Published in final edited form as:
Am J Intellect Dev Disabil. 2011 January ; 116(1): 3–15. doi:10.1352/1944-7558-116.1.3.

Accounting for the "Down Syndrome Advantage"

Anna J. Esbensen, PhD and
Cincinnati Children's Hospital Medical Center

Marsha Mailick Seltzer, PhD
Waisman Center, University of Wisconsin-Madison

Abstract

We examined factors that might explain the higher levels of psychosocial well-being observed in past research on mothers of individuals with Down syndrome (DS), as compared to mothers of individuals with other types of intellectual disabilities. We studied 155 mothers of adults with DS, contrasting factors that might validly account for the "DS advantage" (behavioral phenotype) with those that have been portrayed in past research as artifactual (maternal age, social supports). The behavioral phenotype predicted less pessimism, more life satisfaction and a better quality of the mother-child relationship. However, younger maternal age and fewer social supports, as well as the behavioral phenotype, predicted higher levels of caregiving burden. Implications for future research on families of individuals with DS are discussed.

Mothers of individuals with Down syndrome (DS) typically exhibit better psychological well-being profiles in comparison to mothers of individuals with other intellectual and developmental disabilities (IDD), with better outcomes being evident across the life course (e.g., Fidler, Hodapp, & Dykens, 2000; Hauser-Cram, Warfield, Shonkoff, & Krauss, 2001; Seltzer, Krauss, & Tsunematsu, 1993). However, it has been argued that this advantage is simply an artifact of confounding variables (Cahill & Glidden, 1996; Glidden & Cahill, 1998; Stoneman, 2007) or that confounding variables may contribute to the advantage (Corrice & Glidden, 2009). In order to develop a better understanding of the factors associated with syndrome-specific impacts on the family, it is important to sort out valid explanations that account for between-group differences in family functioning from artifacts.

There is an abundance of literature suggesting a "DS advantage" in mothers of children, adolescents and adults with DS, compared to mothers of children with IDD (either of unknown etiology or with other specific syndromes or diagnoses). There is extensive evidence that mothers of young children with DS experience lower levels of stress (Kasari & Sigman, 1997; Marcovitch, Goldberg, MacGregor, & Lojkasek, 1986), more extensive and satisfying networks of social support (Hauser-Cram et al., 2001; Shonkoff, Hauser-Cram, Krauss, & Upshur, 1992), less pessimism about their children's future (Fidler et al., 2000), and they perceive their children to have less difficult temperaments (Kasari & Sigman, 1997). Families with a child with DS also have been rated to be more cohesive and harmonious than families of children with other types of IDD (Mink, Nihira, & Meyers, 1983).

Similar to mothers of young children, mothers of adolescents and young adults with DS continue to display better psychological well-being than mothers of similarly aged children

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Correspondence concerning this article should be addressed to Anna J. Esbensen, Cincinnati Children's Hospital Medical Center, Division of Developmental and Behavioral Pediatrics, MLC 4002, 3333 Burnet Avenue, Cincinnati, OH 45229. anna.esbensen@cchmc.org.

with other types of IDD (Abbeduto, Seltzer, Shattuck, Krauss, Orsmond & Murphy, 2004). Mothers of adolescents with DS report less pessimism about their child's future, more closeness in the relationship with their child, and fewer depressive symptoms, and were more likely to perceive that the child reciprocated feelings of closeness as compared to mothers of adolescents with other types of IDD (Abbeduto et al., 2004). And there is evidence that the advantage of having a son or daughter with DS continues well into adulthood (Greenberg, Seltzer, Krauss, Chou & Hong, 2004; Seltzer, Krauss, Orsmond & Vestal, 2001; Seltzer et al., 1993). Mothers of adults with DS report less conflicted family environments, less stress and burden, more satisfaction with their social supports, more optimism and acceptance of their child's disability, and more appreciation for their child's strengths than do mothers of adults with IDD due to other causes (Seltzer et al., 1993; Krauss & Seltzer, 1995; Krauss & Seltzer, 2000).

However, it should be noted that not all researchers have found that mothers of individuals with DS report better psychological well-being on all measures (Cunningham, 1996; Esbensen, Seltzer & Abbeduto, 2008; Gath, 1990; Greenberg et al., 2004; Roach, Orsmond & Barratt, 1999; Sanders & Morgan, 1997). Instead, in some studies, mothers of individuals with DS have been found to be similar to the comparison group with IDD on some (but not all) measures of psychological well-being, such as depressed mood, pessimism and marital satisfaction. Yet the bulk of the evidence suggests that mothers of individuals with DS have a more normative pattern of psychological well-being than mothers of children and adults with other types of IDD.

Despite the empirical evidence in favor of a “DS advantage,” an argument has been presented that this advantage may be an artifact of sampling bias or between-group differences in other factors (e.g., maternal age) that may contribute to the association of maternal functioning and the diagnosis of her child (Corrice & Glidden, 2009). In some research, the DS advantage was no longer evident after controlling for factors such as maternal age and coping, marital status, child age, family income, and other contextual variables (Abbeduto et al., 2004; Blacher & McIntyre, 2006; Cahill & Glidden, 1996; Corrice & Glidden, 2009; Eisenhower, Baker & Blacher, 2005; Glidden & Cahill, 1998; Stoneman, 2007). However, other studies found persistent evidence of the DS advantage, even after controlling for a variety of covariates such as maternal age and education (Eisenhower et al., 2005; Seltzer et al., 1993). Together, these findings suggest that covariates cannot fully account for why mothers of individuals with DS appear to be advantaged relative to mothers of individuals with other types of IDD with respect to psychological functioning.

A different way to address the question of what accounts for the DS advantage is to examine differences *within* samples of mothers of individuals with DS. Variables that have differentiated groups in between-group analyses could be examined directly in a within-group analysis to determine if they are associated with the hypothesized outcomes. For example, older maternal age at the time of the birth of the child with DS (and hence greater maturity and financial stability) is one explanation frequently offered for the DS advantage (Cahill & Glidden, 1996; Corrice & Glidden, 2009; Glidden & Cahill, 1998; Stoneman, 2007). In a within-group analysis, it would be possible to assess whether mothers who were older at the age of the birth of their child with DS would indeed have better well-being outcomes than mothers who were younger. Another explanation that is frequently offered for the DS advantage is that mothers of individuals with DS have greater access to syndrome-specific support groups than mothers of individuals with other types of IDD. Support groups for a particular syndrome provide families with information pertinent to their child's specific behaviors and characteristics, offer mothers social support, and can lead to more adaptive coping (Erickson & Upsur, 1989). Mothers of children with DS are also reported to receive more family support than mothers of children with other disorders and to have larger social support networks (Poehlmann, Clements, Abbeduto & Farsad, 2005; Seltzer & Krauss, 1998). Again, in a within-group analysis, it would be possible to determine whether those mothers with greater support actually have more favorable well-being outcomes than mothers who have less support.

Whereas older maternal age and greater social support can be conceptualized as artifacts that may account for the DS advantage, an alternative explanation concerns the level of stress associated with parenting a child with DS as compared with parenting stress associated with other types of IDDs. Children with DS are commonly described as affectionate, sociable, and easy in temperament (Dykens, 1999). Individuals with DS are also reported to exhibit better functional abilities and fewer behavior problems than individuals with other types of IDD (Corrice & Glidden, 2009; Greenspan & Delaney, 1983; Harrison, 1987; Hodapp & Dykens, 1994; Loveland & Kelley, 1988; Zigman et al., 1987). Such a profile of the behavioral phenotype of individuals with DS could explain lower levels of parenting stress, and would suggest a nonartifactual (i.e., valid) explanation of the DS advantage in maternal psychological well-being.

The current analysis sought to examine the impact of maternal age, social supports, and the behavioral phenotype of the son or daughter with DS on the well-being of their mothers. We focused this within-group analysis on mothers of individuals with DS in order to test whether artifactual (i.e., maternal age and social supports) or valid (i.e., behavioral phenotype) factors account for advantages in maternal well-being. We also focused on four positive and negative maternal well-being outcomes in order to determine if the effects of these variables vary across different outcomes. Specifically, in the present study, we examine the influence of maternal age, maternal supports, and the behavioral phenotype of the adult with DS on maternal well-being, as measured by life satisfaction, the quality of the mother's relationship with her son or daughter with DS, maternal pessimism about the son or daughter's future,, and subjective caregiving burden, in a sample of mothers of adults with DS. We hypothesize that (1) mothers who were older when they gave birth to their child with DS will have better well-being, (2) mothers of adults with DS with larger social networks and who participate in parent support groups will have better well-being, and (3) mothers of adults with higher levels of functional abilities and fewer behavior problems will have better well-being. The first two of these hypotheses would lend support to the argument that the DS advantage is artifactual, whereas the latter hypothesis would suggest that it is due, at least in part, to differential levels of parenting stress.

Methods

Participants

The current sample was drawn from a larger longitudinal study of mothers age 55 and older caring for an adult son or daughter with IDD (Krauss & Seltzer, 1999). From 1988 to 2000, eight waves of data were collected at 18 month intervals on an initial sample of 461 adults with IDD who lived at home, 169 of whom had Down syndrome (DS). At the second wave of data collection (1989-1990), mothers of 155 adults with DS continued to participate and they form the sample for the present analysis. The second wave of data collection was selected for analysis because this was the first point when behavior problems were measured.

At the time that they gave birth to their child with DS, these mothers ranged in age from 20 to 47 years (*M* = 35.6, *SD* = 6.1). They were primarily Caucasian (98.7%), and 80.6% had graduated from high school or had at least some post-secondary education. They had between one and 9 children, including their son or daughter with DS (*M* = 4.3, *SD* = 2.0). At the second wave of data collection of the ongoing study, which is the time point of focus in the present study, mothers ranged in age from 56 to 86 years (*M* = 67.9, *SD* = 6.7). Two-thirds were married (65.2%), and nearly one-third (30.3%) were widows. The median family income was between $15,000 and $19,999, which was typical for older household incomes at that time (US Census Bureau, 2005). The adult child with DS ranged in age from 17 to 56 years (*M* = 32.4, *SD* = 7.4). Nearly two-thirds were males (61.3%) and three-fourths had mild or moderate ID (76.5%), and the remaining adults had severe or profound ID.

Instruments

Maternal Well-Being—Four dimensions of maternal well-being were assessed: life satisfaction, quality of the mother's relationship with her adult child with DS, pessimism about her adult child's future, and subjective caregiving burden. Differences between these mothers of adults with DS and mothers of adults with other types of IDD have already been published (Seltzer et al., 1993), supporting the DS advantage. The present sample includes 92% of the mothers in the Seltzer et al. sample, and the between-group DS advantage is also evident in the current sample (data available from first author). We also checked whether the range of scores on these outcome variables in this DS sample was restricted, or alternatively, whether the range overlapped with the scores of the non-DS IDD sample in the same study (data available from first author). There was no restriction of range in the data from mothers of adults with DS relative to mothers of adults with other types of IDD.

The Philadelphia Geriatric Center Morale Scale (PGC) was used to measure maternal life satisfaction, defined as a “basic sense of satisfaction with oneself, a feeling that there is a place in the environment for oneself, and an acceptance of what cannot be changed” (Lawton, 1972). This 17-item scale consists of yes or no questions and has an internal consistency coefficient of .84 in the larger longitudinal study (Krauss & Seltzer, 1993), and of .81 in the current sample.

The Positive Affect Index (PAI) was used to measure the mother's perception of the quality of her relationship with her adult son or daughter (Bengtson & Schrader, 1982). This 10-item scale assesses the mother's feelings towards her child and her perception of her child's feelings towards her. Items relate to feelings of intimacy, trust, understanding, fairness and respect, and are rated on a 6-point scale. Internal consistency for the PAI was .87 in the larger longitudinal study (Esbensen, Seltzer & Greenberg, 2006), and .88 in the current sample.

The Pessimism subscale from the Questionnaire on Resources and Stress-F was used to measure maternal pessimism about her child's future (Friedrich et al., 1983). The 11-item Pessimism subscale asked whether the mother has concerns about her child's future and potential for achieving self-sufficiency. Internal consistency was found to be .77 in the larger longitudinal study (Esbensen et al., 2006), and .75 in the current sample.

The Zarit Burden Interview is a 29-item measure of subjective burden related to caregiving, rated on a 3-point scale (Zarit et al., 1980). Subjective burden represents potential problems a mother may experience as a result of caregiving for her son or daughter. Mothers indicated how much discomfort was caused by each item. The internal consistency for this instrument was .83 in the larger longitudinal study (Esbensen et al., 2006), and .81 in the current sample.

Health—Maternal and child health were measured using a maternal rating of current health status (1 = poor, 2 = fair, 3 = good, 4 = excellent). Global ratings of health have been found to be accurate measures of health status (Idler & Benyamini, 1997). Mothers, and the sons or daughters with DS, were both primarily in good health (*M* = 2.9, *SD* = 0.8; *M* = 3.4, *SD* = 0.7, respectively).

Maternal Social Supports—Mothers reported on individuals in her personal network, including family and friends, with whom they felt a special bond (Antonucci & Akiyama, 1987). Network size was assessed as the total number of people in the social support network, and ranged from 0 to 14 (*M* = 8.2, *SD* = 3.3). Mothers also reported if they currently participated in a parent support group. More than one-third (39.6%) of mothers currently participated in such a group.

Behavioral Phenotype—Behavioral phenotype was assessed using measures of functional abilities and behavior problems. Our measure of functional abilities was a 30-item scale measuring functional skills in the areas of housework, personal care, meal related activities, and mobility. This measure of functional skills was based on a revised version of the Barthel Index (Mahoney & Barthel, 1965) to measure personal and instrumental activities of daily living appropriate for adults with IDD (Seltzer, Ivry & Litchfield, 1987). Each item was rated on a 4-point scale of independence (0 = cannot perform the task at all, 1 = could do but doesn't, 2 = can perform the task with help, 3 = performs the task independently), and averaged for a total score. Internal consistency coefficient for the total score is .90 in the larger longitudinal study (Esbensen, Seltzer & Greenberg, 2007) and .93 in the current sample. Average functional ability scores ranged from 0.53 to 2.93 (*M* = 2.3, *SD* = 0.4).

The measure of behavior problems was the ICAP (Inventory for Client and Agency Planning; Bruininks, Hill, Weatherman, & Woodcock, 1986), later known as the SIB-R (Scales of Independent Behavior – Revised; Bruininks, Woodcock, Weatherman, & Hill, 1996). This measure assessed the frequency and severity of eight types of behavior problems, providing an overall measure of generalized behavior problems. Individual problem behaviors are scored as present or absent. Index scores provide ratings of the seriousness of the problem behavior as sub-clinical (90-110), marginally serious (111-120), moderately serious (121-130), serious (131-140) or very serious (141 or above). Reliability and validity are excellent (Bruininks et al., 1986). Generalized behavior problem scores ranged from 96 to 141 (*M* = 99.3, *SD* = 5.7).

Data Analysis

Multiple hierarchical regression was used to test the extent to which maternal age, social support and child behavioral phenotype would predict maternal well-being (life satisfaction, the quality of the mother's relationship with her son or daughter, pessimism, and subjective burden), after controlling for maternal and child covariates. *Maternal and child background characteristics* were entered in the first step of the regression model. Maternal covariates included number of children, family income, marital status, maternal education, and maternal health. Child covariates included gender, child health and child age. Child age and current maternal age were significantly correlated ($r = .62$, $p < .001$) and together are redundant with the theoretically important variable of age of the mother at the birth of her child with DS. As there is greater variability in child age, this covariate was entered in the model instead of current maternal age.

To test the research hypotheses, *maternal age* at the birth of her child with DS was entered in the second step of the regression model. *Social support* was entered in the third step and included size of maternal social network and whether the mother attended a parent support group. In the fourth step, *child behavioral phenotype* variables were added, including total functional abilities and generalized behavior problems.

Results

The means, standard deviations, and ranges for the four measures of maternal well-being are presented in Table 1. Inter-correlations of study variables are presented in Table 2. Tables 3 and 4 present regression models examining how maternal age, maternal supports and child behavioral phenotype were associated with the four measures of maternal well-being, after controlling for maternal and child background characteristics.

Life Satisfaction

As shown in Table 3, among the control variables (step 1), only maternal health predicted life satisfaction, with better health predictive of higher levels of life satisfaction. Neither maternal age when she gave birth to her child with DS nor social supports had a significant influence on maternal life satisfaction (steps 2 and 3), counter to Hypotheses 1 and 2. However, having greater behavior problems (step 4) was predictive of lower levels of life satisfaction in mothers of adults with DS, partially supportive of Hypothesis 3.

Quality of Relationship

As shown in Table 3, among the control variables, only child health predicted the quality of the relationship between the mother and her son or daughter with DS, with better child health predicting a better quality relationship. Neither maternal age when she gave birth to her child with DS nor social supports had a significant influence on mother-child relationship quality in adulthood, counter to Hypotheses 1 and 2. However, greater behavior problems were predictive of poorer relationship quality in adulthood, partially supportive of Hypothesis 3.

Pessimism

As shown in Table 4, no control variables predicted maternal pessimism. Neither maternal age when she gave birth to her child with DS nor current social supports had a significant influence on maternal pessimism, counter to Hypothesis 1 and 2. However, higher levels of behavior problems were predictive of greater pessimism. Thus, Hypothesis 3 was partially supported.

Subjective Burden

In contrast to the prediction of the above three measures of maternal well-being, the factors that are associated with maternal subjective burden are more complex. As shown in Table 4, among the control variables, maternal health and child age and gender were predictive of subjective burden in Step 1, and ultimately by Step 4 maternal marital status, and child age, gender and health were significant predictors of subjective burden. Mothers not currently married (primarily widows) were more burdened than those who were married, and mothers of daughters with DS who were in poorer health, and whose child was younger in age felt more burdened. In addition, mothers who were older when they gave birth to their child with DS and who had larger social support networks had less subjective burden. These findings support Hypotheses 1 and 2. In addition, fewer behavior problems significantly predicted less subjective burden, partially supporting Hypothesis 3.

Discussion

We examined, in a within-group analysis of mothers of adults with DS, whether artifactual or valid factors account for advantages in well-being. Our findings suggest that it may be problematic to infer, from between-group comparisons, explanations for why a particular group of mothers of individuals with IDD manifest their distinctive profiles of well-being, without checking whether these explanations hold up in within-group studies. Pairing between-group comparative analyses with within-group investigations may yield a stronger understanding of the factors that account for well-being profiles in mothers of individuals with different types of IDD than either analytic approach alone. For the most part, we found that, *among* mothers of adults with DS, older maternal age and access to social supports were not related to three of our four measures of maternal well-being, even though these factors differentiated such mothers from their counterparts whose children have other types of IDD in past research. However, we found a different pattern of predictors for one measure of maternal well-being, implicating both factors that have been portrayed as artifactual as well as those that are considered to be valid.

Specifically, for the outcomes of life satisfaction, quality of the mother's relationship with her son or daughter with DS, and pessimism, maternal age at birth of her child with DS and social supports were not significant predictors. Instead, the DS behavioral phenotype of having fewer behavior problems was found to contribute the most to better outcomes, net of all other variables. This finding suggests that the DS advantage found for these three maternal outcomes may be valid, not artifactual. It is noteworthy that the aspect of the DS behavioral phenotype that most strongly predicts maternal well-being is not functional abilities, but rather behavior problems. This finding points to the importance of treating behavior problems in adulthood, even among adults with DS.

A different pattern was found with respect to maternal subjective burden. Both variables conceptualized by others as artifacts (older maternal age and greater social support) as well as the DS behavioral phenotype were found to contribute to maternal subjective burden, suggesting that accounting for the DS advantage with respect to subjective burden is more complex than with the other measures of maternal well-being we examined. In addition, several other maternal and child characteristics also had a significant role in predicting this outcome, including maternal marital status, and child age and gender. Widows, mothers of daughters, and mothers of younger adult children felt more burdened. As child and maternal age are strongly correlated in our sample, our findings are consistent with the literature that older mothers commonly report better maternal well-being than younger mothers (Esbensen, Seltzer & Abbeduto, 2008; Krauss & Seltzer, 1995). Our finding that mothers of daughters report more burden is novel. A closer examination on an item-level of gender differences in perceived caregiving burden suggests that this finding is driven by maternal feelings of not receiving needed support from family and having to manage multiple roles (family, work). The impact of the gender of the child with DS on maternal well-being warrants further examination. Maternal burden is a role-specific measure of well-being, and thus the specific circumstances of the caregiving context may be more significant than with more general measures.

Our findings also have implications for service provision for adults with DS and their mothers. One of the maternal characteristics that consistently played a role in the present analysis in predicting maternal well-being was maternal health. Sample mothers were in their late 60s, so naturally their own health problems would play a large role in predicting their psychological well-being (life satisfaction and subjective burden). This pattern persisted even when we substituted maternal age for child age in the regression model (data available from the first author). However, maternal health did not play a significant role in predicting the quality of the relationship with her son or daughter. Instead, child health influenced the quality of the mother-child relationship. This finding further underscores the importance of providing quality health care to individuals with DS as they age, as well as to their mothers, as our past research has documented the health declines that accompany advancing age in adults with DS (Esbensen, Seltzer & Krauss, 2008).

One limitation of this analysis is that is it based on a sample of mothers of *adult* children with DS, taking advantage of a previously collected dataset. We do not know if the same pattern of findings would be observed among mothers of at earlier stages of the life course. It may be that maternal age at the time of her child's birth is a more salient protective factor for mothers of young children than for mothers of adults. On the other hand, theories of cumulative advantage across the life course (Ryff, Singer, Love & Essex, 1998) would suggest that if maternal age confers an early advantage to mothers of children with DS, this advantage should become magnified over time. Given the longer lifespan of adults with DS and, for many, the concomitant longer period of coresidence with the mother, the persistence of patterns across the full life course is a highly salient issue for research, policy, and provision of services to these families.

In our sample, social support did not contribute to several measures of maternal psychological well-being. However, there are other methods of measuring social support, indicating that our findings warrant replication before the contribution of social support is discounted as being a contributor to the DS advantage (Cohen, Underwood & Gottlieb, 2000). Other limitations include that the current sample was based on a volunteer, largely Caucasian sample. The current sample also relies on only maternal informants and concurrent measures, which introduces shared method variance to the analyses possibly masking other significant findings. Further, the models accounted for only a portion of the variance in maternal well-being (ranging from 22% to 30%), suggesting that there is much additional research to be conducted to fully understand maternal well-being in the later years of the life course among mothers of individuals with DS.

An additional explanation for the DS advantage is that some of the groups to which mothers of individuals with DS have been compared may themselves bear biological vulnerability to poor well-being outcomes, separate from any reactive effects of parenting. Whereas DS is a sporadic condition, not passed on from the parent to the child, this is not the case for all other IDD conditions. For example, some mothers of individuals with autism spectrum disorders (ASD) are believed to have the broader autism phenotype (Piven, Palmer, Jacobi, Childress & Arndt, 1997), which may predispose them to higher levels of depression, anxiety, and other indicators of poorer psychological functioning independent of the stressful behaviors of their child with ASD. Similarly, mothers of children with Fragile X Syndrome (FXS) have either the full mutation of FXS or the premutation, both of which have been shown to have mental health comorbidities independent of parenting stress (Seltzer, Abbeduto, Greenberg, Almeida, Hong & Witt, 2009). It is possible that, as a group, mothers of individuals with DS may have better well-being profiles than mothers of individuals with ASD or FXS in part because of differential biological vulnerability as well as differential levels of parenting stress.

This study contributes to the understanding of the DS advantage. Our findings suggest that a diagnosis of DS confers an “advantage” with respect to maternal well-being, and that this advantage is not merely an artifact. However, depending on the measure of maternal well-being of interest, understanding the DS advantage can be complex, with multiple family and child characteristics also contributing to enhanced maternal well-being. The next step in this line of investigation is to examine what accounts for the DS advantage among mothers of younger children and adolescents. The better we understand what accounts for the DS advantage, the better we will be able to inform and support families of individuals with DS.

Acknowledgments

This manuscript was prepared with support from the National Institute on Aging (R01 AG08768, M.M. Seltzer, PI) and the National Institute on Child Health and Human Development (R03 HD59848, A.J. Esbensen, PI; P30 HD03352, M.M. Seltzer, PI). We also thank the families who participated in this research.

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Table 1

Mean, standard deviation and range of study variables

	Mean	SD	Range
Life satisfaction	12.90	3.61	1-17
Relationship with adult child	51.46	5.35	33-60
Pessimism	6.10	2.72	0-11
Subjective burden	27.94	6.23	18-57

Table 2

Intercorrelations of study variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Number of children	-															
2. Family income	-.08	-														
3. Marital status	.03	.42*	-													
4. Maternal education	-.19*	.31*	.07	-												
5. Maternal health	.10	.30*	.18*	.18*	-											
6. Child gender	-.04	-.18*	-.06	.01	.02	-										
7. Child health	.13	.24*	.07	-.07	.33*	-.06	-									
8. Child age	-.22*	-.16*	-.29*	-.04	-.05	.06	-.01	-								
9. Maternal age at birth	.18*	-.22*	-.01	.02	-.17*	-.13	-.12	-.52*	-							
10. Size of social network	.15	.25*	.23*	.16*	.17*	-.01	.06	-.14	-.03	-						
11. Attend parent group	.04	-.08	-.00	-.02	-.04	-.09	-.04	-.06	.24*	.03	-					
12. Functional abilities	.13	.09	.08	.02	.13	-.07	.14	.12	-.14	.10	.02	-				
13. Generalized behavior	-.02	.07	.11	-.11	-.16	.05	.00	-.14	.10	.02	-.05	-.26*	-			
14. Life satisfaction	.07	.21*	.07	.14	.45*	-.19*	.17*	-.02	-.00	.11	.02	.12	-.30*	-		
15. Relationship with child	-.09	.03	.00	.07	.06	-.04	.27*	.10	-.07	.07	.01	.15	-.36*	.12	-	
16. Pessimism	-.11	-.06	-.02	.02	-.10	.12	-.12	-.09	.08	-.19*	-.02	-.24*	.30*	-.34*	-.30*	-
17. Subjective burden	-.16	-.11	-.14	.09	-.26*	.20*	-.28*	-.10	.02	-.20*	-.06	-.22*	.28*	-.54*	-.34*	.62*

[*] $p < .05$

Table 3

Hierarchical regression analysis for the prediction of life satisfaction and relationship quality.

	Life satisfaction				Relationship with adult child			
	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4
Step 1: Maternal and child background characteristics								
Number of children	.05	.05	.04	.03	-.10	-.10	-.12	-.13
Family income	.04	.07	.07	.09	-.10	-.08	-.10	-.05
Marital status	-.01	.00	-.01	.02	.02	.03	.01	.04
Maternal education	.11	.10	.10	.08	.06	.05	.05	-.00
Maternal health	.41**	.42**	.42**	.37**	-.03	-.02	-.03	-.09
Child gender	-.16	-.15	-.15	-.13	-.05	-.05	-.05	-.01
Child health	-.01	.01	.01	.02	32**	.32**	.32**	.32**
Child age	.06	.13	.14	.12	.07	.09	.09	.06
Step 2: Age variable								
Maternal age at birth of child with DS		.11	.10	.11		.02	.03	.06
Step 3: Maternal social support								
Size of social network			.05	.06			.07	.08
Attend parent group			.04	.03			.00	-.02
Step 4: Child behavioral phenotype								
Functional abilities				-.06				.05
Behavior problems				-.26**				-.35**
ΔR^2	.24**	.01	.00	.06*	.11**	.00	.00	.12**

β coefficients presented in table.

Marital status coded: 0=single/divorced/widowed, 1=married

Maternal education coded: 0=some college or less, 1=college degree or higher

Gender coded: 0=male, 1=female

Attend parent group coded: 0=no, 1=yes

$^{**}p < .01$

[*] $p < .05$

Table 4

Hierarchical regression analysis for the prediction of pessimism and subjective burden.

	Pessimism				Burden			
	Step 1	**Step 2**	**Step 3**	**Step 4**	**Step 1**	**Step 2**	**Step 3**	**Step 4**
Step 1: Maternal and child background characteristics								
Number of children	-.14	-.14	-.11	-.08	-.10	-.08	-.05	-.03
Family income	-.02	-.01	.00	-.04	.14	.09	.10	.04
Marital status	-.05	-.04	-.02	-.03	-.17	-.18	-.16	-.19*
Maternal education	-.01	-.01	.01	.04	-.02	-.00	.01	.06
Maternal health	-.06	-.06	-.05	.01	-.20*	-.22*	-.21*	-.16
Child gender	.12	.12	.12	.09	.22	.21*	.21*	.18*
Child health	-.06	-.06	-.05	-.05	-.19*	-.20*	-.19*	-.19*
Child age	-.14	-.13	-.14	-.11	-.21*	-.30**	-.32**	-.32*
Step 2: Age variable								
Maternal age at birth of child with DS		.01	.02	-.02		-.15	-.16	-.20*
Step 3: Maternal social support								
Size of social network			-.17	-.17			-.18*	-.19*
Attend parent group			-.04	-.02			-.03	.00
Step 4: Child behavioral phenotype								
Functional abilities				-.12				-.00
Behavior problems				.27**				.31**
ΔR^2	.06	.00	.03	.10**	.20**	.01	.03	.09**

β coefficients presented in table.

Marital status coded: 0=single/divorced/widowed, 1=married

Maternal education coded: 0=some college or less, 1=college degree or higher

Gender coded: 0=male, 1=female

Attend parent group coded: 0=no, 1=yes

[**] $p < .01$

[*] $p < .05$