



## Introducing the Coding Observations of Parent–Child Interactions (COPI): An Observational Measure of the Parental Behaviours That Matter for Language Development



## Présentation de l'outil *Comportements observés du parent en interaction avec l'enfant (COPI)* : un outil permettant d'observer les comportements parentaux importants pour le développement langagier

### KEYWORDS

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VALIDATION

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### Abstract

Previous studies have highlighted domains of parent–child interactions associated with language development among preschool-aged children, namely responsiveness, support to learning, affect, and control. Although many tools have been developed, no single tool has been validated among young children to allow a comprehensive observation of the parental behaviours linked with early language development. The Maternal Behavior Rating Scale-Revised (Mahoney, 2008) presents good content validity. However, since it was not specifically designed for the observation of parental behaviours involved in child language outcomes, an adaptation was necessary. This led to the validation of a new tool named the Coding Observations of Parent–Child Interactions. This tool includes 10 parental behaviours divided into four domains of parent–child interactions: responsive behaviours (sensitivity to the child's interests, responsivity, reciprocity, inventiveness); control (directiveness, pace); support to learning (stimulation); and affect (warmth, enjoyment, acceptance). A factor analysis conducted with 95 children ( $M_{\text{age}} = 42.07$  months,  $SD = 0.28$ ) and one of their parents confirmed the factorial structure of the tool. Its reliability was demonstrated through high inter-rater (87%–93%,  $p < .001$ ) and intra-rater (88%–98%,  $p < .001$ ) agreement. The validation of this tool among a population of 42-month-old children from the general population and their families suggests that it can serve as a valid and reliable method for observing the main parental behaviours of interest for the language development of preschool aged-children. It could therefore be a useful tool for researchers and clinicians interested in early language development.

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### Abrégé

Des études antérieures ont mis en évidence les domaines de l'interaction parent-enfant associés au développement langagier des enfants d'âge préscolaire, soit la réponse à l'enfant, le soutien aux apprentissages, l'affect et le contrôle. Quoique de nombreux outils aient été développés, aucun outil permettant d'observer de façon exhaustive les comportements parentaux associés au développement langagier précoce n'a été validé auprès de jeunes enfants. L'outil *Maternal Behavior Rating Scale-Revised* (Mahoney, 2008) présente une bonne validité de contenu. Toutefois, cet outil n'a pas été conçu pour observer spécifiquement les comportements parentaux importants pour le développement langagier; une adaptation était donc nécessaire. Cela a mené à la validation d'un nouvel outil intitulé *Comportements observés du parent en interaction avec l'enfant*. Cet outil permet l'observation de 10 comportements parentaux répartis dans quatre domaines de l'interaction parent-enfant : la réponse à l'enfant (sensibilité aux intérêts de l'enfant, adéquation des réponses, réciprocité, créativité), le contrôle (directivité, rythme), le soutien aux apprentissages (stimulation) et l'affect (chaleur, plaisir et acception). Une analyse factorielle a été réalisée avec les données recueillies auprès de 95 enfants ( $M_{\text{âge}} = 42,07$  mois,  $\hat{E}-T = 0,28$ ) et de l'un de leurs parents, ce qui nous a permis de confirmer la structure factorielle de l'outil. La fiabilité de cet outil a été montrée grâce aux fidélités interjuges (87%–93%,  $p < 0,001$ ) et intrajuges (88%–98%,  $p < 0,001$ ) élevées obtenues. La validation de cet outil, qui a été réalisée avec un échantillon d'enfants âgés de 42 mois issus de la population générale et leur famille, suggère qu'il s'agit d'une méthode valide et fiable pour observer les principaux comportements parentaux associés au développement langagier des enfants d'âge préscolaire. Ainsi, cet outil pourrait s'avérer utile pour les chercheurs et cliniciens s'intéressant au développement langagier précoce.

A wide range of studies have highlighted the important role of parent–child interactions on child language development. Specifically, current literature points to four main domains of parent–child interactions which are involved in the language development of preschool-aged children, namely response to the child (responsiveness), support to learning, affect, and control (e.g., Guttentag et al., 2014; Levickis et al., 2014; Roberts & Kaiser, 2011). Interventions aimed at developing the language of young children—whether in prevention programs or programs targeting children with language difficulties—encourage parents to adopt behaviours related to these domains (DeVeney et al., 2017; Kaiser & Roberts, 2013; Trivette & Dunst, 2014).

To help parents adopt specific behaviours, prior observation of parent–child interactions with appropriate methods must be conducted. However, to this day, clinicians and researchers in the field of child language development do not have access to any tools designed to observe the parental behaviours which contribute significantly to early language development. This kind of observational tool would be useful in clinical contexts because it could help plan interventions geared towards tailoring parental behaviours to the child’s specific developmental needs. A reliable and systematic observation of parental behaviours has the potential to lead to the identification of families who may be good candidates for interventions aimed at fostering the language development of their child, and to more targeted interventions. By including specific definitions and measures of all the parental behaviours involved in language development, such a tool would also support research in speech-language pathology. In light of these considerations, the goal of this article is to present a new observational measure of the parental behaviours associated with early language development, adapted from the Maternal Behavior Rating Scale-Revised (MBRS-R; Mahoney, 2008). This work was approved by the main author (G. Mahoney, personal communication, May 26, 2016).

### Domains of Parent-Child Interactions Associated with Language Development

*Responsiveness* can be described as parenting that is prompt, contingent on the child’s current focus of attention, and appropriate to the child’s needs (Tamis-LeMonda et al., 2001). Responsiveness refers to a wide range of parental abilities, such as maintaining joint attentional focus with the child, commenting on the child’s play and interests, and responding to the child’s communicative acts or behaviours using semantically contingent and/or appropriate responses. Responsive behaviours encourage communicative exchanges during which children initiate

a topic of interest and parents respond in a way that is meaningful to the child (Hudson et al., 2015). Such mutual turn-taking between the parent and child supports the child’s development of conversational structures and allows children to be highly receptive to new words and language in their role as listeners (Smith et al., 2018).

*Support to learning* refers to how parents interact with the child in a way that promotes cognitive and/or language development and learning (e.g., explanations, supporting concept development and reasoning skills, giving constructive feedback, adding information). Stimulation techniques geared specifically towards the child’s language, such as labelling objects, are other examples of support to learning known to foster language abilities specifically (Cleave et al., 2015).

*Affection* expressed towards the child also creates a secure relational foundation between parent and child, which allows the children to explore their environment freely (Guttentag et al., 2014; Levickis et al., 2014; Moss et al., 2014). Recent studies have specifically shown that parental behaviours such as warmth and positive regard towards the child are associated with numerous positive outcomes in children’s language development (Guttentag et al., 2014; Perkins et al., 2013).

Finally, several studies have investigated the links between *controlling* behaviours, such as directiveness, expressed by the parent towards the child and language development. Directiveness refers to the degree to which the parent requests, commands, suggests, and/or physically prompts to direct the infant’s immediate attention, behaviour, or play. Typically, child-centered and non-intrusive behaviours have been shown to support language development more favourably than intrusive or directive behaviours which redirect the child’s current focus of attention. Such directive behaviours have often been regarded as hindering language performance because they may reduce periods of joint attention, complexify the task of mapping words to situational referents, and put higher cognitive demands on the child’s language processing skills (Akhtar et al., 1991; Tomasello & Farrar, 1986). However, other findings suggest that some levels or types of directive behaviours (e.g., supportive vs. intrusive directiveness; successful vs. unsuccessful redirectives) may, on the contrary, support language development (Flynn & Masur, 2007; Masur et al., 2005; Shimpi et al., 2012). The child’s age, cultural background, and level of language skills may play an important role in the relationship between directiveness and language development. Nonetheless, these studies indicate that control is an important aspect of parent–child interaction when focusing on the associations between parental behaviours and language development.

## Observational Tools Including Measures of the Parental Behaviours That Foster Early Language Development

A review of current literature was conducted to verify the existence of observational tools including measures of the aforementioned domains of parent–child interactions. Two observational tools were identified, namely, the Parenting Interactions with Children: Checklist of Observations Linked to Outcomes (PICCOLO; Roggman et al., 2013) and the Maternal Behavior Rating Scale (MBRS; Mahoney et al., 1986).

The PICCOLO is a checklist including 29 items distributed across three of the four domains of parent–child interactions that are of interest for language development (i.e., affection, responsiveness, and teaching). The psychometric properties of the PICCOLO are considered robust (Roggman et al., 2013). Only positive behaviours adopted by parents are considered in this checklist, which uses yes/no responses to indicate whether a given behaviour is observed or not. The presence or absence of a behaviour does not provide any qualitative information (e.g., timing, duration, level of fit with current activity), which limits intervention planning. Likert-type measuring scales (Likert, 1932) provide a more nuanced assessment of the frequency of occurrence and magnitude of a given behaviour.

The MBRS is a global rating scale which was developed to observe parental behaviours in dyads including children at risk for developmental delays. This tool, as well as its most recent and revised version, the MBRS-R (Mahoney, 2008), have been widely used in research contexts (e.g., Chiarello et al., 2006; Kim & Mahoney, 2004; Moore et al., 1998; Sénéchal et al., 2013). The MBRS-R has never been validated, and its authors do not recommend using its current version for evaluation or family assessment purposes because they do not consider it reliable and valid enough for making judgments regarding parent–child relationships (Mahoney et al., 1996). The MBRS-R allows the observation of 12 distinct behaviours that have been reported in the child development literature as having significant influences on the development of young children (Mahoney et al., 1986). Based on a factor analysis, these 12 behaviours contribute to four interactive styles (domains of parent–child interactions; Boyce et al., 1996, as cited in Mahoney et al., 1998): (a) responsive/child-oriented behaviours (sensitivity to the child's interests, responsivity, reciprocity); (b) directive behaviours (directiveness, pace); (c) achievement orientation (achievement, verbal praise); and (d) affect (expressiveness, warmth, enjoyment, inventiveness/creativity, acceptance). Definitions and indicators are provided for each of the parental behaviours, with examples to facilitate scoring. A 5-point Likert scale is used to assign a score to each behaviour, ranging from 1 (*very low*) to 5 (*very*

*high*), which allows for a qualitative measure of the parental behaviours of interest.

Covering the four theoretical constructs of interest, namely responsive and directive behaviours, behaviours that support learning, and affect, the MBRS-R presents good content validity with regard to the parental behaviours involved in child language outcomes. It could be a relevant tool for both researchers and clinicians interested in the early language development of preschool-aged children. However, the MBRS-R includes some overlap in the definitions of the specific parental behaviours it includes. Most importantly, some parental behaviours included in this tool, such as expressiveness (i.e., intensity and animation) or verbal praise, are not theoretically associated with the language development of preschool-aged children. Furthermore, the MBRS-R includes a mid-scale position (3), which may lead to difficulties in scoring. When an odd number of criteria are used, participants tend to interpret the central category in different ways—neutral, no opinion, not applicable, partly agree/partly disagree, unsure, undecided, confused, need more information—such that it is not truly in line with the other response categories (Chyung et al., 2017). In the context of parent–child interaction, the goal is to estimate the degree to which a parent adopts a given behaviour, meaning that the mid-scale position may not be informative.

Lotzin et al. (2015) stated that the use and refinement of an established tool with evidence of validity might be a better investment of time and resources than the ongoing development of new assessment tools. Following this statement, an adaptation of the MBRS-R was undertaken in order for this observation scale to meet the needs of the research and clinical field of child language.

### Adapting the MBRS-R to the Context of Language Development

The adaptation of the MBRS-R was carried out by the first three authors, who are speech-language pathologists and researchers in the field of early childhood development. The use of three experts increases the content validity of the adaptation procedure (Lotzin et al., 2015). The coding of 48 videos of parent–child interactions using the MBRS-R by the second author led to the identification of overlaps among two of the 12 parental behaviours measured by the tool, namely verbal praise (e.g., Praise may be given for compliance, achievement or for the child being himself) and acceptance (e.g., Acceptance is measured primarily in terms of how parents' nonverbal and verbal behaviours accept and affirm the child for who he/she is or what he/she is currently doing). Consequently, they were collapsed into

a single behaviour, *acceptance*, leading to the elimination of one of the 12 original behaviours.

The first and second authors also reviewed the definitions and added examples which better reflected the parental behaviours of interest for language outcomes, in light of the current literature and previous studies in the field of parent-child interactions and typical language development. For example, reciprocal behaviours that specifically foster language development, such as interacting without interrupting the child and asking open-ended questions that help maintain or pursue the ongoing interaction, were added as examples of the behaviour *reciprocity*. Similarly, examples of responsivity that specifically pertain to language, such as repeating or recasting what the child says, as well as interpreting his/her utterances, were added. All of the revised definitions and examples were then submitted to researchers in the fields of speech and language pathology, child and family psychology, and early language development to validate their accuracy and relevance in relation to early language development. Lastly, these definitions were submitted to childhood clinicians, namely speech-language pathologists and psychologists, to confirm their clarity.

The second step of the adaptation process concerned the reorganization of the Likert scale to include four, rather than five, response categories for each behaviour (1 = *never*, 2 = *sometimes*, 3 = *often*, and 4 = *always*). The third and final step involved adapting the indicators (statements) provided for each of the possible scores for the remaining 11 parental behaviours. The MBRS-R included indicators which took into account both frequency and quality of behaviours for a given dimension (e.g., "Enjoyment occurs in the context of a warm relaxed atmosphere. Parent manifests delight fairly frequently;" Enjoyment = 4), as well as indicators which only took into account frequency (e.g., "Parent occasionally manifests delight in child being himself;" Enjoyment = 3) or quality of behaviours (e.g., "Parent may appear rejecting of the child as a person;" Enjoyment = 1). These inconsistencies complexified coding, which compromised the accuracy of the ratings and thus, the reliability of the tool. To facilitate its use and minimize subjectivity, it was decided that each indicator would be standardized to include both frequency of occurrence and quality (or appropriateness) of a given behaviour.

Following this adaptation process, the observational tool included 11 of the 12 behaviours measured by the MBRS-R, as well as a Likert scale including four possible scores. This version of the tool was tested by analyzing 12 more videos, coded independently by the first three authors. Some remaining disagreements in coding resulted, after discussion among the three coders, in slight final adjustments to the

definitions and indicators for the four possible response categories associated with each parental behaviour. The coding of an additional 10 videos revealed satisfactory agreement among the three coders; thus, this version of the tool became the focus of the current validation study. This new observational measure of parental behaviours was entitled the Coding Observations of Parent-Child Interactions (COPI). A validation of the COPI among a population of 42-month-old French-speaking children from a non-clinical population and their families followed.

## Method

The sample included 95 monolingual French-speaking children (45 boys, 50 girls) aged, on average, 42.07 months ( $SD = 0.28$ ), and one of their parents. These participants were recruited through educational childcare settings in the Québec city and Montréal areas (Québec, Canada) as part of the comparison group of a longitudinal study on the language development of neglected children aged 3 to 5 years (Early Longitudinal LAnguage and Neglect [ELLAN] study; Sylvestre et al., 2014). Data for the current validation study was collected at the second measurement time of the ELLAN Study. This study was approved by the Research Ethics Committees of the Québec (CJQ-IU-2014-03) and Montréal (CJM-IU 14-05-06) Youth Centres.

Participant characteristics are presented in **Table 1**. The families are mainly nuclear (93.7%) and include two or less children (77.9%). More than 70% of mothers have a university certificate, diploma, or degree (70.5%), while this proportion is 49.4% among fathers. Most families (70.2%) benefit from incomes over \$80,000 annually. In terms of family structure, the current sample appears to be representative of families living in the province of Québec, where an estimated 87% of children aged 0 to 4 years live in two-parent households, and 84% of families are composed of two children or less (Institut de la statistique du Québec, 2018a). Similar trends were observed for the percentage of children living in low-income households, that is, 3.3% in the current sample and 5.8% in the general Québec population (Institut de la statistique du Québec, 2018b, 2018c). Data on the educational level of parents with children is currently not available at the provincial level.

## Materials and Procedures

The videos used to code parental behaviours consisted of 15 minutes of free play between the parent and child, recorded at the end of a 2-hour home visit as part of the ELLAN study. Participants were offered a choice of toys (i.e., a farmhouse including characters and animals, a puzzle, a ball, a toy kitchen and food set, a book, a stuffed teddy

<b>Table 1</b>	
<b>Participant Characteristics</b>	
<b>Variables</b>	<b>n (%)</b>
<b>Participating parent (N = 95)</b>	
Mother	81 (85.3)
Father	13 (13.7)
Legal tutor	1 (1.05)
<b>Type of family (N = 95)</b>	
Nuclear (two parents)	89 (93.7)
Single parent	6 (6.3)
<b>Number of children in the family (N = 95)</b>	
1 or 2	74 (77.9)
3 or more	21 (22.1)
<b>Education level of the responding parent (N = 95)</b>	
High school or professional studies	28 (29.5)
University certificate, diploma, or degree	67 (70.5)
<b>Education level of the other parental figure (N = 89)<sup>a</sup></b>	
High school or professional studies	45 (50.6)
University certificate, diploma, or degree	44 (49.4)
<b>Gross household income (N = 94)</b>	
≤ \$39 999 <sup>b</sup>	4 (4.2)
\$40 000–79 999	24 (25.5)
≥ \$80 000	66 (70.2)
<b>Low income households<sup>c</sup> (N = 91)</b>	
	3 (3.3)

Note. <sup>a</sup>The adjusted totals account for missing data. <sup>b</sup>Amounts are in Canadian Dollars (CAD). <sup>c</sup>The low-income cut-off is calculated based on gross household income and the size of the household (Institut de la statistique du Québec, 2019).

bear, and a “Mr. Potato Head”) to standardize the free-play setting. Parents were instructed to play with their child as usual, without paying attention to the camera. Parental behaviours were then coded using the COPI. The middle portion of each recording, that is, from the beginning of the 4th minute to the 11th minute (for a total of 7 minutes) was coded. If the child or parent was temporarily absent during this given period, the corresponding duration was added and coded after the 11th minute, until 7 minutes of parent-child interactions had been coded.

### Data Analysis

Following the adaptation process of the COPI, the entire sample of 95 videos was recoded by the second author. The analyses were then performed using IBM SPSS Statistics software (version 24.0) and R statistical software (version 3.4.3). Following descriptive analyses, a measure of sampling adequacy was calculated using the Kaiser-Meyer-Olkin index (Kaiser, 1974). A principal component analysis was then conducted using a varimax rotation with Kaiser normalization. Based on the factorial structure of the original

tool (i.e., MBRS-R), the extraction included a fixed number of four factors. In the context of principal component analysis, saturations above .63 are considered very good and those above .71 are considered excellent (Comrey & Lee, 1992). Cronbach's alpha was also calculated to measure internal consistency of the scale items. Cronbach's alpha values above .70 are considered satisfactory (Nunnally, 1978).

Inter-rater agreement was calculated for 20 of these 95 videos (21% of the sample), which were coded independently by the first two authors. Each of these authors also recoded 10 of these 20 videos 1 month later to measure the intra-rater agreement for each rater. Inter- and intra-rater agreement were calculated using the quadratic weighting method and Gwet's AC2 statistic. Like the classical Cohen's kappa, the Gwet's AC2 statistic is a measure of rater agreement but is more robust than the classical statistic (Wongpakaran et al., 2013). A weighting method was applied by assigning a weight of 1 for perfect agreement and .80 for a one-point difference between the raters' scores. Deviations of 2 or 3 points were given a null weight. In this study, Gwet's AC2 coefficients greater than .70 were considered acceptable.

## Results

A Kaiser-Meyer-Olkin index of .798 confirmed sampling adequacy and quality. The factor loadings following varimax rotations revealed that the COPI respected the factorial structure of the MBRS-R. Four behaviours of the COPI loaded onto the Response to the Child domain, two on the Control domain, one on the Support to Learning domain, and three others on the Affect domain. Nine of the 11 behaviours of the COPI loaded onto the same four factors as the MBRS-R. Inventiveness, which originally belonged to the Affect domain of the MBRS-R, loaded mainly onto the Response to the Child factor of the COPI (.707) rather than Affect (.141). This behaviour was thus reattributed to the Response to the Child dimension of the COPI. Also, considering that "expressiveness" was weakly distributed among the four factors, this behaviour did not add any useful information to the observations of parent-child interactions and was thus removed from the COPI. This brought the total number of items included in the COPI to 10. Following these changes, a second factorial analysis was conducted with the remaining 10 items of the scale (**Table 2**). The final version of the COPI is thus comprised of 10 parental behaviours divided into four domains of parent-child interactions (**Table 3**). Overall, both raters used all 4 points of the Likert scale. Internal consistency for all four subscales of the final version of the COPI ( $\alpha = .84$  to  $.88$ ) is considered excellent (Nunnally, 1978).

Results for intra-rater agreement are shown in **Table 4**. Overall, the intra-rater agreement was between .88 and .98, which is considered excellent. A single value (Rater 1, "Enjoyment," AC2 = .69) was slightly lower than the established threshold for acceptable values (i.e., .70). However, for this behaviour, Rater 1 used only three of the four possible scores on the Likert scale, with a score of 1 never being attributed, which highly influences Gwet's AC2 statistic. The associated confidence interval for this behaviour was quite wide [.42, .96]. The lower bounds of the confidence intervals for the remaining 10 behaviours were often close to .70.

**Table 5** reports the results for inter-rater agreement. This agreement was also very high and significant ( $p < .001$ ) for all 10 parental behaviours of the COPI. The percentage of agreement ranged from 87% to 93% and was much higher than the agreement by chance, which was, on average, 47.5% (range = 41%–53%).

## Discussion

The goal of this study was to develop a tool for observing the parental behaviours that foster language development and validate it among a population of preschool-aged children from the general (non-clinical) population. This tool, named the COPI, was adapted from the MBRS-R (Mahoney, 2008). The final version of the COPI includes 10 parental behaviours distributed among four domains of parent-child interactions: Response to the Child (sensitivity to the child's interests, responsivity, reciprocity, inventiveness); Control (directiveness, pace); Support to Learning (stimulation); and Affect (warmth, enjoyment, acceptance). Both French and English versions of each component of the COPI—definitions of the four domains and 10 parental behaviours, and indicators associated with each possible score (1 to 4) on these behaviours—are available upon request from the corresponding author.

The factorial structure of the COPI is robust and the four domains are clearly distinct from one another, as shown by the principal component analysis. This suggests that using specific subscales (domains) of the COPI independently may be feasible in a clinical or research context. The indicators used to score each parental behaviour appear reliable, as confirmed by the high rates of inter- and intra-rater agreement. Overall, both raters used all 4 points of the Likert scale, further suggesting that the COPI allows for a nuanced analysis of parental behaviours.

The results of the current study suggest that the COPI can serve as a valid and reliable method for observing the parental behaviours that foster language development in a population of preschool-aged children in a research context. It is important to mention that perfect inter-rater

agreement is highly unlikely in the context of observations of parent-child interactions. However, in this validation study, the scores of both raters were consistently within one

Likert point of one another, which is similar to the results of other observational tools used to measure adult-child interactions (e.g., Pianta et al., 2008).

<b>Table 2</b>				
<b>Factor Loadings for Principal Component Analysis with Varimax Rotation of the COPI Behaviours</b>				
Domains	Factor loading			
	1	2	3	4
<b>Parental behaviours</b>				
<b>Factor 1: Response to the child</b>				
Sensitivity to child	<b>.78</b>	.10	.14	.41
Responsivity	<b>.81</b>	.01	.16	.34
Reciprocity	<b>.88</b>	.17	.05	.24
Inventiveness	<b>.66</b>	-.30	-.24	.21
<b>Factor 2: Control</b>				
Directiveness	.13	<b>.92</b>	-.13	.10
Pace	-.07	<b>.93</b>	-.03	.00
<b>Factor 3: Support to learning</b>				
Stimulation	.07	-.15	<b>.94</b>	.13
<b>Factor 4: Affect</b>				
Enjoyment	.39	-.13	-.15	<b>.83</b>
Warmth	.27	.03	.27	<b>.82</b>
Acceptance	.39	.28	.12	<b>.72</b>

Note. N = 95. Factor loadings above .63 are in bold. COPI = Coding Observations of Parent-Child Interactions.

<b>Table 3</b>	
<b>Definitions of the Four Domains and 10 Parental Behaviours of the COPI</b>	
<b>Response to the child</b>	
Sensitivity to the child's interests	<p>Parent's awareness and understanding of what captures the child's attention (game, activity, interests, etc.)</p> <p>Examples of sensitivity to the child include the parent's verbal comments about what the child is interested in, his/her ability to monitor the child's activity or behaviour, the position adopted by the parent to visually monitor the child's actions as well as the parent's general commitment and engagement in the child's activity.</p> <p>Note: Sensitive behaviours are observed independently of directive behaviours, that is, a parent can be both very directive in the choice of an activity and sensitive to what the child does or says during the activity once engaged.</p>

**Table 3 (Continued)****Definitions of the Four Domains and 10 Parental Behaviours of the COPI**

Responsivity	<p>Consistency and relevance of the parent's responses to the child's behaviours.</p> <p>Responses are relevant when they are related to the child's actions, requests, and intentions, and allow the ongoing conversation or activity to continue. Responsivity is observed in relation to child behaviours that both <i>demand a response (direct demands)</i> from adults as well as behaviours that <i>may not be specifically directed</i> toward the adult (<i>indirect demands</i>). Child behaviours include play and social activity as well as facial expressions, vocalizations, gestures, signs of discomfort, body language, requests, and demands.</p> <p>Relevant responses include, for example, actions or comments related to the child's actions/ comments, repeating or rephrasing what the child says, expansions and interpretations of their utterances, and the parent's actions in response to the child's direct or indirect requests.</p>
Reciprocity	<p>Parent's ability to engage the child or engage with the child in a collaborative and balanced exchange, that is, where parent and child take part in the ongoing activity in equal parts, oriented towards a common goal.</p> <p>Examples of reciprocity include interacting without interrupting the child, asking open-ended questions that help maintain or pursue the ongoing interaction, creating balanced turn-taking or conversations, and successfully engaging the child in lasting interactive sequences.</p>
Inventiveness	<p>Variety of strategies used by the parent to capture the child's interest.</p> <p>Examples of inventiveness include the ability to use a toy or object in many different ways, to invent games with or without objects, to combine different toys or to use them in an unconventional way, and to find innovative solutions or ideas related to the child's activity or interests.</p>
<b>Control</b>	
Directiveness	<p>Frequency of requests, orders, suggestions, advice/clues, or other ways of directing the child's activity or immediate behaviour.</p> <p>Examples of directiveness include initiating a new activity when there has been no previous sign of inertia and/or resistance shown by the child, telling the child what to do, making frequent suggestions, and directing the minute details of the child's free play.</p>
Pace	<p>Rate of the parent's behaviour. This item allows the observation of the pace and rhythm of the parent's verbal (flow and abundance of speech) and nonverbal (gestures, movements, actions) behaviours. This item is rated independently from the child and does not observe the extent to which the parent's pace matches the child's pace.</p>
<b>Support to learning</b>	
Stimulation	<p>Parent activities/comments that stimulate the child's sensorimotor (visual, auditory, tactile, motor) and cognitive (including language) development. This item allows the observation of the amount of stimulation offered by the parent as well as the energy the parent strives to exert towards promoting and encouraging the child's development. Stimulation is measured by the extent to which the parent fosters sensorimotor and cognitive development whether through play, instruction, training, or sensory stimulation.</p> <p>Examples of stimulation include teaching new words/concepts to the child, describing their function, explaining/demonstrating how a game or task is completed, scaffolding, offering constructive feedback to the child, etc.</p> <p>Note 1: Some behaviours that support learning may not be sensitive to the child's interest, but they must nevertheless be coded in this item.</p> <p>Note 2: Putting the child's knowledge to test by asking closed (non-supportive) questions (e.g., asking the child to name things/colours/letters) without either teaching something new or giving supportive feedback to the child, is not considered an appropriate example of supportive learning and should not be coded here.</p>

**Table 3 (Continued)**

**Definitions of the Four Domains and 10 Parental Behaviours of the COPI**

<b>Affect</b>	
Enjoyment	<p>Enjoyment expressed by the parent towards the child. This item allows the observation of parents' enjoyment expressed in response to the child (actions and behaviour) rather than in response to the game or the activity.</p> <p>Examples of enjoyment may include smiling, sincere laughter, and a high level of engagement by the parent in the child's play, in a relaxed atmosphere.</p>
Warmth	<p>Positive attitude expressed towards the child.</p> <p>Frequency and intensity of the expression of positive feelings and demonstrations of affection towards the child are considered.</p> <p>Examples of warmth include physical proximity, pats, lap-holding, caresses, kisses, hugs, tone of voice, and verbal endearments.</p>
Acceptance	<p>Verbal and nonverbal parental behaviours that indicate to the child that he/she is accepted as he/she is, and that his/her behaviours, words, ideas, actions, and decisions are valued.</p> <p>Examples of acceptance include a parent frequently expressing his/her agreement by acknowledging what the child says or suggests ("that's a good idea," "you're right," "that's true"), accepting/engaging in the child's ideas/suggestions that might be silly or foolish, or by offering verbal or nonverbal praise to the child ("well done," "good job").</p>

Note. COPI = Coding Observations of Parent-Child Interactions.

**Table 4**

**Intra-rater Agreement on the 10 Parental Behaviours of the COPI**

Parental behaviours	AC2	95% CI	% agreement	% agreement by chance	p
<b>Sensitivity to child's interests</b>					
Rater 1	.90	[.75, 1]	.96	.60	< .001
Rater 2	.88	[.73, 1]	.94	.50	< .001
<b>Responsivity</b>					
Rater 1	.96	[.86, 1]	.98	.52	< .001
Rater 2	.88	[.74, 1]	.94	.50	< .001
<b>Reciprocity</b>					
Rater 1	.76	[.53, 1]	.92	.66	< .001
Rater 2	.76	[.57, .94]	.88	.51	< .001
<b>Inventiveness</b>					
Rater 1	.88	[.69, 1]	.96	.66	< .001
Rater 2	.82	[.63, 1]	.90	.46	< .001
<b>Directiveness</b>					
Rater 1	.82	[.66, .99]	.92	.55	< .001
Rater 2	.83	[.66, .99]	.92	.54	< .001

<b>Table 4 (Continued)</b>					
<b>Intra-rater Agreement on the 10 Parental Behaviours of the COPI</b>					
<b>Parental behaviours</b>	<b>AC2</b>	<b>95% CI</b>	<b>% agreement</b>	<b>% agreement by chance</b>	<b>p</b>
<b>Pace</b>					
Rater 1	.83	[.67, .98]	.92	.55	< .001
Rater 2	.83	[.67, .98]	.92	.54	< .001
<b>Stimulation</b>					
Rater 1	.81	[.64, .97]	.90	.48	< .001
Rater 2	.84	[.68, 1]	.92	.49	< .001
<b>Enjoyment</b>					
Rater 1	.69	[.42, .96]	.90	.68	< .001
Rater 2	.88	[.73, 1]	.94	.50	< .001
<b>Warmth</b>					
Rater 1	.88	[.73, 1]	.94	.52	< .001
Rater 2	.91	[.78, 1]	.96	.54	< .001
<b>Acceptance</b>					
Rater 1	.84	[.69, .99]	.92	.49	< .001
Rater 2	.88	[.72, 1]	.94	.51	< .001

Note. COPI = Coding Observations of Parent-Child Interactions; AC2 = Gwet's AC2 agreement coefficient; CI = Confidence interval.

<b>Table 5</b>					
<b>Inter-rater Agreement on the 10 Parental Behaviours of the COPI</b>					
<b>Parental behaviours</b>	<b>AC2</b>	<b>95% CI</b>	<b>% agreement</b>	<b>% agreement by chance</b>	<b>p</b>
Sensitivity to child's interests	.79	[.69, .89]	.89	.47	< .001
Responsivity	.82	[.73, .91]	.90	.44	< .001
Reciprocity	.78	[.68, .88]	.87	.42	< .001
Inventiveness	.81	[.72, .91]	.89	.41	< .001
Directiveness	.83	[.73, .93]	.92	.53	< .001
Pace	.84	[.74, .94]	.92	.51	< .001
Stimulation	.79	[.69, .89]	.89	.48	< .001
Enjoyment	.80	[.70, .90]	.90	.50	< .001
Warmth	.78	[.69, .87]	.89	.50	< .001
Acceptance	.86	[.76, .96]	.93	.50	< .001

Note. COPI = Coding Observations of Parent-Child Interactions; AC2 = Gwet's AC2 agreement coefficient; CI = Confidence interval.

Although it remains to be confirmed through studies conducted in clinical settings, the three first authors, who have extensive clinical experience in speech-language pathology, consider that its use in a clinical setting is promising. Despite the unavoidable degree of subjectivity inherent to such observations, the detailed definitions of the domains and parental behaviours, as well as the precision of the indicators and examples provided for the four possible scores on each behaviour, allow for coding that closely reflects the observed behaviour. By allowing a judgment on the frequency of occurrence and magnitude (intensity) of a given behaviour on a 4-point Likert scale, the COPI allows for more qualitative and nuanced measures of each behaviour, compared to other tools focusing on identifying the presence or absence of such behaviours. Provided they are trained on the conceptual bases of the tool and the coding procedures of the COPI using video recordings and that satisfactory inter-rater agreement is obtained, this tool could be used by early childhood special educators, early interventionists, teachers, or any other qualified professional.

Coding with the COPI is not time-consuming as approximately 10 minutes were needed to code a 7-minute video. Real-time coding, without recording parent-child interactions, might also be feasible for experienced professionals. Although levels of inter- and intra-rater agreement were high in this validation study, they remain to be measured with other speech-language pathologists in clinical contexts, and for real-time coding. Indeed, it is important to remember that in this study, the inter-rater agreement was obtained by the same researchers who developed the definitions and examples of the COPI behaviours during the adaptation phase. This is likely to have led to a higher agreement than the one obtained by two raters who have not benefited from the discussions around these parental behaviours.

Finally, it is important to remember that the objective of this tool is not to evaluate parental behaviours. Rather, it is to observe them at a specific time and provide a common language with which to describe certain parental behaviours that are important when focusing on language outcomes for children. These observations made synchronously with the assessment of the child's developmental needs could help determine which behaviours are already adopted in a developmentally appropriate way by the parent, as well as those which are never, or seldom present. Such a tool can also help identify behaviours that are already adopted by the parent, but for which adjustments (e.g., dosage) could be made to better meet the child's needs (Baker, 2012; Lotzin et al., 2015; Warren et al., 2007). The diversity and

specificity of the parental behaviours observed using the COPI could help establish specific, measurable objectives of increasing complexity.

We conducted the development and validation study of the COPI with parents of 42-month-old children from the general population who did not present biological or environmental risk factors with regard to language development. Although this first step of the validation process confirms that using the COPI is a simple and feasible way to observe parental behaviours within these families, its validity remains to be demonstrated with other subgroups of the population (e.g., low SES families and families from other cultural backgrounds).

Finally, observations of parental behaviours using the COPI must also be conducted while keeping in mind the context in which such observations are made. Contextual factors such as the physical location in which these observations are conducted (e.g., clinical setting, at home), the available materials or ongoing activity, and even factors related to the child or parent's current state (e.g., energy levels, physical or psychological well-being) should be taken into account when interpreting these measures.

## Conclusion

The COPI is a systematic and structured observational measure of 10 parental behaviours, divided among four domains of parent-child interactions that are associated with language development among preschool-aged children. The results of this adaptation and validation study suggest that the COPI shows valid construct and structure. The specific and operational indicators of the 10 parental behaviours of interest, which include examples that specifically pertain to language development, resulted in satisfactory inter-rater agreement upon these measures. The COPI can be a useful observational tool of the parental behaviours of interest when focusing on child language development, for both clinical settings and research contexts. This tool helps provide a much needed common language with which to describe certain aspects of parent-child interactions which are important for language development. Its reliability, as demonstrated by the current study, can lead to more systematic observations of parental behaviours in a clinical context and, consequently, has the potential to lead to more targeted and individualized interventions addressed to children and their families.

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