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Research Paper

Kia Tīmata Pai: Parent- and teacher-reported oral language and self-regulation in a large diverse sample of New Zealand toddlers

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ABSTRACT

Oral language and self-regulation are both critical for lifelong development. Both skills are developing rapidly in the toddler years, when informant-report measures are often used to assess such development. Yet research comparing parent and teacher reports of these skills in toddlers is limited. The present study compared parent and teacher reports of children's oral language (gesture, vocabulary, syntax) and self-regulation (effortful control) with a large, ethnically diverse sample of New Zealand toddlers ($N = 1481$; 688 girls and 737 boys; Mage = 20.60 mo, SD = 3.38, range = 13-30). The sample included primarily New Zealand European, Māori, Asian, and Pacific ethnicities, from low to high socioeconomic status (SES). Parent and teacher reports of oral language were significantly moderately correlated whereas ratings of self-regulation were weakly, yet still significantly, correlated. Parents reported steeper age-related differences in children's oral language and effortful control than teachers. Both parents and teachers reported greater effortful control for girls than boys. Few differences by ethnicity were noted in multivariable models except for a Māori advantage for gestures and a non-European advantage for effortful control (parent-report only). Teachers reported more differences in both oral language and effortful control as a function of family SES than did parents. These findings highlight that both parent and teacher reports of oral language and self-regulation are important, but parents may be particularly sensitive reporters of children's oral language and teachers of children's self-regulation.

Oral language and self-regulation skills in early childhood are both critical for children's later academic, socioemotional, and behavioral development (Lonigan & Shanahan, 2010; Pace et al., 2019; Robson, Allen, & Howard, 2020; Stucke & Doebel, 2024). Language in toddlerhood includes communicative gestures, vocabulary, and syntax (Bornstein et al., 2018). Self-regulation includes cognitive (executive function), behavioral, and emotional aspects (Blair & Ku, 2022). Both skills are developing rapidly in the toddler years, yet less is known about interrelationships (Bruce & Bell, 2022; Thériault-Couture et al., 2025). The main aim of the Kia Tīmata Pai (KTP) study, a New Zealand early childhood teacher-implemented randomized controlled trial (RCT), is to examine interrelationships between oral language and self-regulation in toddlerhood. In this manuscript, we report on the baseline phase of KTP, capturing oral language and self-regulation in a large and diverse sample of toddlers (Reese et al., 2023). Our aim is to map the existing associations between toddlers' oral language and self-regulation prior to intervention and to identify factors that predict these outcomes, providing insights for both theory and practice.

Large individual differences in both oral language and self-regulation exist as a function of age, gender, socioeconomic status (SES), ethnicity,

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and multilingualism (e.g., Lecheile et al., 2020; Morgan et al., 2015; Newbury et al., 2025; Petersen, Bates, & Staples, 2015; Putnam et al., 2006; Putnam et al., 2024; Reese et al., 2018; Thériault-Couture, Matte-Gagné, & Bernier, 2025). These variations highlight the importance of capturing how individual and familial characteristics are linked to oral language and self-regulation skills.

Yet, assessing toddlers' oral language and self-regulation presents methodological challenges, especially in large and diverse samples. Direct observation or standardized testing can be resource-intensive, leading researchers to rely on informants. Typically, only a single informant is used —either parents or teachers. However, parents and teachers observe children in different contexts and can provide complementary insights into their development (Mulder et al., 2019; Stolarova et al., 2014). Parents typically see children in familiar, home-based settings, capturing behaviors influenced by family routines and everyday interactions. Teachers observe children in structured, group-based, peer-focused environments, providing information on compliance and social skills. Incorporating these perspectives allows researchers to capture children's behaviors across both home and educational settings, enhancing the reliability of measurements. Comparing parent and teacher perspectives can also reveal informant discrepancies: These discrepancies are not necessarily a function of measurement error but may reflect meaningful differences in behavior across contexts. Data from multiple informants can also inform intervention design and improve the generalizability of findings. Despite these advantages, few studies have directly compared parent and teacher reports of oral language or self-regulation in toddlers (Mulder et al., 2019; Pratt et al., 2022; Vagh, Pan, & Mancilla-Martinez, 2009), and none with large and diverse non-US samples.

1. Oral language development in toddlers

Across cultures and languages, children's expressive language skills develop rapidly in the second and third years of life (Bornstein et al., 2018; Gilkerson et al., 2018; Mancilla-Martinez & Vagh, 2013). There is also large individual variation across children, with systematic differences generally reported as a function of age, gender, birth order, socioeconomic status (SES), ethnicity, and multilingualism (Morgan et al., 2015; Newbury et al., 2025; Petersen, Bates, & Staples, 2015; Reese et al., 2018). Older children, girls, firstborns, monolingual speakers, children from higher-SES backgrounds, and children from European ethnic backgrounds tend to have more advanced oral language skills. For instance, Newbury et al. (2025) found that, based on mothers' reports within the Growing Up in New Zealand cohort, children identified as Māori, Pacific, other Asian (not Chinese or Indian), or Middle Eastern, Latin American, and African (MELAA) were more likely to have lower language scores at age 4.5-years compared to their peers. These patterns were evident across dimensions of language (communicative gestures, vocabulary size, syntax). In the present study, we consider these dimensions separately because it is important to go beyond vocabulary size as the sole measure of oral language when predicting children's later development (Dickinson, 2003; Lonigan & Shanahan, 2010).

The gold standard of analyzing naturally occurring speech samples is not practical for large samples, so toddlers' oral language is most often measured by parent report. The parent-report version of the Communicative Development Inventories (CDI; Fenson et al., 1994, 2000) is the most popular of these instruments. Few studies have measured early childhood teacher reports (e.g., Bleses et al., 2020 in Danish) and even fewer studies have included both parents' and teachers' reports of toddlers' language (Pratt et al., 2022; Vagh, Pan, & Mancilla-Martinez, 2009). These studies report moderate correlations between parent and teacher ratings of vocabulary size, similar in size to correlations between mother and father ratings (see Stolarova et al., 2014 for a review). Expanding on these findings, we assess mean differences and correlations between parent and teacher ratings of multiple dimensions of toddlers' oral language (gestures, vocabulary, and syntax) in a large and diverse non-US sample.

2. Self-regulation development in toddlers

Self-regulation begins with attention skills in infancy, with effortful control emerging in the toddler years (Masek et al., 2021; Putnam et al., 2006). For toddlers, effortful control is frequently measured by the Early Childhood Behavior Questionnaire (ECBQ; Putnam et al., 2006) as a composite of attention-focusing, attention-shifting, inhibitory control, cuddliness, and low-intensity pleasure. Similar to oral language skills, toddlers show large individual variations in effortful control, with systematic differences as a function of age, gender, SES, and ethnicity (Lecheile et al., 2020; Putnam et al., 2006; Putnam et al., 2024). Older children, girls, and children from higher-SES families tend to have higher effortful control (Lecheile et al., 2020; Putnam et al., 2006; Putnam et al., 2024). For instance, the Global Temperament Project included 83,423 parent ratings of infants, toddlers, and preschool children from 59 nations (Putnam et al., 2024). Across nations, girls were rated higher than boys in self-regulation (effortful control). There was also significant variation in effortful control by nation; this pattern was complex, with toddlers in Southeastern Asian and Western Asia rated by parents as relatively higher in effortful control, and toddlers in Eastern Asia rated as relatively lower in effortful control. Although there was no toddler sample from New Zealand, toddlers in Australia were rated relatively lower in effortful control.

Both parent and teacher versions of the effortful control scale are available (Putnam et al., 2024), but few studies have directly compared parent and teacher reports for toddlers, and none in large, diverse, non-US samples. For instance, Mulder et al. (2019) found a weak, non-significant correlation between parent and teacher ratings of a subset of the effortful control items from the Early Childhood Behavior Questionnaire (ECBQ) with 2- to 3-year-olds. In that study, only teacher reports and not parent reports correlated significantly with children's performance on executive function tasks. Using the Childhood Behavior Questionnaire (CBQ) with preschoolers, Teglasi et al. (2015) noted similar yet significant parent-teacher correspondence for inhibitory control items but weaker, non-significant correspondence for attention-focusing items. Further, in a meta-analysis of 158 studies of childhood executive function from 30 to 60 months, teacher reports of executive function were a stronger predictor of children's later behavioral problems than were parent reports of executive function (Stucke & Doebel, 2024). Parents and teachers observe children in different situations that may tap different aspects of effortful control. The present study includes parent and teacher ratings of effortful control for toddlers of diverse ethnicities and family SES within New Zealand. We assess both mean differences and correlations between parent and teacher ratings of effortful control as a function of demographics.

3. Associations between oral language and self-regulation in toddlers

Although there is a great deal of research on each domain separately (see Pace et al., 2019), only a few studies have examined interrelations between reports of oral language and self-regulation in the toddler years, most with relatively large US longitudinal samples (see also Lecheile et al., 2020; Masek et al., 2022). For instance, Ayoub, Vallotton and Mastergeorge (2011) found that children's expressive vocabulary at 24 months predicted growth in self-regulation from 14 to 36 months. In another study, toddlers' communicative gestures at 15 months were indirectly related to their self-regulation (executive function) at age 4 via their expressive vocabulary at ages 2-3 (Family Life Project; Kuhn et al., 2014). In the same sample, children's growth in vocabulary from 15 to 36 months predicted later growth in self-regulation from 36 to 60 months (Kuhn et al., 2016). Finally, Petersen, Bates and Staples (2015) found a stronger path from children's oral language to self-regulation from 30 to 42 months than the reverse. Thus, oral language and

self-regulation are already positively associated in the toddler years, with oral language appearing to more strongly predict later self-regulation than the reverse. However, previous research has relied largely on single-informant data, usually from parents, or combined parent and non-parental reports (see Leicheile et al., 2020). Given that the meta-analysis mentioned earlier found teacher reports of self-regulation to be more predictive than parent reports of children's later development (Stucke & Doebel, 2024), it is important to assess teacher reports separately. In the current study, we examine these associations concurrently both within and across informants —parents and teachers— to understand how these skills are related as observed in different contexts.

4. The current study

This study is the first to examine associations between oral language and self-regulation as a function of demographic differences for both parent and teacher reports in a large and diverse non-US sample. It is possible that the previously reported patterns for toddlers' oral language and self-regulation development are different as a function of children's cultural background. We present findings from the baseline phase of a national longitudinal cluster randomized controlled trial (RCT) in Aotearoa New Zealand aimed at promoting oral language and self-regulation via professional development with early childhood teachers. Using a train-the-trainer approach in this teacher-implemented RCT, 136 centers across New Zealand were randomly assigned to one of four conditions: an oral language intervention (Enhancing Rich Interactions; ENRICH), a self-regulation intervention (Enhancing Neurobehavioral Gains through Activities, Games, and Exercises; ENGAGE), a combined oral language and self-regulation intervention (ENRICH plus ENGAGE), or an active control (curriculum-as-usual plus child development webinars; see Reese et al., 2023; Poulton et al., 2025 for more details).

The main aims of this paper are to examine demographic differences in toddlers' oral language and self-regulation (effortful control), and to compare how these patterns differ between parent and teacher reports, prior to intervention in a culturally, linguistically, and socioeconomically diverse non-US cohort (Hypothesis 1), and to examine links between toddlers' oral language and self-regulation within and across parents and teachers at baseline (Hypothesis 2). These analyses were not formally preregistered.

Hypothesis 1. We hypothesize that we will replicate previous demographic differences in oral language and self-regulation across both parent and teacher reports, extending these findings to diverse groups in New Zealand. Specifically, we expect that children who are older, female, monolingual, and from higher-SES families will exhibit higher scores in both domains. Children of European ethnicity are hypothesized to have higher scores in oral language and lower scores in self-regulation. We expect these patterns to be present for both parent and teacher reports.

Hypothesis 2. We hypothesize that we will replicate previous associations between parent and teacher reports of oral language and self-regulation within domains. Specifically, toddlers' oral language and self-regulation will be positively associated within each informant, such that higher oral language scores will correspond to higher self-regulation scores in both parent and teacher reports. We predict a weaker association between parent and teacher reports for self-regulation, given the findings of a meta-analysis that teacher ratings of children's self-regulation are more predictive of later functioning than are parent ratings (Stucke & Doebel, 2024). We will also explore cross-domain associations between parent and teacher reports of oral language and self-regulation. We expect positive and weak-to-moderate cross-domain associations across informants, with parent-reported oral language positively correlated with teacher-reported self-regulation, and teacher-reported oral language positively correlated with parent-reported self-regulation.

5. Method

5.1. Design and procedure

Early childhood centers were recruited using stratified random sampling from a large New Zealand ECEC provider. These centers were randomly assigned after baseline to one of four intervention conditions mentioned earlier (see Reese et al., 2023; Poulton et al., 2025 for more details). Children, caregivers, and teachers were recruited from 136 centers across New Zealand, representing a wide range of ethnicities and home languages (Poulton et al., 2025).

The data presented here were part of the baseline phase of a national RCT, Kia Tīmata Pai (Reese et al., 2023). Cohort A was assessed between May and August 2021, and Cohort B between February and April 2022. Cohort B was added due to reduced recruitment during the initial phase of the COVID-19 pandemic to ensure the study met target sample sizes.

Teachers and parents interested in participating were invited to complete questionnaires. These were administered either on paper or electronically via REDCap (Research Electronic Data Capture, Harris et al., 2019, 2009), a secure, web-based platform for creating, collecting, and managing surveys and databases. If completed on paper, questionnaires were scanned and sent securely to a university email address to be double-entered into REDCap.

5.2. Participants

We recruited children, parents, and teachers from 136 early childhood centers across New Zealand, with a total of 1496 families and 1634 teachers consenting to participate in the study at baseline across the two cohorts (an estimated response rate of 81% of eligible children; see Poulton et al., 2025). However, we excluded 15 children who fell outside the age range of 13-30 months ($N_{CohortA}$ = 1126, $M_{CohortA}$ = 20.13, $SD_{CohortA}$ = 3.23; $N_{CohortB}$ = 355, $M_{CohortB}$ = 22.08, $SD_{CohortB}$ = 3.44). Both parents and teachers completed assessments on children's language and effortful control. The majority of parent assessments were completed by mothers (1,247; 92.3%) (see Poulton et al., 2025 for more details). Although we encouraged teachers to supply us with only one assessment per child, from the teacher who best knew that child, a total of 82 children (5.5% of the total sample) was evaluated by more than one teacher. In these few instances, instead of selecting a single teacher's report, we opted for an average score. This approach was deemed more robust given that we did not know which of those teachers knew the child best.

5.3. Measurements

5.3.1. Demographic information

Table 1 presents the demographic characteristics of children by cohort. For additional details, see the cohort profile paper (Poulton et al., 2025).

Ethnicity. We used a total-response approach to ethnicity (Didham, 2005) allowing parents to nominate multiple ethnicities for themselves and their children (e.g., European, Māori, Asian, Pacific and MELAA-Middle Eastern, Latin American or African).

Socioeconomic status (SES). Parent-reported occupation was used to create a three-level SES index (low, middle, high) based on the New Zealand Socio-Economic Index (Boven et al., 2022), an occupation-based measure reflecting the typical income and educational attainment associated with each occupation. The initial six-group classification was consolidated into three SES categories due to the small number of children in the lowest three categories.

Language status. Children were classified as multilingual if their parents reported a language other than English as the primary language spoken at home. This is a conservative measure of multilingualism

because some children whose primary language in the home is English may also hear other languages; however, all children were attending an English-medium early childhood center.

Gender, age, and birth status. Parents provided information regarding the child's gender, age, and birth status (preterm versus full-term).

Cohort. Recruitment and baseline assessments began in May 2021 (Cohort A). Due to pandemic-related challenges, initial enrollment numbers were lower than expected. A second recruitment phase, conducted from February to April 2022 (Cohort B), brought the final sample size to 1,481 children. For further details, please see the cohort profile paper (Poulton et al., 2025).

5.3.2. Language development

Children's language development was assessed with the New Zealand Communicative Development Inventories (CDI; parent and teacher forms; Peterson et al., 2017; Reese et al., 2018): a checklist of 12 gestures (Words and Gestures; Fenson et al., 1994); a 100-word English vocabulary list; and a single question about the child's syntax skills (Fenson et al., 2000). Tables 2 and 3 show descriptive statistics as a function of demographic factors.

Gesture development. The gesture items assessed the extent to which children use meaningful gestures to communicate and interact with their environment. This scale comprised 12 items that parents and teachers rated on a 3-point Likert-type scale (0 = not yet; 1 = sometimes; 2 = often; see Peterson et al., 2017). Examples of items on the questionnaire include "Signals desire to be picked up by extending the arm upwards" and "Independently waves goodbye when someone leaves". Total scores were used in analyses. The questionnaire demonstrated good reliability for parent reports with a Cronbach's alpha score of .79 and excellent reliability for teacher reports with a Cronbach's alpha score of .91.

English vocabulary. The questionnaire used in this study is adapted from the CDI: Words and Sentences (Fenson et al., 2000) for New Zealand English (Reese et al., 2018). It consists of 100 NZ English words across different categories, such as sound effects (e.g., quacking), animals, and vehicles. Parents and teachers reported whether the child said each word or not, using a binary scale (0 = Not yet; 1 = Yes). The total score for each child was calculated by summing the number of words they said, with a range of 0 to 100. Cronbach's alpha was .98 for both parent- and teacher-reports, indicating an exceptionally high level of internal consistency in measuring children's vocabulary development.

Syntax skills. To assess children's ability to combine words across languages, we asked parents and teachers: "Has your/this child started putting words together (in any language), like 'more banana' or 'doggie bite'?" (see Reese et al., 2018; from Fenson et al., 2000). Parents and teachers rated children's skills as "not yet", "sometimes", or "often". Following the scoring guidelines of the original CDI, the responses "sometimes" and "often" were grouped into a "combining" category, while "not yet" was categorized as "not yet combining" for data analysis purposes (Klee et al., in preparation).

Table 1
Child demographics by cohort.

Demographic	Cohort A		Cohort B	
	N	% or mean [95% CI]	*N*	% or mean [95% CI]
Age	1126	20.13 [19.94–20.32]	355	22.09 [21.72–22.44]
Gender				
Girls	548	51.21%	141	39.72%
Boys	522	48.79%	214	60.28%
Ethnicity*				
Māori	268	25.94%	64	18.23%
Pacific	97	9.39%	25	7.12%
Asian	220	21.30%	93	26.50%
MELAA	24	2.32%	11	3.13%
Euro	760	73.57%	24	68.95%
SES				
Low	71	6.81%	22	6.59%
Middle	442	42.38%	114	34.13%
High	530	50.81%	198	59.28%
Main language at home (English)	861	84.83%	277	78.92%
Preterm	146	14.85%	52	15.57%

Note. Parents could select multiple ethnicities for children (total response method), so percentages add up to >100.

5.3.3. Self-Regulation

The parent and teacher versions of the ECBQ: Very Short Form (Putnam et al., 2006) assessed children's self-regulation via the effortful control subscale. This subscale comprises 12 items tapping inhibitory control, attentional control, low-intensity pleasure, and perceptual sensitivity. The effortful control subscale captures core regulatory processes that are developmentally salient during this period and is widely used as an index of emerging self-regulatory capacity. Researchers studying self-regulation in very young children, including infants and toddlers, often focus on effortful control because individual differences in this construct can be detected early in life (Lin, Liew, & Perez, 2019). Parents and teachers evaluated each question using a 7-point Likert-type scale (ranging from 1 to 7) to indicate the frequency of a specific behavior observed in the child. The questionnaire also includes a "does not apply" option for each item, allowing parents and teachers to indicate whether a particular behavior is not applicable to the child. Questions marked as "does not apply" did not contribute to the numerical scoring. An example item from this subscale is how often the child pays attention immediately when called upon during everyday activities. Cronbach's alpha for this scale was .72 for parent-reports and .84 for teacher-reports, both indicative of good internal consistency.

5.4. Analytic plan

See Tables 2 and 3 for oral language and self-regulation raw means and standard deviations before imputation as a function of demographic factors (differences between pre- and post-imputation statistics were minimal). A total of 56 parents did not respond to the demographic questionnaire. Missing data for child assessments was as follows: parent report of gestures (12.09%), vocabulary (10.20%), syntax (12.22%), effortful control (10.87%); teacher report of gestures (11.75%), vocabulary (11.01%), syntax (11.34%); teacher report of self-regulation (16.00%).

Expectation Maximization (EM) was employed to handle missing non-categorical data, with the aim of minimizing errors and maximizing the utility of available information. Imputation was carried out across the initial three waves of data simultaneously, to facilitate backward imputation for cases with missing baseline data. Each imputed dataset was computed separately based on intervention condition (Active Control versus ENRICH) and dependent variable domain (oral language and self-regulation), followed by merging of the datasets. The longitudinal and clustered nature of our data likely contributed to non-random missingness in three out of the four datasets (Little's MCAR test $ps < .03$), although sensitivity analyses did not reveal significant predictors of missing values among our variables of interest. For a detailed view of our missing data protocol, please consult https://osf.io/p7ex2/files/78s9m. To test Hypothesis 1, multilevel regression models including both parent and teacher reports were estimated. Informant was included as a factor, and interactions between informant and child characteristics were specified to allow associations with language and self-regulation to differ between parents and teachers. Models were parameterized with alternative reference categories for informant to obtain directly interpretable estimates for each informant group. The centers came from three regions across the country (i.e. Southland, Midland, and Northland), so these analyses took account of any clustering effects of center and region. Normality assumptions were checked for the models based on the visual assessments (Kernel Density Plot, Normal Probability Plot and Q-Q plot), and no departures from

Table 2
Descriptive statistics for parent reports of children's oral language and self-regulation as a function of demographic variables.

	Language Skills				Self-Regulation
	Gestures	English Productive Vocabulary	Syntax*		Effortful Control
	M (*SD*)	*M* (*SD*)	(%)		*M* (*SD*)
			Not Yet Combining	Combining	
Child gender					
Female	19.62 (3.84)	34.86 (24.19)	37.60%	62.40%	4.66 (.70)
Male	18.39 (4.15)	31.22 (24.24)	47.83%	52.17%	4.53 (.73)
Ethnicity					
Māori	19.52 (3.68)	34.30 (23.69)	39.74%	60.26%	4.59 (.72)
Pacific	19.72 (4.12)	35.00 (23.06)	36.61%	63.39%	4.68 (.79)
Asian	18.59 (4.59)	31.47 (24.22)	52.45%	47.55%	4.69 (.74)
MELAA	19.47 (3.97)	28.47 (19.98)	50.00%	50.00%	4.72 (.75)
European	19.06 (3.85)	33.30 (24.23)	40.02%	59.98%	4.54 (.71)
SES					
Low	19.65 (3.51)	35.76 (26.63)	47.13%	52.87%	4.68 (.77)
Middle	18.94 (3.97)	32.81 (25.00)	43.33%	56.67%	4.56 (.72)
High	18.90 (4.18)	32.65 (23.49)	42.54%	57.46%	4.60 (.71)
Language Status					
Monolingual	19.09 (3.90)	33.72 (24.42)	40.63%	59.38%	4.57 (.71)
Multilingual	18.49 (4.69)	29.52 (23.56)	54.85%	45.15%	4.69 (.77)
Birth status					
Preterm	18.89 (4.73)	32.53 (23.86)	44.50%	55.49%	4.61 (.69)
Full-term	19.01 (3.92)	33.08 (24.31)	42.64%	57.36%	4.59 (.72)
Cohort					
Cohort A	19.02 (3.96)	31.31 (23.33)	43.63%	56.37%	4.63 (.71)
Cohort B	18.92 (4.27)	38.02 (26.40)	41.11%	58.90%	4.49 (.73)

Note. MELAA = Middle Eastern, Latin American, or African ethnicity.
* Syntax categories sum to 100% and reflect word combinations in any language.

Table 3
Descriptive statistics for teacher reports of children's oral language and self-regulation as a function of demographic variables.

	Language Skills				Self-Regulation
	Gestures	English Productive Vocabulary	Syntax*		Effortful Control
	M (*SD*)	*M* (*SD*)	(%)		*M* (*SD*)
			Not Yet Combining	Combining	
Child gender					
Female	17.59 (5.55)	26.54 (22.08)	42.52%	57.48%	4.84 (.83)
Male	15.79 (6.04)	22.74 (21.40)	52.54%	47.46%	4.56 (.92)
Ethnicity					
Māori	17.28 (5.54)	24.43 (21.59)	46.69%	53.31%	4.75 (.91)
Pacific	16.45 (6.54)	25.09 (19.97)	42.45%	57.55%	4.76 (1.05)
Asian	15.10 (6.01)	19.97 (19.99)	57.14%	42.86%	4.69 (.86)
MELAA	15.77 (6.14)	18.48 (17.52)	64.71%	35.29%	4.78 (.76)
European	17.15 (5.65)	25.92 (22.22)	44.21%	55.79%	4.70 (.90)
SES					
Low	16.08 (5.85)	18.84 (17.45)	56.79%	43.21%	4.74 (.90)
Middle	16.40 (6.15)	23.15 (20.83)	49.00%	51.00%	4.60 (.95)
High	16.95 (5.64)	26.41 (22.67)	44.68%	55.32%	4.76 (.85)
Language Status					
Monolingual	17.03 (5.74)	25.87 (22.29)	45.09%	54.91%	4.70 (.90)
Multilingual	14.60 (6.12)	17.19 (17.44)	60.32%	39.68%	4.61 (.86)
Birth status					
Preterm	16.35 (5.61)	22.52 (20.51)	50.29%	49.71%	4.61 (.83)
Full-term	16.69 (5.90)	24.88 (22.01)	47.11%	52.89%	4.70 (.91)
Cohort					
Cohort A	16.65 (5.91)	23.72 (20.88)	46.35%	53.65%	4.70 (.92)
Cohort B	16.71 (5.65)	27.24 (24.15)	52.08%	47.92%	4.63 (.86)

Note. MELAA = Middle Eastern, Latin American, or African ethnicity.
* Syntax categories sum to 100% and reflect word combinations in any language.

normality were detected. Because we found significant differences in demographic factors by cohort (see Poulton et al., 2025), we also included child age and cohort as covariates in all models. Briefly, children in Cohort A were significantly younger, with a higher percentage of girls and children of European and Māori ethnicity, whereas children in Cohort B contained a higher percentage of children of Asian ethnicity and were more likely to have a non-English home language. Multivariable analyses assessed all potential predictors of language and self-regulation simultaneously (Tables 5–8). Predictors were gender, ethnicity, SES, language status (i.e. multilingual vs monolingual), preterm vs full-term, age, cohort, and informant. Significant findings by informant are reported in text below and in Figs. 1–6. Ethnicity was represented by a single contrast (non-European vs European, as the most frequent child ethnicity was European). Analyses examining each predictor separately (i.e., single-predictor model), controlling for age and cohort, were also conducted and are reported in the supplemental files

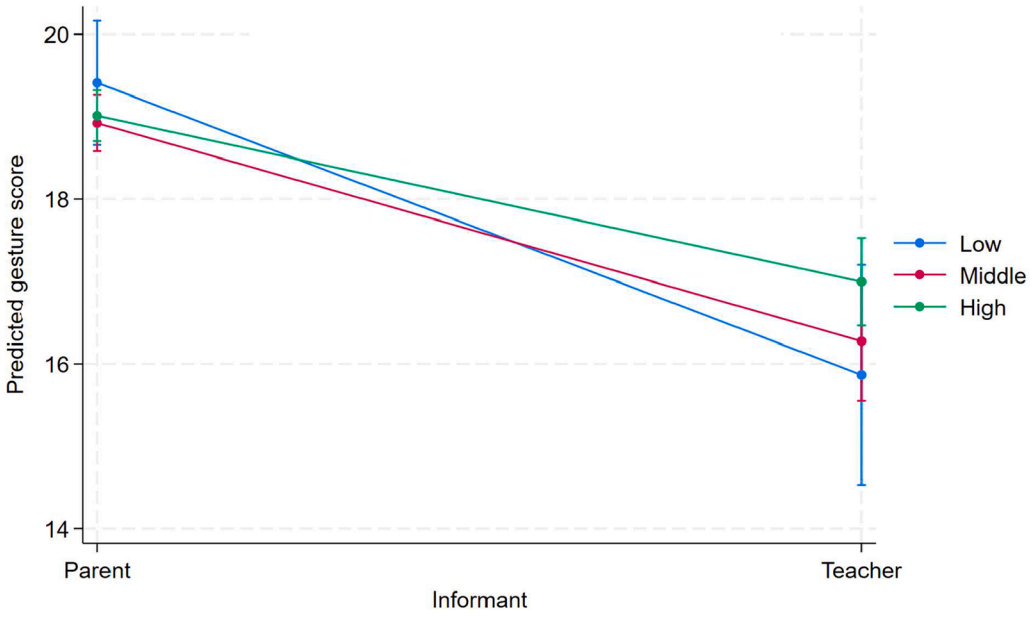

Fig. 1. Predicted gesture use by SES group and informant.
Note. Error bars represent the 95% confidence intervals.

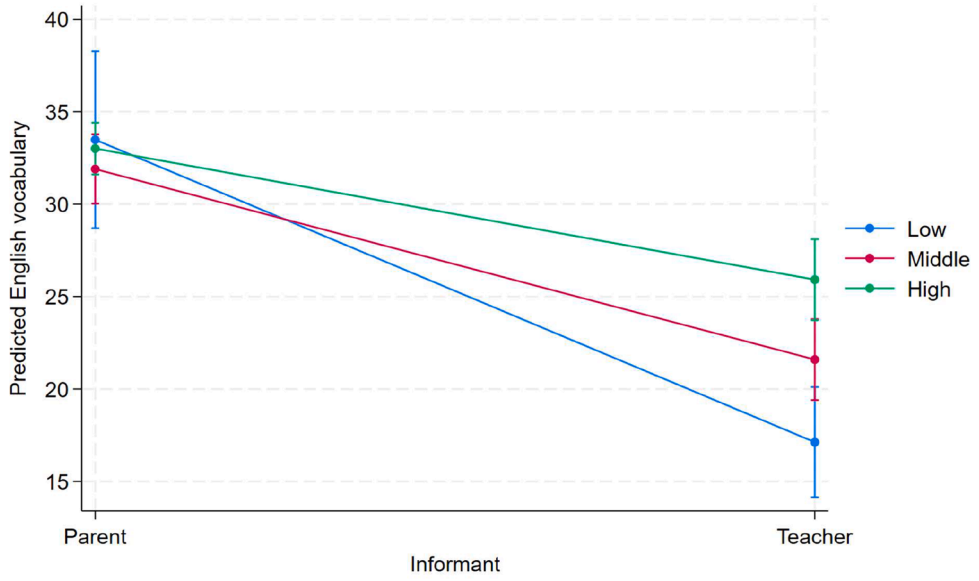

Fig. 2. Predicted English vocabulary by SES group and informant.
Note. Error bars represent the 95% confidence intervals.

(see Tables S1-S4). When a predictor was significant in the multivariate model but not in the single-predictor model, this was noted in the Results. Follow-up multivariable models focusing on alternative ethnicity contrasts were conducted only when that contrast was significant in the separate-predictor models and are reported in supplemental files (see Tables S5-S8).

Furthermore, to test Hypothesis 2, parent-teacher within- and cross-domain associations were examined using two approaches: both raw Pearson correlation coefficients (Table 4) and regression-based estimates that additionally accounted for clustering and covariates (child age, gender, cohort, and SES). The regression models provided standardized coefficients after accounting for clustering. In these models, the oral language and self-regulation variables were standardized (z-scored), allowing the resulting regression coefficients to be interpreted similarly to partial correlations as they reflect the association between the two standardized variables after adjusting for clustering and covariates (Table 9).

6. Results

6.1. Children's language development

6.1.1. Gestures

Parent-report. Gender was a unique predictor, with girls using more gestures than boys (see Table 5). Moreover, older age and being in Cohort A were also unique significant predictors of higher gesture use. Being of Māori ethnicity was a significant predictor of gesture ratings, with Māori children rated as using significantly more gestures compared to non-Māori children (see Table S1).

Teacher-report. Gender was a unique predictor, with girls using

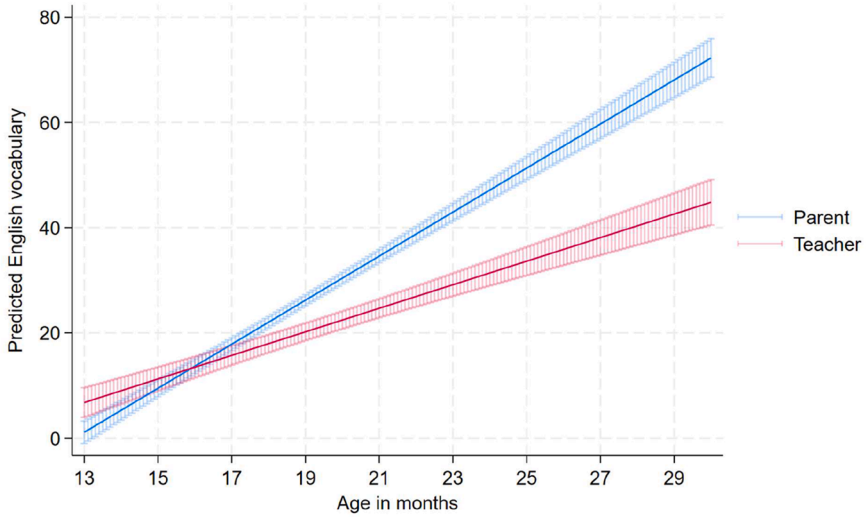

Fig. 3. Predicted English vocabulary by age and informant.
Note: The lines show predicted values, and the shaded area represents the 95% confidence bands.

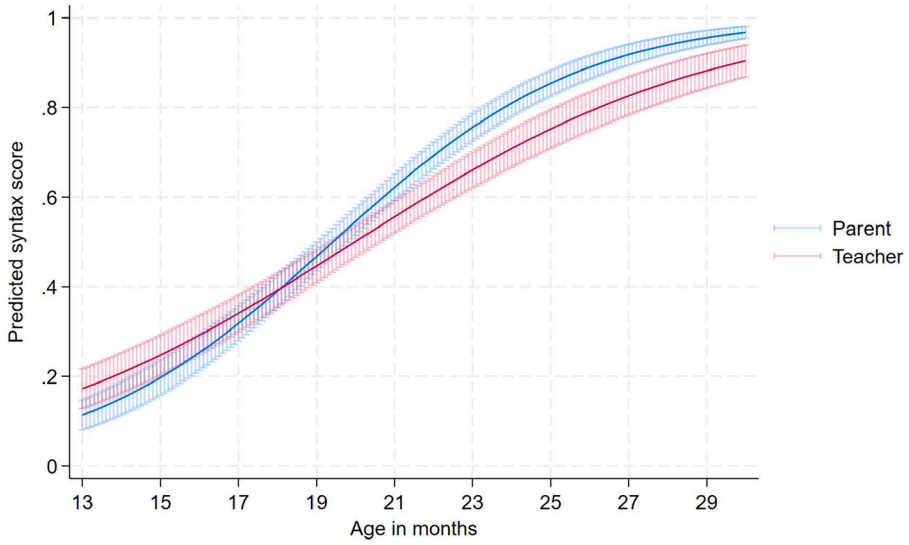

Fig. 4. Predicted syntax by age and informant.
Note: The lines show predicted values, and the shaded area represents the 95% confidence bands.

more gestures than boys, and being monolingual (see Table 5). Older age was also uniquely associated with greater gesture use, as did non-Asian ethnicity. Notably, only in the multivariable model, SES emerged as a unique predictor, with children from higher SES backgrounds rated as using significantly more gestures compared to their middle-SES counterparts.

Parent-report versus teacher-report. Parent and teacher reports for gestures showed a moderate association when clustering and covariates were accounted for ($B = .32$, $p < .001$), and a similar pattern was observed in the unadjusted Pearson correlation, $r = .37$, $p < .001$ (see Table 4). In the multivariable model, the overall difference between teacher and parent scores was not significant ($B = -0.45$, SE = 1.01, $t = -0.44$, $p = .659$, 95% CI [−2.44, 1.55]). However, the interaction between SES and informant was significant. Teachers' scores were significantly lower than parents' scores for both children from low SES ($B = -1.53$, SE = 0.67, $t(130) = -2.29$, $p = .023$, 95% CI [−2.85, −0.21]) and middle SES ($B = -0.63$, SE = 0.29, $t(130) = -2.15$, $p = .033$, 95% CI [−1.21, −0.05]). The difference was largest for children from low SES, indicating that informant discrepancies in scores were most pronounced in lower SES groups (see Fig. 1).

Overall, both parents and teachers identified similar key predictors (gender, age) for children's gestures, but SES influenced gesture scores more for teachers. Informant differences were most pronounced in lower-SES groups.

6.1.2. *English vocabulary*

Parent-report. Children's English vocabulary size was significantly associated with age, gender, and language status. Parents scored children as having a larger vocabulary if they were older, girls, or monolingual (see Table 6).

Teacher-report. As with parent-report, teacher-reported vocabulary size was significantly linked with children's age, gender, and language status. Teachers scored children as having a larger vocabulary if they were older, girls, or monolingual. The multivariable model also showed that teachers scored middle SES families as having a smaller vocabulary compared to their peers (see Table 6).

Parent-report versus teacher-report. Parent and teacher reports for English vocabulary showed a moderate association when clustering and

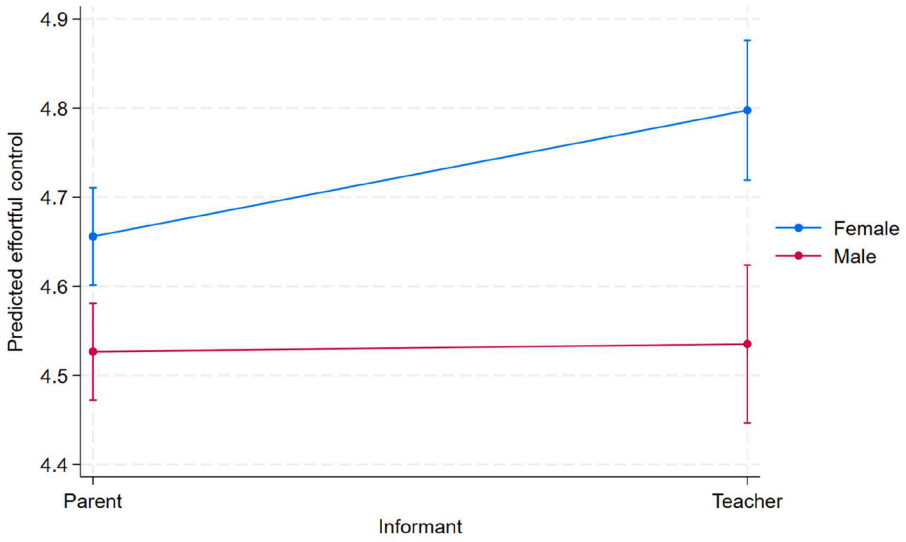

Fig. 5. Predicted effortful control by gender and informant.
Note. Error bars represent the 95% confidence intervals.

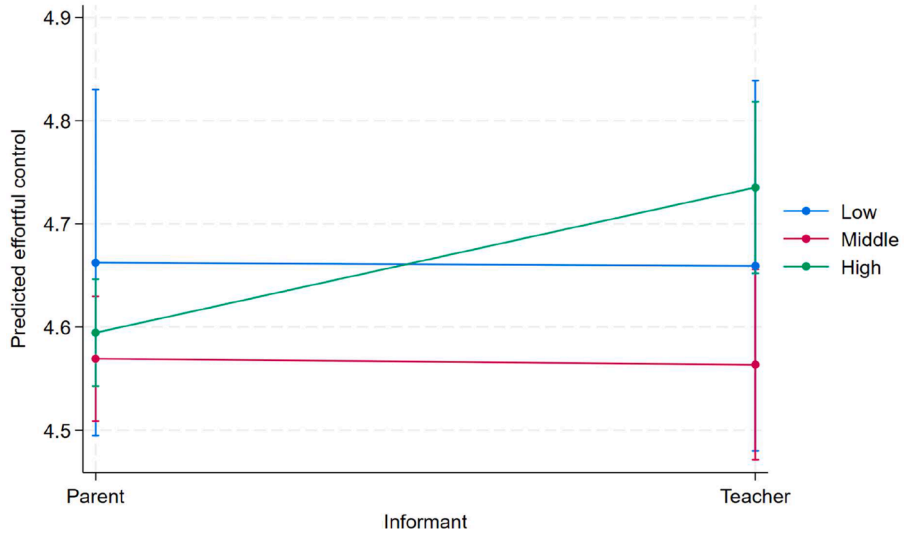

Fig. 6. Predicted effortful control by SES and informant.
Note. Error bars represent the 95% confidence intervals.

covariates were accounted for ($B = .45$, $p < .001$). A strong link was observed in the unadjusted Pearson correlation ($r = .59$, $p < .001$, see Table 4). Parent reports of English vocabulary were significantly higher than teacher reports ($B = 33.84$ (3.64), $t(130) = 9.29$, $p < .001$, 95% CI = [26.63, 41.05]. Informant type also interacted with SES. Teachers rated children lower than parents for low SES ($B = -9.27$, SE = 2.52, $t = -3.68$, $p < .001$, 95% CI [−14.25, −4.28]) and middle SES families ($B = -3.21$, SE = 1.30, $t = -2.47$, $p = .015$, 95% CI [−5.78, −0.64]). Parents reported English vocabulary fairly consistently across SES (see Fig. 2). In addition, the interaction between informant and age was significant ($B = -1.95$, SE = 0.19, $t = -10.41$, $p < .001$, 95% CI [−2.32, −1.58]). Specifically, parent scores changed more steeply across age groups, whereas the age-related change in teacher scores was significantly smaller (see Fig. 3).

Overall, both informants showed similar patterns by age and gender, with girls and older children rated as having larger vocabulary sizes. However, SES and age influenced the magnitude of parent-teacher discrepancies.

6.1.3. *Syntax*

We performed multilevel logistic regression for the syntax variable. Recall that syntax ratings were across all the child's languages if multilingual.

Parent-report. Children's syntax was associated with gender and ethnicity with girls and those of European, rated as having more advanced syntax (see Table 7). Older children and those from Cohort A were rated as having more advanced syntax. In addition, unlike in the single-predictor analysis (see Table S3), low-SES children were rated as lower compared to high-SES children in the multivariable analysis.

Teacher-report. Similar to parent reports, children's syntax was associated with gender, ethnicity, and SES, with girls or those of European, or from high-SES families, rated as having more advanced syntax (see Table 7). Older children and those from Cohort A were also rated as having more advanced syntax. In teacher reports, language status emerged as an additional unique predictor, with monolingual children rated higher in syntax than multilingual peers.

Parent-report versus teacher-report. Parent and teacher reports for syntax showed a moderate association when clustering and covariates

Table 4
Descriptive statistics and correlations among parent- and teacher-reported language scores and effortful control.

	Parent-Gestures	Teacher-Gestures	Parent-Vocabulary	Teacher-Vocabulary	Parent-Syntax	Teacher-Syntax	Parent-Effortful Control	Teacher-Effortful Control
Parent-Gestures	—							
Teacher-Gestures	.37***	—						
Parent-Vocabulary	.50***	.35***	—					
Teacher-Vocabulary	.33***	.58***	.59***	—				
Parent-Syntax	.48***	.35***	.63***	.46***	—			
Teacher-Syntax	.35***	.48***	.53***	.63***	.51***	—		
Parent-Effortful Control	.27***	.06*	.18***	.07**	.14***	.08**	—	
Teacher-Effortful Control	.17***	.43***	.18***	.31***	.16***	.26***	.12***	—
Mean	19.02	16.64	33.08	23.73	.58	.53	4.60	4.66
SD	3.92	5.63	23.83	20.75	.49	.50	.69	.85
N	1481	1481	1481	1481	1481	1481	1481	1481

Note:.
*** $p < .001$.
** $p <.01$.
* $p < .05$. ^.

Table 5
Multivariable predictors of parent and teacher reports of children's gestures.

	Parent-Reported Gestures B [95% CI]	**Teacher-Reported Gestures B [95% CI]**
Females vs males	1.25 [.80, 1.69]***	1.78 [1.23, 2.34]***
Ethnicity		
Non-Euro vs Euro	-.04 [−.57, .49]	−1.15 [−2.34, .03]
SES		
Low vs High	.40 [−.41, 1.21]	−1.13 [−2.40, .14]
Middle vs High	-.09 [−.53, .35]	-.72 [−1.36, −.08]*
Language Status (Multilingual vs monolingual)	-.60 [−1.26, .07]	−1.49 [−2.66, −.32]*
Preterm vs full-term	-.14 [−.80, .52]	-.37 [−1.18, .43]
Age	.37 [.30, .43]***	.30 [.20, .40]***
Cohort B vs Cohort A	-.78 [−1.34, −.21]**	-.54 [−1.62, .54]

Note: Parent-Report: $ICC_{centre} = .02$, 95% CI: [.00, .05], $p = .03$; $ICC_{region} = .00$, 95% CI: [.00, .00], $p = .42$. Teacher-Report: $ICC_{centre} = .17$, 95% CI: [.12, .23], $p < .001$; $ICC_{region} = .00$, 95% CI: [.00, .00], $p = .42$.
* $p < .05$.
** $p < .01$.
*** $p \leq .001$.

Table 6
Multivariable predictors of parent and teacher reports of children's English vocabulary.

	Parent-Reported English Vocabulary B [95% CI]	**Teacher-Reported English Vocabulary B [95% CI]**
Females vs males	4.48 [2.29, 6.68]***	3.80 [1.62, 5.99]***
Ethnicity		
Non-Euro vs Euro	−2.02 [−5.39, 1.26]	−3.04 [−6.22, .14]
SES		
Low vs High	.48 [−4.44, 5.40]	−8.79 [−12.06, −5.51]***
Middle vs High	−1.11 [−3.36, 1.14]	−4.32 [−6.91, −1.73]***
Language Status (Multilingual vs monolingual)	−5.63 [−9.31, −1.95]**	−7.39 [−10.33, −4.46]***
Preterm vs full-term	-.04 [−3.05, 2.96]	−2.27 [−4.88, .33]
Age	4.19 [3.87, 4.50]***	2.24 [1.87, 2.61]***
Cohort B vs Cohort A	−1.12 [−3.85, 1.62]	-.19 [−3.95, 3.58]

Note: Parent-report: $ICC_{centre} = .03$, 95% CI: [.00, .06], $p = .004$; $ICC_{region} = .00$, 95% CI: [.00, .00], $p = .93$. Teacher-report: $ICC_{centre} = .12$, 95% CI: [.07, .17], $p < .001$; $ICC_{region} = .01$, 95% CI: [.00, .02], $p = .02$.
* $p < .05$.
** $p < .01$.
*** $p \leq .001$.

were accounted for ($B = .43$, $p < .001$). This pattern was consistent with the unadjusted Pearson correlation ($r = .51$, $p < .001$, see Table 4). Parents were more likely than teachers to report the "combining" category than "not yet combining" ($B = 1.89$, SE = 0.53, $t(130) = 3.60$, $p < .001$, 95% CI [0.85, 2.93]). The role of age on children's syntax scores differed by informant. Parents' ratings increased more steeply with age, whereas teachers' ratings increased more slowly ($B = -0.10$, SE = 0.03, $t(130) = -3.74$, $p < .001$, 95% CI [−0.15, −0.05]; see Fig. 4).

Overall, patterns were broadly consistent across informants, with gender, age, cohort, and ethnicity as key predictors of syntax. Language status influenced ratings differently for parents and teachers, emerging as an additional unique predictor in teacher reports. Informant differences were observed for SES and age effects.

6.2. Children's self-regulation development: effortful control

Parent-reports. Gender, age, cohort, and non-European ethnicity were unique predictors of children's effortful control, indicating that girls, older children, those in Cohort A, and those of non-European ethnicity were rated as having higher levels of effortful control (see Table 8).

Teacher-reports. Children's effortful control was significantly associated with gender and SES. Teachers rated girls, and those from high-SES backgrounds (compared to middle-SES), as higher in effortful control. However, teacher ratings of effortful control did not differ between children from high-SES and low-SES backgrounds (see Table 8).

Parent-report versus teacher-report. Parent ($M = 4.59$, $SD = .69$) and teacher ($M = 4.66$, $SD = .85$) ratings of effortful control were weakly but significantly associated after accounting for clustering and covariates ($B = .12$, $p < .001$). This pattern was consistent with the unadjusted Pearson correlation ($r = .12$, $p < .001$). Teacher-rated effortful control did not differ significantly from parent ratings ($B = .37(.20)$, $t(130) = 1.88$, $p = .063$, 95% CI [−.02, .76]. The interaction between informant and gender indicated that teachers rated girls higher than boys to a greater extent than did parents ($B = .13(.06)$, $t(130) = 2.34$, $p = .021$, 95% CI [.02, .25]; see Fig. 5). In addition, informant differences were also significant among children from high-SES, with teachers providing higher ratings than parents (see Fig. 6).

Overall, gender was a unique predictor in both parent and teacher reports. Ethnicity, age, and cohort were linked with parent ratings, while SES was linked with teacher ratings. Informant discrepancies were most pronounced for girls and children from high-SES families.

Table 7
Multivariable predictors of parent and teacher reports of children's syntax (word combinations in any language).

	Parent-Reported Syntax B [95%CI]	Teacher-Reported Syntax B [95%CI]
Females vs Males	.58 [.32, .83]***	.54 [.28, .79]***
Ethnicity		
Non-Euro vs Euro	-.53 [−.93, −.13]**	-.56 [−.93, −.20]**
SES		
Low vs High	-.59 [−1.16, −.01]*	-.95 [−1.43, −.46]***
Middle vs High	-.24 [−.49, .02]	-.38 [−.65, −.11]**
Language Status (Multilingual vs monolingual)	-.43 [−.92, .05]	-.46 [−.90, −.03]*
Preterm vs full-term	-.08 [−.42, .26]	-.17 [−.53, .19]
Age	.34 [.29, .38]***	.24 [.20, .28]***
Cohort B vs Cohort A	-.49 [−.83, −.16]**	-.71 [−1.05, −.37]***

Note: Parent-report: $ICC_{centre} = .02$, 95% CI: [.00, .05], $p = .043$; $ICC_{region} = .00$, 95% CI: [.00, .00], $p = .852$. Teacher-report: $ICC_{centre} = .04$, 95% CI: [.00, .07], $p = .003$; $ICC_{region} = .00$, 95% CI: [.00, .01], $p = .752$.
* $p < .05$.
** $p < .01$.
*** $p \leq .001$.

Table 8
Multivariable predictors of parent and teacher reports of children's effortful control.

	Parent-Reported Effortful Control B [95%CI]	Teacher-Reported Effortful Control B [95%CI]
Females vs males	.13 [.05, .21]***	.26 [.17, .35]***
Ethnicity		
Non-Euro vs Euro	.20 [.11, .30]***	.05 [−.10, .21]
SES		
Low vs High	.07 [−.10, .24]	-.08 [−.26, .10]
Middle vs High	-.03 [−.11, .05]	-.17 [−.27, −.07]***
Language Status (Multilingual vs monolingual)	-.03 [−.14, .09]	-.17 [−.35, .01]
Preterm vs full-term	.04 [−.07, .15]	-.09 [−.21, .03]
Age	.02 [.00, .03]*	.00 [−.01, .02]
Cohort B vs Cohort A	-.18 [−.26, −.10]***	-.06 [−.19, .08]

Note: Parent-report: $ICC_{centre} = .01$, 95% CI: [.00, .03], $p = .22$; $ICC_{region} = .00$, 95% CI: [.00, .02], $p = .057$. Teacher-report: $ICC_{centre} = .13$, 95% CI: [.08, .17], $p < .001$; $ICC_{region} = .00$, 95% CI: [.00, .00], $p = .64$.
* $p < .05$
** $p < .01$.
*** $p < .001$.

6.3. *Within-informant and cross-informant associations for oral language and self-regulation*

Finally, we explored associations within and across informant (parents and teachers) on oral language and effortful control, controlling for potential confounding variables such as age, gender, cohort, and family SES, also accounting for the cluster effect of early childhood center (see Table 9). The analyses revealed significant within-informant associations between oral language and effortful control for parents (column 1) and for teachers (column 2). Cross-informant associations also revealed significant links between parent-reported language and teacher-reported effortful control (column 3), but not between teacher-reported language and parent-reported effortful control (column 4).

Table 9
Within-informant (columns 1 and 2) and across-informant (columns 3 and 4) associations, accounting for clustering and controlling for child age, gender, cohort, and family SES.

	Effortful Control			
	Parent ratings of language and effortful control	Teacher ratings of language and effortful control	Parent ratings of language and teacher ratings of effortful control	Teacher ratings of language and parent ratings of effortful control
Gestures	.23***	.43***	.15***	.04
Vocabulary Size	.13***	.30***	.18***	.04
Syntax	.12***	.27***	.16***	.04

Note.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

7. Discussion

The main aim of this paper was to examine the associations between oral language and self-regulation within and across informants (parents and teachers) as a function of demographic differences. Overall, our findings highlight both similarities and differences of parent and teacher reports of toddlers' oral language and self-regulation. Parents' and teachers' reports of oral language (gestures, vocabulary, and syntax) were moderately and significantly correlated as in past research (Stolarova et al., 2014). Parent and teacher ratings of effortful control were weakly correlated as in past research (Mulder et al., 2019), yet significantly so due to our large sample size. Both parents and teachers are important informants of both aspects of children's development, observing somewhat different slices of children's lives.

Our findings showed the largest differences within oral language and self-regulation skills as a function of children's age and gender, with older children and girls showing more advanced oral language (gestures, vocabulary, and syntax) according to both parents and teachers. For self-regulation, both parents and teachers rated girls as higher in effortful control than boys. However, only parents rated older children and non-European children as higher in effortful control, and only teachers rated high-SES children as higher in effortful control than middle-SES children. Thus, the measures were sensitive to toddlers' developing competencies with age, especially for oral language.

7.1. *Predictors of children's oral language skills*

With respect to our extension to a large, diverse non-US cohort (Hypothesis 1), most of our findings for predictors of children's oral language skills were in line with previous international and New Zealand research. In addition to age and gender, we found that monolingual children were reported to have larger English vocabularies than multilingual children (Hoff, 2021; Reese et al., 2018). Thus, even with our broad measure of monolingualism of having English as the primary language in the home, these children demonstrated an advantage in English vocabulary. For syntax ratings, which assessed across all children's languages, monolingual and multilingual children were similar according to parents but not teachers. Parents were in a better position to respond to this question across all their child's languages, whereas most teachers would have responded to this question solely with respect to children's English word combinations.

Likewise, most of our findings with respect to SES were similar to previous international and New Zealand literature, with children from higher-SES families scored as higher on all aspects of oral language development than low- or middle-SES families (Walker & Carta, 2020).

However, SES differences were noted for children's syntax and English vocabulary only from teacher and not parent reports. In future waves of this study, we will compare parent and teacher reports to researcher-administered measures of oral language development to better understand this finding.

Few differences in children's oral language were apparent as a function of children's ethnicity once other variables were entered. There were no longer any unique differences for children's English vocabulary; however, both parents and teachers continued to rate non-European children as lower in their word combination skills across all languages, and teachers rated Asian children as lower in gestures.

On that note, the communication advantage we found for gestures in Māori toddlers is novel and intriguing. This finding is in line with sociolinguistic reports of Māori adults using some gestures more often than European adults (Gruber et al., 2016). Yet this finding was not predicted and needs to be replicated. Unpublished evidence shows a similar pattern for parent reports on the same measure in the large Growing Up in New Zealand cohort of >6000 children at 9 months (Prickett, 2024). Moreover, the difference we found was present only for parent reports, and not teacher reports. It could be that parents recognize children's idiosyncratic gestures better than teachers, and/or that Māori parents place greater value on gestures than do non-Māori parents and teachers. Most of the teachers in our sample were not of Māori ethnicity.

7.2. Predictors of children's self-regulation

In addition to unique advantages for girls and older children for effortful control (parent-report only), we also found unique advantages for non-European children (parent-report only) and for high-SES children compared to middle-SES (teacher-report only). These findings for non-European and high-SES children are similar to those in other cultures and countries (e.g., Lecheile et al., 2020; Putnam et al., 2024). Cultural values that emphasize social harmony and compliance—common in many non-European contexts—may influence how parents perceive and rate effortful control, as self-regulation is often considered an important socialization goal. It is also possible that these differences are real and that parents are in a better position to observe children across a wider range of settings (e.g., sitting through lengthy church services, meetings, or cultural rituals). Together, these possibilities provide a potential explanation for why ethnicity differences emerged in parent reports but not in teacher reports. Similarly, high-SES families often share parenting practices such as structured routines and an emphasis on academic readiness, which promote and reinforce school-like regulatory behaviors. Our results also show some evidence of sensitivity to toddlers' developing self-regulation with age, although only for parents' ratings and not teacher ratings.

7.3. Cross-informant associations and differences for oral language and effortful control

We found that parents' reports of all three dimensions of oral language were correlated with teacher reports of effortful control, bolstering theorized interrelationships between oral language and self-regulation during toddlerhood (Salmon et al., 2016; Thériault-Couture, Matte-Gagné, & Bernier, 2025; Vygotsky, 1934/1986). However, teachers' reports of oral language were not significantly correlated with parents' reports of effortful control. This apparent discrepancy may arise from differences in perception between parents and teachers, with teachers possibly demonstrating greater sensitivity to children's effortful control skills due to their exposure to diverse settings and more children of the same age. Indeed, a recent meta-analysis found that teacher reports of preschool children's executive function were better predictors of later development than were parent reports (Stucke & Doebel, 2024). The authors concluded that teachers may observe children in a wider range of contexts taxing children's executive function compared to parents; teachers may also be more objective raters of children's behavior compared to parents. It is also possible that self-regulation skills are easier to notice in a group setting than a home setting.

In turn, parents may demonstrate greater sensitivity to their children's oral language skills than teachers due to their greater exposure to their children's utterances in one-to-one settings, and potentially to their greater understanding of children's utterances. Parents also have privileged access to children's home language use compared to teachers. Consistent with this, age-related patterns differed reliably between parent and teacher reports for all language domains except gestures: parents' ratings showed steeper age-related changes than teachers'. This pattern indicates that parents may be more sensitive to age-linked changes in children's language abilities, which is consistent with their greater exposure to children's communicative behaviors across contexts and languages.

In addition to the age-related differences, socioeconomic status also moderated informant discrepancies. For gestures and English vocabulary, teachers had a stronger SES gradient than parents. Teachers scored children from low- and middle-SES backgrounds lower than parents did, with the largest discrepancies in the low-SES group, whereas parent ratings were comparatively stable across SES groups. This indicates that informant differences may vary systematically by SES, with teacher perceptions more strongly differentiated by children's socioeconomic backgrounds. Prior research has documented SES-related differences in children's language via parent reports (e.g., Fenson et al., 1994; Reese et al., 2018). In the current study, those differences appeared clearly in teacher reports but not in parent reports. This pattern points to distinct influences on each informant's perspective: parents' close, individualized observations highlight developmental variation, whereas teachers' evaluations are more shaped by structural aspects of children's backgrounds. It is also possible that teachers rely more on these structural aspects in their language reports because they are less able than are parents to have as many individual conversations with children. These findings underscore the value of integrating multiple informants when assessing children's oral language, as each informant contributes unique and complementary information.

7.4. Strengths, limitations, and future research

The strengths of this study are the large, ethnically diverse, and non-U.S. sample drawing upon both parents and teacher reports of oral language and self-regulation. The recruitment during the pandemic is also a strength in terms of showing largely similar patterns to previously published research globally. We should acknowledge, however, that during the recruitment period, New Zealand was relatively more protected from pandemic-related disruptions compared to other countries, with much lower death rates (OECD et al., 2023).

One of the limitations of this study is that we under-sampled low-SES families, at least when measured via parents' occupational status. New Zealand government childcare subsidies began at age 3 for this cohort, so low-SES families were often unable to afford childcare. However, our sample included families from the full range of SES, and we found expected differences in oral language and self-regulation between low-SES and higher-SES children. Another limitation of our study is the lack of data on multilingual children's vocabularies in their non-English languages. Recognizing the unique developmental trajectories associated with growing up in a multilingual environment is crucial, as language development in such contexts may differ from monolingual norms. Our future research will focus on the effects of oral language (ENRICH) and self-regulation (ENGAGE) professional development programs with early childhood educators for this sample of children throughout early childhood and into primary school (Reese et al., 2023).

8. Conclusions

Both parents and teachers provide insightful information about

children's oral language and self-regulation development, yet parents may be somewhat more sensitive reporters of their children's oral language skills, and teachers of children's self-regulation skills. In future waves of Kia Tīmata Pai, we will be able to assess the fascinating interplay of these two developmental domains across the transitions from toddlerhood to preschool to primary school.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.ecresq.2026.04.002.

Data availability

Data will be made available on request.

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