellen dat de ouderlijke sociaaleconomische status (SES) negatief samenhangt met de sociaal-communicatieve en sociaal-emotionele ontwikkeling van het kind (kinderuitkomsten), maar de processen die deze associatie kunnen verklaren zijn nog niet goed in kaart gebracht.

     Deze studie onderzoekt ouderlijke stress en breedsprakigheid als mogelijke mediatoren in de relatie tussen ouderlijke SES en de sociaal-communicatieve en sociaal-emotionele ontwikkeling van het kind. Bovendien onderzoekt deze studie of het geslacht van de ouders de associatie tussen ouderlijke SES en de ouderschapspraktijken, stress en breedsprakigheid, modereert. We veronderstelden dat ouderlijke SES en de kinderuitkomsten significant geassocieerd zouden zijn, ouderlijke stress en breedsprakigheid deze associatie tenminste gedeeltelijk zou mediëren, en dat er geen duidelijke verwachtingen waren voor het ouderlijk geslacht als mediator. Voor deze studie werd er data van de TRAILS-NEXT-studie gebruikt met een steekproef van 100 kinderen en beide biologische ouders. De variabelen werden gemeten door middel van zelfrapportagevragenlijsten en observaties. Eenvoudige mediatieanalyses en gemodereerde mediatieanalyses werden uitgevoerd om deze hypothesen te testen. Tegen verwachtingen in toonden de resultaten dat er geen significante relatie was tussen SES en de ontwikkeling van het kind, ouderschapspraktijken waren geen significante mediator in de relatie russen SES en kinderuitkomsten en het geslacht van de ouders was ook geen significante moderator in de analyses. Hoewel er geen significante relaties zijn gevonden, is het toch belangrijk om deze associaties verder te onderzoeken, aangezien de vroege ontwikkeling van het kind cruciaal is voor de verdere ontwikkeling en successen van het kind. Het is voornamelijk noodzakelijk dat vervolgonderzoek rekening houdt met grotere steekproeven bij het uitvoeren van soortgelijke onderzoeken.

Inhoud

1. Introduction

This study will focus on parental practices (i.e., parental stress and verbosity), and their role as potential mediators in the relationship between parental SES and the social-communicative and social-emotional development of the child. Moreover, this study will investigate whether this association is different for mothers and fathers.

Background

The first 1000 days of a child's life are very important for the development of the child (Adair, 2014; Barker, 2006, Campbell et al., 2014; Hanson & Gluckman, 2015; Kelly, 2018; Roseboom, 2018; Walker et al., 2011). These 1000 days regarded the period before birth, during pregnancy, and the first two years after birth (VWS, 2018). Black et al. (2017) argued that the accumulation of difficulties in this period can disrupt brain development, attachment, and early learning. For example, 43% of children younger than five years old in low- and middle-income countries were at great risk of developmental delays because of (e.g.) poverty (Black et al., 2017). Manji et al. (2015) also suggested that poverty was associated with developmental delays before children turn one year old and that these delays will at least increase until children are five years of age. This illustrated how certain periods in the child's development were sensitive to economic adversity (Manji et al., 2015). In the Netherlands, most children have a good start in life and grow up in a safe and well-protected environment. However, the Dutch national action program 'Promising Start' pointed out that still 16% of Dutch children were born with an unfair start, meaning that these children spend their first 1000 days in a vulnerable environment because of poverty or the disadvantaged lifestyles of their parents. These vulnerable children could experience life-long effects on their physical and mental health and development (VWS, 2018), making them the target for intervention of the Promising Start program. All in all, these findings have shown how crucial the early childhood developmental period is and how, for instance, poverty could be a predictor of the future development of children.

Not surprisingly, research has found substantial support for the negative association between child developmental outcomes and the parental income and educational level, also known as social-economic status (SES) (Cauduro et al., 2021; DePasquale & Gunnar, 2020; Kluczniok & Mudiappa, 2019; Levine et al., 2020; Wimer & Wolf, 2020). Compared to children from parents with a high SES, children from parents with a lower SES performed significantly worse on vocabulary, syntax, and language learning processes (Kluczniok & Mudiappa, 2019; Levine et al., 2020), had a delay in their fine and gross motor skills,

cognitive development, receptive language and communication, expressive language and communication, and adaptive development (Cauduro et al., 2021), and experienced more stress because of the risk factors that were related to the parental low educational- and income levels, such as poverty, housing instability, food insecurity, and (neighbourhood) violence (DePasquale & Gunnar, 2020; Evans & Kim; 2013; McCoy & Raver, 2014). In contrast, many children from parents with a higher income level achieved higher levels of educational and economic success later in their lives compared to those from low SES families (Wimer & Wolf, 2020). Thus, these studies have convincingly shown that parental SES and the social-communicative and social-emotional development of the child are related.

Problem definition

Thus, research stated that the first 1000 days of the child's life were important for the further development of the child (Adair, 2014; Barker, 2006, Campbell et al., 2014; Hanson & Gluckman, 2015; Kelly, 2018; Roseboom, 2018; Walker et al., 2011) and that parental SES was negatively associated with the early childhood developmental outcomes (Cauduro et al., 2021; DePasquale & Gunnar, 2020; Kluczniok & Mudiappa, 2019; Levine et al., 2020; Wimer & Wolf, 2020). However, the processes that might explain this association have received less research attention. Not much research has included possible mediator variables like parental practices to analyse if the relationship between parental SES and the developmental outcomes of the child could be predicted by other factors. Since the Dutch national action program 'Promising Start' has argued that the parental lifestyle affects the child's physical and mental health and development (VWS, 2018), it will be relevant to look further into parental practices and their influence on child outcomes.

Parental SES, parental practices, and child development outcomes

Multiple previous studies have convincingly demonstrated positive and negative relationships between parental SES and the parenting practices stress and verbosity (Jeong et al., 2017; Kalil & Ryan, 2020; Malhi et al., 2018; Rafferty & Griffin, 2010; Roubinov & Boyce, 2017; Rowe et al., 2016; Walker et al., 2011). Firstly, higher SES parents were less likely to experience parental stress than lower SES parents (Kalil & Ryan, 2020; Rafferty & Griffin, 2010; Roubinov & Boyce, 2017). Moreover, the depressive symptoms of parents with a lower SES were related to economic pressure and negative parenting (Roubinov & Boyce, 2017). Furthermore, research showed that parents with a higher SES used a richer vocabulary (verbosity) when interacting with their child (Jeong et al., 2017; Malhi et al.,2018; Rowe et al., 2016), were more likely to provide adequate language support in the home environment

(Rafferty & Griffin, 2010) and provided a more stimulating home environment in general than parents with a lower SES (Walker et al., 2011). This was related to having more economic resources, better access to relevant information related to parenting practices (Roubinov & Boyce, 2017; Walker et al, 2011), and whether they had more time with their children (Kalil & Ryan, 2020; Walker et al., 2011).

On the other hand, studies reported that the social-communicative and social-emotional development of the child was also associated with these parenting practices (Chazan-Cohen et al., 2009; Kalil & Ryan, 2020; Rafferty & Griffin, 2010). Parental stress and psychological distress led to a more hostile parent-child relationship (Kalil & Ryan, 2020) and more family conflict (Rafferty & Griffin, 2010). Parental stress has also been linked to the development of child emotion regulation and attention control skills (Chazan-Cohen et al., 2009). Chazan-Cohen et al. (2009) have found that parental stress when a child was fourteen months old, was associated with a less emotionally regulated child when the child was five years old. These studies thus showed that children from parents with poorer parental practices are at increased risk of social-communicative and social-emotional developmental delays.

Relevancy: raising awareness, research method, and parental gender

In sum, the paragraphs above explained how the variables parental SES, parental practices, and child developmental outcomes are related to each other, but the processes that might explain these associations are not well understood. Firstly, this study aims to add to the existing literature by examining how parental practices (stress and verbosity) influence the relationship between parental SES and child developmental outcomes. This has great academic relevancy because it is not yet completely clear if parental practices fully mediate the association between parental SES and child outcomes. This potential mediating role of parental practices will be analysed using a standardized quantitative research design based on questionnaires and observations. Fraenkel et al. (2015) stated that including observation in the research will increase the objectivity of the study. Observations from a non-participating observer will illustrate the most complete picture of interaction and hardly influence the actions of the participants (Fraenkel et al., 2015). Not many studies regarding this topic have included observations, so this study will be innovative regarding this matter.

Secondly, this study will explore whether the effects are different for mothers and fathers. The mother's educational level is often used as the sole indicator of the SES, as it is considered to be the best predictor of parenting (Mendive et al., 2017). However, opposing evidence, indicating that the father's educational level was more significantly associated with

the child's cognitive and social-emotional development than the mother's educational level, has also been found (Rubio-Codina et al., 2016), suggesting that not including paternal SES could be an oversight. Further research suggested that there are many similarities in the way mothers and fathers use their parenting skills (Anderson et al., 2013; Cabrera et al., 2007; Cabrera et al., 2014; Fagan et al., 2014; Roggman, 2004). For instance, mothers and fathers engaged with their children in the same way (Anderson et al., 2013; Cabrera et al., 2014), they were not unique in their role in children's development (Fagan et al., 2014), and they became more and more similar in terms of their roles and behaviours (Cabrera et al., 2007; Fagan et al., 2014; Roggman, 2004). Other studies emphasized the differences between mothers and fathers (Craig, 2006; Grusec & Davidov, 2010; Paquette, 2004; Roopnarine & Mounts, 1985). Mothers and fathers had different roles in the family (Grusec & Davidov, 2010; Paquette, 2004), biological differences had effects on the parenting behaviour (Paquette, 2004), mothers were more often involved in raising their children than fathers (Craig, 2006; Roopnarine & Mounts, 1985), and mothers and fathers had specific domains of influence based on social interactions, mechanisms, and outcomes (Grusec & Davidov, 2010). Because of the inconsistency in the literature and the more outdated studies on this topic, it is relevant to analyse if the patterns of the relationships between parental SES, parental practices, and the developmental outcomes of the child are the same for mothers and fathers.

Lastly, to examine the associations here above, it is necessary to firstly replicate findings on the negative relationship between parental SES and the social-communicative and social-emotional development of the child.

Research questions and hypotheses

The theoretical background and the gaps in the research field have resulted in three research questions. The first research question is: *Are parental SES and the social-communicative and social-emotional development of the child related to each other?* The hypothesis for this question is that parental SES will be negatively associated with the social-communicative and social-emotional development of children. Previous studies have shown that children from parents with a lower SES perform worse in almost all areas of development compared to children from parents with a higher SES (language: Kluczniok & Mudiappa, 2019; Levine et al., 2020; motor skills: Cauduro et al., 2021; and mental health: DePasquale & Gunnar, 2020; Evans & Kim; 2013; McCoy & Raver, 2014).

The second research question is stated as follows: *To what extent is the relationship between the parental SES and the social-communicative and social-emotional development of*

the child mediated by parental stress and verbosity? It is expected that parental practices will at least partially mediate the relation between the variables. Studies have shown that parental practices are associated with parental SES (Jeong et al., 2017; Kalil & Ryan, 2020; Malhi et al., 2018; Rafferty & Griffin, 2010; Roubinov & Boyce, 2017; Rowe et al., 2016; Walker et al., 2011) and with the child's developmental outcomes (Chazan-Cohen et al., 2009; Kalil & Ryan, 2020; Rafferty & Griffin, 2010), but it is unknown whether or not these practices will fully explain the association between SES and child outcomes.

The last research question is: *Does parental gender moderate the relation between parental SES and parental practices?* Because there is not much consistency in the literature about the influence of parental gender on the relationship between parental SES and parenting practices (and subsequently child outcomes), this research is exploratory with regards to this analysis.

Figure 1 illustrates how the three questions are related to each other in a (moderated) mediation model.

Figure 1

Moderated mediation model: The relation between parental SES on child outcomes through parental practices with parental gender as the possible moderator for the a-path.
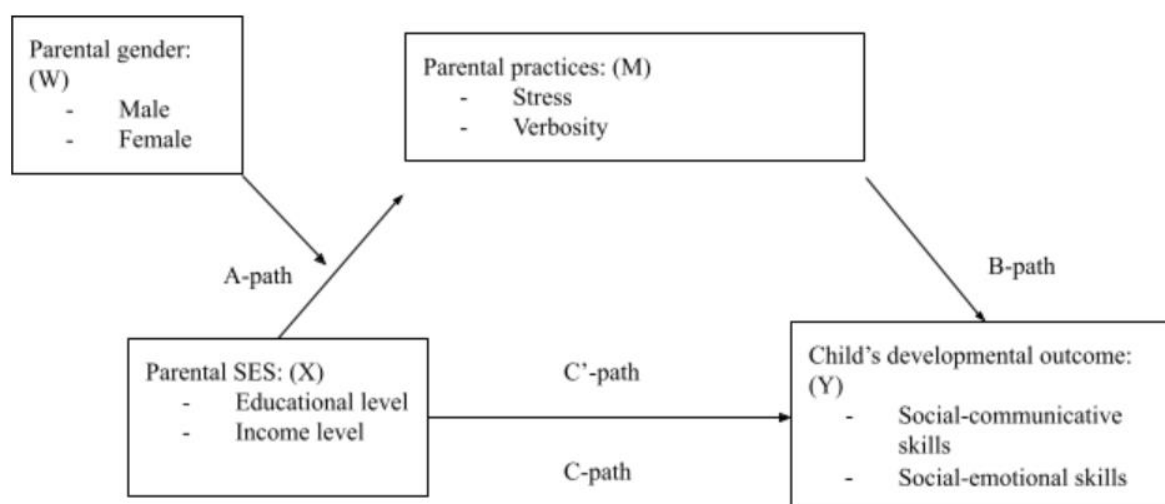
Structure overview

The method chapter will discuss the type of research, the research sample, the used instruments, and the analysis method. The results chapter will present the most important outcomes of the analyses. The discussion will put the results in perspective by comparing

them to relevant literature. Furthermore, it will give implementations for future research and the chapter will discuss the strengths and limitations of this study.

2. Method

Research population and sampling method

This study used data from the TRAILS – Tracking the Next-generation study (Hartman et al., 2022). The TRAILS-NEXT study is an intergenerational follow-up study to the Tracking Adolescent' Individual Live Study (TRAILS) study in the Netherlands (e.g. Huisman et al., 2008; Oldehinkel et al., 2014). The psychological, social, and physical development of the TRAILS participants (N=2229) has been followed since 2001, when they were eleven years of age, with regular measurement moments. Currently, these participants have completed seven assessment waves and are around 29 years of age. TRAILS participants were eligible to join the TRAILS-NEXT study if they thought about having children, were pregnant, or already had children. Four e-mails per year were sent to the TRAILS participants in which they were informed about the TRAILS-NEXT study and asked to participate. The ongoing TRAILS-NEXT study focuses on the development of the offspring and the parent-child relationship. The study has four measuring waves: T1) during pregnancy, T2) when the child is three months old, T3) when the child is 30 months (2.5 years) old, and T4) when the child is 54 months (4.5 years) old. The Dutch Central Committee on Research Involving Subjects has ethically approved the TRAILS NEXT study. Affirming TRAILS participants were contacted by research assistants who informed them further about the study and eventually carried out the home visits (Hartman et al., 2022). In the current study, TRAILS-Next data was included from the measurement waves at 3 and 30 months of child age. Data from in total of 200 parents (male=100/female=100) and 100 children were included in this study.

Variables and instruments

Parental SES

Parental SES was the independent variable (X) in this study. Parental SES was measured using a self-report questionnaire in which both parents separately were asked about their monthly income and highest achieved educational level when their children were three months old. For their monthly income level, they had to choose between categories that went from earning less than 300 euros to earning more than 3000 euros per month. For example, '*My monthly income is less than 300 euros*' or '*My monthly income is between 1501 and 1800 euros*'. There were eleven categories in total and the higher the category, the higher their income was. When the participants did not want to reveal their income, they could state this

as well by choosing the twelfth category, however, these data were excluded from the sample because they could not be used in the analyses.

The highest achieved educational attainment was measured using fourteen categories. However, these categories were oddly distributed based on the Dutch educational system and were not coded correctly from lower to higher education. The participants had also the possibility to not tell their educational level or to answer 'other.', if their educational level was not included in the list. These latter two categories were also excluded from the data. The original categories were recategorized into 1= 'primary school', 2= 'secondary school', 3= 'vocational education', 4= 'higher vocational education', and 5= 'university'.

For the analyses, a combined measurement was used for parental SES, consisting out of the z-scores of parental income and diploma. So, in this case, the z-scores of the SES meant how relatively high or low the SES score of the participant was compared to the rest of the sample.

Child outcomes

The variable 'child's developmental outcome,' known in this sample as the social-communicative and social-emotional skills, was the dependent variable (Y). It was measured with an observation method (Early Social Communication Scales; ESCS) during a home visit and with a parent-report questionnaire (Infant-Toddler Social and Emotional Assessment; ITSEA) when the child was 30 months old.

Social-communicative skills. The ESCS is a semi-structured observation that measures the non-verbal communication skills of children between eight and thirty months with typical development or children with developmental delays whose estimated age falls within this age range (Mundy et al., 2003). An observation takes 15 to 25 minutes to administer and six categories of behaviour were measured during the observation: 1) Initiating Joint Attention, 2) Responding to Joint Attention, 3) Initiating Behavioral Requests, 4) Responding to Behavioral requests, 5) Initiating Social interaction, and 6) Responding to Social interaction. Toys and other materials were used because of their potential to stimulate social interaction, joint attention, and/or behavioral requests. An example of a task for the child was to follow commands, such as handing over a toy to the tester. The coding was conducted by student-observers with observations made from the videotapes. The frequency of Joint Attention, Behavioral Requests, and Social Interaction was noted during the coding. Five of the six categories were indicated with a total score and one category was indicated in a percentage (Mundy et al., 2003). In this study, the scores of the separate categories were

transformed into a mean z-score because of the one category that was noted in percentages. The z-scores of the ESCS could be interpreted the same way as the parental SES variable.

The reliability of the ESCS has been measured with the intraclass correlation coefficient (ICC) in an earlier bachelor's thesis supervised by the first supervisor. The ICC indicated the agreement between repeatedly measured values on a continuous scale. All of the categories had an excellent ICC, except for the 'Initiating Social interaction' category, which scored between insufficient, moderate, and excellent (A.M. Sluiter-Oerlemans, personal communications, March 2022).

Social-emotional skills. The ITSEA is a parent report to measure social-emotional problems and competencies in one- to three-year-olds (Carter et al., 2003). The problematic behaviour included internalizing and externalizing problems, but also regulatory problems, and severe maladaptive behavioural problems. The ITSEA included behaviours that were part of the typical development but were seen as problems when they were observed excessively or too infrequently, and it also measured infrequently occurring problem behaviour that is considered as deviations from a normative developmental course. The complete ITSEA included 166 items, which are rated on a 3-point scale: (0) *Not true/rarely,* (1) *Somewhat true/sometimes,* and (2) *Very true/often.* An example of an item is: (my child) '*Is restless and can't sit still.'* It took approximately thirty minutes to complete the questionnaire (Carter et al., 2003). This study used the mean of the total score of the ITSEA. A higher score meant that the parents observed a better social-emotional competence in their child. The test-retest (.61-.91, mean=.79) and the interrater reliability (.56-.72, mean=.66) of the ITSEA were acceptable (Carter et al., 2003).

Parental practices

Parental practices (stress and verbosity) were the mediator variables (M). Parental stress has been measured using self-report questionnaires when their children were three and thirty months old. Parental verbosity was observed during the interaction of parents with their child when the child was three months old.

Stress. Parental stress was measured with the 'Nijmeegse Ouderlijke Stress Index' (Parental stress index from Nijmegen (NOSI-K, de Brock et al., 1992). The NOSI is a questionnaire that measures the stress experienced by the parents about twenty aspects of upbringing. The questionnaire has three domain scales (parent, child, and life events). The parent domain scale is divided into seven constructs: 1) competence, 2) role restriction, 3)

attachment, 4) depression, 5) health perception, 6) social isolation, and 7) marital relationship. The child domain scale has six constructs: 1) adaption, 2) mood, 3) hyperactivity, 4) demanding, 5) positive reinforcement, and 6) acceptance. The lifestyle scale assessed whether stressful events had occurred in the past twelve months. An example of an item is: '*Sometimes I have a feeling that my child does not like me*'. The parents could answer a six-point scale from *totally disagree* to *totally agree* (de Brock et al., 1992). The total score of the NOSI was used for these analyses. A higher score on the NOSI questionnaire meant that the parents experienced more stress. All of the domain scales had good reliability (.91 to 97, de Brock et al., 1992).

Verbosity. Parental verbosity was measured with observations during a home visit (Hartman et al., 2022). The observers noted the total amount of verbal expressions within a 10-minute parent-child free play interaction. The coding was done using verbatim transcription, which eventually measured the total score of the parental vocalizations, which we used to indicate parental verbosity. A higher total score meant that the parents spoke more to their child within these ten minutes. The videos were coded by two trained student-observers and 20% of the videos were double-coded to determine the intraclass correlations (ICC). The ICC was excellent for the proportion score for the total amount of verbal expressions (ICC=.922), based on the guidelines of Cicchetti (1994) (A.M. Sluiter-Oerlemans, personal communications, March 2022). However, the ICC could not be verified for all of the data of the parental vocalizations.

Parental gender

Parental gender was the moderator variable (W) in this study. The TRAILS NEXT study ask about the parental gender in its standard question procedure when they recruited the participants (Hartman et al., 2022). Mother was coded as '1' and father as '2' for the analyses.

Research design, analysis of the method, and procedure

This study had a correlational research design in which a three-way linear analysis was performed using model 7 of the process macro analysis of Hayes (2012) to test the possible mediating role of parental practices in the relation between parental SES and the developmental outcomes of the child. The data were analysed using the Statistical Package for Social Studies (SPSS) version 27.0 (IBM Corp, 2020). Firstly, the assumption for the normality was checked with the *Shapiro Wilk test* and the residues got assessed with the *Durbin Watson test* if they were sufficiently uncorrelated. Moreover, the assumptions for

linearity, homoscedasticity, and normally distributed residuals were checked by the means of (scatter)plots, and the outliers were examined with boxplots. Furthermore, the descriptive data of the sample was assessed with the measures of central tendency and the measures of variability.

The first step of the three-way linear regression analysis was to test the c-path (see *Figure 1*), to analyse if parental SES was a significant predictor of the developmental outcomes of the child with the mediator (parenting practices) in isolation. In the second step, the a-path was tested to analyse if parental SES was a predictor of parenting practices. In the third and last step of the analysis, the b-path and the c'-path were tested to verify if parenting practices predicted the developmental outcomes of the child and whether parental SES still predicted the developmental outcomes of the child when parenting practices were taken into account as a mediator. The *bootstrapping procedure* with 5000 *resamples* was used to test whether the indirect effect (c-path – c'-path) was significant. The indirect effect showed the extent to which the X-variable influenced the Y-variable through the mediator. When the bootstrap interval of the indirect effect contains zero, there is evidence to state that the indirect effect is not statistically significant. The relative difference between the original direct effect (c-path) and the residual direct effect (c'-path) was used as an indicator for the effect size of the mediation using the formula of MacKinnon, Fairchild, and Fritz (2007), 1-c'-c (outcome range between 0 and 1). Separate analyses were conducted for the two parental practices and the two child outcomes. So, in total four mediation analyses and four moderated mediated analyses were conducted.

Lastly, with model 7 of the process macro analysis of Hayes (2012), it was possible to test whether parental gender (male/female, *W* in *Figure 1*) had a moderating effect between parental SES and parenting practices.

Sensitivity analyses

Sensitivity analyses were conducted to make sure that the right conclusions could be made based on the current data and results. A sensitivity analysis is a method to determine the robustness of an assessment by investigating the extent to which results are influenced by changes in methods, model, and values of unmeasured variables. For instance, sensitivity analyses could be conducted when there are multiple cut-offs or definitions of variables (Thabane, 2013). This was also the case for the current study. For the sensitivity analyses, the parental diploma was used as the sole indicator of parental SES. Parental education has been previously used as the only indicator of parental SES (e.g. Mendive et al., 2017; Rubio-

Codina et al., 2016), so it seemed reasonable to also use this measurement to check whether the same results would be found.

Secondly, to confirm the influence of gender on the relationship between parental SES and child outcomes through parental practices, simple mediation analyses were conducted for separate variables for the mothers (females) and the fathers (males) as post hoc tests.

3. Results

Descriptive statistics

Table 1 presents the missing data for the SES variable, the child outcome variables (social-communicative and social-emotional skills), and the parental practices (stress and verbosity). The only variable that had no missing data was social-communicative skills. Verbosity had the most missing data (60%). Data was not imputed. Table 1 also visualizes the means and standard deviations of all variables. Table 2 presents the descriptive statistics of this study. The sample had an equal amount of males and females. Most of the respondents (28%) report vocational education, as their highest attained school diploma, followed by higher vocational education with 26.5 percent. Further, most of the respondents (12%) report a monthly income between 1501 and 1800 euros, and only nine respondents (4.5%) report an income below three hundred euros per month.

Table S9 and S9 present the descriptive statistics of the sensitivity analyses for mothers and fathers separately. It visualizes that more mothers (36%) report that they earn between less than 300 and 1200 euros per month than fathers (5,1%). Moreover, more fathers (17,4%) report that they earn more than 3000 euros per month than mothers (4,3%).

Table 1.

Sample sizes, missing data, means, and standard deviations of the variables

	N (%)	Missing (%)	Mean	SD
SES	128 (64)	72 (36)	.03	.80
Social-communicative skills	200 (100)	0 (0)	.0*	.48
Social-emotional skills	127 (63.5)	73 (36.5)	2.39	.29
Stress	103 (51.5)	97 (48.5)	2.44	.37
Verbosity	80 (40)	120 (60)	185.03	66.30

Note: *z-scores used as the total score

Table 2.

Demographic data for respondents

Demographics	Items	Frequency (%)
Gender		
	Male	100 (50)
	Female	100 (50)
	Missing	0 (0)
	Total	200 (100)
Highest achieved diploma		
	'Primary education'	1 (.5)
	'Secondary education'	14 (7)
	'Vocational education'	56 (28)
	'Higher vocational education'	53 (26.5)
	'University'	15 (7.5)
	N	139 (69.5)
	Missing	61 (30.5)
	Total	200 (100)
Income per month in euros		
	Less than 300	9 (4.5)
	Between 300 and 600	4 (2)
	Between 601 and 900	5 (2.5)
	Between 901 and 1200	11 (5.5)
	Between 1201 and 1500	19 (9.5)
	Between 1501 and 1800	24 (12)
	Between 1801 and 2100	17 (8.5)
	Between 2101 and 2400	16 (8)
	Between 2401 and 2700	8 (4)
	Between 2701 and 3000	2 (1)
	More than 3000	13 (13)
	N	128 (64)
	Missing	72 (36)
	Total	200 (100)

Assumptions

Almost all variables were not normally distributed, except for verbosity (See Table S1). The values of the Durbin Watson test (uncorrelated residues) on this sample showed that all of the variables had a normal Durbin Watson value, except for the association between SES and social-communicative skills (.93, See Table S2), and diploma and social-communicative skills (.83, See Table S2). This means that the variables are to some extent autocorrelated to each other. Moreover, the parental stress variable was the only one with an extreme outlier (see Figures S1.1-1.4). The (significant) analyses including parental stress were run again without the outlier and there were differences observed in the outcomes (See Tables S4, S5, and S8). These differences will be further explained in the results. Furthermore, there was variation in the distribution of residuals, homoscedasticity, and linearity of the variables (see Figures S2.1-S2.12). This suggests that the findings of this study should be carefully interpreted because of the violated assumptions.

Hypothesis 1: parental SES on child outcomes

First, the c-path was tested to analyse the association between parental SES and child outcomes (hypothesis 1). These results showed that there was no significant association found between parental SES in infancy and the social-emotional and social-communicative development if the child was 30 months old (all p-values >.05), see Table 3. The same results were found for the sensitivity analyses with only diploma as the X-variable, see Table S3.

Hypothesis 2: parental practices as a mediator

After the c-path of hypothesis 1, the a-path was tested to analyse the relationship between parental SES and parental practices. No significant relationships between parental SES and parental practices were found (all *p*-values >.05), see Table 3. Subsequently, the b-path and c'-path were tested to analyse if parental practices predicted the child outcomes (b-path) and if parental SES still predicted child outcomes when parenting practices were considered as a mediator (c'-path) (hypothesis 2). Results showed that there were no significant associations between parental practices and child outcomes (all *p*-values >.05), see Table 3). Also, none of the mediation analyses found that parental practices significantly mediated the relationship between parental SES and child outcomes (all *p*-values >.05), see Table S3 (c'-path). The sensitivity analyses with diploma as the X-variable indicated the same results for all of these analyses, see Table S3.

Table 3.

Simple mediation analyses, X=SES

Model	N	B	t	p	Bootstrap Interval
X= SES, M= verbosity , Y= ITSEA*	54				
a-path: SES on verbosity		-.05	-.45	.361	
b-path: verbosity on ITSEA		-.00	-.14	.888	
c-path: SES on ITSEA		-.05	-.44	.351	
c'-path: SES on ITSEA through verbosity		-.05	-.94	.351	
Indirect effect		.00			-.05;.01
Effect size		1.00			
X= SES, M= verbosity , Y= ESCS**	66	*B*	*t*	*p*	*Bootstrap Interval*
a-path: SES on verbosity		-2.83	-.29	.775	
b-path: verbosity on ESCS		-.00	-.19	.854	
c-path: SES on ESCS		.12	1.59	.117	
c'-path: SES on ESCS through verbosity		.12	1.57	.122	
Indirect effect		.00			-.02;.02
Effect size		1.00			
X= SES, M= stress , Y= ITSEA*	67	*B*	*t*	*p*	*Bootstrap Interval*
a-path: SES on stress		-.04	-.45	.367	
b-path: stress on ITSEA		-.08	-.76	.451	
c-path: SES on ITSEA		-.04	-.87	.387	
c'-path: SES on ITSEA through stress		-.04	-.90	.367	
Indirect effect		.00			-.01;.02
Effect size		1.00			
X= SES, M= stress , Y= ESCS**	94	*B*	*t*	*p*	*Bootstrap Interval*
a-path: SES on stress		.05	1.15	.254	
b-path: stress on ESCS		.09	.64	.523	
c-path: SES on ESCS		.08	1.42	.159	
c'-path: SES on ESCS through stress		.08	1.33	.187	
Indirect effect		.00			-.01;.02
Effect size		1.00			

Note. *= Social-emotional skills, **= Social-communicative skills

Figure 4.

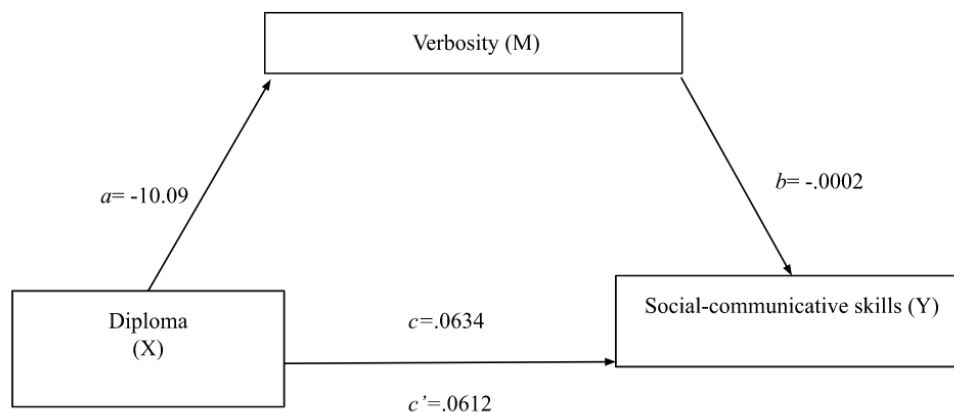*Simple mediation model: X= diploma, Y= social-communicative skills, and M= verbosity*

Figure 4 presents an example of a simple mediation model.

Hypothesis 3: parental gender as a moderator

To assess whether gender moderated the indirect effect of parental SES on child outcomes through parental practices, a moderated mediation analysis was conducted, using model 7 of Hayes' conditional process analysis (hypothesis 3). To test this association, the model generated bias corrected 95% bootstrap confidence intervals for the indirect effects using 5,000 bootstrap samples. For the moderated mediation analyses, the following variables were used: Y= social-communicative skills/ social-emotional skills, X= SES, M= verbosity/ stress, and W= parental gender, see Figure 1.

The results showed a significant relationship between parental SES and parental stress with gender as a moderator (a-path= .28, t=1.99, p=.050), see Figure 5. However, the index of the moderated mediation was .02 [-.03;.09], and the indirect effect also contained zero for both mothers (B=-.00, 95% Conf. Interval: -.02 to .0) and fathers (B=.24, 95% Conf. Interval: -.02 to .08) indicating a non-significant moderated effect. The same results were found with sensitivity analyses when diploma was used as the X-variable (see Table S5), and also with only paternal stress in the mediation analyses. However, the significant relationship between parental SES and parental stress disappeared when an extreme outlier of parental stress was removed, see Tables S4 and S5.

Noticeably, a sensitivity mediation analysis (X= Diploma mother, Y= social-emotional skills mother, M= verbosity mother), see Table S7, showed a significant c-path (B=-.13, t=-2.14, p=.041), c'-path (B=-.13, t=-2.08, p=.047) and indirect effect (B=-.00, 95% Conf. Interval: -.26 to -.01).

All of the other results of the moderated mediation analyses were non-significant, see Tables S4 and S5.

Figure 5.

Moderated mediation model: X= SES, Y= social-communicative skills, M= stress, and W=gender
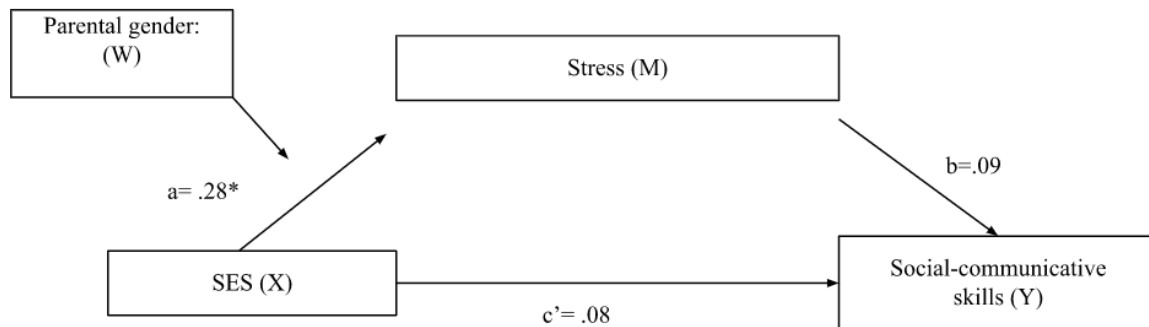
Note: * *p*-value <.05

4. Discussion

This study aimed to assess whether the parental practices stress and verbosity mediated the relationship between parental SES and the social-communicative and social-emotional development of the child and whether parental gender was a potential moderator in this analysis. To investigate this, simple mediation and moderated mediation analyses were conducted. Unexpectedly, our results showed that there was no significant relationship between parental SES and the social-communicative and social-emotional development of the child. Furthermore, the results indicated that parental practice stress and verbosity both did not mediate the relationship between parental SES and the social-communicative and social-emotional development of the child. Lastly, the results showed that parental gender was not a significant moderator in the indirect effect of parental SES on child outcomes through parental practices.

We found no support for the first hypothesis that stated that parental SES would be negatively associated with child outcomes. This means that, in our sample, a lower parental income/and or educational level (SES) was not associated with a worse social-communicative and social-emotional development of the child at the ages of three and thirty months old. This finding is in sharp contrast to earlier studies convincingly demonstrating the negative association between parental SES and child functioning (Cauduro et al., 2021; DePasquale &

Gunnar, 2020; Kluczniok & Mudiappa, 2019; Levine et al., 2020; Wimer & Wolf, 2020). A potential explanation for this lack of association is the small sample size of this study. This study used data from 100 families, but almost all variables had missing data including parental SES and the child outcome variables. The reasons for the missing data were: not all of the data was coded yet (verbosity and social-communicative development), children enrolled at a later age in the TRAILS-NEXT study and were not included in a particular measuring wave, or children/parents quit participating in the study. Previous studies that found significant associations between parental SES and child outcomes had indeed larger sample sizes (e.g. *n*= 2406 (Kluczniok & Mudiappa, 2019) and *n*=258 (Levine et al., 2020)). Larger sample sizes make it usually easier to assess the representativeness of the sample and generalize the results (Biau et al., 2008), and find small-sized effects (Sullivan & Feinn, 2012). The second explanation could be the differences in child outcome measurements and the instruments that were used to assess them between this study and the previous studies. The social-communicative development of the child was measured with the observational tool ESCS which assessed the non-verbal communication skills of the child (Mundy et al., 2003). Though, other studies that analysed the communicative development of the child focussed more on the verbal communication and language learning skills of the child (Kluczniok & Mudiappa, 2019; Levine et al., 2020) and used instruments such as the Peabody Picture Vocabulary Test, the Test for Reception of Grammar (Kluczniok & Mudiappa, 2019), and the Quick Interactive Language Screener (Levine et al., 2020). Some studies only used one instrument to measure the social-communication skills, social-emotional skills, and other child outcomes (Cauduro et al., 2021; Jeong et al., 2017; Malhi et al., 2018). For example, the Dimensional Inventory of Child Development (IDADI; Cauduro et al., 2021) measured the cognitive-, social-emotional-, motor-, communication-, language-, and adaptive behavior skills of children between four and seventy-two months. All in all, this shows that different instruments could have been used to investigate the relationship between SES and the social-communicative and social-emotional development of the child. The third reason could be the time difference between the assessments of the variables. Parental SES was assessed when the child was three months old and the social-communication and social-emotional development was assessed when the child was thirty months old. Within these two years, things could have changed in the socioeconomic status of the parent. For example, the parent could have had a pay raise or attained a higher educational level. Meanwhile, previous studies that found significant associations assessed parental SES and child outcomes at the same time (Cauduro et al., 2021; Jeong et al., 2017; Kluczniok & Mudiappa, 2019; Malhi et al., 2018). This

suggests that a cross-sectional research design would have been the best design to conduct this study because cross-sectional studies efficiently answer research questions unrelated to longitudinal assumptions and this was also the aim of the current study. Moreover, cross-sectional studies provide motivation, justification, and background to propose and design subsequent efficient longitudinal studies (Kraemer et al., 2000).

With regard to the second hypothesis about parental practices partially mediating the relationship between parental SES and the social-communicative and social-emotional development of the child, we again found no evidence. Previous literature demonstrated that parental practices were associated with parental SES (Jeong et al., 2017; Kalil & Ryan, 2020; Malhi et al., 2018; Rafferty & Griffin, 2010; Roubinov & Boyce, 2017; Rowe et al., 2016; Walker et al., 2011) and with the child's developmental outcomes (Chazan-Cohen et al., 2009; Kalil & Ryan, 2020; Rafferty & Griffin, 2010). The findings of this study contradict these previous studies and suggest that parental verbosity and stress do not (positively or negatively) influence the relationship between a high SES and a better social-communicative and social-emotional development of the child. The first feasible reasons for this contradiction were, as already revealed, the small sample sizes and the missing data. The second explanation is related to the parental practice measurements that were used in this study. The verbosity measurement in this current study has not been previously measured in other studies in this way. Verbosity was measured with the total amount of verbal expressions of the parents towards the child within a ten-minute free-play interaction when the child was three months of age. This indicated how much the parent interacted with (spoke to) their child. Though, interaction is usually a mutual action between people which involves mutual influencing (Ensie, 2015), which could not be assessed with this verbosity measurement. Leman et al. (2012) state that even with a three-month-old baby, it is possible to have some sort of interaction since three-month-olds have already abilities to make eye contact, have a face-to-face play, reach out and gently explore, smile at familiar faces, show wariness, frustration, excitement, and boredom, to make soft sounds, to imitate short strings of vowel sounds, to respond with inflection and pitch, and to recognize their name (Leman et al., 2012). Previous studies have used other measurements to assess the parent-child interaction. Jeong et al. (2017) measured the parent-child interaction by scoring whether the parent read to their child, told stories, sang songs together, went outside, played together, or named or counted things together with their child. And Malhi et al. (2018) assessed the parental verbal responsivity (PVR) using a questionnaire with items about interactive play and talk while performing daily activities like bathing and feeding. Furthermore, the reliability of the

verbosity variable could not be verified which negatively affects the generalizability of this study even more. A third explanation could be that the parental practice stress (measured at three months of age) was no longer informative for the child outcomes at the age of thirty months because children develop and change physically, mentally, and emotionally a lot in their early childhood (Leman et al., 2012). Moreover, parental stress could have also been changed during this period. Research suggests that parenting practices change in the first five years of the child's life, and this also includes changes in parental stress (Chazan-Cohgen et al., 2009). Fourthly, DePasquale and Gunnar (2020) argue that the parent does not only influence the child but the child also influences the parent as well. This suggests a dynamic association between parental practices and child outcomes. Besides, it indicates that the social-communicative and social-emotional development of the child could have also been predictor variables, and parental stress and verbosity outcome variables to investigate the association between them. Lastly, it could be that other parental practices indicate a significant association with child outcomes. Literature suggests that the socioemotional skills of the child perhaps could be better predicted by indicators of parental affection, such as warmness, tone of voice, and closeness, compared to maternal literacy (Eisenberg, Fabes, Schaller, Carlo, & Miller, 1991; Pettit, Dodge, & Brown, 1988; Robinson et al., 2009). Also, more recent studies have shown that parental sensitivity is related to the social-communicative and social-emotional development of the child. Frequent parental affection was associated with better social-emotional and cognitive development of the child (Cauduro et al., 2021), and children of sensitive, caring parents had fewer psychological problems (Rafferty & Griffin, 2010), better social competence (Poon et al., 2017), greater empathic capacity and showed more prosocial behaviour towards distressed others (Davidov & Grusec, 2006). Besides, studies also suggested that a higher parental SES was a predictor of more sensitive parenting (DePasquale & Gunnar, 2020; Kalil & Ryan, 2020; Walker et al., 2011). This indicates that positive parental practice, such as sensitivity, may be more viable mediator candidates in the relationship between parental SES and the social-communicative and social-emotional development of the child since the more negative (stress) and neutral (verbosity) were found not to significantly mediate the relationship.

Lastly, we did not find evidence for a different effect for mothers and fathers (hypothesis 3). Previous studies were inconsistent on whether gender influenced parental practices. Some studies suggested similarities, such as, engaging with their children in the same way (Anderson et al., 2013; Cabrera et al., 2014), having the same role in their children's development (Fagan et al., 2014), and presenting similar behaviours (Cabrera et al.,

2007; Fagan et al., 2014; Roggman, 2004). Other studies emphasized the differences between mothers and fathers. They had different roles in the family (Grusec & Davidov, 2010; Paquette, 2004), biological differences had effects on the parenting behaviour (Paquette, 2004), mothers were more often involved in raising their children than fathers (Craig, 2006; Roopnarine & Mounts, 1985), and mothers and fathers had specific domains of influence based on social interactions, mechanisms, and outcomes (Grusec & Davidov, 2010). In general, our findings corroborated the studies that did not find significant gender differences in parenting practices (Craig, 2006; Grusec & Davidov, 2010; Paquette, 2004; Roopnarine & Mounts, 1985). While it appeared that gender moderated the relationship between paternal SES, paternal stress, and the social-communicative development of the child, the significant effect disappeared after correction for outliers. The separate demographic data for mothers and fathers present that fathers have more income per month than mothers, which could assume that there would be a significant difference found between mothers and fathers. However, the studies that emphasize the differences between the mothers and fathers did not present income as a explanation for the differences in the parenting of mothers and fathers. So perhaps, SES or income is not significantly relevant to these differences. Moreover, this study investigated the differences between mothers and fathers who were both parts of the same two-parent household. This means that even though the SES was separately calculated for both mothers and fathers, they still had shared resources and raised their children together. Studies state that in the last fifty years, mothers and fathers out of the same household started to share more childcare responsibilities because more mothers began to work, the maternal income became higher, and parents achieved higher educational attainment (Craig & Mullan, 2011; Sullivan, 2012), which eventually contributed to more positive cognitive child outcomes (Cabrera et al., 2012; Pendry & Adam, 2012). This suggests that it is perhaps not possible to divide maternal and paternal SES out of the same household because two-parent households have evolved through the years, and paternal and maternal SES are difficult to be seen as separate. Another noticeable finding was a significant negative association between maternal diploma and the social-emotional development of the child with and without verbosity as a mediator. This unexpected finding suggests that a high maternal diploma was associated with a worse social-emotional development of the child, which contradicts the findings of most previous studies. However, since this study conducted many analyses, and we did not control for multiple testing, it is possible that this was just a coincidental finding because the p-values were close to .05 ($p=.041$ (c-path) and $p=.047$ (c'=path)).

Strengths, limitations, and implications for future research

Despite the lack of evidence to support the hypotheses, this study still had multiple strengths. Firstly, this study combined data from questionnaires with observational data, which could be seen as innovative in the field. Most of the studies regarding the topics of parental SES, child outcomes, and parental practices only used self-report questionnaires. Self-report measures of parental behaviours can lead to more socially desirable answers (Johnston et al., 2017; Kohlsdorf & da Costa Junior, 2017). With observations, it was possible to attain more objective data (Fraenkel et al., 2015), which was an asset to this study. Moreover, this current study was explorative and innovative by including both mothers and fathers in the sample. The influence of gender on the relationship between parental SES and child outcomes through parental practices was largely unknown. Our, study provided new insight into this matter, which is of great value for this research field. Lastly, the instruments that were used to measure parental practices and child outcomes, except for verbosity, all had good to excellent reliabilities. This indicates that the instruments were dependable in measuring these constructs and that the data of this sample was consistent (Fraenkel et al., 2015). Besides, parental SES was indicated by the parent's income and highest attained diploma, which were the most common indicators in other studies for SES.

On the other hand, this study had also limitations. Some of them have already been discussed, such as the relatively large amounts of missing data, the large time gaps between the measurements with the risk of developmental changes in the child and as well in the parents, unverified reliabilities, and the lack of informative predictor variables. The small sample size is the most important limitation of this study. Future research using larger sample sizes is needed to determine whether parental SES, the social-communicative and social-emotional development of children, and parental practices are indeed not associated as the findings of this study suggest. Since the first 1000 days of the child's life are very important for the further development (Adair, 2014; Barker, 2006, Campbell et al., 2014; Hanson & Gluckman, 2015; Kelly, 2018; Roseboom, 2018; Walker et al., 2011), it is still necessary to generate generalizable and representative findings to attain the appropriate insight into the relationship between these variables. Another limitation is that the data did not meet all the assumptions. For example, almost all the variables were not normally distributed, except for verbosity. This could be caused by, among other things, outliers and small sample sizes, and this study had both. Moreover, the Durbin Watson test revealed, to some extent, autocorrelation between the residues of the variables. This may cause predictor variables to be

significant when they are actually not. However, in this study, the predictor variables did not seem to have a significant relationship with the outcome variables. Yet, the violated assumptions indicate that the findings of this study still warrant a careful interpretation. Future studies should consider all these limitations when conducting similar studies.

Concluding, the results of this study did not find significant support for our hypotheses. This lack of significant associations may be explained by a large amount of missing data, the large time gaps between the measurements with the risk of developmental changes in the child and as well in the parents, unverified reliabilities, violated assumptions, and the lack of informative predictor variables. This suggests that future research using larger samples should produce more generalizable results and allow to have more accurate conclusions to be drawn about the relationship between maternal and paternal SES, parental practices, and child outcomes in early childhood. It remains very important to get more accurate insight into these relationships since the early childhood development is crucial for the further development of the child and their future successes in life.

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Appendix

Table S1.

Shapiro Wilk tests for the child outcome and parental practice variables

Variable	Statistic	df	Sig.
Social-communicative skills	.93	200	.000
Social-emotional skills	.97	127	.013
Stress	.87	103	.000
Verbosity	.99	80	.552

Table S2.

Durbin Watson test: correlation of residues

Variables	Durbin Watson
SES and social-communicative skills	.93
SES and social-emotional skills	1.52
SES and stress	1.41
SES and verbosity	1.87
Diploma and social-communicative skills	.83
Diploma and social-emotional skills	1.58
Diploma and stress	1.51
Diploma and verbosity	1.78

Table S3.

Simple mediation analyses for sensitivity analyses, X=Diploma

Model	N	B	t	p	Bootstrap Interval
X= Diploma, M= verbosity , Y= ITSEA*	56				
a-path: Diploma on verbosity		-8.31	-.84	.403	
b-path: verbosity on ITSEA		.00	.06	.956	
c-path: Diploma on ITSEA		-.03	-.70	.498	
c'-path: Diploma on ITSEA through verbosity		-.03	-.68	.498	
Indirect effect		.00			-.01;.01
Effect size		1.00			
X= Diploma, M= verbosity , Y= ESCS**	68	B	t	p	Bootstrap Interval
a-path: Diploma on verbosity		-10.09	-.1.18	.244	
b-path: verbosity on ESCS		-.00	-.24	.815	
c-path: Diploma on ESCS		.06	.97	.335	
c'-path: Diploma on ESCS through verbosity		.06	.92	.361	
Indirect effect		.00			-.02;.03
Effect size		1.00			
X= Diploma, M= stress , Y= ITSEA*	72	B	t	p	Bootstrap Interval
a-path: Diploma on stress		-.03	-.66	.510	
b-path: verbosity on ITSEA		-.10	-.89	.377	
c-path: Diploma on ITSEA		.00	.08	.933	
c'-path: Diploma on ITSEA through stress		.00	.01	.989	
Indirect effect		.00			-.01;02
Effect size		1.00			
X= Diploma, M= stress , Y= ESCS**	103	B	t	p	Bootstrap Interval
a-path: Diploma on stress		.02	.63	.531	
b-path: verbosity on ESCS		.06	.48	.633	
c-path: Diploma on ESCS		.03	.69	.490	
c'-path: Diploma on ESCS through stress		.03	.66	.512	
Indirect effect		.00			-.01;.01
Effect size		1.00			

Note. *= Social-emotional skills, **= Social-communicative skills

Table S4.

Moderated mediation analyses, X=SES

Model	N	B	t	p	Bootstrap Interval
X= SES, M= verbosity , Y= ITSEA*, W= gender	54				
Moderated a-path: SES on verbosity		-9.23	-.33	.738	
Significance of interaction (X*W)		.00		.738	
b-path: verbosity on ITSEA		-.00	-.16	.870	
c'-path: SES on ITSEA through verbosity		-.0478	-.94	.351	
Indirect effect mother		-.00			-.02;.01
Indirect effect father		.00			-.03;.03
Index moderated effect		.00			-.03;.04
X= SES, M= verbosity, Y= ESCS**, W= gender	66	*B*	*t*	*p*	*Bootstrap Interval*
Moderated a-path: SES on verbosity		-16.08	-.59	.557	
Significance of interaction (X*W)		.00		.557	
b-path: verbosity on ESCS		-.00	-.17	.865	
c'-path: SES on ESCS through verbosity		.12	1.73	.088	
Indirect effect mother		-.00			-.06;.06
Indirect effect father		.00			-.06;.05
Index moderated effect		.00			-.06;.06
X= SES, M= stress, Y= ITSEA*, W= gender	67	*B*	*t*	*p*	*Bootstrap Interval*
Moderated a-path: SES on stress		.03	.29	.774	
Significance of interaction (X*W)		.00		.774	
b-path: stress on ITSEA		-.08	-.75	.457	
c'-path: SES on ITSEA through stress		-.04	-.87	.387	
Indirect effect mother		.00			-.01;.03
Indirect effect father		.00			-.02;.03
Index moderated effect		.00			-.04;.02
X= SES, M= stress, Y= ESCS**, W= gender	94	*B*	*t*	*p*	*Bootstrap Interval*
Moderated a-path: SES on stress		.2835	1.99	.050	
Significance of interaction (X*W)		.07		.050	
b-path: stress on ESCS		.09	.89	.377	
c'-path: SES on ESCS through stress		.08	1.54	.128	
Indirect effect mother		-.00			-.03;.09

Indirect effect father		.24			-.02;.08
Index moderated effect		.02			-.03;.09
*****X= SES, M= stress, Y= ESCS**, W= gender*	93	*B*	*t*	*p*	*Bootstrap Interval*
Moderated a-path: SES on stress		.18	1.80	.075	
Significance of interaction (X*W)		.04		.075	
b-path: stress on ESCS		.07	.50	.616	
c'-path: SES on ESCS through stress		.08	1.27	.208	
Indirect effect mother		-.00			-.03;.01
Indirect effect father		.24			-.02;.05
Index moderated effect		.01			-.03;.07

Note. *= Social-emotional skills, **= Social-communicative skills, ***= Moderated mediation analyses done without the extreme outlier of parental stress

Table S5.

Moderated mediation analyses for sensitivity analyses, X=Diploma

	Model	N	B	t	p	Bootstrap Interval
X= Diploma, M= verbosity , Y= ITSEA*, W= gender		56				
Moderated a-path: Diploma on verbosity			-9.23	-.47	.643	
Significance of interaction (X*W)			.00		.643	
b-path: verbosity on ITSEA			.00	.06	.986	
c'-path: Diploma on ITSEA through verbosity			-.31	-.68	.498	
Indirect effect mother			-.00			-.01;.01
Indirect effect father			-.00			-.02;.02
Index moderated effect			-.00			-.12;.06
X= Diploma, M= verbosity, Y= ESCS**, W= gender		68	B	t	p	Bootstrap Interval
Moderated a-path: Diploma on verbosity			-10.31	-.60	.553	
Significance of interaction (X*W)			.01		.553	
b-path: verbosity on ESCS			-.00	-.24	.82	
c'-path: Diploma on ESCS through verbosity			.06	.92	.36	
Indirect effect mother			.00			-.02;.03
Indirect effect father			.00			-.04;.05
Index moderated effect			.00			-.05;.04
X= Diploma, M= stress, Y= ITSEA*, W= gender		72	B	t	p	Bootstrap Interval
Moderated a-path: Diploma on stress			.01	.10	.919	
Significance of interaction (X*W)			.01		.919	
b-path: stress on ITSEA			-.10	-.89	.377	
c'-path: Diploma on ITSEA through stress			.00	.01	.989	
Indirect effect mother			.00			-.01;.02
Indirect effect father			.00			-.01;.03
Index moderated effect			-.00			-.02;.03
X= Diploma, M= stress, Y= ESCS**, W= gender		103	B	t	p	Bootstrap Interval
Moderated a-path: Diploma on stress			.15	2.13	.036	
Significance of interaction (X*W)			.04		.036	
b-path: stress on ESCS			.06	.48	.633	
c'-path: Diploma on ESCS through stress			.03	.66	.512	
Indirect effect mother			-.00			-.02;.01

		B	t	p	Bootstrap Interval
Indirect effect father		.01			-.02;.04
Index moderated effect		.01			-.02;.05
***X= Diploma, M= stress, Y= ESCS**, W= gender*	102	B	t	p	Bootstrap Interval
Moderated a-path: Diploma on stress		.10	1.47	.157	
Significance of interaction (X*W)		.02		.157	
b-path: stress on ESCS		.04	.26	.795	
c'-path: Diploma on ESCS through stress		.03	.58	.561	
Indirect effect mother		-.00			-.02;.01
Indirect effect father		.00			-.02;.02
Index moderated effect		.00			-.03;.03

Note. *= Social-emotional skills, **= Social-communicative skills, ***= Moderated

mediation analyses done without the extreme outlier of parental stress

Table S6.

Simple mediation analyses for sensitivity analyses: Maternal variables, X= SES

Model	N	B	t	p	Bootstrap Interval
X= SES, M= verbosity , Y= ITSEA*	32				
a-path: SES on ITSEA		4.82	.39	.693	
b-path: SES on verbosity		.00	.50	.622	
c-path: SES on ITSEA		-.06	-1.05	.301	
c'-path: SES on ITSEA through verbosity		-.07	-1.07	.292	
Indirect effect		.00			-.02;.02
Effect size		1.00			
X= SES, M= verbosity , Y= ESCS**	37	B	t	p	Bootstrap Interval
a-path: SES on ESCS		6.43	.54	.591	
b-path: SES on verbosity		-.00	-1.15	.260	
c-path: SES on ESCS		.15	1.58	.124	
c'-path: SES on ESCS through verbosity		.17	1.68	.102	
Indirect effect		-.01			-.09;.03
Effect size		.99			
X= SES, M= stress , Y= ITSEA*	42	B	t	p	Bootstrap Interval
a-path: SES on ITSEA		-.04	-.59	.557	
b-path: SES on stress		-.02	-.12	.902	
c-path: SES on ITSEA		-.04	-.83	.411	
c'-path: SES on ITSEA through stress		-.04	-.83	.412	
Indirect effect		.00			-.15;.06
Effect size		1.00			
X= SES, M= stress , Y= ESCS**	52	B	t	p	Bootstrap Interval
a-path: SES on ESCS		-.04	-.83	.412	
b-path: SES on stress		-.16	-.77	.446	
c-path: SES on ESCS		.13	1.63	.109	
c'-path: SES on ESCS through stress		.12	1.53	.134	
Indirect effect		.01			-.04;.11
Effect size		.99			

Note. *= Social-emotional skills, **= Social-communicative skills

Table S7.

Simple mediation analyses for sensitivity analyses: Maternal variables, X=Diploma

Model	N	B	t	p	Bootstrap Interval
X= Diploma, M= verbosity , Y= ITSEA*	32				
a-path: Diploma on verbosity		-4.55	-.35	.727	
b-path: verbosity on ITSEA		.00	.31	.727	
c-path: Diploma on ITSEA		-.13	-2.14	.041	
c'-path: Diploma on ITSEA through verbosity		-.13	-.208	.047	
Indirect effect		-.00			-.26;-.01
Effect size		1.00			
X= Diploma, M= verbosity , Y= ESCS**	37	B	t	p	Bootstrap Interval
a-path: Diploma on verbosity		-6.17	-.50	.618	
b-path: verbosity on ESCS		.00	-.89	.381	
c-path: Diploma on ESCS		.10	1.01	.321	
c'-path: Diploma on ESCS through verbosity		.10	.92	.36	
Indirect effect		.01			-.02;.08
Effect size		.99			
X= Diploma, M= stress , Y= ITSEA*	45	B	t	p	Bootstrap Interval
a-path: Diploma on stress		-.03	-.66	.510	
b-path: verbosity on ITSEA		-.04	-.32	.764	
c-path: Diploma on ITSEA		-.04	-.91	.368	
c'-path: Diploma on ITSEA through stress		-.04	-.93	.360	
Indirect effect		.00			-.01;.03
Effect size		1.00			
X= Diploma, M= stress , Y= ESCS**	56	B	t	p	Bootstrap Interval
a-path: Diploma on stress		-.05	-1.1	.273	
b-path: verbosity on ESCS		-.26	-1.2	.232	
c-path: Diploma on ESCS		.06	.84	.404	
c'-path: Diploma on ESCS through stress		.05	.66	.515	
Indirect effect		.01			-.01;.06
Effect size		.99			

Note. *= Social-emotional skills, **= Social-communicative skills

Table S8.

Simple mediation analyses for sensitivity analyses: Paternal variables, X= SES

Model	N	B	t	p	Bootstrap Interval
X= SES, M= verbosity , Y= ITSEA*	22				
a-path: SES on verbosity		-3.12	-.13	.810	
b-path: verbosity on ITSEA		-.00	-.70	.491	
c-path: SES on ITSEA		.04	.39	.701	
c'-path: SES on ITSEA through verbosity		.037	.36	.720	
Indirect effect		.00			-.09;.05
Effect size		1.00			
X= SES, M= verbosity , Y= ESCS**	29	B	t	p	Bootstrap Interval
a-path: SES on verbosity		-8.13	-.47	.640	
b-path: verbosity on ESCS		.00	.69	.493	
c-path: SES on ESCS		.10	.88	.389	
c'-path: SES on ESCS through verbosity		.11	.97	.362	
Indirect effect		.00			-.09;.04
Effect size		1.00			
X= SES, M= stress , Y= ITSEA*	25	B	t	p	Bootstrap Interval
a-path: SES on stress		.00	.02	.983	
b-path: stress on ITSEA		-.17	-.98	.338	
c-path: SES on ITSEA		.05	.46	.649	
c'-path: SES on ITSEA through stress		.05	.45	.647	
Indirect effect		.00			-.05;.04
Effect size		1.00			
X= SES, M= stress , Y= ESCS**	42	B	t	p	Bootstrap Interval
a-path: SES on stress		.20	2.40	.021	
b-path: stress on ESCS		.28	1.55	.129	
c-path: SES on ESCS		.08	.80	.426	
c'-path: SES on ESCS through stress		.02	.21	.832	
Indirect effect		.06			.00;.15
Effect size		.94			
***X= SES, M= verbosity , Y= ESCS*	41	B	t	p	Bootstrap Interval
a-path: SES on stress		.12	1.47	.149	

|			
b-path: stress on ESCS	.31	.146	.151
c-path: SES on ESCS	.06	.59	.557
c'-path: SES on ESCS through stress	.03	.25	.805
Indirect effect	.04		.00;.12
Effect size	.96		

Note. *= Social-emotional skills, **= Social-communicative skills, ***= Mediation analyses done without the extreme outlier of parental stress

Table S9.

Simple mediation analyses for sensitivity analyses: Paternal variables, X=Diploma

Model	N	B	t	p	Bootstrap Interval
X= Diploma, M= verbosity , Y= ITSEA*	24				
a-path: Diploma on verbosity		-12.81	-.77	.449	
b-path: verbosity on ITSEA		-.00	-.24	.812	
c-path: Diploma on ITSEA		.10	1.49	.151	
c'-path: Diploma on ITSEA through verbosity		.09	1.40	.177	
Indirect effect		.00			-.05;.03
Effect size		1.00			
X= Diploma, M= verbosity , Y= ESCS**	31	B	t	p	Bootstrap Interval
a-path: Diploma on verbosity		-15.18	-1.14	.264	
b-path: verbosity on ESCS		.00	.48	.634	
c-path: Diploma on ESCS		.03	.32	.634	
c'-path: Diploma on ESCS through verbosity		.04	.40	.689	
Indirect effect		-.01			-.09;.03
Effect size		.99			
X= Diploma, M= stress , Y= ITSEA*	27	B	t	p	Bootstrap Interval
a-path: Diploma on stress		-.02	-.27	.786	
b-path: stress on ITSEA		-.17	-1.04	.310	
c-path: Diploma on ITSEA		.12	2.00	.060	
c'-path: Diploma on ITSEA through stress		.11	1.91	.068	
Indirect effect		.00			-.02;.04
Effect size		1.00			
X= Diploma, M= stress , Y= ESCS**	47	B	t	p	Bootstrap Interval
a-path: Diploma on stress		.12	1.73	.091	
b-path: stress on ESCS		.28	1.73	.090	
c-path: Diploma on ESCS		.01	-.34	.733	
c'-path: Diploma on ESCS through stress		-.02	-.34	.733	
Indirect effect		.03			-.01;.09
Effect size		.97			

Note. *= Social-emotional skills, **= Social-communicative skills

Table S9.

Demographic data for mothers

Demographics	Items	Frequency (%)
	Missing	0 (0)
	Total	100 (100)
Highest achieved diploma		
	'Primary education'	1 (1,3)
	'Secondary education'	7 (9,3)
	'Vocational education'	29 (38,7)
	'Higher vocational education'	29 (38,3)
	'University'	9 (12)
	N	75 (75)
	Missing	25 (25)
	Total	100 (100)
Income per month in euros		
	Less than 300	9 (12,8)
	Between 300 and 600	4 (5,7)
	Between 601 and 900	4 (4,7)
	Between 901 and 1200	9 (12,8)
	Between 1201 and 1500	15 (21,4)
	Between 1501 and 1800	16 (22,9)
	Between 1801 and 2100	9 (9)
	Between 2101 and 2400	2 (2,9)
	Between 2401 and 2700	0 (0)
	Between 2701 and 3000	0 (0)
	More than 3000	3 (4,3)
	N	70 (70)
	Missing	30 (30)
	Total	100 (100)

Table S10.

Demographic data for fathers

Demographics	Items	Frequency (%)
	Missing	0 (0)
	Total	100 (100)
Highest achieved diploma		
	'Primary education'	0 (0)
	'Secondary education'	7 (10,9)
	'Vocational education'	27 (42,2)
	'Higher vocational education'	24 (37,5)
	'University'	6 (9,3)
	N	64 (64)
	Missing	36 (36)
	Total	100 (100)
Income per month in euros		
	Less than 300	0 (0)
	Between 300 and 600	0 (0)
	Between 601 and 900	1 (1,7)
	Between 901 and 1200	2 (3,4)
	Between 1201 and 1500	4 (6,9)
	Between 1501 and 1800	9 (15,5)
	Between 1801 and 2100	8 (13,8)
	Between 2101 and 2400	14 (24,1)
	Between 2401 and 2700	8 (13,8)
	Between 2701 and 3000	2 (3,4)
	More than 3000	10 (17,4)
	N	58 (70)
	Missing	42 (30)
	Total	100 (100)

Figure S1.1.

Boxplot of social-communicative skills
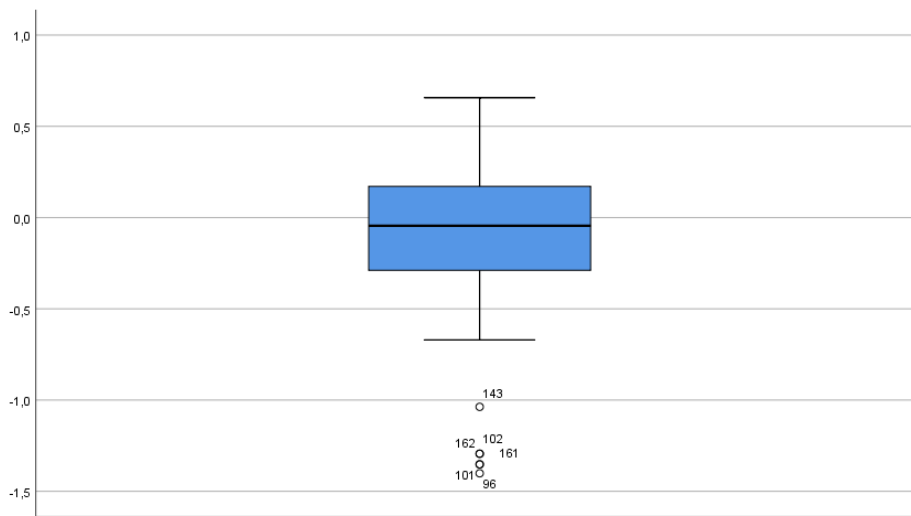
Figure S1.2.

Boxplot of social-emotional skills
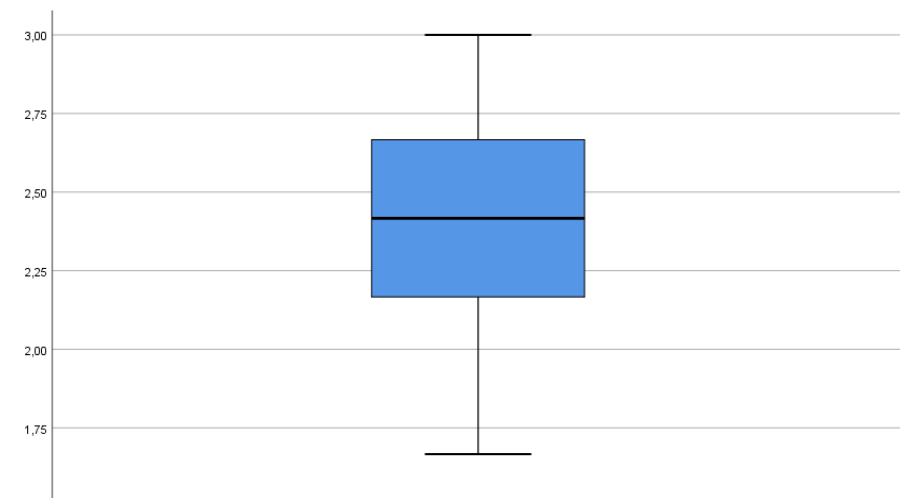
Figure S1.3.

Boxplot of parental stress
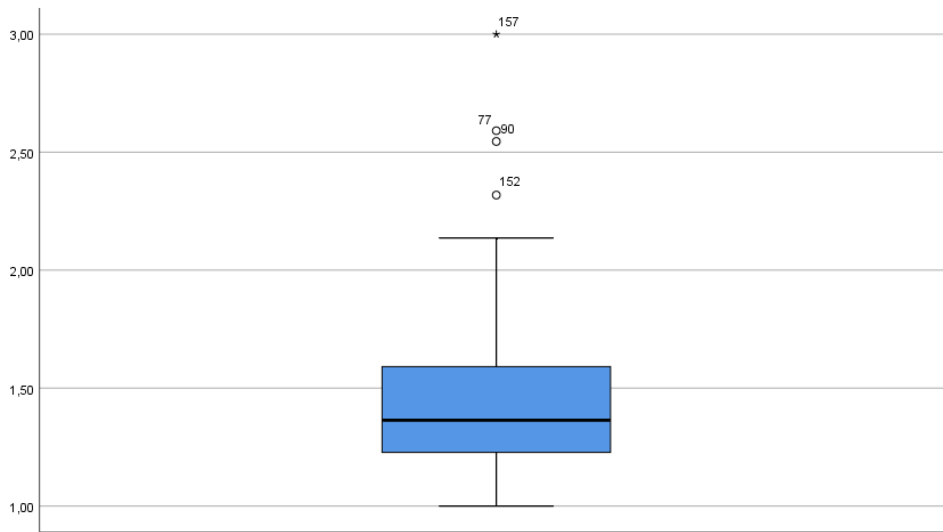
Figure S1.4.

Boxplot of parental verbosity
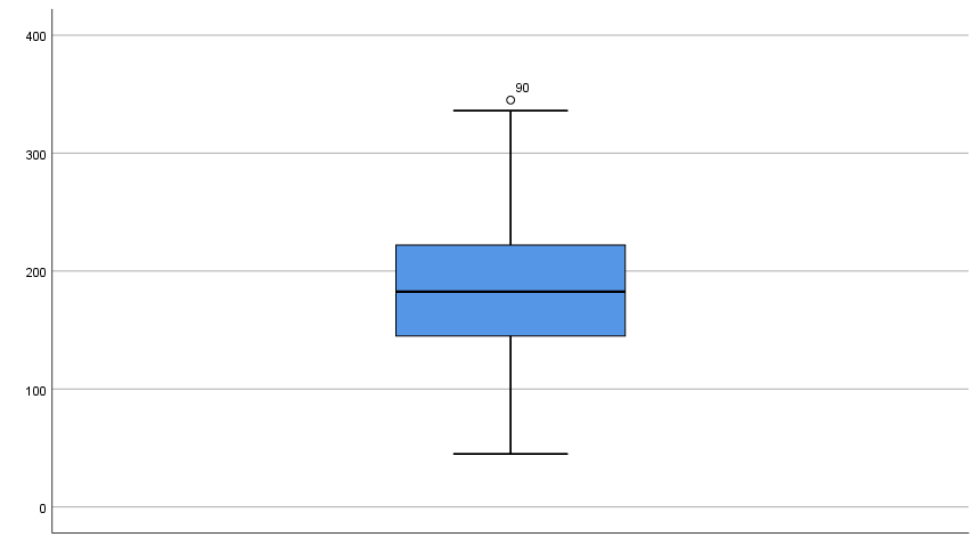
Figure S2.1.

Normal P-P plot of regression standardized residual: SES (X) and social-communicative skills (Y)
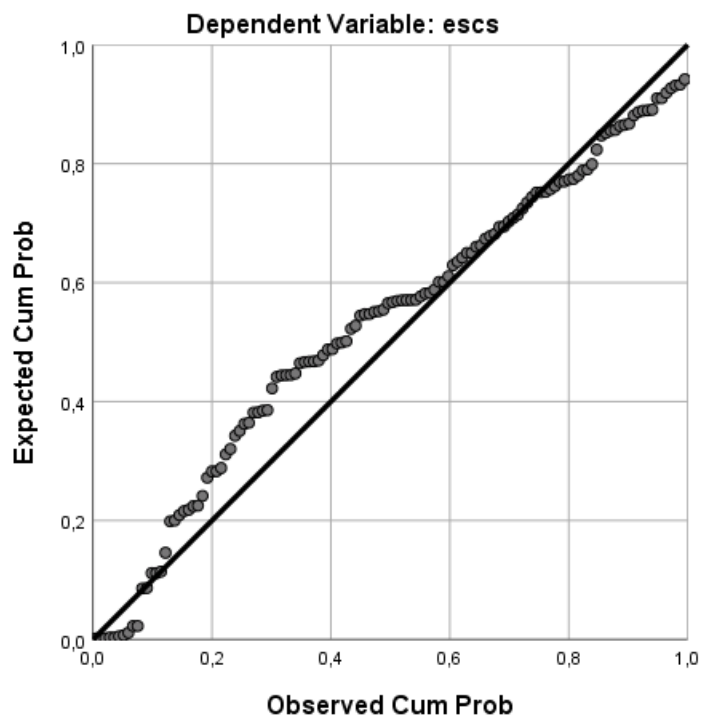
Figure S2.2.

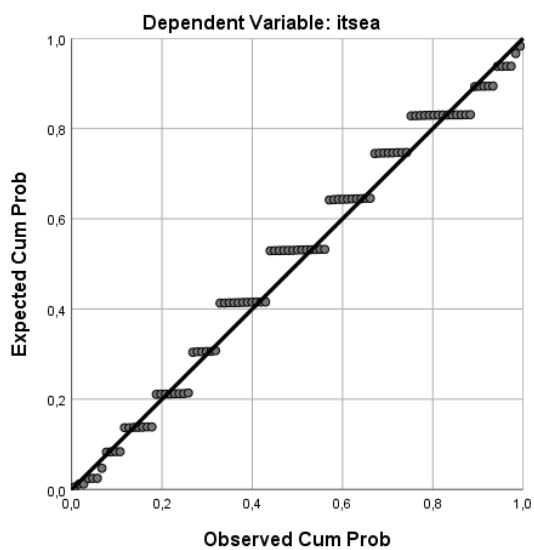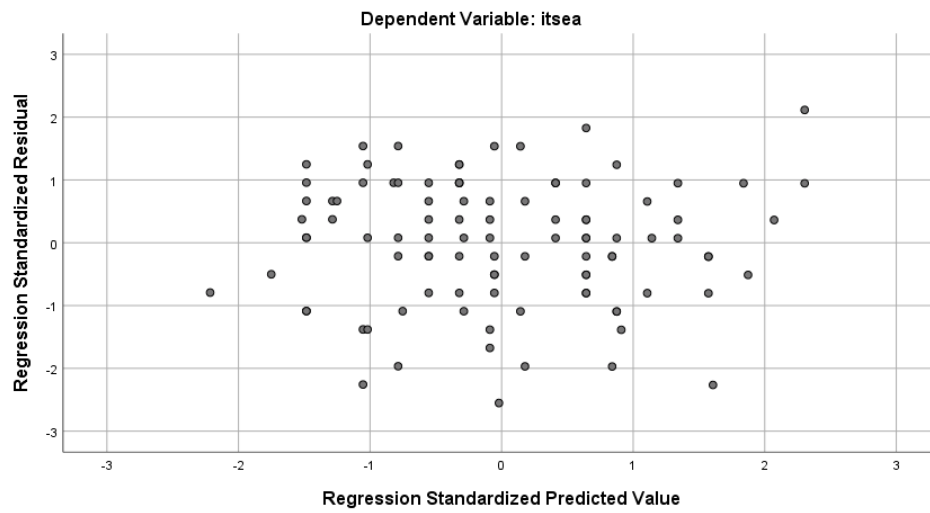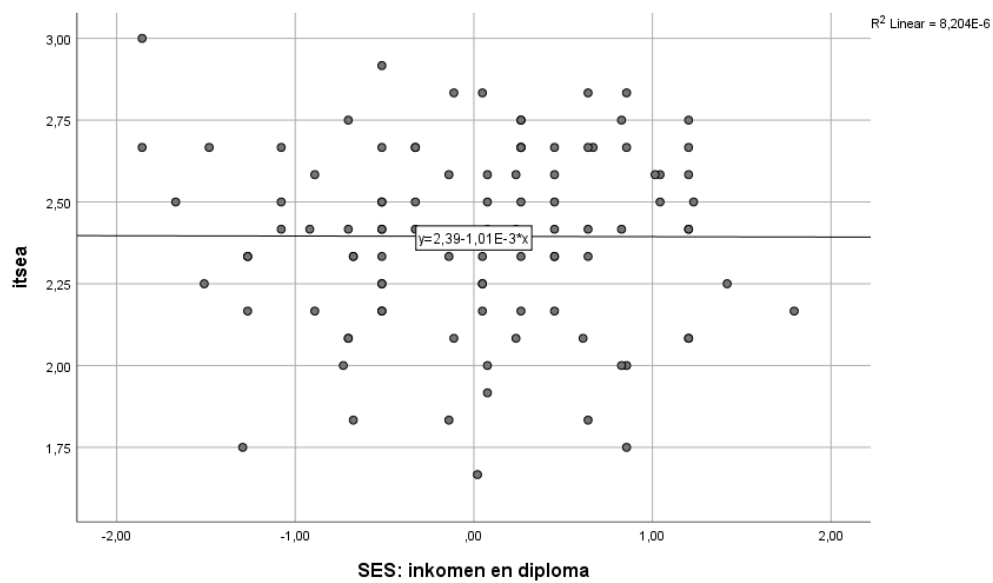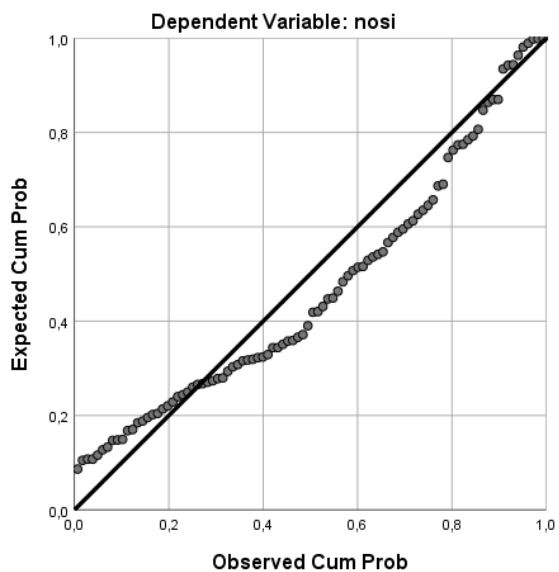*Scatterplot homoscedasticity: relationship SES (X) and social-communicative skills (Y)*
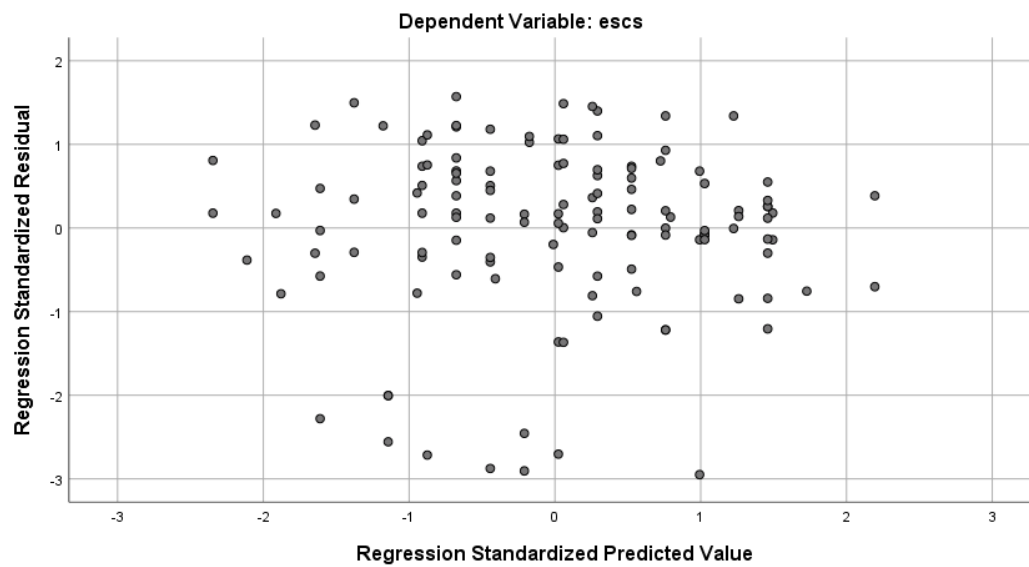
Figure S2.3.
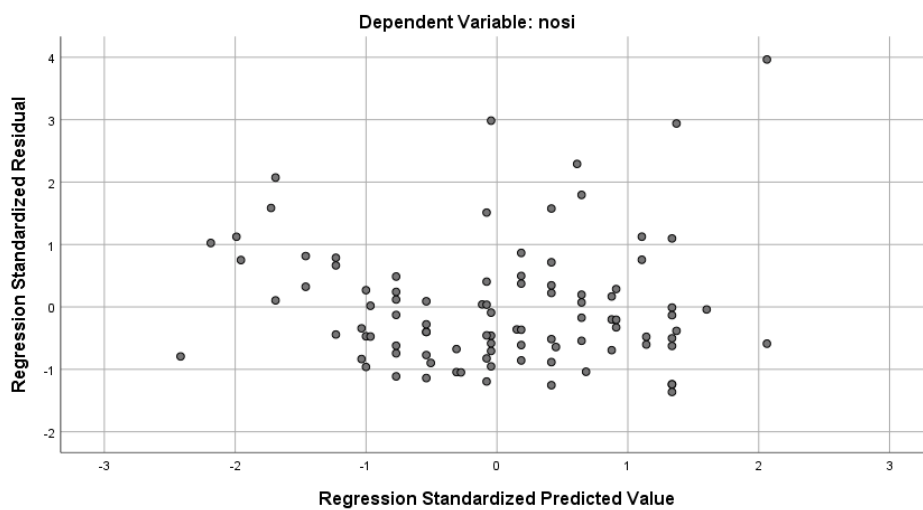
Scatterplot linearity: relationship SES (X) and social-communicative skills (Y)
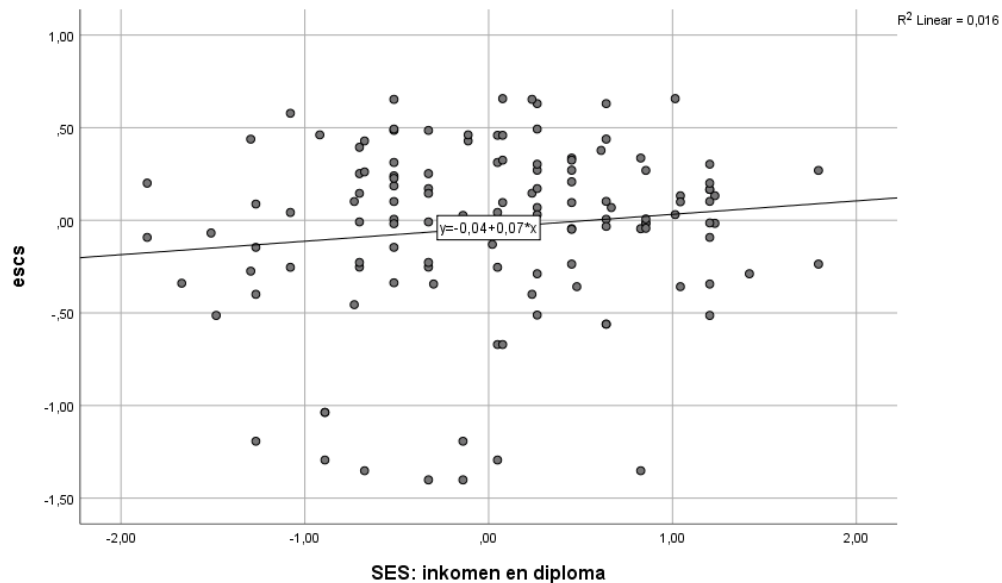
Figure S2.4.

Normal P-P plot of regression standardized residual: SES (X) and social-emotional skills (Y)

Figure S2.5.

Scatterplot homoscedasticity: relationship SES (X) and social-emotional skills (Y)

Figure S2.6.

Scatterplot linearity: relationship SES (X) and social-emotional skills (Y)

Figure S2.7.

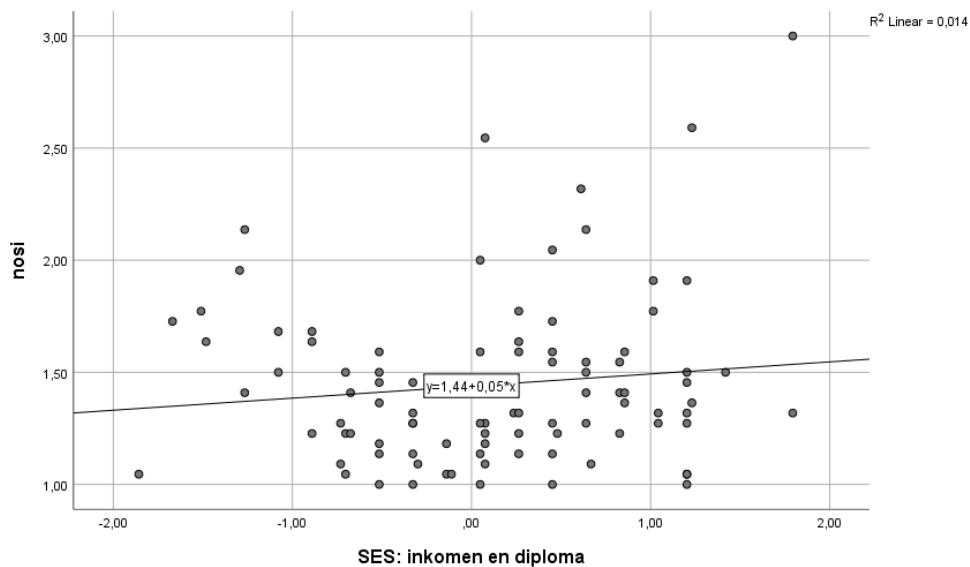*Normal P-P plot of regression standardized residual: SES (X) and parental stress (Y)*

Figure S2.8.

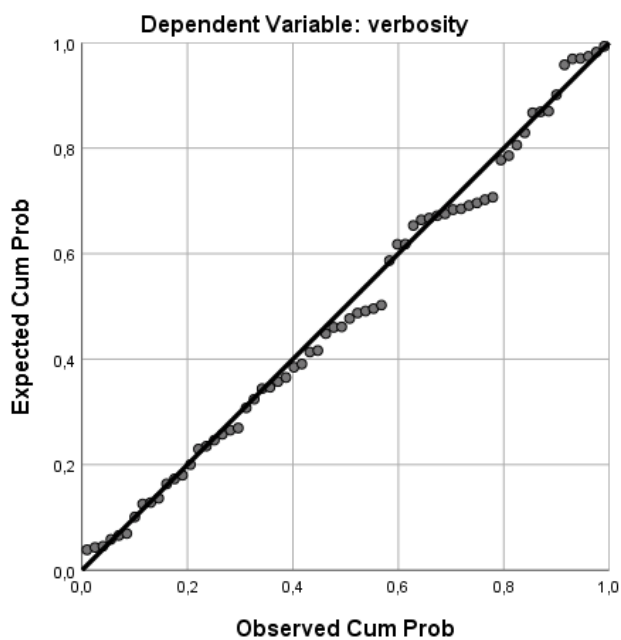*Scatterplot homoscedasticity: relationship SES (X) and parental stress (Y)*

Figure S2.9.

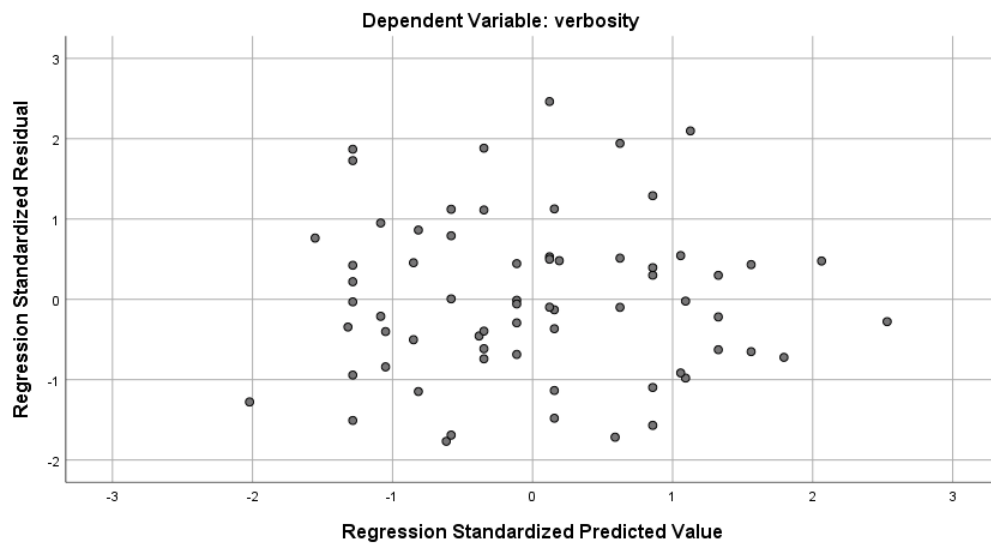*Scatterplot linearity: relationship SES (X) and parental stress (Y)*

Figure S2.10.

Normal P-P plot of regression standardized residual: SES (X) and parental verbosity (Y)

Figure S2.11.

Scatterplot homoscedasticity: relationship SES (X) and parental verbosity (Y)

Figure S2.12.

Scatterplot linearity: relationship SES (X) and parental verbosity (Y)