FAMILY RELATIONSHIPS AND THEIR ASSOCIATIONS WITH PERCEPTIONS OF FAMILY FUNCTIONING IN MOTHERS OF CHILDREN WITH INTELLECTUAL DISABILITY (ID)

Emma Langley, Vasiliki Totsika, Richard P Hastings, Tom Bailey

Corresponding author:

Dr Emma Langley, PhD

e.langley.1@warwick.ac.uk

Centre for Educational Development, Appraisal and Research (CEDAR)

University of Warwick

Coventry

UK

CV4 7AL

Dr Vasiliki Totsika, PhD, Division of Psychiatry, Faculty of Brain Sciences, University College London, London, UK, WC1E 6BT and Centre for Educational Development, Appraisal and Research (CEDAR), University of Warwick, Coventry, UK, CV4 7AL

Professor Richard Hastings, PhD, Centre for Educational Development, Appraisal and Research (CEDAR), University of Warwick, Coventry, UK, CV4 7AL

Dr Tom Bailey, PhD, Centre for Educational Development, Appraisal and Research (CEDAR), University of Warwick, Coventry, UK, CV4 7AL

Family Relationships and their Associations with Perceptions of Family Functioning in

Mothers of Children with Intellectual Disability (ID)

Abstract

We explored whether reports of three dyadic relationships (marital/partner, parent-child, sibling) were related to perceptions of family functioning in 467 mothers of children with Intellectual Disability (ID) aged 4-15 years. Structural equation models were fitted to examine associations between relationship indicators and family functioning. The final structural model showed that partner relationship satisfaction, partner disagreement, child-parent conflict, and sibling relationship warmth accounted for the most variance in family functioning, with partner relationship satisfaction having the strongest positive association. Dimensions of dyadic relationships appear to be associated with broader constructs of family functioning in this sample of mothers, signifying the potential for systemic intervention.

Key words: Family functioning, Intellectual Disability, confirmatory factor analysis, structural equation modelling

Introduction

The aim of the current study was to explore whether functioning in three family subsystems (marital/partner, parent-child, sibling) was associated with perceptions of overall family functioning in mothers of children with Intellectual Disability (ID). According to Family Systems Theory (FST), the family is a unit that can comprise a number of subsystems, including the marital/partner, parental (parent-child), and sibling subsystem (Cox & Paley, 1997). From this perspective, the family is viewed as an interconnected system where raising a child with a disability impacts on all family members in these subsystems (Seligman & Darling, 2007). Much of the family research in the ID field has explored the individual as the core unit of analysis, rather than the family (Davis & Gavidia-Payne, 2009; Hoffman et al., 2006). While research focusing on interactions within and between family subsystems in families of children with ID is growing, far less research has been conducted involving larger triadic and whole-family questions, perhaps due to the level of complexity involved in conceptualizing and measuring outcomes or functioning at the broader family system level (Cox & Paley, 1997). Different knowledge can be gained from exploring experience at the family rather than the individual or dyadic level (Zuna, Summers, Turnbull, Hu & Xu, 2010). Broadening the unit from the 'individual' to the 'family' not only recognizes the impact on other members within the family system, but how the well-being of other family members and subsystems may in turn influence the outcomes of the child with a disability (Boehm & Carter, 2019; Guralnick, 2001; Rolland, 2012).

Until recently, there have only been a few measures available to analyze functioning or outcomes at the whole family level, and even fewer which are specific to families of a child with a disability (Singer & Wang, 2014). One family-level construct that has emerged as an important aspect to explore in the disability field is Family Quality of Life (FQOL) (Brown et al., 2006; Turnbull, Summers, Lee, & Kyzar, 2007). FQOL has been defined as

"conditions where the family's needs are met, and family members enjoy their life together as a family and have the chance to do things which are important to them" (Park et al., 2003, p.368). Whilst initial work focused primarily on the development of the FQOL construct and how to measure it (Gardiner & Iarocci, 2012; Hastings, 2016), more recent studies have explored variables associated with FQOL with parents of children with ID (Boehm et al., 2015; Boehm & Carter, 2019; Ferrer, Vilaseca, & Olmos, 2017; Vanderkerken, Heyvaert, Onghena & Maes, 2018). Work by Boehm and Carter (2019) with 529 parents of children with ID, for example, found that overall FQOL was high, and that social relationships accounted for 26% of the variance in this outcome.

Another family-level construct that has received some research attention is family functioning, which arose from Family Systems Theory (Summers et al., 2005). Family functioning can be defined in a variety of ways, but most definitions comprise the extent to which members of the family unit communicate, build relationships, and manage daily life (Jellett, Wood, Giallo, & Seymour, 2015). Family functioning has been found to be associated with parent and child outcomes in families with typically developing children. For example, using large-scale normative data of caregivers of typically developing children, Renzaho, Mellor, McCabe, and Powell (2011) found that after controlling for socioeconomic status (SES) and ethnicity, parents in more poorly functioning families were at greater risk of psychological distress and had children with lower levels of prosocial behavior and higher levels of behavioral difficulties.

The construct of family functioning appears particularly pertinent to families raising a child with ID. Parents are often required to care for the child on an intensive basis, which can impact family lifestyles (Brown et al., 2006), priorities, and interactions between family members (McConkey, Truesdale-Kennedy, Chang, Jarrah, & Shukri, 2008). Family functioning has been shown to be poorer in families of children with ID (Al-Krenawi,

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Graham, & Al Gharaibeh, 2011; Rani et al., 2018) and Autism Spectrum Disorder (ASD) (Pisula & Porębowicz-Dörsmann, 2017) when compared to families with typically developing children. Work in this area has often focused on families of children with ASD, with mothers of children with ASD reporting lower family adaptability and cohesion compared to mothers of typically developing children (Gau et al., 2012; Higgins et al., 2005). Interestingly, there have been found to be no differences in family functioning between fathers with and without a child with ASD (Gau et al., 2012), which could be explained by mothers' greater involvement in the daily care of the child (Hartley, Mihaila, Otalora-Fadner, & Bussanich, 2014), and changes to other life roles, like work (Gray, 2003), which require significant adaptation. It is therefore possible that these changes in role for mothers implicate their perceptions of how their family is functioning. While ASD often co-occurs with ID (Tonnesen et al., 2016), further work is needed to explore what contributes to mothers' perceptions of family functioning in families raising a child with ID. This would inform the design and delivery of support which has the potential to impact outcomes of other family members, based on the understanding that family subsystems are interconnected.

There is theoretical and empirical evidence to suggest that functioning in one family subsystem can influence functioning in another. For example, there is some linkage between marital relationships and parent-child relationships, where conflict in one subsystem can affect another (Erel & Burman, 1995). Harley et al. (2016) used diary studies to capture the positive and negative marital interactions and levels of parenting stress of 176 married couples, and found that negative marital interactions 'spilled over' into parenting experiences: a day with a high number of negative marital interactions was associated with a higher level of parenting stress for both mothers and fathers of children with ASD. This same-day 'spillover' was also found to flow bidirectionally for mothers and not fathers. Currently there are no ID studies that have examined whether functioning at the subsystem

level is associated with functioning at the broader family system level. For example, it could be that how a mother feels about their relationship with their partner, with their child, or the relationship between children in their family, may have some bearing on how satisfied they feel with their family overall. Existing research evidence suggests that these subsystem-family functioning associations may be significant.

The couple subsystem is considered to be at the heart of the family system, with its stability having implications for others in the family unit (Seligman & Darling 2007). Marital (or partner) satisfaction has been found to be a predictor of family-level outcomes. Early work by Trute (1990) explored child and parent predictors of family adjustment in 88 families of children with DD, reporting that overall family adjustment (as captured by the Family Assessment Measure III; Skinner, Steinhauer, & Santa-Barbara, 1983) was associated with specific aspects of marital adjustment (dyadic cohesion, and consensus). Trute suggested that strengthening the couple subsystem could assist in maintaining a stable family environment. Correlations between couple negativity and subsequent negative family interactions (Kitzmann, 2000), and between maternal marital satisfaction and overall family functioning (Feldman, Wentzel, Weinberger, & Munson, 1990) have also been found in studies within the general population. It is therefore possible that satisfaction in the marital/partner subsystem may have a bearing on how satisfied mothers of children with ID feel about how their family functions overall.

The parenting subsystem and family functioning may also be related. The quality of parent-child interactions influence child developmental outcomes (Guralnick, 2001), with warmth and criticism in parent-child interactions found to be bidirectionally related to the symptoms and emotional and behavioral outcomes of children with ASD (Hickey, Bolt, Rodriguez & Hartley, 2020). Parent-child interactions can be affected when raising a child with ID (Totsika, Hastings, Vagenas, & Emerson, 2014), with greater conflict and less

warmth in the parent-child relationship found to lead to later child behavioural and emotional problems (Totsika et al., 2020), which may in turn be reflected in how a mother perceives the functioning of their family. However due to a lack of empirical evidence, it is not clear whether the parent-child relationship is associated with broader family-level outcomes such as family functioning. Poorer family functioning (Herring et al., 2006; Jellett et al., 2014) and family quality of life (Davis & Gavidia-Payne, 2009) has been found to be significantly associated with the presence of child emotional and behavioral problems in families of children with disabilities.

The sibling subsystem is an aspect of family functioning which requires further exploration. As one of the key subsystems of a family unit (Seligman & Darling, 2007), relations between siblings have the capacity to affect those at the individual and subsystem level (Feinberg, Solmeyer, & McHale, 2012). Closeness to siblings is a consistent predictor of an individual's adjustment in later life (Vaillant & Mukamal, 2001) and conflictual sibling interactions have been found to contribute to parental stress (McHale & Crouter, 1996 cited in Feinberg et al., 2012). The outcomes for siblings of children with a brother or sister with ID and/or ASD have been the focus of a number of empirical studies (Hayden, Hastings, Totsika & Langley, 2019; Stoneman, 2005), however relationships between siblings have received significantly less attention (Hastings, 2016). Associations between sibling relationship quality and parents' perceptions of family functioning are yet to be studied in the disability field. It is interesting and pertinent to explore whether the sibling subsystem - a subsystem of which a mother is not a part - has an influence on how they perceive their family to be functioning.

The current study took a micro-level family systems approach (Cridland, Jones, Magee, Caputi, 2014) to explore interactions within the family itself. The following research question was investigated:

- Is functioning in three family subsystems (marital/partner, parent-child, sibling) associated with perceptions of overall family functioning in mothers of children with ID?

Based on Family Systems Theory, we hypothesised that family subsystems would be associated with latent construct of family functioning. We did not add specific hypotheses as to the direction or relative magnitude of associations because of the lack of previous guiding research.

Methods

Participants

Data from 467 mothers of children with ID from a UK cohort study (citation removed for blind review) were analysed. Detail about the participating sample is provided in Table 1. The majority were biological mothers (*n*=437, 93.6%) and lived with their spouse (*n*=397, 85%). Two hundred and twenty-four mothers (48%) were educated to university degree level or higher, with 236 (50.5%) not in work at the time of the research. The majority of mothers described their ethnicity as White (*n*= 431; 92.3%). Families had on average two children living in the household (M=2.48, SD=0.71, Range= 1-7) and the majority of families had a weekly household income below the UK median level at the time of the data collection (*n*=268, 57.4%).

The children mothers reported on in the survey were all reported to have ID. Two-hundred and thirty-nine (51.2%) children were reported to have a 'mild/moderate' ID, and 223 (47.8%) a 'severe/profound' ID. Just over half of the sample were also reported to have ASD (*n*=243, 52%). Children were on average 9 years of age (SD=2.93, Range = 4-15 years) and most were male: 293 (68.0%).

Parents were asked to answer questions about any sibling between the ages of 4 and 15 years of age. If there was more than one sibling in this age range, they were asked to select the child closest in age to the child with ID. Two-hundred and thirty-four siblings were male (50.1%) and 225 (48.2%) were female. The majority of siblings were the same gender: 228 (52.9%). Siblings of the child with ID were on average 9 years of age (SD=3.24, Range = 4-15 years). The majority of siblings (*n*=342, 73.2%) were not considered to themselves have "a longstanding illness, disability or infirmity".

Table 1 Demographic profile of mothers (N=467) and their child with Intellectual Disability and a sibling

Variables	*n* (%)
Mother type	
Biological	437(93.6)
Adoptive	27(5.8)
Step	1(0.2)
Foster	2(0.4)
Marital status	
Married and living with spouse	397(85.0)
Living with partner	70(15.0)
Education level	
University degree level or above	224(48.0)
Below degree level	221(47.3)
Missing	22(4.7)
Employment status	
In work	230(39.3)
Not in work	236(50.5)
Missing	1(0.2)
Ethnic group	
White	431(92.3)
Mixed	4(0.9)
Indian	4(0.9)
Pakistani and Bangladeshi	5(1.1)

Chinese	5(1.1)
Black or Black British	5(1.1)
Ethnic other	7(1.5)
Missing	6(1.3)
UK Median Weekly Household Income	
Above median	181(38.8)
Below median	268(57.4)
ID severity	
Mild/Moderate ID	239(51.2)
Severe/Profound ID	223(47.8)
Missing	5(1.1)
Child gender	
Male	320(68.5)
Female	146(31.3)
Missing	1(0.2)
Sibling gender	
Male	234(50.1)
Female	225(48.2)
Missing	8(1.7)
Sibling illness/disability	
Yes	121(25.9)
No	342(73.2)
Missing	4(0.9)

Variables	Mean (SD)
Child age	9.09 (2.93)

Sibling age	9.54 (3.24)
Number of all children in the household	2.4(0.71)
Number of all people in the household	3.63(0.92)

Note. SD: Standard Deviation

Measures

The Family APGAR scale (Smilkstein, 1978) was used to assess mothers' perceptions of family functioning. The Family APGAR was designed to capture five components of family functioning: Adaptation, Partnership, Growth, Affection and Resolve. Sample items from the measure include: "I am satisfied that I can turn to my family for help when something is troubling me" (Adaptation), and "I am satisfied with the way my family expresses affection and responds to my emotions, such as anger, sorrow and love" (Affection). Mothers were asked to rate the 5 items on a Three-point scale: *Almost Always =2, Some of the time =1, Hardly ever=0.* The measure is scored by summing the values for the items for a total score that can range from 0 to 10. A higher score indicates a greater degree of satisfaction with family functioning. Scores can be also be used to categorise families into dysfunctional (0-3), moderately dysfunctional (4-7) and highly functional (8-10). The mean total score on the Family APGAR for this sample was 5.71(SD=2.81, Range=0-10). The majority of scores fell into the 'moderately dysfunctional' category (49.3%), followed by 'highly functional' (28.7%) and 'dysfunctional' (21.8%). The Family APGAR questionnaire has been used previously in studies investigating family functioning in the general population (Gardner et al., 2001) and has more recently been used to study family functioning where there is a child with a disability (Rani et al., 2018). Internal consistency (Cronbach's α) for the total Family APGAR score in the present study was .87.

Two single item measures were used to assess aspects of the mothers' relationship with their spouse or partner. The first item was a global measure of relationship happiness. Mothers were asked to select "the number which best describes how happy or unhappy you are with your relationship, all things considered" on a scale of 1 (*very unhappy*) to 7 (*very happy*). The modal score for this measure was 6. The second item asked mothers to rate "how often do you and your [husband/wife/partner] disagree over issues related to your child?" on a scale of 1 (never) to 6 (more than once a day). The modal score for this measure was 2 (less than once a week). Both these items have been used in UK population-representative cohort studies such as the Millennium Cohort Study (Johnson, 2012).

The Child-Parent Relationship Scale Short Form (CPRS-SF) was used to measure the quality of the mother-child relationship. The CPRS-SF is adapted from the Student-Teacher Relationship Scale (STRS; Pianta, 1992) and is a 15 item scale asking parents to rate their relationship with their child. Items are measured on a scale of 1 (*definitely does not apply*) to 5 (*definitely applies*). Item scores are summed to provide scores for two dimensions: closeness, and conflict. Seven items are summed for closeness, and eight items for conflict. Higher scores indicate greater closeness or conflict in the parent-child relationship. The mean score for closeness was 25.91(SD=5.26, Range=7-35) and conflict 24.52(SD=7.41, Range=8-40). The measure has been used in studies of parents of children with ID (Totsika et al., 2014). Sample items include "I share an affectionate relationship with this child" (Closeness), and "This child and I always seem to be struggling with each other" (Conflict). Internal consistency (Cronbach's α) in the present study was .76 for Closeness, and .85 for Conflict.

A shortened version of the Sibling Relationship Questionnaire – revised (SRQ brief parent-version; Furman & Buhrmester, 1985) was used to assess mothers' perceptions of sibling relationship quality. The SRQ brief version is a 39-item questionnaire which measures 16 aspects of sibling relationship across four broad domains: warmth/closeness, relative

status/power, conflict, and rivalry. In the present study, participants completed 10 items that captured dimensions of warmth/closeness, and conflict. Mothers completed the three two-item subscales of the Warmth factor (Intimacy, Companionship, Affection), and two scales of the Conflict factor (Quarrelling and Antagonism). Mothers were asked to read the 10 items and rate how much they applied to the relationship between their child with ID and the sibling on a Five-point scale from 1 (*hardly at all*) to 5 (*extremely much*). The mean score for warmth was 17.68(SD=4.98, Range=6-30) and conflict was 11.11(SD=4.53, Range=4-20). The brief parent-version of the SRQ has been used before to assess the relationship quality of children with ASD and their siblings (Petalas et al., 2012). Sample items include "How much do the sibling and the child love each other?" (Affection), and "How much do the sibling and the child disagree and quarrel with each other?" (Quarrelling). Scores for Warmth and Conflict were derived by calculating a weighted mean score from 1-5 for each of these two relationship domains. Internal consistency (Cronbach's α) in the present study was .85 for Warmth and .84 for Conflict.

Procedure

The data used for the present analysis were part of a large survey of caregivers of children with ID aged 4 to 15 years in the UK [citation removed for blind review]. Following ethical approval from a National Health Service research ethics committee, information about the study was distributed via a number of charity organizations who support families of children with ID. Recruitment took place mostly online through social media and locally through advertising via local parent support groups. A primary caregiver was asked to complete an online or paper survey. A total of 1192 primary parental caregivers took part in the study. The present research focuses on the data from all 467 mothers who reported being married and

living with their spouse, or living with a partner; and who provided data on a sibling in the household (including reporting on sibling relationship quality with the child with ID), and also reported on their relationship with their child with ID.

Approach to Statistical Analysis

A series of Structural Equation Models (SEM) were fitted in AMOS 24®. In comparison to other statistical analysis techniques such as regression, SEM is capable of testing more sophisticated theory (Schumacker & Lomax, 2012). It can test how variables define constructs, simultaneously test how constructs are related to each other, and explicitly take into account measurement error when analysing data (Schumacker & Lomax, 2012). The data was normally distributed so models were estimated using Maximum Likelihood (ML), a consistent and unbiased approach to parameter estimation commonly employed in SEM (Hair, Black, Babin, Anderson, & Tatham, 2006). Full Information Maximum Likelihood (FIML) was used to account for missing values across all the measures used in the sample (total n=42), as it can be used on an incomplete dataset to produce estimates which allow for the fit of a model to an entire sample (Little, Jorgensen, Lang & Moore, 2013).

The analysis was conducted in four stages. First, a Confirmatory Factor Analysis (CFA) was fitted to assess the construct validity of a latent variable of family functioning, using the five items of the Family APGAR scale. Model fit was assessed using a number of goodness of fit indexes including the Tucker Lewis Index (TLI), Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA).Hu and Bentler (1999) recommend a CFI and TLI value >.95, and an RMSEA of <.06 to .08 indicate good fit between the model and observed data (Hu & Bentler, 1999; Schreiber, Nora, Stage, Barlow, & King, 2006).

With limited existing theory to guide the entry of observed relationship indicators into the structural model, a correlation matrix of six observed relationship indicators (that represented measurements of parental relationship satisfaction, parental disagreement, parent-child conflict, parent-child closeness, sibling warmth, and sibling conflict) was conducted to determine which subsystem indicators would be entered into the structural models and their order of entry based on the strength of their association with family functioning. The correlation matrix showed that all of the six subsystem relationship indicators were significantly correlated with the latent construct of family functioning (r= -.12 to .45) (Table 2). Each indicator was entered into the model sequentially, with paths drawn from each of the exogenous variables to the endogenous variable of family functioning. Where an entered variable did not have a significant path it was not retained in the next model. Models with significant paths were then examined by a nested model comparison (Chi-Square difference test) to ascertain which one was most parsimonious (Preacher, 2006).

Finally, as recommended by Pohlmann (2004), a within-sample replication was performed to gauge factor stability. We randomly divided the sample into two groups (Group 1 n=233, Group 2 n=234) and fitted the final structural model to both halves of the dataset.

Results

Measurement Model

The measurement model for the five Family APGAR items showed good fit to the data χ^2 (5) =16.696, p=.005, CFI = .98, TLI = .96, RMSEA = .07 (90% CI .03 -.11). All factor loadings were significant (p <.05) and ranged from .71 to .80 (Figure 1). Standardized factor loadings showed that Affection (APGAR4, Figure 1) had the strongest loading on family functioning (β = 0.80).

Table 2 Correlation matrix

1. Family functioning	1	2	3	4	5	6	7	8	9	10	11	12
2. Adaptation	.76***	-										
3. Partnership	.78***	.62**	-									
4. Growth	.77***	.60**	.59**	-								
5. Affection	.80***	.56**	.63**	.62**	-							
6. Resolve	.71***	.53**	.52**	.54**	.60**	-						
7. Relsat	.45***	.34**	.40**	.37**	.40**	35**	-					
8. Disagree	-.34***	-.24**	-.30*	-.28**	-.31**	-.26**	-.39**	-				
9. CPConflict	-.24***	-.19**	-.19**	-.18**	-.18**	-.25*	-.09	.36**	-			
10. CPClose	.20***	.13**	.15**	.16**	.15**	.22**	.09*	-.17**	-.29**	-		
11 .SRQConflict	-.12**	-.05	-.14**	-.07	-.13**	-.12**	-.08	.30**	.44**	.11*	-	
12 .SRQWarmth	.24***	.15**	.20**	.17**	.20**	.27**	.10*	-.16**	-.27**	.42**	-.03	-

Note. Adaptation, Family APGAR item 1; *Partnership,* Family APGAR item 2; *Growth,* Family APGAR item 3; *Affection,* Family APGAR item 4; *Resolve,* Family APGAR item 5; *Relsat,* Global measure of relationship satisfaction; *Disagree,* How often couples disagree over issues related to their child; *CPConflict,* Child-Parent Relationship Scale-Short Form Conflict Factor; *CPClose,* Child-Parent Relationship Scale-Short Form Closeness Factor; *SRQConflict,* Sibling Relationship Questionnaire Short version Conflict Factor; *SRQWarmth,* Sibling Relationship Questionnaire Short version Warmth Factor
* p < .05, ** p < .01, *** p < .001

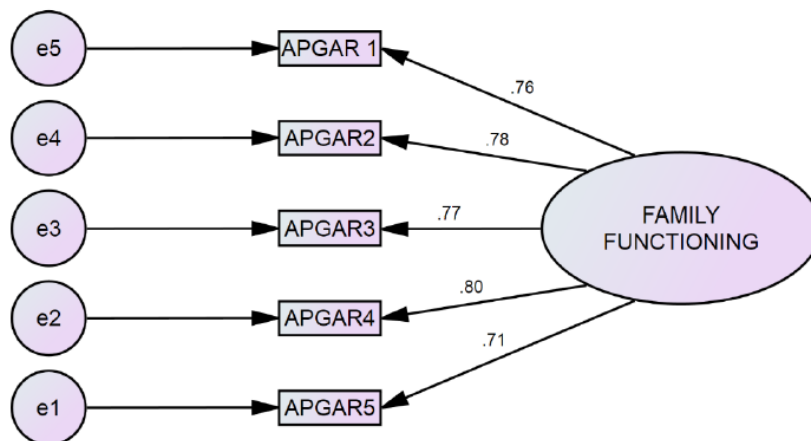Figure 1. *Confirmatory factor analysis of the latent construct of family functioning*

Figure 1. APGAR 1, Adaptation*; APGAR2,* Partnership; *APGAR3, Growth; APGAR4,* Affection; *APGAR5,* Resolve.

Structural Model

Model 5 (including partner relationship satisfaction, partner disagreement, child-parent conflict, and sibling relationship warmth) accounted for the most variance in family functioning (32%) and was the most parsimonious (*p=*.002) when compared to model 2 (Table 3).

Table 3 Structural models predicting family functioning

Structural models	$\chi 2(df)$	CFI	TLI	RMSEA	Total variance explained (R^2)	All paths sig $(p<.05)$	Nested Chi-square comparison
1 – Relsat	17.997(9)	.99	.98	.04	.24	yes	
2 – Relsat, Disagree	20.060(13)	.99	.99	.03	.27	yes	
3 – Relsat, Disagree, CPConflict	28.424(17)	.99	.98	.03	.30	yes	3 vs 2
4 – Relsat, Disagree, CPConflict, CPClose	33.546(21)	.99	.98	.03	.31	no	
5 – Relsat, Disagree, CPConflict, SRQWarmth	37.925(21)	.98	.97	.04	.32	yes	5 vs 2*
6 – Relsat, Disagree, CPConflict, SRQWarmth, SRQConflict	45.422 (25)	.98	.97	.04	.32	no	

Note. * p < .05

Standardized regression weights (Figure 2) showed that partner relationship satisfaction ($\beta = .40$, $p < .001$) had the strongest positive association with family functioning, followed by sibling relationship warmth ($\beta = .15$, $p < .001$). Disagreement between parents over issues related to the child ($\beta = -.15$, $p = .003$) and conflict in the child-parent relationship ($\beta = -.13$, $p = .006$) had a negative association with family functioning. The model showed good fit to the data χ^2 (21) = 37.925, $p = .019$, CFI = .98, TLI = .97, RMSEA = .04, 90% CI .01 -.06), and was accepted as the final structural model. Given that mothers of children with ID are more likely to experience mental health problems (Emerson, 2003; Singer, 2006), we conducted a sensitivity analyses with the Kessler 6 (K6; Kessler et al., 2003), a screening tool for mental illness used in the general population, as a covariate in the model. The path coefficients did not change significantly as a result.

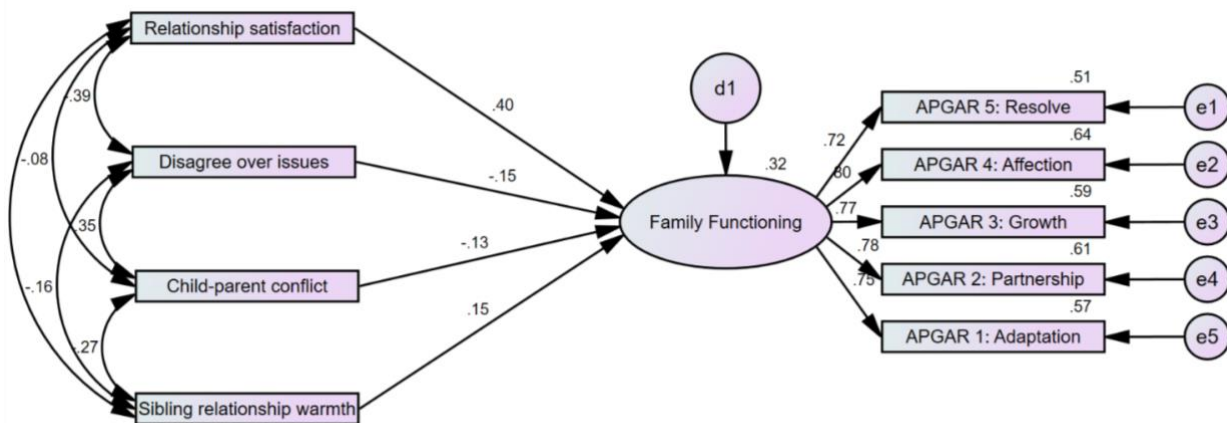Figure 2. *Final structural model predicting family functioning*

Figure 2. Standardized estimates. *Relationship satisfaction*, Global measure of relationship satisfaction; *Disagree over issues,* How often couples disagree over issues related to their child; *Child-parent conflict,* Child-Parent Relationship Scale-Short Form Conflict Factor; *Sibling relationship warmth,* Sibling Relationship Questionnaire Short version Warmth Factor

Within-sample replication

Model fit for Group 1 was extremely good ($\chi 2$ (21) =17.025, p=.710, CFI = 1.00, TLI = 1.01, RMSEA = .00, 90% CI .00 -.04) (Table 4). Model fit for Group 2 (χ^2 (21) =44.006, p=.001, CFI = .96, TLI = .91, RMSEA = .07, 90% CI .04 -.10) was reasonable (Table 4). The model fit for Group 1 is likely to be a result of low statistical power failing to detect discrepancies between the observed and specified model. The directions of the paths in both the random groups were the same as within the overall sample (Table 5). Lastly, it is also worth noting that for Group 2 that the strength of sibling warmth is very weak.

Table 4 Within-sample structural models predicting family functioning

Structural models	$\chi2(df)$	CFI	TLI	RMSEA	Total variance explained ($R^{2)}$	All paths sig (p<.05)
1 – Overall sample	37.925(21)	.98	.97	.04	.32	yes
2 – Random Group 1	17.025(21)	1.00	1.01	.00	.31	no
3 – Random Group 2	44.006(21)	.96	.91	.07	.34	no

Table 5 Within-sample associations between family functioning and relationship variables

Structural models	Relsat β	Disagree β	CPConflict β	SRQWarmth β
1 – Overall sample	.40***	-.15**	-.13**	.15***
2 – Random Group 1 (*N*=233)	.39***	-.10	-.11	.22***
3 – Random Group 2 (*N*=234)	.41***	-.19**	-.15*	.07

Discussion

We explored whether dimensions of dyadic relationships in the family were related to overall family functioning. The latent factor structure of family functioning among families of children with ID was initially tested in a CFA, where the five observed Family APGAR variables (Adaption, Partnership, Growth, Affection, and Resolve) loaded onto a latent construct of family functioning. Good model fit suggested that family functioning is a valid construct that can be described using the Family APGAR items in this sample of mothers of children with ID. Given that the Family APGAR is a relatively new measure to be used in the ID field, further validation work is needed to fully establish its psychometric properties. However, the data suggest that it might be a useful measure for research which explores family functioning in families of children with ID.

The final structural model showed that functioning in the three family subsystems (marital/partner, parental, sibling) was associated with perceptions of overall functioning, thus supporting our original hypothesis. Four dimensions: partner relationship satisfaction, sibling warmth, partner disagreement, and child-parent conflict were all associated with maternal perceptions of family functioning, accounting for 32% of the variance in the family functioning latent construct. These findings appear to support the idea that subsystem functioning and broader family functioning are somehow linked: how mothers felt about relationships in all of three subsystems was related to how they perceived their family to be functioning overall. Family systems theories pertain that families are comprised of subsystems (Cox & Paley, 1997; Minichin, 1985) that are interconnected and operate within a larger family system (Cridland et al,. 2014; Smith-Acuña, 2010), however they say less about the relationship between these two hierarchical levels. Our findings seem to suggest an interdependence between subsystems and the broader-level construct of family functioning, however further empirical research to explore these theoretical ideas is warranted.

Interestingly, our findings show that both of the variables capturing aspects of the marital/partner relationship were predictive of family functioning, with the perceived quality of the relationship between the mother and their spouse or partner the strongest predictor of perceived family functioning. Family systems theories pertain that the marital/partner relationship is at the heart of the family unit (Seligman & Darling, 2007), and our findings appear to support this and furthermore indicate that subsystems may be hierarchical in nature. There is existing empirical evidence reporting associations between marital quality and family functioning in the general population (Feldman, Wentzel, Weinberger, & Munson, 1990; Froyen, Skibbe, Bowles, Blow & Gerde, 2013; Kitzmann, 2000; Henderson, Sayger & Horne, 2003). Work by Shek (1999; 2001) showed that marital satisfaction was related to parental perceptions of family functioning over time, and that compared to individual measures of well-being, dyadic measures (including marital satisfaction and adjustment) had a stronger influence on perceived family functioning for parents. Given that mothers have already been found to be more likely to experience spillover between marital and parental subsystems (Hartley et al., 2016), these findings also indicate the potential for spillover between the marital dyad and broader family system. Intervention which bolsters spousal/partner relationship satisfaction and provides strategies which aim to reduce disagreement between parents about their child with ID, could be beneficial for family functioning.

Our findings also show a relationship between the sibling subsystem and the broader family subsystem, with perceived warmth between the child with ID and their sibling a significant predictor of how mothers perceived family functioning. This is an important finding given the lack of empirical work exploring the relationship between the sibling subsystem and the wider family system in the disability field. In the general population, sibling relationship quality has been found to be related to the quality of relationships in

parental and spousal/partner subsystems (Dunn, Deater-Deckard, Pickering & Golding, 1999) and overall family functioning (MacKinnon, 1989). What is unclear at this point is why sibling warmth but not conflict was associated with family functioning. It could be the case that aspects of the 'warmth' factor (intimacy, companionship, and affection) are more pertinent to mothers when one of the children has a disability. Mothers may expect conflict between siblings and so it has little bearing on how they perceive their family to be functioning, however sibling relationships with little warmth and closeness may have more bearing on aspects of family functioning captured in the Family APGAR measure, such as the way that family members express affection and respond to emotions, and the way that the family share time together. There is the potential for positive, preventative intervention which promotes warm sibling interactions. Further investigation is needed to help us understand the role of sibling relationships in the functioning of families of children with ID, particularly as siblings age, given the pivotal and long-lasting nature of their relationship (Dunn, 2000) and the likelihood that siblings may one day need to provide care or support to their sibling with ID

Conflict in the parent-child relationship was also found to be negatively associated with mother's perceptions of family functioning. According to FST, conflict in any family subsystem has the potential to reverberate throughout a family, affecting other subsystems and members, and the maintenance of subsystem boundaries (Seligman & Darling, 2007). The quality of the parent-child relationship has been found to be associated with parental views of family functioning over time in the general population (Shek, 1999), and parents of children with ID have been found to report a more negative parent-child relationship compared to parents of typically developing children (Totsika et al., 2014). This finding may be explained by previous evidence of an association between the increased behavioral and emotional problems in children with ID and poorer family functioning (Herring et al., 2006;

Jellett et al., 2015). While our study did not focus on behavioral and emotional problems per se, child behavioral and emotional problems have been found to be associated with parent-child conflict (Totsika et al., 2014) and so one might theorize that this may then influence how mothers feel about the functioning of their family - a pathway that could be examined using longitudinal research designs. Programmes which target parent-child relationships have been found to benefit parents of children with Special Educational Needs (Lindsay, 2019) and have the potential to positively impact on family-level outcomes. This study has provided an initial insight into the associations between dimensions of subsystem functioning and maternal perceptions of family functioning. As the data were cross-sectional, future replication is needed with longitudinal data to allow exploration of causal pathways and understand why certain relationship dimensions were more strongly associated with family functioning than others.

It is important to note a number of other study limitations, namely that our findings only capture global perceptions of family functioning and not necessarily how the family is actually functioning on a day to day basis. Diary studies may be a way of overcoming this limitation (Lickenbrock, Ekas, & Whitman, 2011). We also acknowledge that there is an issue of self-report bias as all measures were mother-reported and are therefore likely to be highly correlated (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). When exploring relationship quality, the perspective of one individual should be interpreted with caution. For example, when assessing partner relationship quality, both partners should be reporting on their relationship (Sim, Cordier, Vaz & Falkmer, 2016). There is also evidence that parental perceptions of sibling relationships do not always align with siblings' reports of their relationship with their sibling (Rossiter & Sharpe, 2001; Hastings & Petalas, 2014). Therefore, we need to solicit the views of other family members such as fathers and siblings in order to be truly systematic in our approach (Gardner et al., 2012). We should also look to

understand family functioning in other family structures (Gardner et al., 2012). The current study focused on the experiences of mothers who are currently living a with a partner and with at least two children, so the findings cannot be extended to other family types. Future research should look to further investigate other pertinent covariates (such as maternal depression), and consider taking a 'macro-level' family systems approach that explores the way in which systems, such as families, interact with other systems, such as communities (Cridland et al., 2014; Seligman & Darling, 2007). It could be that family functioning is affected by factors outside of the family unit, such as interactions with services, which is particularly pertinent to families raising a child with a disability.

The functioning of families of children with ID is emerging as an important field of study. Our research, underpinned by family systems approaches, demonstrates the interconnectedness of family subsystems and broader family functioning, and signifies the potential for systemic family intervention which aims to improve functioning at the individual, subsystem, and unit level. However, further research is needed to understand the direction of these associations to establish where support should be targeted and what is needed at different points of the family lifecycle.

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