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**Mothers' and fathers' perceptions of marital relationships and coparenting twins
during school transition.**

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Abstract

Coparenting and the marital relationship are closely related yet distinct family subsystems hypothesized to influence one another. Little is known about these processes with consideration of more than one child in the family, which may have important implications. Here, we specifically focus on families with young twins, enabling us to account for sibling age-difference confounds, as well as due to the greater parenting demands and higher divorce rates in twin families. Using cross-lagged models for both mothers and fathers, we examined bidirectional associations between coparenting and the marital relationship during children's transition to formal schooling. Parents of twins from 107 'intact' families reported perceptions of coparenting and the marital relationship via telephone interview at Time 1 ($M_{\text{child age}} = 4\text{years } 8\text{ months}$, $SD_{\text{child age}} = 4.44\text{ months}$) and questionnaire at Time 2 ($M_{\text{child age}} = 6\text{ years}$, $SD_{\text{child age}} = 6.12\text{ months}$). Accounting for within-time associations and temporal stability for both mothers and fathers, coparenting was positively associated with subsequent reports of the marital relationship; there was no evidence of reciprocal associations between the marital relationship and subsequent coparenting. As children transition to primary school, the quality of coparenting may be a driver of the quality of the marital relationship for parents of twins. Those seeking to improve the marital relationship should pay due attention to perceptions of coparenting.

Keywords: Coparenting; family processes; marital quality; transitions; twin-families

The way that couples work together as a parenting team – termed coparenting – and the marital relationship are considered to be distinct, yet closely related family subsystems that are seen as influencing each other (Feinberg, 2003). However, few studies have investigated potential bidirectional influences, particularly when family dynamics may be changing dramatically such as during children's transition to formal schooling. Understanding the direction of the flow of influence between coparenting and the marital relationship is important for considering family support.

Family systems theory views the family as a complex system composed of several distinct but interconnected subsystems. In a family consisting of a mother, father and a child, for example, there are the parent-child, inter-parental (hereon referred to as 'marital') and coparenting subsystems. Functioning within one of these subsystems is proposed to be related to functioning within another, an interdependency that emphasises the importance of the broad family context for understanding children's development (Cox & Paley, 1997; Minuchin, 1988). This theoretical framework has guided a plethora of empirical research demonstrating the significance of marital relationship quality and – more recently – coparenting, for children's adjustment.

Importantly, scholars consider coparenting and the marital relationship to be key, yet distinct family subsystems. While the marital relationship refers to spouses' interactions with, and sentiments about one another as romantic partners (Mangelsdorf, Laxman, & Jessee, 2011), coparenting refers to the way in which parents work together in the care and upbringing of a child (Feinberg, 2002). Often conceptualised as including multiple aspects, such as coparent support, undermining, division of labour, child rearing agreement, and the endorsement of partners' parenting (Feinberg, 2003), these constructs are important individually but may also be considered together as a global measure of coparenting quality (Feinberg, 2003). High quality coparenting may involve shared child-rearing values,

expressions of warmth during interactions with the child and actions that support or extend the coparent's parenting efforts. In contrast, lower quality coparenting may be evidenced by criticism or actions that thwart or undermine the others' parenting. Coparenting comes into existence only when couples become parents, and has the potential to survive even if their marital relationship ceases (Beckmeyer, Markham, & Troilo, 2019). Indeed, coparenting has traditionally been explored within the context of parental divorce, with parents' continued coordination and cooperation in childrearing highlighted as critical for children's wellbeing (e.g., Maccoby & Mnookin, 1992). In recent decades, however, research has increasingly considered coparenting in 'intact' dual-parent families (Feinberg, Brown, & Kan, 2012; Latham, Mark & Oliver, 2017; Pelz, Rogge, & Sturge-Apple, 2018).

There are long-established links between problems within the marital relationship and disruptions to the parent-child relationship (e.g. Erel & Burman, 1995; Newland, Ciciolla, & Crnic, 2015) as well as adverse child outcomes (e.g. Cummings & Davies, 1994; Harold & Sellers, 2018). A growing literature recognises that within intact families, positive, cohesive coparenting is also important for favourable child outcomes (e.g. Cabrera, Scott, Fagan, Steward-Streng, & Chien, 2012; Schoppe, Mangelsdorf, & Frosch, 2001). Importantly, coparenting has been shown to contribute uniquely to children's development over and above the marital relationship (see Teubert & Pinquart, 2010 for a review), and to mediate the association between marital relationship quality and parenting (e.g. Pedro, Ribeiro, & Shelton, 2012; Stroud, Meyers, Wilson, & Durbin, 2015).

However, although distinct, coparenting and the marital relationship are closely and reliably related (Mangelsdorf et al., 2011). For example, cross-sectional research has demonstrated positive associations between couples' coparenting and their marital relationship (McHale, 1995; Pedro et al., 2012) suggesting a process of spill-over – the transference of affect and behaviour from one subsystem to another (Engfer, 1988; Erel &

Burman, 1995). Of particular interest for considering family support is understanding the direction of this transference, that is, whether the flow of influence is from the marital relationship to coparenting and/or vice versa, as well as shifts in this flow of influence that may occur alongside changing family dynamics as children develop.

Inferring a direction of effect from the marital relationship to coparenting is reasonable, given that couples' marital relationship typically exists prior to them becoming coparents (Liu & Wu, 2016). Longitudinal studies focused on the transition to parenthood and child infancy have shown that the prenatal marital relationship 'sets the stage' for postnatal coparenting (Le, McDaniel, Leavitt, & Feinberg, 2016). This supports the notion that couples bring their existing ways of interacting with each other (e.g., demonstrations of respect for one another, resolution of conflicts) to the formation of the coparenting relationship (Feinberg, 2003). Moreover, the importance of changes in the quality of the marital relationship during this key period has been demonstrated. For example, increases in marital conflict have been associated with lower levels of cooperative and supportive coparenting two years later, with declines in fathers' marital satisfaction also predicting higher competitive coparenting (i.e., competing for influence over, or attention from, the child) at this later stage (Christopher, Umemura, Mann, Jacobvitz, & Hazen, 2015). Thus, when couples first become parents, positive and negative spill over from the marital relationship to coparenting is evident.

Just as the marital relationship has been hypothesized to influence coparenting, so too coparenting has been hypothesized to influence the marital relationship (e.g. Feinberg, 2003). Using cross-sectional data, Morrill and colleagues (Morrill, Hines, Mahmood, & Cordova, 2010) compared two possible models. In one, parent perceptions of marital quality predicted their perceptions of coparenting, which, in turn, predicted their parenting practices; in the second, coparenting simultaneously predicted the marital relationship and parenting. Both

models were found to fit the data equally well, providing initial support for coparenting influencing the marital relationship as well as the other way around. Furthermore, in a longitudinal study, Don, Biehle, and Mickelson (2013) reported an association between prenatal marital satisfaction and parents' perceptions of coparenting agreement at child age 4 months, as well as – for mothers only – an association between coparenting agreement and subsequent marital satisfaction at child age 9 months.

However, it is likely that marital and coparenting family subsystems are transactional in nature (e.g. Sameroff, 1975), that is, the recurrent, reciprocal interactions that occur between the couple as coparents and as marital partners over time influence the quality of each of these subsystems. A few studies have explored potential bidirectional processes between coparenting and marital relationships, but they are far from consistent in their findings. On the one hand, in a sample of 46 families, observed coparenting at child age 6 months was shown to predict observations of marital relationship quality at 3 years, but not vice versa (Schoppe-Sullivan, Mangelsdorf, Frosch, & McHale, 2004). Conversely, using a larger sample ($N=164$), and focusing on parents' perceptions, Le et al., (2016) found evidence of reciprocal associations between mothers' – but not fathers' – perceptions of the marital relationship and coparenting support and undermining over the transition to and first 3 years of parenthood. Finally, in a study of 6,100 fathers over a two-year period (child age 24-48 months), reciprocal links were found between marital and coparenting conflict, as well as positive aspects of coparenting (Fagan & Lee, 2014).

The studies highlighted above point towards three important issues. First, there are potential differences in the associations between coparenting and marital relationship constructs for mothers and fathers. These parent differences have been explained in terms of socialization and the proposed greater importance of the parenting role to women's identity compared to men's (e.g. Maurer, Pleck, & Rane, 2001). The suggestion here is that,

compared to fathers, mothers place a greater emphasis for their identity on whether their partner assists, approves of, or indeed impedes their parenting efforts and that these feelings about coparenting may have more of an influence on mothers' evaluations of their marital relationship. Accordingly, longitudinal, reciprocal associations for mothers, but links from the marital relationship to coparenting only for fathers have been found previously (Don et al., 2013; Le et al., 2016). Contrary to this, however, are findings of reciprocal associations between coparenting and the marital relationship for fathers as well (Fagan & Lee, 2014). Given these mixed findings, further exploration of potential parent differences is needed, particularly since few studies have included both mothers and fathers to enable direct comparisons. This is of interest given the very different societal expectations for the roles of mothers and fathers, such that mothering and fathering are not necessarily one and the same (Palkovitz, Trask & Adamson, 2014).

Second, there has been little consideration of mother/father differences in the relationship between coparenting and marital subsystems beyond the transition to parenthood when coparenting first forms. Yet, as children age, coparents must adapt and respond to the changing needs of the developing child (McHale & Irace, 2011). Moreover, as parents become more established as coparents, the influence of coparenting on the quality of their marital relationship may become particularly pertinent (Morrill et al., 2010). Examining associations between coparenting and the marital relationship for mothers and fathers at later developmental stages is thus critical. Transition periods are an important focus for this, since family relationships are redefined and realigned as families move from one phase to another (Carter & McGoldrick, 1988). In particular, children's transition to formal schooling is a key period of childhood affecting the whole family; daily routines change, new external influences appear, and the amount of time children spend at home with their parents is reduced. Concurrently, changes to coparenting and marital relationships have also been

noted. For example, parents' have been found to show increased satisfaction with the division of labour, but reduced marital satisfaction (Cowan & Heming, 2005); this work also suggests that there may be changes to the links between the two subsystems. Thus, children's transition to school may be a time of change as parental roles and family dynamics may adapt and new challenges present for the parents and the coparenting team.

Third, a broadly defining attribute of coparenting studies is that they consider first-born single children. However, family systems theory highlights the increased complexity of family dynamics as a function of additional family members (e.g. Minuchin, 1988). Indeed, the presence of more than one child in a family is associated with greater parenting demands and parenting stress (Corkin et al., 2018; Ostberg & Hagekull, 2000) which are known to affect both coparenting and the marital relationship (e.g. Bronte-Tinkew, Horowitz, & Carrano, 2010; Kwok, Cheng, & Ling, 2015; Lavee, Sharlin, & Katz, 1996). Examining the relationship between these two subsystems in families with more than one child may therefore be of critical importance. Here, we specifically focus on families of twins for several reasons. Using twin-siblings allows us to control for the confounds of sibling age differences as we examine coparenting and marital subsystems in families with more than one child. In addition, it may be important to study these processes in families of twins *per se* since parenting demands and stress are especially compounded in these families. Parents of twins are tasked with juggling the demands of two children with the same developmental needs, leading to physical and psychological resource implications. Indeed, these parents have been shown to experience greater parenting stress than singleton families (Lutz et al., 2012; Olivennes, Golombok, Ramogida, & Rust, 2005), report negative feelings including ineffectiveness (Boivin et al., 2005), frustration, guilt and inadequacy (Goshen-Gottstein, 1980; Leonard & Denton, 2006) with parenting, and are also at higher risk of divorce (Jena, Goldman, & Joyce, 2011; McKay, 2010) suggesting that they experience a greater strain on

the marital relationship. Considering these findings, coparenting may be particularly salient for families with twins. Sharing child-related responsibilities, for example, may be particularly pertinent to easing the parenting burden. In contrast, coparenting characterized by, for example, undermining, a lack of solidarity and dissatisfaction with the division of labour may exacerbate the challenges already associated with raising twins. Moreover, given the close – potentially bidirectional – relationships between marital and coparenting subsystems already described, a greater understanding of how these influence one another in twin families is critical. If the marital relationship is under additional strain, negative affect and behaviour may spill over and impact the quality of coparenting for these families. Moreover, to the extent that coparenting also influences the marital relationship, improving the quality of coparenting may be an effective means of promoting a better quality marital relationship for parents of twins.

The Current Study

We investigated bidirectional links between parents' perceptions of coparenting and the marital relationship, using a cross-lagged model to control for within-time correlations and temporal stability. We sought to extend the existing literature in three main ways. First, we focused on children's transition to formal schooling as an important but understudied period in this context (Le et al., 2016). Second, we included both mothers' and fathers' perceptions of coparenting and the marital relationship to test for potential parent differences in the pattern of associations. Third, for the first time, we examined these research questions in a sample of parents of twins. In line with previous research, for both mothers and fathers we anticipated positive cross-sectional associations between coparenting and the marital relationship at both time points, as well as stability across time. We hypothesized the flow of influence to be bidirectional but given the mixed nature of the small extant literature, the lack

of previous research in this age range, and our focus on twin families, the pattern of cross-lagged associations and of potential parent differences was exploratory.

Method

Sample and Procedure

The sampling frame for the current study was the Twins, Family and Behaviour (TFaB) study. TFaB is a longitudinal study of families with twins born in England and Wales in 2009 and 2010 recruited from UK birth records through the Office for National Statistics. The full sample, comprising 283 single- and two-parent families, is described elsewhere (Mark, Pike, Latham, & Oliver, 2017). One-hundred and fifty-three (54%) mothers reported a co-resident father of the twins, all of whom were invited to take part in the present study. For the current analyses, a subsample of 107 (69.9%) of these ‘intact,’ co-resident families (95.3% married) who remained intact at outcome and where both mother and father were active participants was included. Compared to the 46 ‘intact’ TFaB families not included, these mothers reported higher household income ($t(59.39) = -2.27, p = .027$), maternal ($t(70.43) = -2.45, p = .017$) and paternal ($t(143) = -2.27, p = .025$) education. Forty-seven (44%) of twins in this subsample had no other siblings, 43% had older siblings only, 11% had younger siblings and 2% had both older and younger siblings. Families did not differ on core study variables at baseline (Time 1) or one year later (Time 2) as a function of whether the twins had siblings or not (mothers’ coparenting at Time 1: $t(101) = -.90, p = .372$ and at Time 2: $t(102) = .04, p = .971$; fathers’ coparenting at Time 1: $t(74) = .01, p = .995$ and at Time 2: $t(102) = -.12, p = .907$; mothers’ marital relationship at Time 1: $t(98) = -1.63, p = .107$ and at Time 2: $t(103) = -.79, p = .430$; fathers’ marital relationship at Time 1: $t(57.06) = -1.55, p = .128$ and at Time 2: $t(102) = -1.57, p = .119$).

Forty-one percent of families in our subsample had fertility treatment when they conceived their twins. There were no differences between these families and those not having fertility treatment on study variables at time 1 (mothers' coparenting: $t(101) = .33, p = .745$; fathers' coparenting: $t(74) = .18, p = .857$; mothers' marital relationship: $t(98) = -.13, p = .899$; fathers' marital relationship: $t(71) = 1.32, p = .191$) or at time 2 (mothers' coparenting: $t(102) = -.39, p = .695$; fathers' coparenting: $t(67.75) = 1.04, p = .301$; mothers' marital relationship: $t(103) = 1.04, p = .303$; fathers' marital relationship: $t(102) = 1.48, p = .141$). Fifty-four percent of twins were dizygotic (non-identical); twin zygosity was determined using maternal reports shown to be more than 95% accurate when compared to DNA testing (Price et al., 2000; four pairs of twins were unable to be classified in this sample).

To assess the representativeness of this subsample, parental education, parental age at twins' birth, and household income were compared to UK Census data. Our sample was well-educated, with 74.29% of mothers and 53.49% of fathers holding an undergraduate degree qualification or higher, compared to a national average of 33.9% of women and 33.3% of men of comparable age range (Office for National Statistics, 2014a). In addition, parents in our sample were older compared to UK census data, as expected given the higher prevalence of twin births among older women (Office for National Statistics, 2011a). At the time of their twins' birth, mothers were an average of 34 years 6 months ($SD = 4$ years 0 months) and fathers, an average of 36 years 8 months ($SD = 6$ years 9 months) compared to national averages of 29 years 6 months for all mothers (Office for National Statistics, 2011a) and 33 years 1 month for all fathers (Office for National Statistics, 2014b). In terms of financial circumstances, our families were asked to categorize (rather than specify exactly) their total household income. The full range of categories (<£5,000 to >£100,000) were endorsed, with an average income given in the '£40,000 to £49,000' category. This compares favourably to the average UK household income of £44,330 (Office for National Statistics, 2011b).

For the current analyses, we utilized standard parent-report measures of the quality of coparenting and the marital relationship collected via a 40-minute telephone interview (Time 1; $M_{\text{child age}} = 4$ years 8 months, $SD_{\text{child age}} = 4.44$ months) and a follow-up postal questionnaire 1 year later (Time 2; $M_{\text{child age}} = 6$ years, $SD_{\text{child age}} = 6.12$ months). Identical questions were asked at both time points and informed consent was provided at each study phase. The project was approved by NHS Health Research Authority, National Research Ethics Service (NRES) committee, and the University of Sussex Science & Technology Cross-schools Research Ethics Committee (CREC).

Measures

Coparenting. Mothers' and fathers' perceptions of the quality of their coparenting were assessed using 12 items from the Brief Measure of Coparenting (Feinberg, Brown, & Kan, 2012). Sample items include 'My partner undermines my parenting of [child name]', and 'My partner and I have different ideas about how to raise [child name]', to cover six core coparenting constructs (support, undermining, agreement, closeness, endorsement and division of labour). Two items from the original measure, 'How often in a typical week do you argue about your relationship or marital issues unrelated to [child name] in the child's presence?' and 'How often in a typical week does one or both of you say cruel or hurtful things to each other in front of [child name]?' were not included to avoid inflating planned associations, because of marital rather than coparenting focus (Latham, Mark, & Oliver, 2018). Responses were given on a 7-point scale (*disagree strongly* (1) to *agree strongly* (7)). Negative items were reversed, and responses averaged, such that a higher mean score reflected higher quality coparenting. Mothers and fathers reported on coparenting in respect of each of their twins. Twin correlations were very large (see Supplementary Material Table S1) and so coparenting scores for Twin 1 and Twin 2 were averaged. This was calculated for mothers (Time 1: $\alpha = .78$, Time 2: $\alpha = .82$) and for fathers (Time 1: $\alpha = .65$, Time 2: $\alpha = .79$).

The Brief Measure of Coparenting has shown good internal reliability, construct and convergent validity (Feinberg et al., 2012).

Marital relationship. Mothers and fathers reported on the quality of their marital relationship using the six-item Quality Marriage Index (Norton, 1983). Sample items include ‘My relationship/marriage with my partner makes me happy’ and ‘Our relationship/marriage is strong’. Responses were given on a 7-point scale for 5 items (*disagree strongly* (1) to *agree strongly* (7)), and the final item, ‘Please rate the degree of happiness, everything considered, in your marriage/relationship’, uses a 10-point rating scale (1 = low and 10 = high). Items were averaged such that a higher score indicated greater marital relationship quality (mothers Time 1: $\alpha = .94$, Time 2: $\alpha = .93$; fathers Time 1 $\alpha = .87$, Time 2: $\alpha = .95$). This measure has excellent convergent and discriminant validity (Heyman, Sayers, & Bellack, 1994).

Analytic Strategy¹

Prior to conducting all analyses, correlations between the study variables and family socioeconomic status (SES; composed of household income, parental education and job type), children’s age and the number of boys in the twin dyad were examined. SES did not correlate with parents’ perceptions of coparenting or the marital relationship at either time point and was therefore not included as a control. Children’s age correlated significantly with mothers’ perceptions of coparenting ($r = .24, p = .013$) and the marital relationship ($r = .21, p = .038$) at Time 1 such that perceptions of higher quality coparenting and marital relationship were both associated with having older twins. Fathers’ coparenting at Time 2 was marginally correlated with the number of boys in the twin dyad ($r = -.19, p = .056$) such that they

¹ We repeated cross-lagged models accounting for the total number of children in the household; the pattern of results remained unchanged.

perceived higher quality coparenting when there were fewer boys in the dyad. Thus, for our analyses, we used unstandardized residual variables controlling for children's age and the number of boys in the dyad.

In order to explore the longitudinal, potentially reciprocal relationships between mothers' and fathers' perceptions of the quality of their coparenting and marital relationship over time, we used cross-lagged panel analysis. To illustrate, assume variable X and variable Y are both measured at Time 1, and again at Time 2. These four measures produce a cross-lagged two-panel model as depicted in Figure 1. The model includes the cross-sectional association between X and Y at Time 1 and at Time 2 (indicated by double-headed arrows) as well as two autoregressive paths (indicated by horizontal, single-headed arrows linking the same variable across time points) that model the temporal stability of the variables. In addition, two cross-lagged paths (indicated by diagonal, single-headed arrows) model the relationship between variable X at Time 1 and variable Y at Time 2, whilst simultaneously modelling the relationship between variable Y at Time 1 and variable X at Time 2. These cross-lagged associations are of particular interest here because they indicate the degree to which variable X and Y – in our analysis, perceptions of coparenting and the marital relationship – influence one another. Importantly, these cross-lagged models provide conservative estimates of longitudinal prediction (Kenny, 2005) since they account for the stability in perceptions of the quality of coparenting and the marital relationship, as well as the cross-sectional associations between these variables. Models for mothers' data and father's data were estimated simultaneously using multiple groups analysis (group = mother or father) with M-Plus version 6 (Muthén & Muthén, 2012) using Full Information Maximum Likelihood to handle missing data and non-normality of the data. Bias-corrected bootstrapped 95% confidence intervals (CIs) based on 10,000 samples were used to identify potential differences in the magnitude of analogous paths for mothers and fathers.

-- Figure 1 about here--

Results

Preliminary Analyses

Table 1 presents descriptive statistics for all study variables. Paired *t*-tests to assess mean-level differences between mothers and fathers revealed no significant differences in their reports of coparenting at Time 1 ($t(75) = -.08, p = .938$), coparenting at Time 2 ($t(102) = .08, p = .938$), the marital relationship at Time 1 ($t(70) = .15, p = .879$) or the marital relationship at Time 2 ($t(103) = .27, p = .788$).

--Table 1 about here--

Correlations among study variables (Table 2) showed stability in mothers' and fathers' respective reports of coparenting and the marital relationship. In addition, as expected, for mothers and fathers, there were cross-sectional associations between the perceived quality of coparenting and the marital relationship at both time points – higher quality coparenting was associated with a higher quality marital relationship. For both parents, there were positive associations between the marital relationship at Time 1 and later coparenting, and between coparenting at Time 1 and subsequent perceptions of the marital relationship. Although not relevant for the current study aims, for interest, cross-rater correlations are also shown in Table 2. All correlations between mother variables and father variables were positive, and moderate to large in size – with one exception, fathers' perception of the quality of the marital relationship at Time 1 and mothers' coparenting at Time 2 were not significantly correlated ($r = .08, p = .492$).

--Table 2 about here--

Cross-lagged Analysis

Cross-lagged analysis (see *Analytic Strategy*) was used to explore the pattern of association between parents' perceptions of the quality of coparenting and the marital relationship (see Figure 2). Model fit was satisfactory ($\chi^2(10) = 278.33, p < .001$; RMSEA = 0.00 (90% CI 0.00-0.00); CFI = 1.00; TLI = 1.00).

--Figure 2 about here--

Mothers. In line with the simple correlations, within-time associations between coparenting and the marital relationship were evident, after accounting for all other pathways, indicating that mothers who perceived the quality of coparenting to be high also perceived a high quality marital relationship at Time 1 ($b = 0.40, 95\% \text{ CI } [0.24, 0.64]$) and Time 2 ($b = 0.12, 95\% \text{ CI } [0.05, 0.22]$). Autoregressive paths indicated moderate stability in mothers' perceptions of their marital relationship ($b = 0.35, 95\% \text{ CI } [0.10, 0.80]$) and considerable stability in coparenting over this one-year time period ($b = 0.71, 95\% \text{ CI } [0.46, 0.92]$). Of particular interest here are the cross-lagged path coefficients that indicate the degree to which perceptions of coparenting and the marital relationship influence one another, accounting for the within-time associations and stability of perceptions over time. Mothers' perceptions of high quality coparenting at Time 1 were significantly associated with their perceptions of a high quality marital relationship at Time 2 ($b = 0.38, 95\% \text{ CI } [0.14, 0.72]$). Notably, however, there was no significant association between mothers' earlier perceptions of the marital relationship and subsequent perceptions of coparenting ($b = .14, 95\% \text{ CI } [-0.12, 0.33]$).

Fathers. The pattern of results for fathers was strikingly similar to that for mothers. Considerable within-time positive associations were found between fathers' perceptions of the quality of coparenting and the marital relationship (Time 1: $b = 0.15, 95\% \text{ CI } [0.09, 0.23]$; Time 2: $b = 0.17, 95\% \text{ CI } [0.11, 0.26]$), and autoregressive paths indicated substantial stability in these constructs over time (coparenting: $b = 0.91, 95\% \text{ CI } [0.67, 1.15]$; marital

relationship: $b = 0.71$, 95% CI [0.44, 1.07]). Also consistent with the finding for mothers, fathers' perceptions of coparenting at Time 1 were positively associated with their later perceptions of the marital relationship at Time 2 ($b = 0.63$, 95% CI [0.20, 1.15]), but not the other way around ($b = 0.18$, 95% CI [-0.03, 0.40]).

Parent differences. Bias-corrected bootstrapped confidence intervals (see *Analytic Strategy*) indicated marginally significantly different cross-sectional associations for mothers and fathers between coparenting and the marital relationship at Time 1 (Mothers: $b = 0.40$, 95% CI [0.24-0.64]; Fathers: $b = 0.15$, 95% CI [0.09-0.23]) suggesting that mothers' perceptions of the quality of coparenting and the marital relationship may be more closely related than fathers' at this first time point. Overlapping confidence intervals revealed no other parent differences (Figure 2).

Discussion

The aim of the current study was to explore bidirectional associations between mother and father perceptions of the quality of coparenting and the marital relationship during their children's transition to formal schooling. Specifically, in a UK sample of young twins, we a) used cross-lagged analysis to examine the temporal flow of influence whilst accounting for within-time associations and short-term longitudinal stability, and b) compared mothers' and fathers' perceptions of coparenting and the marital relationship to uncover potential parent differences. In brief, our results indicated that the quality of coparenting and the marital relationship were associated cross-sectionally, that patterns of association for mothers and fathers differed little, and that perceptions of coparenting were longitudinally associated with subsequent perceptions of the quality of the marital relationship. We discuss these results before acknowledging study strengths and limitations.

Consistent with the spill-over hypothesis, and with prior empirical research (McHale, 1995; Pedro et al., 2012), the nature of our cross-sectional associations were such that mothers and fathers who perceived coparenting to be of high quality also reported a high quality marital relationship. That is, for example, parents who perceived their coparent as being more supportive and sharing their child-rearing values also perceived their marital relationship to be strong and felt happy with their spouse. Accounting for these cross-sectional associations, our results additionally revealed considerable stability in parents' perceptions of both their coparenting and marital relationship over the one-year study period. Notwithstanding their substantial continuity, change in these key relationships was also apparent. These findings add to the existing literature that has reported modest change in the quality of coparenting and the marital relationship during the transition to, and first three years of, parenthood (Christopher et al., 2015; Le et al., 2016). As children transition to formal schooling, developmental changes – notably, children's greater autonomy – may present new challenges for the coparenting team, to which they must adapt (McHale & Irace, 2011). As such, developmental changes in the children and the parent-child relationships may contribute to the change evident in parents' perceptions of the quality of their coparenting.

In light of cross-sectional associations between perceptions of coparenting and the marital relationship, as well as the longitudinal stability in these constructs during the transition to primary school, we found cross-lagged associations between parents' perceptions of the quality of their coparenting and, subsequently, the quality of the marital relationship. Earlier perceptions of the marital relationship were not associated with later perceptions of coparenting. Our findings were contrary to research highlighting the importance of the quality of the prenatal marital relationship for subsequent coparenting in the very early years (Le et al., 2016). Extending this work to the transition-to-school period, our cross-lagged results suggest that, as children age, the flow of influence between these two

subsystems may revolve, such that it is mothers' and fathers' perceptions of the quality of their coparenting that becomes the 'driver' for how they evaluate their marital relationship (Morrill et al., 2010). By the time children transition to formal schooling, the central focus for couples has been as coparents – rather than just as marital partners – for a longer period of time, and in part we interpret our findings to reflect these more established coparent roles. Over time, if the quality of coparenting is perceived to be low (e.g. parents feel their partner undermines, or is not supportive of, them), this may erode the quality of the marital relationship. Conversely, if the quality of coparenting is perceived to be high (e.g. parents feel their partner endorses and supports their parenting), over time, this may promote a higher quality marital relationship. This notion is supported by research indicating that marital relationships that deteriorated (from child age 10 months to 5 years) evinced more observed unsupportive coparenting in the intervening years (Belsky & Hsieh, 1998). For these reasons, extending the coparenting literature to include studies of within-family changes in coparenting and marital relationship associations as the family expands with subsequent children would be of great interest.

That earlier perceptions of the quality of coparenting were found to influence subsequent evaluations of the marital relationship may also be due to our novel focus on multiple children in the family. As parenting tasks and responsibilities increase, mothers and fathers may rely more on the input, help and support of the other to ease the parenting load. This may be even more pertinent for parents raising two children of the same age and developmental stage – twins. It is an interesting empirical question to compare families with one child, more than one child, and those with twins in terms of coparenting and marital subsystems; it has not yet been addressed and is an important area for future research.

Parent differences

Our comparison of mothers' and fathers' perceptions in the study of bidirectional links between coparenting and marital relationship quality during the transition to formal schooling is – to our knowledge – the first. We revealed no differences in the pattern of cross-lagged associations between parents' perceptions of the quality of their coparenting and marital relationship. This is contrary to some previous findings that coparenting influences the subsequent marital relationship for mothers but not fathers (Don et al., 2013; Le et al., 2016). One explanation these scholars provided of their findings is that the greater amount of time spent by mothers in the caretaking role means that – compared to fathers – mothers' evaluation of their marital relationship is more influenced by their perceptions of coparenting. Considering this, we posit two reasons for our differing finding. First, the focus of these prior studies is on the transition to parenthood and infancy, a period when parenting roles are typically more traditional (e.g. Baxter et al., 2008; Katz-Wise et al., 2010). Thus, our finding of no parental differences as children transition to formal schooling may reflect less divergent parental roles at this later child age. Indeed, our cross-sectional findings support this notion, since mothers' perceptions of the quality of their coparenting and marital relationship were more closely related at Time 1 than were fathers', however, one year later this difference was no longer evident. We note this with necessary caution, because the difference between mothers and fathers at Time 1 was marginal. Children's transition to formal schooling marks a qualitative shift for the whole family, daily routines change, and the amount of time children spend at home with parents is reduced. Moreover, when children transition, the main carer – typically the mother (Craig & Powell, 2012; Lamb, 2004) – spends less time in the caretaking role than previously, may be more likely to work in paid employment, or to work more hours (Office for National Statistics, 2013). This has been associated with greater father involvement in childcare (Parke, 2000; Raley, Bianchi, & Wang, 2012). We speculate that

these changes in mothers' and fathers' roles contribute to the similarity in how our parents' perceptions of coparenting related to their perception of the marital relationship.

Second, we posit that the mothers' and fathers' parenting roles for twin families may be less divergent than those of singletons, on which previous findings are based. Indeed, it has been suggested that multiple births generate relatively high father involvement (Lytton, 1980; Brout, Lepofsky, Silverstein & Auerbach, 2010). In a study of families of triplets, for example, Brout et al., (2010) note the relatively high level and comprehensive nature of fathers' involvement in childcare, so-called 'de-gendered parenting' where both parents participate in all aspects of child care. It is therefore possible that our focus on twin-parents contributes to the similarity of associations between mothers' and fathers' evaluations of their marital relationship and perceptions of coparenting.

Our approach of comparing models of mothers and fathers was guided by previous research suggesting that parents' evaluations of their marital quality may be differentially influenced by coparenting (Don et al., 2013; Le et al., 2016) such that examining potential differences between mothers and fathers was of interest. Although beyond the scope of the current paper, questions regarding the interdependence between mothers and fathers, are also important. For example, the influence of fathers' earlier perceptions of coparenting on mothers' subsequent perceptions of marital quality within the Actor-Partner Interdependence Modelling framework (Cook & Kenny, 2005) – is an interesting avenue for future research.

Limitations

The current study makes an important contribution to the limited research examining bidirectional associations between the coparenting and marital subsystems. The study has a number of strengths including the use of a longitudinal cross-lagged design, as well as utilizing twin families – a unique sample for this field – and including information from both

mothers and fathers. Nevertheless, we acknowledge its limitations and note areas for future research. First, our statistical power – particularly to detect small bidirectional effects – was limited due to the relatively small sample size such that non-significant findings may not reflect the true absence of meaningful effects. However, bivariate correlations suggested cross-domain associations to be almost as strong as those within domain across time (see Table 2); our reasonable model fit indices, and size of effects are also to be noted.

Second, we have focused on a brief, global measure of coparenting quality. Illuminating the sub-constructs of coparenting (e.g. support, undermining, division of labour) during the transition-to-school period that are most important for the later quality of the marital relationship is an interesting area for future longitudinal research. Moreover, it is notable that parents reported no differences in coparenting each of the twins. We would expect a more detailed measure to capture twin-differences in coparenting since parents do not behave, or parent, identically towards each of their children (Conger & Conger, 1994; Feinberg & Hetherington, 2001; Meunier, Bisceglia & Jenkins, 2012), and since children's characteristics may influence coparenting, in-line with what is found in the parenting literature (Kendler & Baker, 2007). Whether coparenting is shared between siblings in a family (such that it contributes to sibling similarity) or whether it is non-shared (and thus contributes to sibling differences) is of interest for future research.

Third, our use of different methods to administer the measures at Time 1 and Time 2 (telephone interview versus postal questionnaire) adds a degree of method variance, which may confound our results; though this potential confound was similar for both constructs, and conservative for our findings. Fourth, our focus on the transition to primary school may limit the generalisability of our findings. Examination of associations between coparenting and marital relationships across multiple time points is critical and may illuminate possible transactional associations (Sameroff, 1975). Although beyond the scope of the current study,

future research should also consider the role of children's behavioural characteristics or temperament for these associations. Finally, we were interested in, and therefore focused on coparenting of twins within families headed by a mother and father; as a consequence, our sample was not representative of the UK population and caution is warranted in generalizing our findings. Using a twin sample, however, enables family processes to be studied in households where there is more than one child without the confound of sibling age differences. Given that the majority of children have a sibling, studies of coparenting that consider more children than just the first-born, single child are vital. We therefore encourage future work across family types, studies designed to examine twin- and singleton-family differences, as well as using samples of greater economic diversity.

Implications and Conclusions

Our key finding of associations between parents' coparenting and subsequent marital relationship during their twins' transition to formal schooling implies that supporting these parents to establish and maintain high quality coparenting over this important period may help to promote a higher quality marital relationship. Our study is particularly pertinent in light of the UK government's recent interest in interventions aiming to support the quality of parents' marital relationship (Department for Work and Pensions, 2019). The findings suggest that these interventions should pay close attention to coparenting as a potential mechanism of change. Indeed, we posit that parents may be more willing to consider a coparenting-based intervention – perhaps finding the focus on their children more acceptable – than traditional forms of marital relationship support. Moreover, the issues highlighted may be particularly important for parents of twins, and an improved understanding of how best to support these families is critical, given their increased risk for divorce (Jena et al., 2011; McKay, 2010).

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Tables

Table 1

Descriptive statistics for mother- and father- reported marital relationship and coparenting at Time 1 and Time 2

	<i>M</i>	<i>SD</i>	Skew	Kurtosis
Mothers				
1. Marital Relationship (Time 1)	6.89	0.86	-13.00	28.52
2. Coparenting (Time 1)	6.14	0.70	-5.64	3.58
3. Marital Relationship (Time 2)	6.85	0.79	-8.47	9.65
4. Coparenting (Time 2)	5.89	0.83	-4.58	2.01
Fathers				
5. Marital Relationship (Time 1)	6.97	0.59	-5.54	3.28
6. Coparenting (Time 1)	6.27	0.50	-3.32	0.99
7. Marital Relationship (Time 2)	6.80	0.88	-10.32	18.06
8. Coparenting (Time 2)	5.95	0.76	-3.78	1.80

Note. Variable anchor ranges: Coparenting = 1-7, Marital relationship = 1-7.5. Higher values = higher scores on each of the constructs.

Table 2

Correlations (unstandardized, child age- and sex-regressed residuals) for mother- and father-reported marital relationship and coparenting at Time 1 and Time 2

	1	2	3	4	5	6	7	8
Mothers								
1. Marital Relationship (Time 1)	1							
2. Coparenting (Time 1)	.73***	1						
3. Marital Relationship (Time 2)	.62***	.60***	1					
4. Coparenting (Time 2)	.57***	.68***	.61***	1				
Fathers								
5. Marital Relationship (Time 1)	.55**	.33**	.38**	.08	1			
6. Coparenting (Time 1)	.51***	.42***	.40***	.35**	.56***	1		
7. Marital Relationship (Time 2)	.44***	.40***	.51***	.36***	.68***	.62***	1	
8. Coparenting (Time 2)	.40***	.41***	.41***	.43***	.49***	.67***	.71***	1

Note. $N = 101-106$ mothers and $74-105$ fathers. ** $p < .01$, *** $p < .001$.

Figures

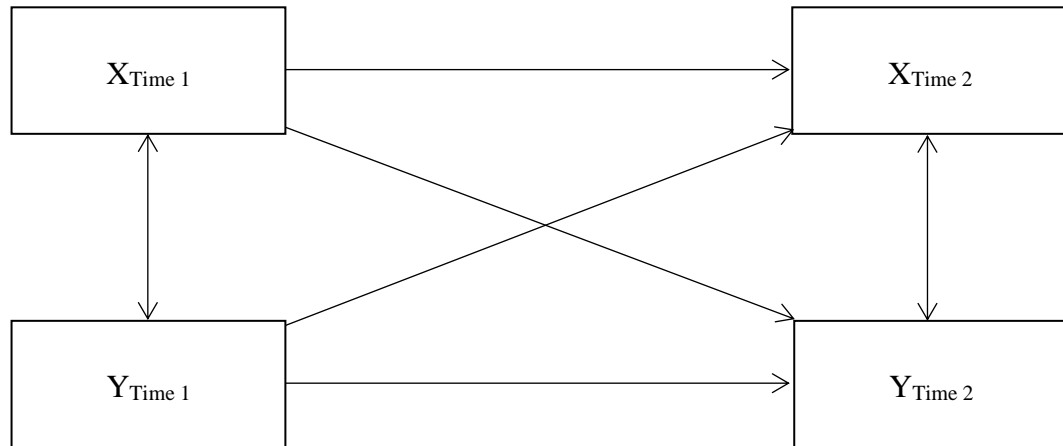


Figure 1 Illustrative structure of a cross-lagged two-panel model.

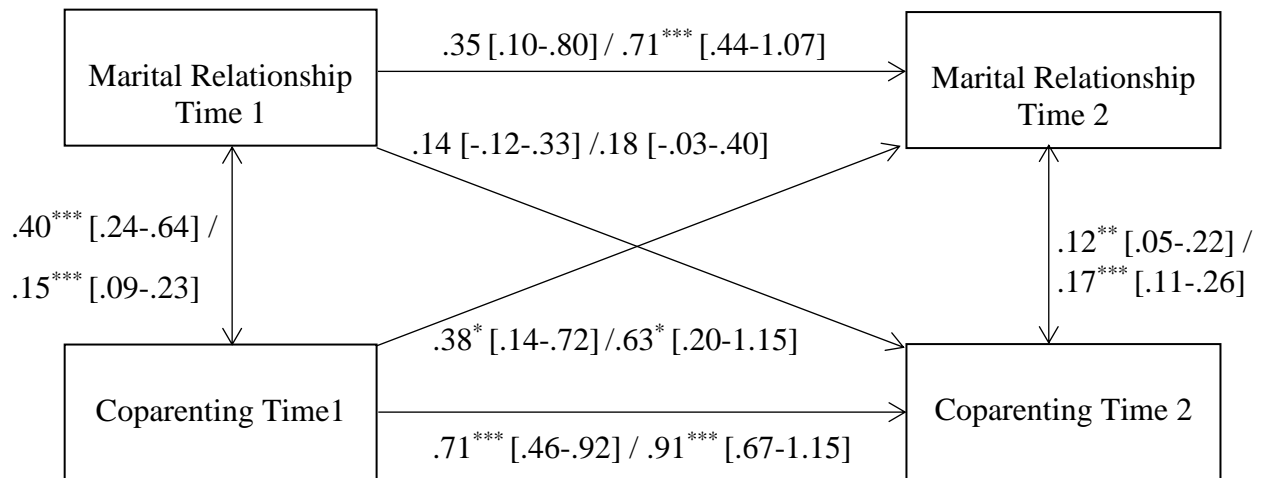


Figure 2 Cross-lagged model of mothers' and fathers' perceptions of the quality of coparenting and the marital relationship. Paths are labelled mother/father unstandardized coefficient with bias-corrected bootstrapped 95% confidence intervals in parentheses.

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