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# Longitudinal Evidence of the Relationship Between Pretend Play and Mental Health in the Early Years

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**Abstract**

Empirical evidence suggests that pretend play can help children manage anxiety. Few longitudinal studies have explored the benefits of pretend play on the mental health outcomes of children in the general population. The current study explored longitudinal associations between pretend play at age 2–3 years old and mental health outcomes at age 4–5 and 6–7 using data from the Longitudinal Study of Australian Children, which included children born in 2004 ($N$=1,426). We also examined whether emotion regulation mediated this relationship. Children's mental health was measured using the Strengths and Difficulties Questionnaire completed by primary caregivers and educators. Higher pretend play ability at age 2–3 was associated with fewer internalising and externalising problems, even after controlling for attachment to main carer and other known predictors. Emotional regulation was not a significant mediator, suggesting that other unexplored factors may have mediated this relationship. These findings suggest that pedagogical practices and high-quality preschool experiences that support the development of pretend play ability could contribute to reducing children's mental health difficulties into primary school.

**Keywords** Pretend Play · Mental Health · Emotional Regulation · Childhood Development

## Introduction

Pretend play is defined as symbolic behaviour in which "one thing is playfully treated 'as if' it was something else" (Fein, 1987, p. 282). Through pretend play, children use symbolic communication, fantasy, and role play to express how they feel or re-enact life experiences (Russ, 2014; Stiefel, 2024). Freud (1961) and others suggest that pretend play is used by children as a way of coping and processing experiences (Erikson, 1964). A child can use conventional toys such as dolls and bottles to pretend to feed the doll (Lewis et al., 1992). Other forms of pretend play involve symbolism which includes transforming an object into something else (e.g., a shoe becomes a car), pretending to represent a state (e.g., feeling ill), or pretending that an absent object exists (e.g., an imaginary companion; Lewis et al., 1992). In clinical settings, pretend play has been used therapeutically to address social, emotional, and psychological concerns in young children (Stiefel, 2024). Empirical evidence suggests that pretend play can help children manage anxiety (Veraksa et al., 2025). Conversely, there is evidence illustrating that play deprivation, including pretend play deprivation, can increase risk of psychopathology (Gray, 2011; Kreppner et al., 1999).

Identifying mental health concerns in young people is based on the developmental stage of the child. In the earlier years, mental health is interconnected with emotional development. With the rapid development of cognitive, emotional and social skills, the focus during early childhood is on observable behaviour. Standardised screening tools such as the Strengths and Difficulty Questionnaire are often

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used in conjunction with other methods such as observing a child's play (Brøndbo et al., 2011). Few longitudinal studies have explored the benefits of pretend play on the mental health outcomes of children in the general population. One naturalistic longitudinal study examined pre-schoolers ($N=250$) pretend play narrative ability (through play with toys), coping strategies (assessed via a delayed gratification task) and internalising/externalising problems (assessed using an observation scale in a laboratory setting) (Marcelo & Yates, 2014). Children (4–5 years old) whose play was rated as having higher quality fantasy play as well as more negative affect themes and who were rated as having higher coping skills at baseline were found to have fewer internalising problems 12-months later. Those who exhibited more positive affect themes at baseline were found to have more externalising behaviours at 12-month follow-up. Interestingly, coping emotional regulation strategies during the delayed gratification task were found to mediate the associations between quality of fantasy play, negative affect laden themes and internalising behaviours, specifically for those who recently experienced stressful life events. These findings indicate that the ability to cope and regulate emotions could be a potential mechanism by which pretend play impacts on internalising problems among children with elevated mental health issues.

Children's emotional regulation skills are significant building blocks for positive development, laying the foundations for good mental health (Compas et al., 2017). These skills develop rapidly during early childhood (Bailey & Jones, 2019), coinciding with the emergence of pretend play (Nielsen & Dissanayake, 2004; Ungerer et al., 1981). More is known about the developmental progression of emotional regulation skills than pretend play. Generally, pretend play abilities emerge at age 2–3 years and pretend play quality peaks at age 5–6 years (Thompson & Goldstein, 2019). Basic emotional regulation skills emerge around age four and become more complex and salient during middle childhood (Bailey & Jones, 2019). Empirical evidence suggests that pretend play may enhance emotional development in young children (Rao & Gibson, 2019).

Correlational studies show an association between pretend play and emotional development (e.g., Hoffman & Russ, 2012). A naturalistic observation study investigated the longitudinal relationship of pretend and physical play and different aspects of emotional development (emotional expressiveness, emotional knowledge and emotional regulation) across two time points over a 12-month period ($N=122$, Lindsey & Colwell, 2013). It was found that pretend play predicted all three aspects of emotional development.

Intervention research on the effects of pretend play in early childhood on emotional outcomes have found mixed results. One study investigated the effect of an eight-week dramatic pretend play intervention on 4–5-year-old disadvantaged children's social and emotional skills (Goldstein & Lerner, 2018). The intervention was taught for twenty minutes three times a week and was compared to story time or blocks building control training conditions that did not involve pretend play ($N=97$). Improvements in children's emotional self-control were identified compared to a comparison group. Another study investigated the effect of a five-week socio-dramatic play intervention on 6–8-year-old children's emotional expressiveness and emotional regulation ($N=50$, Moore & Russ, 2008). Children participated in weekly 30-min sessions in one of three activities; pretend play expressing feelings using pretend stories, imagination play using fantasy, or a control group engaging in puzzles and colouring books. At two- and eight-months post intervention, those that participated in pretend play had better emotional expressiveness compared to those in the control group, however there was no significant benefit of the intervention on children's emotional regulation. Finally, another study explored the social aspect of pretend play by teaching a social dramatic play intervention to pre-school children for 30 min per week for six weeks ($N=211$, Jaggy et al., 2023). Children were assigned to one of three groups; socio-dramatic play with adult guidance, free socio-dramatic play or free play. Follow up assessments immediately post and 16-weeks after the intervention identified improvements in social competence and peer relationships but not emotional regulation or empathy. While the relationship between pretend play and emotional regulation skills has been investigated in the literature through experimental and intervention studies, the longitudinal association with mental health has yet to be explored.

## The Present Study

In many countries, pretend play forms part of an early years learning framework to identify learning and developmental outcomes (e.g.,, Australian Government Department Education, 2022; Department of Education, 2024). The aim of this study is to examine the relationship between pretend play ability at 2–3 years, emotional regulation skills at 4–5 years, and children's mental health outcomes at ages 4–5 and ages 6–7 years of age in a large, population-based longitudinal dataset of Australian children, broadly representative of the general population. Our study is undertaken from a systems theory approach by attempting to identify an activity that early educators could encourage in the early years to support positive mental health development as assessed by educators and primary caregivers. There is limited longitudinal research that has investigated the relationship between pretend play and mental health. It was hypothesised that greater

pretend play ability at age 2–3 years would be longitudinally associated with better mental health at ages 4–5 and ages 6–7 (hypothesis 1). We further hypothesised that emotional regulation at 4–5 years would mediate the association between pretend play ability at 2–3 years and mental health outcomes at ages 6–7 years (hypothesis 2).

## Methods

### Participants

Data for this study came from the Longitudinal Study of Australian Children, drawn from Birth (B) Cohort, $N = 5107$ (AIFS, 2024), who have been followed up biennially from 2003 to 04 (ages 0–1 years). Participant sampling used in LSAC is described in the Online Resources Methods, (see Soloff et al., 2005 for more details of the LSAC design). The present study draws data from Wave 2 (2005-06, ages 2–3 years), Wave 3 (2007-08, ages 4–5 years), and Wave 4 (2009-10, ages 6–7 years; henceforth referred to as T1, T2, and T3, respectively). Children with T1 data on pretend play ability as reported by early educator and who were dropped off at day-care or their child minder by their parents were included in the present study ($N = 1,426$; Gialamas et al. 2014a). This subsample includes children from higher socio-economic backgrounds and more likely to speak English than the original sample recruited at birth (Online Resource Table S1).

### Measures

#### Demographic Variables

Child age and sex recorded at birth (male or female) was generated from baseline enrolment documents. Family socio-economic position (SEP) at T1 was LSAC-generated and combines annual family income, parents' educational attainment and occupational status to summarise the social and economic means of households (Blakemore et al., 2009). Primary caregivers also reported languages other than English (LOTE) spoken at home which was subsequently dichotomised at T1 (English only or other).

#### Maternal Mental Health

Maternal mental health is an explanatory variable of children's emotional regulation and mental health (Coles & Cage, 2022; Goodman et al., 2011). Maternal psychological distress was assessed when children were 3 years old with the Kessler K6 screening scale, a reliable and internally consistent scale (Kessler et al., 2003). The K6 includes six items measuring the frequency of symptoms over the past four weeks summed to create a total score, with higher scores reflecting a greater level of psychological distress.

#### Language Abilities

Language abilities are associated with diagnosable mental health conditions and internalising and externalising problems in young people (Cantwell & Baker, 1987; Francis et al., 2022; Yew & O'Kearney, 2013). There is some evidence that play differs as a function of language abilities (Short et al., 2020). MacArthur Communicative Development Inventories (MCDI) on vocabulary and grammar were reported by mothers at age 3 (Fenson et al., 2007). A higher score signifies better language development.

#### Attachment

Secure attachment in children is related to better emotional regulation and prosocial behaviours (Mikulincer et al., 2003; Van Lange et al., 1997) and reduced risk of psychopathology (Rosenstein & Horowitz, 1996). Secure attachment also benefits the quality of pretend play (Roggman et al., 1987; Steele & Steele, 2001). The Child Care Separation/Reunion Scale was used to assess secure attachment and was completed by educators at age 3 (McCartney & Beauregard, 1991). The scale asks about child and parent behaviour during separation (eight items such as "the parent stays too long before leaving") and reunion (six items such as "in general, the child ignores or avoids the parent"). A higher score signifies better relationship quality.

#### Pretend Play Ability

A composite score of pretend play ability was extracted from three questions rated by early educators at age 2–3 pertaining to how well the study child performed: (i) *simple pretend play* like feeding a doll or stuffed animal, (ii) *pretend one object is a substitute for something else*, like using a towel as a blanket or a box for a house, and (iii) *peer pretend play* like using materials to role-play in costumes and playing house (AIFS, 2023). A higher score indicates a child doing more and better pretend play. The internal reliability of the composite sum score was acceptable (Cronbach's alpha = 0.77).

#### Emotional Regulation

The reactivity subscale from the Short Temperament Scale for Children (STSC) at age 4–5 was used to provide an indicator of emotional regulation (Gialamas et al. 2014b; Williams et al. 2017). The questions included in the

reactivity sub-scale reflect the reactive and control dimensions of emotional regulation (Calkins & Mackler, 2013). Primary caregivers were asked to indicate how regularly they encountered four situations with their child e.g., "If this child is upset, it is hard to comfort him". Higher scores indicate lower levels of emotional regulation (i.e. emotional reactivity). The STSC scale had moderate albeit acceptable internal consistency (Cronbach's alpha = 0.71).

### Mental Health Outcomes

Children's mental health was evaluated with the Strengths and Difficulties Questionnaire (SDQ, Goodman & Goodman, 2009), completed by educators and primary caregivers at age 4–5 and 6–7. We have included both responses because some children exhibit different types of behaviour in education versus home settings, such as in the case of "after school restraint collapse" (Fält et al., 2017; Naish et al., 2023; Pedersen et al., 2019). The SDQ is a behavioural screening questionnaire for 4–18-year-olds and consists of 25 items. It is suggested that three sub-scales are used in low-risk populations: pro-social, internalising and externalising problem behaviours (Goodman et al., 2010). The SDQ has been used to assess mental health (Stokholm & Lykke, 2020; Zhao & Gibson, 2023). Higher scores reflect more pro-social behaviour or greater mental health difficulties. All three subscales had good internal consistency (Cronbach's alpha=0.80).

## Statistical Analyses

Analysis was conducted in RStudio 4.3.2 (R Core Team, 2020). Pearson's r correlations were used to understand the relationship between measures of pretend play ability, mental health outcomes as measured by the SDQ (primary caregivers and educators), emotional regulation and covariates. Correlations were compared statistically between time points using the z-statistic (Lenhard & Lenhard, 2014). Next, linear regression models were computed, using the Lavaan version 0.6–19 (Rosseel, 2012) package in R, to investigate longitudinal associations between pretend play ability at 2–3 years and mental health outcomes at age 4–5 (T2) and 6–7 years (T3) adjusted for age, sex, socio-economic position, maternal mental health, main language spoken at home, language ability and parent-child attachment (hypothesis 1). Finally, mediation analyses were completed to assess whether the association between pretend play ability at age 2–3 years and mental health outcomes at age 6–7 years was mediated by emotional regulation at age 4–5 (hypothesis 2). Mediation analyses were performed using a robust maximum likelihood (MLR) estimation method (Li, 2016). Mediation effects were tested using the bootstrap method with 5000 resamples and a 95% confidence interval.

Fit indices were evaluated against pre-existing empirically validated cut-offs for all mediation analyses. The present study considers the different properties of the model to take a close fit approach, suggesting a minimum two-index view (Hooper et al., 2007; Hu & Bentler, 1999). The $\chi 2$ test statistic becomes inflated with large samples and was not considered when determining goodness of fit (Steenkamp & Baumgartner, 1998). The fit statistics considered were the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardised Root Mean Square Residual indices (SRMR). The fit indices indicated a good fit for most models ($CFI > 0.99$, $TLI > 0.93$, $SRMR < 0.01$, and $RMSR < 0.03$) (Browne & Cudeck, 1992). The mediation model for internalising behaviours as rated by teachers at time point three indicated a good fit for all indicators with the exception of $TLI = 0.73$.

### Missing Data

The selected sample had 11% of the data missing at random (Online Resources Figure S1). Missing data were imputed using multiple imputation with chained equations using Mice version 4.3.2 package in R (Schafer & Graham, 2002; Van Buuren & Groothuis-Oudshoorn, 2011). Covariates and all variables included in the analysis were used to specify imputed variables. Data were imputed 11 times using the rule of thumb that the number of imputations should be equal to the percentage of missing data (Von Hippel, 2009). The distributions of imputed and non-imputed data were compared to confirm their similarity. The Random Forest estimator (RF) was used to impute the data to accommodate nonlinearities and any violations of multivariate normality (Shah et al., 2014). All analyses were performed on each imputed dataset and pooled using the mice package.

# Results

Descriptive statistics for the studied variables can be found in the Online Resources Table S2. The mean age of participants was 2.3 years at T1, 4.3 at T2, and 6.4 at T3. Descriptive analyses showed that on average, pretend play ability at age 2–3 years in the cohort was high. Pearson's correlation coefficients analysing the bivariate relationship between all variables used in this study based on the imputed data. Most of the correlations were weak, with $r < 0.40$ (Evans, 1996). There were moderate associations between primary caregiver and educator SDQ measures of internalising

**Table 1** Regression models to predict mental health at age 4–5 years

| | Educator | | | Caregiver | | |
|---|---|---|---|---|---|---|
| | Internalising | Externalising | Pro-social behaviour | Internalising | Externalising | Pro-social behaviour |
| $R^2$ | 0.06 | 0.12 | 0.10 | 0.07 | 0.12 | 0.08 |
| *n* | 1426 | 1426 | 1426 | 1426 | 1426 | 1426 |
| | Beta (SE) | Beta (SE) | Beta (SE) | Beta (SE) | Beta (SE) | Beta (SE) |
| Pretend play ability | −0.30(0.05)*** | −0.37(0.09)*** | 0.20(0.05)*** | −0.18(0.05)*** | −0.11(0.07) | 0.12(0.04)** |
| Age | 0.49(0.23)* | 0.24(0.34) | 0.15(0.21) | 0.15(0.18) | 0.13(0.25) | 0.01(0.14) |
| Sex (Female) | −0.01(0.14) | −1.54(0.23) | 0.85(0.13)*** | −0.09(0.13) | −0.73(0.18)*** | 0.48(0.09)*** |
| SEP | 0.01(0.07) | −0.40(0.11)*** | 0.15(0.06)* | −0.12(0.06) | −0.58(0.09)*** | 0.06(0.05) |
| LOTE | −0.05(0.28) | −0.62(0.43)*** | 0.20(0.26) | 0.76(0.26)** | −0.40(0.38) | 0.68(0.19)*** |
| K6 | 0.05(0.02)* | 0.07(0.03)* | −0.06(0.02)* | 0.13(0.02)*** | 0.20(0.03)*** | −0.02(0.01)** |
| MCDI | −0.009(0.002)** | −0.017(0.004)*** | 0.006(0.002)* | −0.003(0.002) | −0.012(0.004)** | 0.008(0.001)*** |
| Attachment | −0.02(0.01) | −0.03(0.02) | 0.04(0.01)** | −0.01(0.01) | −0.02(0.02) | 0.01(0.01) |
| Intercept | 5.45(1.02)*** | 8.16(1.80)*** | 3.15(0.94)*** | 3.17(0.91)*** | 6.18(1.29)*** | 5.51(0.70)*** |

$*p < 0.05$. $**p < 0.01$. $***p < 0.001$; SEP = Socio-economic position; LOTE = Language Other Than English; K6 = Kessler Psychological Distress Scale (Maternal depression); MCDI = MacArthur Communicative Development inventories (language ability).

difficulties, externalising difficulties and pro-social behaviour at each time point (Online Resources Table S3). The negative correlation between externalising problems at T2 and pretend play ability at T1 was stronger for educator-reported than primary caregiver-reported mental health ($z = 2.46$, $p = 0.01$).

## Is Pretend Play Ability at Age 2–3 Years Associated with Better Mental Health at Age 4–5 and 6–7 Years? (Hypothesis 1)

Regression models were applied to explore the relationship between pretend play ability as a toddler (age 2–3 years) and mental health outcomes as assessed by educators and primary caregivers one and two years later (Tables 1 and 2). Children who showed better pretend play ability at age 2–3 years in their daycare setting were reported to have fewer internalising and externalising problems at ages 4–5 and 6–7 years as rated by educators. The associations between pretend play ability and SDQ measures were small for internalising problems and moderate for externalising problems at age 4–5. The associations at age 6–7 years were small, and of similar size for both internalising and externalising problems. Overall, higher pretend play ability was associated with a 20–30% variance of internalising or externalising problems as rated by early educators. Associations of pretend play with SDQ measures as rated by caregivers were small and significant for both internalising and externalising problems at age 6–7 years. Regression analyses were repeated on the complete case data (Online Resources S4 and S5). The associations between internalising and externalising problems and pretend-play ability remained significant and of similar size.

**Table 2** Regression models to predict mental health at age 6–7 years

| | Educator | | | Caregiver | | |
|---|---|---|---|---|---|---|
| | Internalising | Externalising | Pro-social behaviour | Internalising | Externalising | Pro-social behaviour |
| $R^2$ | 0.08 | 0.28 | 0.15 | 0.03 | 0.38 | 0.30 |
| *n* | 1426 | 1426 | 1426 | 1426 | 1426 | 1426 |
| | Beta (SE) | Beta (SE) | Beta (SE) | Beta (SE) | Beta (SE) | Beta (SE) |
| Pretend play ability | −0.22(0.07)** | −0.19(0.08)* | 0.08(0.04) | −0.16(0.05)** | −0.13(0.06)* | 0.06(0.03) |
| Age | −0.21(0.23) | −0.58(0.28)* | 0.04(0.18) | −0.11(0.19) | 0.00(0.22) | −0.02(0.12) |
| Sex (Female) | 0.04(0.16) | −1.25(0.21)*** | 0.95(0.12)*** | 0.27(0.13) | −0.60(0.15)*** | 0.53(0.09)*** |
| SEP | −0.25(0.08)** | −0.43(0.10)*** | 0.08(0.06) | −0.24(0.07)** | −0.28(0.08)*** | 0.05(0.04) |
| LOTE | 0.24(0.33) | 0.01(0.40) | −0.20(0.22) | 0.62(0.26)* | −0.39(0.30) | 0.04(0.15) |
| K6 | 0.04(0.03) | 0.01(0.04) | −0.01(0.02) | 0.09(0.022)*** | 0.01(0.03) | −0.02(0.01)* |
| MCDI | −0.01(0.01) | −0.01(0.01) | 0.01(0.01) | −0.01(0.01) | −0.01(0.01)* | 0.01(0.01) |
| Attachment | −0.03(0.01) | −0.02(0.02) | 0.02(0.01) | −0.01(0.01) | −0.02(0.01) | 0.01(0.01) |
| SDQ 4–5 years | 0.19(0.03)*** | 0.40(0.03)*** | 0.21(0.02)*** | 0.54(0.03)*** | 0.55(0.02)*** | 0.43(0.02)*** |
| Intercept | 4.26(1.79)* | 4.49(1.83)* | 3.83(1.14)*** | 3.35(1.15)*** | 5.07(1.41)*** | 4.74(0.79)*** |

$*p < 0.05$. $**p < 0.01$. $***p < 0.001$; SEP = Socio-economic position; LOTE = Language Other Than English; K6 = Kessler Psychological Distress Scale (Maternal depression); MCDI = MacArthur Communicative Development inventories (language ability); SDQ = Strengths and Difficulty Questionnaire related sub-construct internalising, externalising or pro-social behaviour.

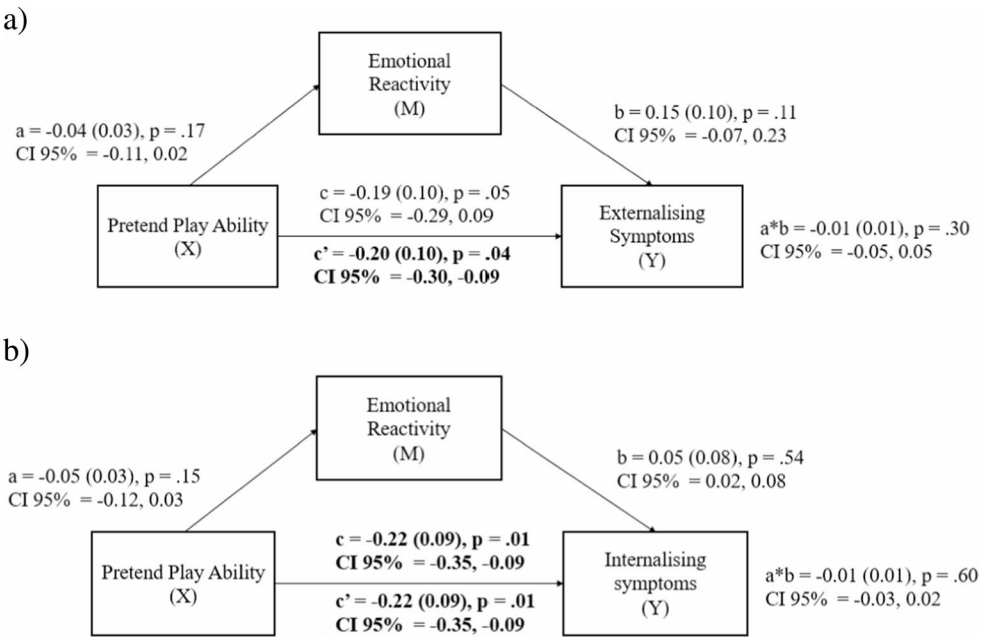


**Fig. 1** Mediation Models: The Effect of Pretend Play Ability ("X") on Mental Health as rated by educators ("Y") Mediated ("M") by Emotional Reactivity. Mediation Models: The Effect of Pretend Play Ability ("X") on Mental Health as rated by educators ("Y") Mediated ("M") by Emotional Reactivity. *Notes.* n = 1,426 on five multiply imputed data sets. Robust standard errors, robust confidence intervals, MLR estimator. a, b, c: standardized estimates β with (SE), p, and CI (95%) values. c': total effect; a × b: indirect effects; c: direct effect after accounting for mediators

### Is Emotional Regulation a Mediator of the Relationship Between Early Pretend Play Ability and Later Mental Health? (Hypothesis 2)

The results indicate that pretend play ability has a small direct association with internalising problems as measured by educators and caregivers (Figs. 1 and 2). The bootstrap confidence intervals (CI) confirm that these associations are robust and statistically significant. Pretend play ability at age 2–3 years was not associated with emotional regulation at age 4–5 years, and emotional regulation was not associated with mental health at age 6–7 years, whether measured by educators or primary caregivers. Mediation models show negligible standardised indirect paths from pretend play to internalising or externalising problems via emotional reactivity of emotional reactivity (Figs. 1 and 2).

## Discussion

The primary objective of the current study was to investigate links between pretend play, emotional regulation, and mental health in childhood and to identify potential mediating pathways. Pretend play ability at age 2–3 was

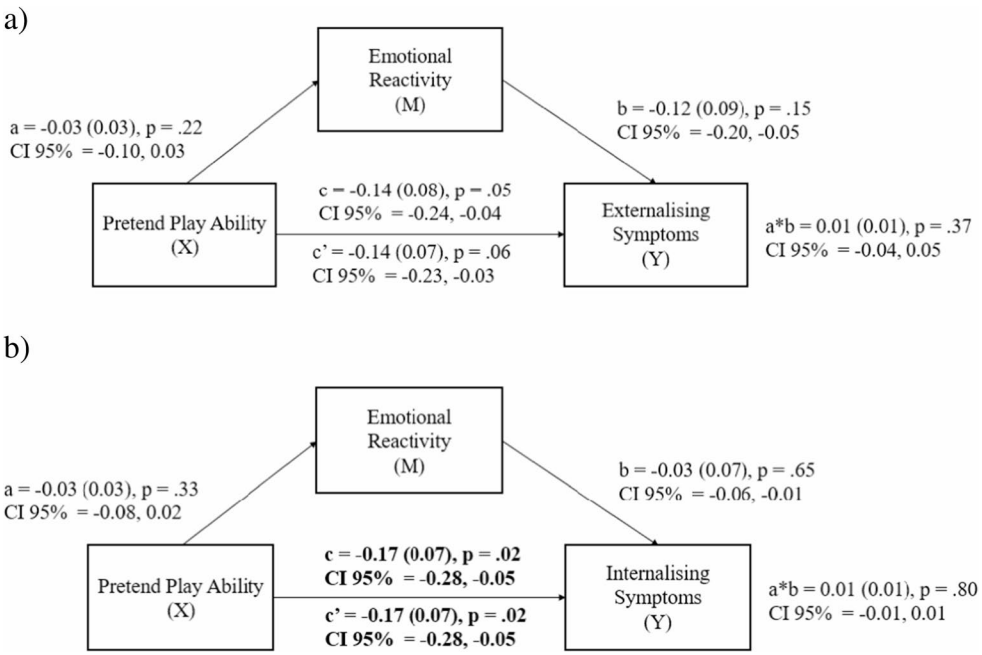


**Fig. 2** Mediation Models: The Effect of Pretend Play Ability ("X") on Mental Health as rated by primary caregivers ("Y") Mediated ("M") by Emotional Reactivity. Note.*n*= 1,426 on five multiply imputed data sets. Robust standard errors, robust confidence intervals, MLR estimator. a, b, c: standardized estimates β with (SE), p, and CI (95%) values. c': total effect; a × b: indirect effects; c: direct effect after accounting for mediators

found to predict mental health outcomes at ages 4–5 and 6–7 years old even while controlling for factors such as SEP, maternal depression, language ability and parental attachment. While this study is correlational, this suggests that supporting pretend play ability in early childhood has an association with later mental health. To our knowledge, our study is the first to quantitatively link pretend play to mental health outcomes in a broad population of children. Mediation analyses suggested emotional regulation did not mediate the relationship between pretend play ability and mental health outcomes.

A recent systematic review identified that pretend play has the greatest potential for mental wellbeing compared to other types of play (Veraksa et al., 2025). While there are promising findings from pretend play experiments (e.g., Korošec & Zorec, 2020) that shows externalising behaviours can be impacted in the short term, how long these effects remain is not known. The current study sought to provide new longitudinal evidence of how long this relationship might hold over time in a broadly developing sample. Previous research has explored associations between different types of play and later mental health outcomes in the same Australian longitudinal dataset (Colliver et al., 2022; Zhao & Gibson, 2023). Colliver and colleagues (2022) found that the more time children spent in unstructured quiet play in early childhood, the fewer internalising and externalising problems they presented at ages 4–5 and 6–7 years. In another study, peer play ability at age 2–3 was shown to temper mental health outcomes at age 6–7 (Zhao & Gibson, 2023). Interestingly, we found that pretend play may also temper internalising behaviours. It could be that pretend play is an activity that children who struggle with peer-play engage in, and playing with e.g., imaginary friends could compensate for limited play with real peers (Akpakir, 2021). Our findings also complement Colliver and colleagues' (2022) results suggesting that it is not only time spent playing but the ability to pretend play that could be important.

Experimental studies and reviews have suggested the beneficial effects of pretend play on emotional development (Rao & Gibson, 2019; Richard et al., 2021). Play therapists and psychoanalysts have documented how pretend play offers an avenue for emotional expression and regulation (Freud, 1961; Stiefel, 2024). Children can explore negative and positive feelings in pretend scenarios to process memories and associations (Russ & Wallace, 2013). Researchers that collected brain imaging activity from 42 4–8-year-old children comparing solo and peer pretend play suggest that the posterior superior temporal sulcus, which is a brain region that plays a role in empathy, is active when pretend playing alone or with others (Aanestad et al., 2021). For our final hypothesis, we explored whether emotional regulation could explain the relationship between pretend play ability and later mental health. Our prediction was not supported, as there was no evidence that emotional regulation at age 4–5 mediated the relationship between pretend play at age 2–3 and mental health at age 6–7. Incorporating observation-based measures or direct assessment through tasks may have allowed us to identify a mediation relationship between pretend play ability and mental health outcomes. Although pretend play experiences can help children identify, express and cope with all their emotions, there may be other aspects related to pretend play that support mental health over time. Factors such as embodiment could play a role.

Embodied cognition theory suggests that thinking is grounded in physical action and perception (Shapiro, 2019). Even when the actions are imaginary, the motor regions of the brain simulate the movements, indicating that cognition, especially in play, is not just a matter of abstract thought but is deeply tied to the body's movement and interaction with objects. During pretend play, children use motor skills to simulate actions with objects, and research suggests that the motor cortex remains active even if the objects themselves are not physically interacted with (Diamond, 2000; Matheson & Kenett, 2020). These simulations support higher-order cognitive goals like improvisation in pretend play, which involves planning, problem finding and problem solving. Neuroimaging research suggests that motor simulation with objects requires reactivating the motor system and thus motor regions in the brain (Matheson & Kenett, 2020). The brain regions involved in motor simulation have been implicated in the neurobiology of anxiety and Attention-Deficit/Hyperactivity Disorder (Brown et al., 2023; Matheson & Kenett, 2020; Nejati, & Ghayerin., 2024).

The current study has several limitations. First, pretend play ability was measured using three questions posed to educators specifically for the LSAC study which restricted the sample of children enrolled in childcare programmes. Future studies should use diverse measures that tap multiple facets of pretend play ability, including direct assessment and observational tasks (O'Connor & Stagnitti, 2011; Smilansky & Shefatya, 1990). Although the LSAC is representative of the population it may not account for children coming from disadvantaged backgrounds whose caregivers may not be able to afford more than eight hours per week of childcare. Future studies could also incorporate contextual factors such as screen time and different childcare settings into research on pretend play ability. In addition, we did not investigate another possible direction of association, whereby good emotional regulation skills may lead to better quality pretend play. Therefore, these findings should be validated through randomised controlled interventions to examine the causal impact of pretend play on later mental health.

These findings have several implications for policy and practice. Ensuring that children and families have access to high-quality preschool experiences that support the development of pretend play ability may support children's mental health. Pretend play shares associations with social, communication and language skills and children who experience these deficits are vulnerable to mental health difficulties. Pretend play interventions afford a medium for intervening in these areas. Children's initiated pretend play is an important factor when considering implementing prevention programmes to support child development. Play-based learning is becoming an increasingly popular method used by early educators for academic and emotional learning (Bubikova-Moan et al., 2019). Many interventions targeting early childhood use pretend play as a mode of communicating with the child. However, the combination of pretend play and learning outcomes can limit how much freedom of choice the child has when pretend playing and may interfere with the development of pretend play ability (Barican et al., 2022). Critically, limited pretend play ability is prevalent in children with neurodevelopmental concerns (Campbell et al., 2016; Yu et al., 2024). Although early screening of pretend play ability in early childhood is one approach, this is costly and would require policy change to be feasible. Instead, an alternative approach could help ensure responsiveness and effectiveness, ultimately fostering better outcomes for all children by implementing intervention programs that extend into an inclusive context focussing on pretend play in general.

## Conclusion

The present study sought to investigate the relationship between pretend play ability during early childhood and later mental health. Controlling for related confounds, our findings indicate that pretend play ability is significantly associated with later mental health. We examined the role that emotional regulation might play between this relationship. Emotional regulation was not a significant mediator, suggesting that other unexplored factors may have mediated this relationship. Early education interventions that increase opportunities for children to improve their pretend play ability during early childhood can be one pathway to prevent mental health risks in middle childhood.

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## Declarations

**Ethical Approval** Ethical approval for the LSAC study was given by the Australian Institute of Family Studies Ethics Committee for each Wave from 22 November 2022 to 14 October 2024. Written, informed consent was proved by parents and teachers and verbal consent from children. Note that an approval reference number is not available, please visit https://aifs.gov.au/growing-australia/study/ethics

**Competing Interest** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.



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