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Expressive language and prosocial behaviour in early childhood: Longitudinal associations in the UK
Millennium Cohort Study

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Abstract

Background: Early childhood is a crucial period for language development and building social skills. While distinct, these two processes may impact upon each other. **Aims:** The current study aimed to identify the directional associations between expressive language ability and prosocial behaviour between three and five years of age. **Methods:** Participants included 14, 004 children and their families enrolled in the UK Millennium Cohort Study (MCS). Children's expressive language and prosocial behaviour were assessed at three and five years of age utilizing standardized assessments and parent reports. Cross-lagged models were used for data analysis. **Results:** Better expressive language at three years was associated with increased prosocial behaviour by five years. No support for the inverse direction of association was found. **Conclusions:** Children's early ability to effectively express themselves with others may help in building better social relationships by entry into formal schooling. Programming efforts that are tailored towards enhancing positive behavioural growth and social skills in the toddler years are likely to be effective when expressive language is also a targeted component of the toddler's skill development.

Keywords: Prosocial behaviour, expressive language ability, Millennium Cohort Study, early childhood

Introduction

Language ability and the acquisition of social behaviours may mutually impact upon each other particularly in toddlerhood when language is beginning to emerge and social behaviours develop. The direction of associations during this time are of specific interest as both language and behavioural development (difficulties and competencies) are important markers of how children will adjust to preschool and formal schooling settings. Until recently, an important focus in the literature has been on the associations between language ability and behavioural difficulties (e.g., conduct and peer problems) and a well-established link from deficits in language acquisition and/or communication problems to future behavioural difficulties in middle childhood and adolescence has been demonstrated (e.g., Brownlie et al. 2004; Menting, van Lier & Koot 2011). However, from late toddlerhood up to age five, a recent study suggested modest bi-directional rather than unidirectional paths of associations between behavioural difficulties (i.e., conduct problems) and expressive language in particular (Girard, Pingault, Doyle, Falissard, & Tremblay, 2015). Notably, there has been less attention paid to whether markers of children's behavioural competence such as prosocial behaviour may be implicated in similar ways (i.e., bi-directional rather than unidirectional) during this period of early development, thus warranting attention.

In the last two decades, the study of prosociality in childhood and adolescences has received growing attention. Prosocial behaviour is defined as empathetic, putting the needs of others first, and having a positive sense of social responsibility (Hay, 1994). Studies examining longitudinal trajectories of prosocial behaviour have been few. Yet there is partial support for the developmental framework put forth by Hay (1994) suggesting that prosocial behaviour develops in infancy, becomes more frequent in the second and third years, followed by a decrease around entrance into preschool and formal schooling (fourth to sixth years) (Baillargeon et al., 2011). Hay, Payne & Chadwick (2004) suggested that this decline in prosocial behaviour results from an increased sense of self-interest and social cognition such as understanding that appropriate behavioural responses vary across situations. Given that prosocial

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behaviour is often linguistically rooted (e.g., giving praise, helping peers, comforting others) it is likely that language ability plays an important contributing role in children's use and engagement in prosocial behaviour. Thus, a better understanding of how language ability and prosocial behaviour may impact upon each other during this developmental period is warranted.

Theoretically, better language abilities may facilitate engagement in prosocial behaviour and build social skills through increased conversations, better understanding and interpretation of verbal cues and subsequent increased interactions with others. That is, increased interactions allow for opportunities to better understand the perspectives of others, create meaningful exchanges, express one's own needs, and consequently may increase the desire to engage in helpful and caring behaviour towards others (Harris, 1992). This direction of association would be supported in the context of social information processing theory, which suggests that cognitive abilities, such as language, play an important role in children's response and outcomes during social interactions (Crick & Dodge, 1996). However, children with underdeveloped language skills may be limited in their social interactions, consequently reducing their opportunities to build these social skills. Alternatively, it is possible that the association between language and prosocial behaviour may operate in the other direction for related reasons. That is, children who are more socially competent and engage in more frequent prosocial behaviour may be more liked by peers and subsequently may interact more frequently with others. As language learning is partially supported by the social environment (i.e., parent-child, teacher-child, and peer-peer relationships), more frequent social interactions would provide additional contexts for learning opportunities and increases in vocabulary acquisition (Hoff, 2006). The higher frequencies of repeated dyadic or group interactions are part of the proximal processes that Bronfenbrenner put forth in his bioecological model of the developing person (Bronfenbrenner, 1999).

Few studies to date have focused on the association between prosocial behaviour and language ability; particularly prior to school entry, and even fewer have focused on the association in a longitudinal context. Despite a few null findings (Barnett, Gustafsson, Deng, Mills-Koonce, & Cox,

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2012; Lindsay & Dockrell, 2000), two significant patterns of associations have been supported, namely between language difficulties and reduced engagement in prosocial behaviour (Horwitz et al., 2003; Fujiki et al., 1999; Ketelaars et al., 2010; von Grünigen, Kochenderfer-Ladd, Perren, & Alsakar, 2012) and language competence and increased prosocial behaviour (Ensor & Hughes, 2005; Rhee et al., 2013). While these findings both point to an association between language ability and social skills, these patterns of associations are quite different. In clinical studies, where the focus is on specific language impairment or abnormal behaviour, supported associations have mainly been between language difficulties and reduced engagement in prosocial behaviour. In cohort studies, associations have largely been between language competence and increased prosocial behaviour or no associations at all. Thus, depending on the targeted population, there is some existing evidence to suggest associations between children's language ability and engagement in prosocial behaviour.

The current literature is however limited in consensus identifying the particular onset and specific language processes implicated in these associations. For example, two recent longitudinal studies using community samples of toddlers revealed different patterns of results, whereby one study found significant direct associations from better overall language at 14 months to increased prosocial behaviour at 36 months (e.g., Rhee et al., 2013), whereas Barnett et al., (2012), found no direct associations between language and prosocial behaviour in either direction between 24 and 36 months. While a similar developmental period was examined, a key methodological difference between the studies was the examination of a combined measure of expressive and receptive language compared to examining the two language processes individually. Further, Barnett et al., (2012) used a combined measure of children's prosocial and compliance behaviour. In order to advance the current state of knowledge surrounding possible associations, onset of associations and processes implicated, more longitudinal studies commencing in the late toddler years that examine the unique contribution of specific language processes are required. In the current study, we focused exclusively on expressive language ability, as linguistically rooted prosocial behaviour should theoretically be partially dependent

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on a child's expressive language ability. Collapsing expressive and receptive language into an overall category of language limits the inferences that can be drawn surrounding possible mechanisms driving the association as expressive and receptive language do not develop in tandem, and consequently, acceleration or delay in one area does not imply the same in the other.

Issues of possible confounding variables have also raised questions surrounding direct associations between language and prosocial behaviour. While not exhaustive, family (e.g., positive and harsh parenting), maternal (e.g., depression), and child (cognition, sex) characteristics have been associated with both prosocial behaviour and language ability. For example, positive parenting has been associated with both increased prosocial engagement (Barnett et al., 2012; Nozadi et al., 2013) and better language outcomes (Barnett et al., 2012; Hann, Osofsk, & Culp, 1996); while harsh parenting has been negatively associated prosocial behaviour (Dunn, Deater-Deckard, Pickering, O'Connor & Golding, 1998) and to a lesser extent with language outcomes (Pungello, Iruka, Dotterer, Mills-Koonce, & Reznick, 2009). There has been mixed support for maternal depression. For example, meta-analyses have found significant negative effects of maternal postpartum depression on both cognitive/language and behavioural outcomes longitudinally from 12 months up to five years of age (Beck, 1998; Murray & Cooper, 1997). In contrast a more recent study found that maternal depression increased the likelihood of following a moderate to high trajectory of engagement in prosocial behaviour longitudinally (Nantel-Vivier, Pihl, Côté, & Tremblay, 2014).

With respect to child factors, cognitive development has consistently been found to be positively associated with both prosocial behaviour and language ability (Brownlie et al., 2004; Carlo, Knight, Eisenberg, & Rotenberg, 1991; Yagmurlu, 2013). Boys have been found to engage in less frequent prosocial behaviour (Eisenberg, Fabes, & Spinrad, 1998) and sex differences for language ability, while mixed, have also been identified (e.g., Eriksson et al., 2011). Taken together, the current state of the literature on early language and prosocial behaviour using small community samples of

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toddlers and young children reveals some direct effects, however other key factors may also be implicated in the manner in which the associations present. Thus, there is a need for more studies assessing the early associations between specific language abilities and prosocial behaviour utilizing large population-based samples, while controlling for potential covariates that may play a role in this association.

Objectives

The objective of this study was to examine the associational paths between children's expressive language ability and prosocial behaviour from three to five years of age over and above possible covariates previously linked to the emergence of both language ability and prosocial behaviour. Based on a review of the literature we controlled for children's sex, nonverbal cognition, maternal depression, harsh parenting, and positive parenting. As expressive language may help in facilitating positive and reinforcing interactions with others and consequently a stronger desire to engage in positive behaviour with peers (e.g., Ensor & Hughes, 2005; Rhee et al., 2013), it was hypothesized that we would identify an association in the direction of better expressive language at three years to increased prosocial behaviour at five years. As the social environment exerts an influential role in the acquisition of language in early development (Hoff, 2006), we also tested for the path from prosocial behaviour at three years to better expressive language at five years. It was hypothesized that we would also find support for an association in this direction.

Methods

Participants

The current study uses data from children and their families enrolled in the Millennium Cohort Study (MCS). The MCS is one of the largest population-based developmental cohort studies, with an original field response of 18, 553 families residing in the UK (England, Wales, Scotland, and Northern Ireland), with infants that were born between 2000 and 2002. The stratification procedures and sample characteristics for the entire cohort have been documented extensively elsewhere (Dex & Joshi, 2005).

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As is common in longitudinal studies, attrition across waves of data collection resulted in a reduced sample size. The sample was restricted to children who had complete data on expressive language and prosocial behaviour at ages three and five (waves 2 and 3) only, which resulted in a sample of $N = 14,004$. Demographic characteristics of the families included in the current study as compared to the entire sample recruited at wave 1 are reported in Table 1. All data were collected during home visits through interviews, questionnaires, and standardised measures. Additionally, all data for the MCS is publicly available and can be requested through the UK Data Archive. Informed consent was obtained in writing from primary caregivers at each wave of data collection. Ethics approval for the primary MCS study was obtained from the South West Multi-Centre Research Ethics Committee and the London Multi-Centre Research Ethics Committee who also approved of the consent procedures.

Measures

Main Variables

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) was used to assess prosocial behaviour when children were three and five years of age. The SDQ asks parents to report on the applicability of five items using a 3-point scale (i.e., 0 = *not true*, 1 = *somewhat true*, or 2 = *certainly true*). The items include 1) shares readily with other children, 2) helpful if someone is hurt, upset or feeling ill, 3) often volunteers to help others, 4) considerate of other people's feelings and 5) kind to younger children. Scores can range from 0-10 with a higher score indicating more engagement in prosocial behaviour. The SDQ is one of the most commonly used behavioural tools in assessing psychosocial difficulties and social competence as it can be administered in a short period of time, has been identified as a good screening tool, and is positively worded (Stone, Otten, Engels, Vermulst, & Janssens, 2010). The psychometric properties of the SDQ have been validated with children as young as three years and are in the acceptable range (Stone et al., 2010; Theunissen, Vogels, de Wolff, & Reijneveld, 2013). Cronbach's alpha for the prosocial scale in the current sample was acceptable, .66 and .68 at three and five years respectively.

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The British Ability Scale Second Edition (BAS II) was used to assess children's language ability. The BAS II is a standardized assessment normed for children and adolescents from three years to 17:11 years of age (Elliott, Smith, & McCulloch, 1996) and has been well validated in the literature (Elliott, Smith, & McCulloch, 1997). The naming vocabulary scale, which assesses expressive language ability, was utilized at three and five years of age. This subscale requires children to identify and define objects. Expressive language is an important component of children's ability to communicate effectively with others as it marks their capacity to label and express feelings, needs and thoughts and to convey meaning in language while engaging with others. Cronbach's alpha is reported as .86 and .65 respectively (Elliott, Smith, & McCulloch, 1997). Children's standardised scores were utilized.

Control Variables

Child-level: Children's nonverbal cognitive functioning was assessed when children were three years old using the Bracken School Readiness Assessment - Revised (BSRA-R; Panter & Bracken, 2009). The BSRA-R is a standardized measure of intelligence and school readiness normed for children between 2:6 – 6:11 years. The six scales assessing nonverbal intelligence, including knowledge of colors, letters, numbers and counting, comparisons, sizes, and shapes, were utilised. Cronbach's alpha in the current sample was .89. Children's sex was treated as a dummy variable and coded such that 1 = boys and 2 = girls.

Maternal and Family-level: Maternal and parenting factors were assessed using either questionnaires or observations. When infants were nine months old, information on maternal psychosocial distress was collected via maternal report from the Rutter Malaise Inventory (Rutter, Tizard, & Whitmore, 1970). Items that focused specifically on maternal depression were utilized in the current study. Mothers reported on the presence or absence of eight items and a composite score was then created. Example items included (1) felt sad or low, (2) depressed and (3) tired most of the time. Cronbach's alpha in the current sample was .84.

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When children were three years old information was collected on harsh parenting practices via parental report utilizing five items from the Conflict Tactics Scale (Straus & Hamby, 1997). The frequency of engagement in harsh parenting was recorded on a 5-point scale that ranged from 1 (*never*) to 5 (*daily*). Example items included (1) smack child if being naughty, (2) shout at child if being naughty, (3) tell him or her off if being naughty. Cronbach's alpha in the current sample was .92.

Finally, a trained interviewer observed parent-child interactions during the home visit when children were three years old and recorded the presence or absence of positive parenting (five items from the Infant Toddler- HOME; Caldwell & Bradley, 2001 were used). Example items included (1) mother's voice is positive, (2) mother converses at least twice with child, (3) mother praises child spontaneously. Cronbach's alpha in the current sample was .99.

Statistical Analysis

The current study utilized cross-lagged modeling techniques. Cross-lagged models are advantageous for multiple reasons, which include the ability to simultaneously test multiple directional associations between variables of interest (Kenny, 1975; Selig & Little, 2012). In the present case, we investigated three types of associations in each model: the auto-regressive path (assessing the stability of constructs over time), the concurrent association (assessing cross-sectional associations), and the cross-lagged paths (assessing longitudinal associations). Another advantage is that while cross-lagged models cannot infer causality, the auto-regressive path in the model works to assess stability while simultaneously partialing out Time 1 variance of the outcome variable. This ensures that cross-lagged estimates are not merely indicative of a correlated predictor and outcome at Time 1. As the cross-lagged paths are estimated from residual variance, this is argued to minimize bias in effects (Cole & Maxwell, 2003; Selig & Little, 2012).

In addition to the chi-square (usually significant in large samples), we provide three approximate fit indexes: the comparative fit index (CFI; Bentler, 1990), the standardized root mean square residual (SRMR; Diamantopoulos and Siguaw, 2000), and the root mean square error of

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approximation (RMSEA; Browne & Cudeck, 1993). Hu & Bentler (1990) have suggested a cutoff value of equal to or greater than 0.95 as representing a good model fit for the CFI. For the SRMR, equal to or lesser than 0.05 represents a good model fit (Diamantopoulos and Siguaw, 2000). Cutoff values suggested for the RMSEA have ranged from 0.06 (Hu & Bentler, 1999) up to 0.08 (MacCallum et al., 1996).

Cross-lagged models were estimated using Mplus version 7.4 (Muthén & Muthén, 1998-2015). Standardized betas (β) are provided for each model as an estimate of effect size. Due to the large study sample we adopted a more stringent statistical threshold: $\alpha = .001$ instead of $.050$ (see Johnson, 2013). Missing data, regarding covariates from non-response, were treated using Full Information Maximum Likelihood (FIML), which has been found to be an unbiased and advantageous approach in handling missing data (Enders & Bandalos, 2001).

Two cross-lagged models were examined: a model without covariates and a model with covariates. Due to saturation of the first model when the six paths were included, the concurrent path at age five was removed. Overall fit for the first model of prosocial behaviour and expressive language was good, $\chi^2(1) = 17.45, p < .001$; RMSEA = .034; RMSEA $CI_{90} = 0.021-0.049$; SRMR = .008; CFI = .99. The second model (with covariates added) had a slightly worse fit, however it was acceptable, $\chi^2(8) = 800.00, p < .001$; RMSEA = .084; RMSEA $CI_{90} = 0.079-0.089$; SRMR = .019; CFI = .97. To note, only age three prosocial behaviour and expressive language were regressed on covariates as a result of model saturation, with one exception whereby age five outcomes were also regressed on sex. This will be discussed in further detail in the limitations section.

Results

The descriptive statistics and bivariate correlations for prosocial behaviour and expressive language are presented in Table 2. The first model (without covariates) is presented in Figure 1. Inspection of the model reveals statistically significant auto-regressive associations from three to five years for both prosocial behaviour and expressive language. A positive concurrent path between

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prosocial behaviour and expressive language was found at three years. The cross-lagged association from prosocial behaviour at three years to expressive language at five years was not statistically significant. However, a statistically significant cross-lagged path from expressive language at three years to increased prosocial behaviour at five years was found, albeit the effect was small.

When covariates were added to the model the results revealed similar patterns of associations between prosocial behaviour and expressive language. The results are presented in Figure 2. Auto-regressive paths for both prosocial behaviour and expressive language remained statistically significant. The initial concurrent path at age three however was no longer statistically significant, yet a significant concurrent path at age five was found. Finally, the cross-lagged path from expressive language at three years to increased prosocial behaviour at five years remained statistically significant.

In the current sample, girls were rated higher on prosocial behaviour as compared to boys, but were comparable on expressive language at three years of age. At five years of age, girls were still rated higher on prosocial behaviour as compared to boys but performed worse on the measure of expressive language. Children's nonverbal cognition was positively associated with both prosocial behaviour and expressive language. Harsh parenting was negatively associated with prosocial behaviour and positively associated with expressive language. Positive parenting was associated with increased prosocial behaviour, but was not found to be significantly associated with expressive language. Finally, maternal depression was negatively associated with prosocial behaviour, but no statistically significant association was found with expressive language.

Discussion

Overall our results using a very large population sample supported one of our two hypotheses adding to the existing literature. There are mixed findings in the literature with respect to the associations between prosocial behaviour and language ability with both younger and older samples of children (Barnett et al., 2012; Ensor & Hughes, 2005; Horwitz et al., 2003; Fujiki et al., 1999; Ketelaars et al., 2010; Rhee et al., 2013; Von Grunigen et al., 2012). The results of the current study are

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in line with previous studies that have found positive associations, direct and indirect, between language and prosocial behaviour in the early years of development (e.g., Ensor & Hughes, 2005; Rhee et al., 2013). However, our study differs from these particular studies in two ways. First, our sample is slightly older (i.e., three to five years of age in this study). Second, this study focuses on and demonstrates a specific association with expressive language ability, rather than utilizing a combined measure of overall language competency. Furthermore, with the exception of the concurrent path at three years, all associations identified in the first model remained statistically significant after controlling for children's sex, nonverbal cognition, parental characteristics and parenting styles, which have been previously implicated in both language development and social competence studies (Barnett et al., 2012; Eisenberg, Fabes, & Spinrad 1998; Menting, van Ijzendoorn, & Koot, 2011). That said, the effect size of the cross-lagged association is small in both models and reduced once covariates are entered.

While some studies have found cross-sectional associations (Horwitz et al., 2003; Lindsay & Dockrell, 2000; Zahn-Waxler, Iannotti, & Chapman, 1982), there are few studies that show direct longitudinal paths between prosocial behaviour and expressive language ability in particular. The results of the cross-lagged paths revealed one significant longitudinal association, from better expressive language at three years to increased prosocial behaviour at five years. This would suggest that better expressive language at three years of age has a small impact upon future engagement in prosocial behaviour at five years of age. Engagement in prosocial behaviour requires a certain level of language competency as it is largely linguistically rooted. Children's ability to express themselves competently during social interactions may lead to more positive exchanges and consequent positive feelings regarding their experiences during their social interactions. This may result in the increased use of future prosocial behaviour such as helping and kindness when subsequent interactions reoccur. Therefore, there is theoretical support for the directionality of the association from language ability to prosocial behaviour, as was found in the current study.

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Taking into account the large sample, it is important to consider the size of the identified effects. Our results point only to a small effect of better expressive language to increased prosocial behaviour. Given that the developmental period under investigation was prior to entry into formal schooling, peer and social interactions in general may have been less frequent and consequently the associations may only be starting to emerge. Future work could build upon and strengthen knowledge regarding associations between expressive language and prosocial behaviour by examining a longer developmental period, such as from three years into adolescence to see if the magnitude of associations becomes larger after school entry. This would also be informative with respect to understanding if the patterns of direction of associations change over time.

It is also possible that combining multiple language processes to examine the association with children's overall language ability, as has been done in other studies, would have produced larger effects across this two-year period (e.g., Rhee et al. 2013). Receptive language for example, requires a certain level of information processing in the child's ability to understand and infer meaning from other's communication during social exchanges. Engagement in prosocial behaviour is also partially dependent on similar skills in being able to infer that an empathetic response is needed in a particular situation. Given that combining subtypes of language may impede on a clearer understanding of the underlying mechanisms driving the association, it is suggested that future work should model the associations between prosocial behaviour and multiple language processes (e.g., expressive, receptive, pragmatic) individually.

Finally, previous studies have largely focused on examining the link between children with specific language impairment and reduced engagement in prosocial behaviour or increased externalizing problems (Brownlie et al. 2004; Horwitz et al., 2003; Fujiki et al., 1999; Ketelaars et al., 2010; von Grunigen, Kochenderfer-Ladd, Perren, & Alsakar, 2012). While this is an important area of investigation, it fails to address how associations between language and prosocial behaviour would present in typically developing children. Further, it does not address whether children who have better

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expressive language engage in more frequent prosocial behaviour. Our results thus add to the literature by suggesting that in typically developing children, a positive association can be observed, in the direction of better early expressive language to increased future engagement in prosocial behaviour, albeit with a small effect. While statistically significant, evaluation of the practical effect of this finding will likely differ across target audiences (e.g., parents, educators, clinicians).

Regardless, the results suggest that early language acquisition (both expressive and receptive) may help towards increasing children's later prosocial behaviour and subsequent social competence. Social competence and social skills training has been found to be associated with children's long-term success within the classroom environment, both academically and socially (e.g., Arnold, Kupersmidt, Voegler-Lee, & Marshall, 2012; Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000). Therefore, the acquisition of language skills should be a focus in the early years of development, especially for young children who appear to lack social skills. The acquisition of language skills may help children in improving social capabilities during interactions with their peers. However, this emphasis on language development should not be placed at the expense of social skills. Language skill acquisition can thus be included as an integral part of social skills training programs, while language programs can also include a social skills training component.

Regarding our second hypothesis we did not find support for a statistically significant cross-lagged path from prosocial behaviour at three years of age to better expressive language ability at five years of age. In line with our hypothesis for why the effect size from better expressive language to increased prosocial behaviour was small, one possible explanation for the lack of association could relate to the developmental period examined. That is, there may be fewer opportunities for social interactions prior to school entry (i.e., at age three). The theoretical perspective underlying prosocial behaviour to better language is rooted in children's opportunities for increased social interactions and the resulting language learning opportunities provided by the social environment (Hoff, 2006). It may be possible then, that this direction of association presents later in development rather than in early

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childhood. Future work that examines this direction of association is warranted in older samples of children.

To note, there were a few unexpected directions of association with covariates in the second model. For example, at the bivariate level girls were found to have better expressive language at both age three and five yet at the multivariate level a negative association at age five was found. While the literature provides mixed findings regarding sex differences in language development, it is likely that in this case, the results may be suggestive of a spurious association at age five. Additionally, a positive path between harsh parenting and expressive language at age three was found. It is possible that the association between harsh parenting and language development is dependent on interactions with other factors affecting the overall family environment (Pungello et al., 2009). As replication is needed, these paths of association should be interpreted cautiously at present.

Strengths and Limitations

The current study utilizes one of the largest and most comprehensive population-based cohorts on infant and child development sampled from 4 different countries across the UK. Further, the types of assessment utilized in the current study (i.e., parent report for prosocial behaviour and a standardized assessment for expressive language) limit the potential of introducing bias that could arise from shared method variance. Despite these strengths, a few limitations should be noted.

First, the data collected on children's social behaviour relied exclusively on the parent-report version of the SDQ. The assessment of prosocial behaviour can prove challenging due to the necessary inferences required (e.g., is considerate of others), however parents may be at a particular advantage in this regard given their intimate knowledge of their children. The use of multiple informants in future studies however, would strengthen the reliability of the associations found. For example, teacher reports or direct observations would offer a complementary perspective on children's prosocial behaviour across multiple settings and the association with language ability over time.

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A second but related limitation pertains to the internal consistency of the prosocial scale. While the SDQ is currently one of the most commonly used assessments of psychosocial behaviour (Stone et al., 2010), the internal consistency of the prosocial scale borderlines on acceptable (i.e., Cronbach's alpha of .66-.68 in the current study). One of the greatest challenges in using a measure with a low internal consistency is that any association found will be attenuated by the reduction of the maximum observable correlations between variables (Schmitt, 1996). Thus, the associations found in the current study may in fact be underestimated. Therefore, some caution is warranted in interpreting the results before replication using alternative measures, in addition to multiple raters, is conducted.

Third, language abilities encompass a wide range of skills, which include but are not limited to, expressive, receptive, pragmatics, syntax, and semantics. Children may exhibit strengths or difficulties in one area exclusively, or in multiple areas. While the examination of the specific contribution of expressive language is a strength of the study, the MCS study collected information solely on children's expressive vocabulary, preventing us from assessing multiple models with other language processes and prosocial behaviour. While we have identified that expressive language in particular is implicated in increased engagement in prosocial behaviour, it would be useful to examine the role of other language processes in future studies.

Fourth, given that no measure of expressive language was collected in the fourth wave of the MCS (at seven years of age), we were unable to look at the associations across a longer period of development. Having only two waves of data also limited our ability to test a mediation model rather than just controlling for covariates in the model.

Finally, due to only having two assessments of prosocial behaviour and expressive language in the current study, we were limited in our ability to test all six paths of associations without saturating the first model. Relatedly, we were unable to regress both age three and age five prosocial and expressive language variables on covariates in the second model. However, stationarity (i.e., when the causal structure remains the same over time; Cole & Maxwell, 2003) could possibly be assumed given

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the covariates that were used. This assumption should be examined in future studies that utilize more frequent assessments of prosocial behaviour, language, and parenting behaviour over a longer period of development.

Overall Conclusions

Despite these limitations, the results have implications with respect to the early associations between social behaviour and language ability. Early childhood development is a dynamic process shaped by many factors, including within child factors and the caregiving environment. Our results point to the inter-associations among language, social development, non-verbal cognition, and parenting. Programming efforts tailored towards enhancing positive growth in the toddler years are likely to be most effective if they target all dimensions of development holistically. Children's ability to effectively express their emotions and their needs with others may help in building better social relationships over time. Support must also be given to the caregiving environment, which may be a positive or negative model for the child, both in terms of language acquisition and social skills. Thus, interventions aimed at teaching parents the skills required to foster language while modeling positive social behaviour in toddlerhood may promote children's overall development.

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Table 1

Demographic Characteristics of the Families Initially Recruited and Families Included in the Current Study

	Initially Recruited (N= 18, 553)	Current Sample (N= 14, 004)
Maternal Age: (Mean, SD)	28.1 (6.03)	30.0 (5.90)
Maternal employment at 9 months:	36.00%	47.02%
Marital Status:		
Single	42.70%	31.17%
Married	49.74%	61.80%
Separated/divorced/widow	7.28%	6.97%
Highest Academic Level Achieved:		
Higher degree	2.45%	3.55%
First degree	7.34%	13.57%
Diploma in higher education	5.69%	9.07%
A/AS/S Levels	7.64%	9.67%
O Level/GCSE grades A-C	32.85%	33.51%
(GCSE) grades D-G	11.38%	10.52%
Other academic qualification	4.21%	2.55%
Ethnic group (% non-white):	22.41%	15.57%

Note: All variables collected when infants were 9 months. Item non-response occurred in both groups for variables presented. The academic qualifications in the UK system are as follows; GCSE grades D-G refers to secondary education and is approximately equivalent to having less than a high school diploma in the US education system; O level/GCSE grades A-C refers to completion of a secondary exit qualification; A/AS/S refers to further education and is comparable to the US equivalent of a high school diploma; Diploma in higher education is approximately equivalent to a two year college degree; First degree is approximately equivalent to a four year bachelor degree; Higher degree is approximately equivalent to a professional/graduate degree.

Table 2

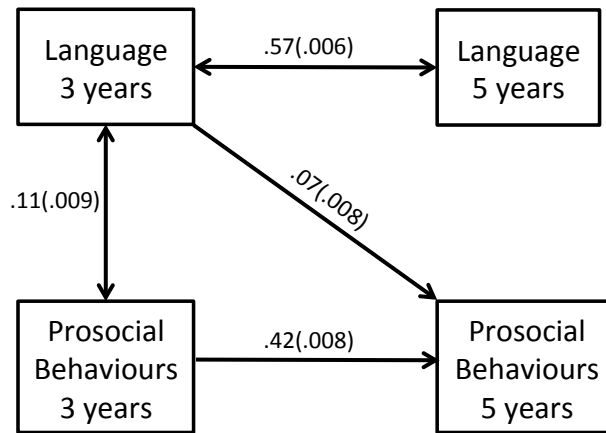
Bivariate Correlations, Means, and Standard Deviations for Prosocial Behaviour and Expressive Language

	Expressive language age 3	Expressive language age 5	Prosocial behaviour age 3	Prosocial behaviour age 5
Expressive language age 3				
Expressive language age 5	0.56 ^{***}			
Prosocial behaviour age 3	0.10 ^{***}	0.05 ^{***}		
Prosocial behaviour age 5	0.11 ^{***}	0.08 ^{***}	0.43 ^{***}	
Harsh parenting	0.03 ^{**}	0.03 ^{***}	-0.17 ^{***}	-0.13 ^{***}
Positive parenting	0.15 ^{***}	0.13 ^{***}	0.06 ^{***}	0.06 ^{***}
Maternal depression	-0.05 ^{***}	-0.06 ^{***}	-0.08 ^{***}	-0.09 ^{***}
Cognitive functioning	0.87 ^{***}	0.58 ^{***}	0.13 ^{***}	0.12 ^{***}
Child sex	0.12 ^{***}	0.02 ^{**}	0.12 ^{***}	0.14 ^{***}
Mean	49.46	54.62	7.35	8.40
Standard deviation	11.35	10.82	1.87	1.65

Note: Significance at the $p < .001$ level is denoted by ^{***}, significance at the $p < .010$ is denoted by ^{**}. Expressive language scores ranged from 20 to 80. Prosocial behaviour ranged from 0 to 10.

Figure 1

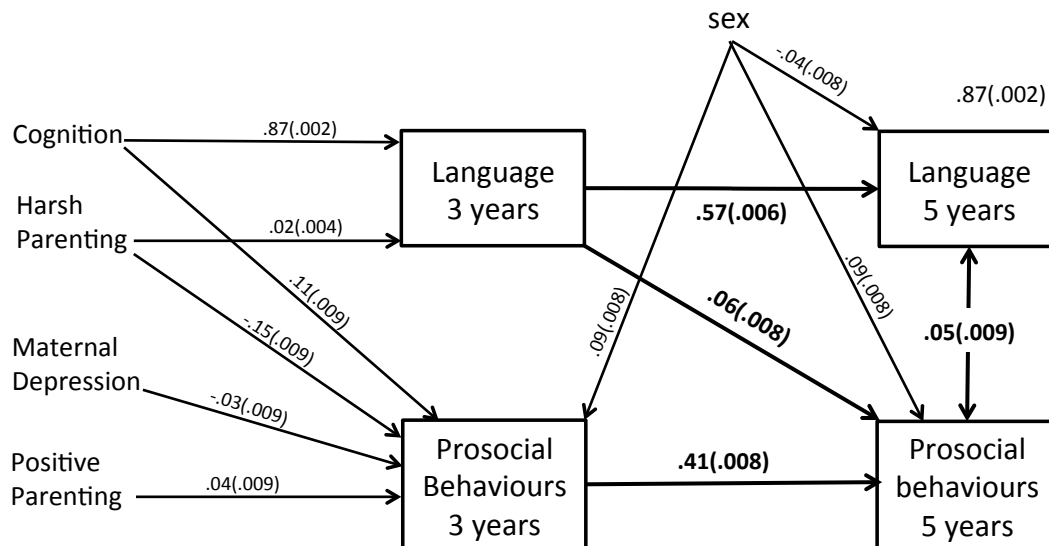
Crossed-Lagged Model: Prosocial Behaviours and Expressive Language from 3 to 5 years (without controls)



Note: Cross-lagged model examining the direction of associations between prosocial behaviour and expressive language ability. Full information maximum likelihood used. Standard errors presented within brackets. All associations significant at $p < .001$. Only significant paths are presented visually. The cross-lagged path from prosocial behaviour at three years to expressive language at five years was not statistically significant (i.e., $\beta = -0.01$ (0.008), $p = 0.49$).

Figure 2

Crossed-Lagged Model with Controls: Prosocial Behaviours and Expressive Language from 3 to 5 years



Note: A cross-lagged model of the directional associations between prosocial behaviour and expressive language with covariates entered. Full information maximum likelihood used. Standard errors are presented within brackets. All associations significant at the $p < .001$ level. Both prosocial behaviour and expressive language at three years were regressed on all covariates and prosocial behaviour and expressive language at five years on sex, however, only significant associations are presented for visual simplicity. Maternal depression was collected when infants were nine months. All other covariates were collected when children were three years of age. The cross-lagged path from prosocial behaviour at three years to expressive language at five years was not statistically significant (i.e., $\beta = 0.00$ (0.008), $p = 0.98$).