Associations between physical activity parenting practices and adolescent girls’ self-perceptions and physical activity intentions

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Abstract

**Background:** The present study investigated cross-sectional associations between maternal and paternal logistic and modelling physical activity support and the self-efficacy, self-esteem and physical activity intentions of 11-12 year old girls.

**Method:** 210 girls reported perceptions of maternal and paternal logistic and modelling support and their self-efficacy, self-esteem and intention to be physically active. Data were analysed using multivariable regression models.

**Results:** Maternal logistic support was positively associated with participants’ self-esteem, physical activity self-efficacy and intention to be active. Maternal modelling was positively associated with self-efficacy. Paternal modelling was positively associated with self-esteem and self-efficacy but there was no evidence that paternal logistic support was associated with the psychosocial variables.

**Conclusions:** Activity-related parenting practices were associated with psychosocial correlates of physical activity among adolescent girls. Logistic support from mothers, rather than modelling support or paternal support may be a particularly important target when designing interventions aimed at preventing the age-related decline in physical activity among girls.
Associations between physical activity parenting practices and adolescent girls’ self-perceptions and physical activity intentions

Physical activity (PA) during childhood confers benefits for both physical and mental health. However, most children in the western world do not engage in 60 minutes of daily moderate-to-vigorous intensity PA as recommended by national governments. Girls engage in less PA than boys and girls’ PA declines during early adolescence, specifically at the start of secondary school. This life transition is a period of physical, mental and social development among girls which involves changes in girls’ psychosocial factors identified as central to their PA participation including their self-perceptions, self-efficacy, intentions and motivations. To this end, identifying the correlates of key psychosocial factors involved in girls’ PA is essential to better understand how to stem its decline.

Conceptual approaches, such as Magnusson’s person-context interaction theory, assert that human development and behaviour arises from ongoing reciprocal interactions between the person and their context or environment. Due to the central socialising role of parents in the lives, behaviour and development of young people, the influence of parents on children’s PA has received considerable attention. A common approach in examining the parental influence on children’s PA is to study the effect of activity-related parenting practices, such as modelling support (e.g., parents being active themselves and holding a positive attitude to PA) and logistic support (e.g., the parent facilitating PA via financial and transportation support) on child PA behaviour. However, evidence for a direct association between parenting practices and child PA behaviour is mixed. For example, fathers’ modelling and mothers’ logistic support was positively associated with the PA of 9-year-old girls. Similarly, parental modelling and logistic support helped to maintain objectively-assessed PA among girls between 9 and 15 years. A study of Scottish children found that
although parental support declined from the end of primary school (age 10-11) to the final year of secondary school (age 15), maternal support (a combined variable reflecting encouragement, logistic and verbal support plus co-participation) was associated with greater PA among girls during the early years of secondary school. In contrast, in a UK study neither maternal or paternal logistic support, modelling or the restriction of sedentary behaviours was associated with girls’ PA.

The inconsistent evidence for a direct association between activity-related parenting practices and child PA suggests that a better understanding of parent-child influences may come from examining how parenting practices influence the psychosocial correlates of PA among their children. Such inquiry can illuminate potential mechanisms of how parents influence the PA of their children and help identify possible targets for parent-based interventions.

Conceptual models in which parental influences on child PA are mediated by child-level psychosocial factors have been proposed to extend understanding of how parent behaviours and attitudes might facilitate, be unrelated to, or impede child PA. Specifically, in the model proposed by Trost et al, parental support is shown to influence child PA via child self-efficacy. In Brustad’s model, parental encouragement influences child attraction to PA via perceived competence. Finally, in the Youth Physical Activity Promotion model proposed by Welk et al, parental influence is hypothesised to be associated with child PA via associations with the child’s attraction to PA and their perceived competence. In studies of these models, parental encouragement and facilitation of PA were found to be positively associated with child attraction to PA, perceived competence and self-efficacy. In addition, there is evidence to suggest that child self-efficacy may mediate the association between parent PA support and child PA.
This research therefore suggests that PA-related parenting practices (e.g., support and encouragement) are associated with some psychosocial factors amongst children, however a number of issues warrant further attention. Firstly, previous research has studied a limited number of psychosocial correlates of PA-related parent support (e.g., self-efficacy & attraction to PA) and important correlates may have been over-looked. It would therefore be informative to extend the evidence base by studying a broader range of psychosocial correlates. Specifically, the behavioural intentions of adolescents to be physically active positively correlate with their PA behaviour. Supportive PA parenting may facilitate the formation of children’s PA intentions whereas unsupportive parenting may undermine intention formation. Further, cross-sectional associations are reported between physical activity and self-esteem among children and it is suggested that children with higher self-esteem may be more likely to overcome barriers to PA.

Previous research suggests that parenting styles are associated with adolescents’ self-esteem and as such, investigating the associations between PA parenting and self-esteem is warranted.

A second limitation of previous research concerning the psychosocial correlates of activity-related parenting practices is that the individual influence of maternal and paternal practices have not been examined, that is, all of the proposed models present an aggregated parent support variable. Research suggests that girls may receive different levels of support from their mothers and fathers and that there may be developmental differences in the support received. It is important therefore to study psychosocial correlates of maternal and paternal PA support separately. Thirdly, the majority of previous research has conceptualised parent support as a combination of different types of parent support. Given findings that different types of parent support (e.g. logistic & modelling support) exhibit varying patterns...
of associations with PA behaviour a more differentiated analysis of the psychosocial correlates of types of parental PA support would add greater detail to the existing evidence. In light of the evidence presented above, the present study aimed to examine associations between maternal and paternal PA support and the PA intentions, self-efficacy and self-esteem of 11-12 year-old girls.

Method

The data presented here are from the baseline assessment of the Bristol Girls’ Dance Project, a feasibility study of a 9-week after-school dance intervention aimed at increasing PA among Year 7 (age 11-12) girls. Data were collected from n=210 girls from seven schools in the greater Bristol area in 2011. A description of the school sampling procedure can be found elsewhere [pending reference]. Briefly, within schools, all Year 7 girls (N = 793) were invited to participate, 318 consented to participate (40.1%) and 210 were selected by random to take part in the feasibility study. Data were collected from pupils in all schools in January 2011 via personal digital assistant devices (on which participants complete electronic versions of questionnaires) under classroom conditions supervised by two experienced researchers. Ethical approval was granted by a University ethics committee and written informed parental consent was obtained for all participants.

Measures

Parents’ activity-related parenting practices. The child-reported logistic support (6 items) and modelling (8 items) subscales of the Activity Support Scale were used to assess participants’ perceptions of maternal and paternal PA support. Participants were presented with statements concerning each parents’ modelling support (e.g., “My mum often exercises or does something active”) and logistic support (e.g., “My mum drives (or takes) me to places
where I can be physically active (for example, sports practices or matches)") and indicated
their agreement using a 4-point Likert scale ranging from 1 (Disagree a lot) to 4 (Agree a
lot). Previous research supports the validity and reliability of the subscale scores. Questions
were answered for mother or step-mother and father or step father depending on who the
child spent most time with. Internal consistency (Cronbach’s Alpha) estimates in the current
study are presented in Table 1.

Self-esteem. Perceptions of self-esteem were measured using the General subscale of
the Self Description Questionnaire II. Participants responded to nine items (e.g., “Overall, I
have a lot to be proud of”) using a 6-point Likert scale ranging from 1 (False: not like me at
all) to 6 (True: very much like me). The psychometric properties of this subscale have been
shown previously. Following reverse scoring of five items, a mean self-esteem score was
calculated. Internal consistency data are presented in Table 1.

Self-efficacy. Physical activity self-efficacy (i.e., confidence in one’s ability to be
physically active) was assessed using the 8-item questionnaire devised by Motl et al. which
has demonstrated structural and content validity among adolescent girls. Participants
indicated their agreement with eight statements (e.g., “I can be physically active during my
free time on most days”) using a 5-point Likert scale ranging from 1 (Disagree a lot) to 5
(Agree a lot). Item responses were averaged to form a self-efficacy score. Internal
consistency data are presented in Table 1.

Physical activity intention. Three items assessed participants’ intentions to be
physically active at least three times per week in the following month (e.g., “I plan to
exercise / play sport at least 3 times a week during the next month”). Participants responded
using a 7-point Likert scale. Previous research supports the reliability of scores computed
from the items. Internal consistency data are presented in Table 1.
Anthropomorphic and Descriptive measures. Height and weight were measured using Seca stadiometers and a digital scale respectively, with participants wearing light clothing and no shoes. Body Mass Index (kg/m$^2$) age and gender-specific standard deviation score (BMI SDS) was calculated. The Index of Multiple Deprivation (IMD), a measure of deprivation based on indicators of income, health, education and employment status was calculated based on home postcode.

Analysis

Means and standard deviations of all variables were calculated in addition to estimates of internal consistency for the scales assessing psychosocial constructs. The distribution of all variables was assessed and found to be acceptable. Student’s paired t-tests were used to explore differences in mean ratings of maternal and paternal activity-support. Bivariate (Pearson) correlations were used to explore associations among the study variables. Data were screened for outliers and compliance with assumptions of linear regression analysis. Multivariable linear regression models were used to determine the associations between parenting variables and the psychosocial variables. In these models, self-esteem, self-efficacy and intention were outcomes and maternal and paternal modelling and logistic support were entered simultaneously as exposures. IMD and BMI SDS were treated as confounders. Robust standard errors, which use residuals at the cluster-level to account for similarity of individuals within clusters (i.e., schools), were used to account for the clustering of children within schools. One influential case was identified and removed. As the original study was a feasibility study, a priori sample size estimates were not conducted and we focus instead on precision of the estimates of associations. All analyses were conducted in STATA version 11 (Statcorp, College Station, Texas). Statistical significance criteria was set at $p<.05$ alongside analysis of confidence intervals.
Results

Maternal and paternal support were reported by 207 (99%) and 199 (95%) participants respectively. Differences in means on all other variables between missing and non-missing cases were explored descriptively as the small number of participants with missing data prevented statistical analysis. Self-efficacy, self-esteem and intention were highly similar between missing and non-missing groups. Mean differences between participants with missing and non-missing parental data for IMD and BMI SDS were; Maternal support data (BMI SDS: missing $M = -0.61$, $SD = 0.03$, non-missing $M = 0.34$, $SD = 1.07$; IMD: missing $M = 32.24$, $SD = 13.07$, non-missing $M = 15.59$, $SD = 13.38$). Paternal support data (BMI SDS: missing $M = 0.72$, $SD = 0.85$, non-missing $M = 0.30$, $SD = 1.07$; IMD: missing $M = 22.88$, $SD = 13.57$, non-missing $M = 15.54$, $SD = 13.44$). The IMD ($M = 15.84$, $SD = 13.50$) score was lower in the present sample than the average IMD recorded for the districts of Bristol ($M = 24.77$, $SD = 15.50$) indicating less deprivation.

Cronbach’s alpha estimates were all $\geq 0.70$ indicating good internal consistency within scales (Table 1). Participants perceived greater maternal than paternal logistic support ($M$ difference $= 0.28$, $SD = 0.78$, 95% CI $= 0.17$ to $0.39$, $t(195)= 5.03$, $p<0.001$, although the magnitude of this difference was small (Cohen’s $d = 0.34$). There was no evidence of a difference between perceived modelling support ($M$ difference $= 0.02$, $SD = 0.85$, 95% CI $= -0.10$ to $0.14$, $t(195)= 0.25$, $p = 0.80$, Cohen’s $d = 0.01$).

Bivariate correlations (Table 2) showed that perceptions of the two types of PA support were positively associated ($p<0.001$) among both mothers and fathers. Perceptions of maternal PA support and paternal PA support were also significantly positively associated, with stronger correlations between the same types of support within gender than between different types. All parenting PA support variables were significantly associated with self-efficacy,
self-esteem and intention. In general, higher correlations were observed between maternal
support and the psychosocial constructs.

Results of the regression analysis are presented in Table 3. Maternal logistic support
was positively associated with girls’ PA intention and the model accounted for 30% variance
in this variable. The other parental support constructs were unrelated to intention. Maternal
logistic and modelling support and paternal modelling support were positively associated
with PA self-efficacy and the model accounted for 41% of its variance. In addition, maternal
logistic support and paternal modelling support were positively associated with self-esteem.
The model also indicated that BMI was negatively associated with self-esteem and accounted
for 30% of the variance in this outcome. There was no evidence that paternal logistic support
was associated with the psychosocial variables.

Discussion

In this study there was some evidence that aspects of parental PA support were
positively associated with psychosocial constructs among adolescent girls, namely self-
efficacy, intention and self-esteem which are considered to be important correlates of young
people’s PA. These findings are consistent with previous observations of a positive
association between general parental support and self-efficacy and perceived competence.
Extending this work, the findings suggest that amongst girls, perceptions of maternal
logistic support might be a particularly important correlate of girls’ self-efficacy. Self-
efficacy is identified as an important correlate of PA among adolescent girls and our
findings suggest that provision of logistical support from mothers could either help their
adolescent girls to develop their self-efficacy (e.g., by facilitating regular PA involvement) or
be necessary to support the PA behaviours of a highly efficacious child.

The results indicate that maternal logistic support and paternal modelling is positively
associated with children’s global self-esteem. This finding is consistent with previous
research which has identified a positive influence of parenting style on children’s self-esteem\(^\text{24}\). Parents’ efforts to encourage and facilitate their children’s PA and to model PA themselves may have positive effects beyond the PA domain, extending to their child’s well-being. Maternal logistic support for PA may provide opportunities for children to engage in settings which could foster their self-esteem (e.g., after-school activities or structured sports clubs with their peers) and opportunities to experience success. Modelling support could lead to feelings of being understood and that their activities are endorsed and similarly valued, which may bolster self-esteem. This supports a multidimensional view of self-esteem, whereby self-worth is underpinned by perceptions of success in multiple domains. \(^\text{34}\) This is an important finding, as it highlights that interventions targeting PA via parent-child interactions could have broader psychological benefits for the child.

Previous research suggests that children’s PA intentions are positively associated with their PA \(^\text{22}\). The data presented in this study suggest that maternal logistic support is associated with children having stronger PA intentions. However parental modelling (both mother and father) and paternal logistic support was not associated with PA intention. Of course, the cross-sectional data prevent the determination of causality in this relationship. It is possible that strong intentions to be active are likely part of being an active child, which will result in the child “pulling” a degree of facilitation from their parent. An alternative possibility is that maternal logistic support may moderate associations between adolescent girls’ intentions and their PA behaviour by facilitating access to PA opportunities to different degrees. Future work is needed however to confirm this hypothesis.

Extending previous literature, in this study we examined the associations between separate maternal and paternal PA support variables and psychosocial variables. This separation appears warranted. Consistent with previous research \(^\text{15,35}\) the female participants perceived their fathers to provide less logistic support for their PA than their mothers. There
is also evidence that active children receive greater support from a same-sex parent. A new finding is that maternal logistic support was more strongly related to self-efficacy, self-esteem and PA intention than maternal PA modelling and paternal logistic and modelling support. Small positive associations were found between paternal modelling and self-esteem and PA self-efficacy but paternal support was not associated with PA intention. Possible explanations of these findings are that the full range of support provided by fathers was not captured sufficiently by the measures we used or that paternal support may be more salient to other psychosocial constructs not measured in the present study. Additionally, the relevance of maternal logistic support within our sample of girls parallels gendered role socialisation derived from social structural theory, where the maternal figure performs more specific family responsibilities central to provision of immediate and household needs (e.g., food, washing, cleaning) and family functioning, and current social trends still reflect these more traditional gendered role attitudes and responsibilities. It could be that if mothers’ family responsibilities encompass logistic support for PA this facilitates a dynamic bi-directional relationship between mothers and daughters around their PA. Such a relationship would be characterised by interdependent maternal “pushes” (in providing support) and child “pulls” (in requiring support). While speculative, this may explain the findings with regards to intention, which is the outcome most proximal to PA behaviour in the present study. Maternal logistic support may allow children to practically plan for PA (e.g., when, how, where, with whom) and actually provide support (i.e., transport to the park after school). Fathers provided less logistic support and it could also be the case that their gender role allows only for actual logistic support at specific times (e.g., weekends rather than afterschool) therefore weakening the association between their support and their children’s intentions.

The findings suggest that it is important for future research to explore maternal and paternal influences separately and the role of parental roles/work patterns and timing of PA
support (e.g., weekend vs. weekday). In interventions involving parents, it may be effective
to focus on activities that foster mother-daughter and father-son interactions. However this
may not always be possible in single-parent families.

Findings from this study add to an understanding of how parental PA support may be
associated with child PA. The lack of a consistent direct relationship between different types
and sources of parental PA support and PA \(^{13,15,35}\) demonstrates a need to further examine
intermediate processes by which this relationship may operate. In exploring psychosocial
correlates of parental PA support, this study suggests ways in which previously hypothesised
conceptual models \(^{16,17}\) could be extended by separating maternal and paternal influences and
incorporating a broader range of psychosocial factors. The data in the present study precludes
us from testing mediation models and thus there is a need for further work using larger
samples and longitudinal designs to fully test these pathways.

Research concerning the associations between parental PA practices and psychosocial
variables in children may benefit from integrating with theories / frameworks used to study
parent-child interactions. For example, self-determination theory \(^{40}\) has been used previously
to study how parents communicate messages such as PA encouragements to their children
and the effect of this on their motivation and behaviour. \(^{41}\) From this perspective, both the
content and way in which parent encouragement and facilitation is communicated with the
child can support choice and autonomy or be coercive and controlling. Parental autonomy
support for PA is positively associated with positive forms of PA motivation amongst
adolescents. \(^{42}\) In light of this, the positive association between maternal logistic support and
self-efficacy, self-esteem and intention observed in the present study could be because
logistic support may give the child the perception that their parent endorses their behavioural
choices, are willing to be involved and provide adequate structure and opportunity to do so,
all elements of autonomy support. \(^{41}\) Modelling support on the other hand does not so
obviously display these characteristics and could be perceived as controlling (e.g., lacking empathy) if the parent is highly active and enjoys activity yet the child does not find such enjoyment in PA. Further research is warranted to explore whether these directions will help to broaden our understanding of parental influences on PA.

Consistent with previous work, the findings imply that interventions involving parents should focus on facilitating parents’ (particularly mothers’) logistic support. As parent PA support declines during the transition from childhood to adolescence, interventions could focus on helping parents to maintain their PA support. Recent research does not support an association between mother and daughter PA, therefore encouraging parents to be more active and act as role models is less likely to result in their child developing adaptive attitudes towards PA than providing logistic facilitation for their child’s PA.

Strengths of the present study include the exploration of alternative psychosocial correlates of different types of parent PA support and the differentiation of maternal and paternal PA support, however a number of limitations are worth noting. Firstly the sample was small which limits the power of our analyses and comprised only girls which prevents a full exploration of parent-child, gender-specific correlates of maternal and paternal PA support. The study should be replicated in a larger sample of boys and girls. Data are also from a single city in Bristol and therefore may not be generalisable to girls in other countries or contexts. Further, although we examined a broader range of psychosocial correlates which build on models of parental influences on children’s PA, the constructs were not selected to comprehensively test a specific theoretical model. The field of PA parenting would benefit from greater integration with and testing of theoretical models. The cross-sectional nature of the data in the present study precludes the drawing of conclusions regarding the directionality of the parent-child associations. Person-interaction theories of development highlight the reciprocity of interpersonal interactions (e.g., the
mutual influence of parents and children) and that such parent-child dynamics function in an ongoing cycle of influence and change. It is therefore possible that the socialisation processes examined in the present study are bi-directional in which parents activity-related parenting practices influence children’s self-perceptions and attitudes towards PA and children provide cues to parents to provide varying types and levels of activity-related parenting practices. It is also likely that these processes evolve over time and reflect developmental changes in children’s lives. A further limitation is that the small sample size prevented us from extending our models to include a measure of PA and statistically testing mediation models in which parent support influences child psychosocial constructs which in turn influence PA. A particularly relevant mediator may be behavioral intention, as in the present study this was positively associated with maternal logistic support and previous research shows that intentions are moderately associated with self-reported physical activity among secondary school age children. Testing models which include objective measures of physical activity would be an interesting avenue of future research.

Conclusion

In the present study maternal logistic support displayed emerged as the parenting PA support variable most strongly associated with PA-related psychosocial constructs (self-efficacy, self-esteem & intention) among 10-11 year old girls. Maternal and paternal modelling of PA was also positively associated with PA self-efficacy. These finding suggest that maternal logistic support and to a lesser extent parental modelling are likely to be important targets to consider in interventions involving parents. Girls aged 10-11 will soon transition to an age where they become less active and as such, maternal logistic PA support may help girls’ develop and/or maintain the efficacy and esteem necessary to maintain their PA.
Acknowledgements

We are grateful to Laura Davis who was Project Coordinator for the Bristol Girls Dance Project.

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References


### Table 1

Descriptive statistics & internal consistency of study variables among 10-11 year-old girls.

<table>
<thead>
<tr>
<th>Variable</th>
<th>M (SD)</th>
<th>Range</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index of Multiple Deprivation</td>
<td>15.84 (13.50)</td>
<td>2.00 to 68.00</td>
<td>-</td>
</tr>
<tr>
<td>BMI (SDS) (kg/m²)</td>
<td>0.32 (1.07)</td>
<td>-2.55 to 3.10</td>
<td>-</td>
</tr>
<tr>
<td>Maternal logistic support</td>
<td>3.05 (.77)</td>
<td>1.00 to 4.00</td>
<td>.72</td>
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<tr>
<td>Maternal modelling support</td>
<td>2.89 (.76)</td>
<td>1.00 to 4.00</td>
<td>.88</td>
</tr>
<tr>
<td>Paternal logistic support</td>
<td>2.78 (.83)</td>
<td>1.00 to 4.00</td>
<td>.89</td>
</tr>
<tr>
<td>Paternal modelling support</td>
<td>2.88 (.83)</td>
<td>1.00 to 4.00</td>
<td>.70</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>3.63 (.73)</td>
<td>1.63 to 5.00</td>
<td>.82</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>4.84 (.71)</td>
<td>2.78 to 6.00</td>
<td>.75</td>
</tr>
<tr>
<td>Intention</td>
<td>5.66 (1.27)</td>
<td>1.67 to 7.00</td>
<td>.82</td>
</tr>
</tbody>
</table>

*Note.* BMI (SDS) = Body Mass Index Standard Deviation Score. SD = standard deviation. α = Cronbach’s alpha.
Table 2

Bivariate correlations between parental activity support, self-efficacy, self-esteem and physical activity intention among 10-11 year-old girls.

<table>
<thead>
<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<td>Maternal modelling support</td>
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<td>(&lt;.001)</td>
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<td>3.</td>
<td>Paternal logistic support</td>
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<td>.65</td>
<td>.33</td>
<td>.33</td>
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<td>.33</td>
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<td>4.</td>
<td>Paternal modelling support</td>
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<td>5.</td>
<td>Self-efficacy</td>
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<td>7.</td>
<td>Intention</td>
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Note. Values in parentheses are p-values.
Table 3

Multivariable linear regression of parental activity support on self-esteem, self-efficacy and intention among 10-11 year-old girls.

<table>
<thead>
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<th>Self-efficacy</th>
<th>Intention</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>b</td>
<td>p</td>
<td>95% CI</td>
</tr>
<tr>
<td>IMD</td>
<td>.00</td>
<td>.70</td>
<td>-.01 to .01</td>
</tr>
<tr>
<td>BMI (SDS)</td>
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<td>.03</td>
<td>-.22 to -.02</td>
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<td>Maternal logistic support</td>
<td>.42</td>
<td>.00</td>
<td>.31 to .53</td>
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<td>.01</td>
<td>.86</td>
<td>-.18 to .21</td>
</tr>
<tr>
<td>Paternal logistic support</td>
<td>-.03</td>
<td>.60</td>
<td>-.14 to .09</td>
</tr>
<tr>
<td>Paternal modelling support</td>
<td>.12</td>
<td>.03</td>
<td>.02 to .22</td>
</tr>
</tbody>
</table>

$R^2 = .30$  $R^2 = .41$  $R^2 = .30$

Note. $b =$ unstandardised regression coefficient; CI = confidence interval; IMD = Index of Multiple Deprivation; BMI (SDS) = Standardised Body Mass Index. All models are adjusted for all other variables and clustering of participants within schools.