Accounting for the “Down Syndrome Advantage”

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Abstract
The authors examined factors that could explain the higher levels of psychosocial well-being observed in past research in mothers of individuals with Down syndrome compared with mothers of individuals with other types of intellectual disabilities. The authors studied 155 mothers of adults with Down syndrome, contrasting factors that might validly account for the “Down syndrome 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 Down syndrome are discussed.

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Mothers of individuals with Down syndrome typically exhibit better psychological well-being profiles compared with mothers of individuals with other intellectual and developmental disabilities, 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, researchers have argued that this advantage is simply an artifact of confounding variables (Cahill & Glidden, 1996; Glidden & Cahill, 1998; Stone- man, 2007) or that confounding variables may contribute to the advantage (Corrice & Glidden, 2009). 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 “Down syndrome advantage” in mothers of children, adolescents, and adults with Down syndrome compared with mothers of children with other intellectual and developmental disabilities (either of unknown etiology or with other specific syndromes or diagnoses). There is extensive evidence that mothers of young children with Down syndrome 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), and 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 Down syndrome are also more cohesive and harmonious than families of children with other types of intellectual and developmental disabilities (Mink, Nihira, & Meyers, 1983).

Similar to mothers of young children, mothers of adolescents and young adults with Down syndrome also display better psychological well
being than mothers of similarly-aged children with other types of intellectual and developmental disabilities (Abbeduto et al., 2004). In past research, mothers of adolescents with Down syndrome have reported less pessimism about their child’s future, more closeness in the relationship with their child, and fewer depressive symptoms; they have also been more likely to perceive that the child reciprocated feelings of closeness compared with mothers of adolescents with other types of intellectual and developmental disabilities (Abbeduto et al., 2004). In addition, there is evidence that the “advantage” of having a son or daughter with Down syndrome continues well into adulthood (Greenberg, Seltzer, Krauss, Chou, & Hong, 2004; Seltzer, Krauss, Orsmond, & Vestal, 2001; Seltzer et al., 1993). Mothers of adults with Down syndrome have reported 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 have mothers of adults with intellectual and developmental disabilities due to other causes (Krauss & Seltzer, 1995, 2000; Seltzer et al., 1993).

However, it should be noted that not all researchers have found that mothers of individuals with Down syndrome 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 Down syndrome have reported similar rates to the comparison group with intellectual and developmental disabilities 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 Down syndrome have a more normative pattern of psychological well-being than mothers of children and adults with other types of intellectual and developmental disabilities.

Despite the empirical evidence in favor of a “Down syndrome advantage,” Corrice and Glidden (2009) posited 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. In some research, the Down syndrome 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 Down syndrome 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 Down syndrome appear to be advantaged relative to mothers of individuals with other types of intellectual and developmental disabilities with respect to psychological functioning.

A different way to address the question of what accounts for the Down syndrome advantage is to examine differences within samples of mothers of individuals with Down syndrome. 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 Down syndrome (and, hence, greater maturity and financial stability) is one explanation frequently offered for the Down syndrome 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 Down syndrome would have better well-being outcomes than mothers who were younger. Another explanation that is frequently offered for the Down syndrome advantage is that mothers of individuals with Down syndrome have greater access to syndrome-specific support groups than mothers of individuals with other types of intellectual and developmental disabilities. 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 Down syndrome 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, &
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 those who have less support. Whereas older maternal age and greater social support can be conceptualized as artifacts that may account for the Down syndrome advantage, an alternative explanation concerns the level of stress associated with parenting a child with Down syndrome compared with the parenting stress associated with other types of intellectual and developmental disabilities. Children with Down syndrome are commonly described as affectionate, sociable, and easy in temperament (Dykens, 1999). Individuals with Down syndrome also exhibit better functional abilities and fewer behavior problems than individuals with other types of intellectual and developmental disabilities (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 Down syndrome could explain lower levels of parenting stress and suggests a nonartifactual (i.e., valid) explanation of the Down syndrome advantage in maternal psychological well being.

In the current analysis, we examined the impact of maternal age, social supports, and the behavioral phenotype of the son or daughter with Down syndrome on the well being of their mothers. We focused this within-group analysis on mothers of individuals with Down syndrome 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 to determine if the effects of these variables vary across different outcomes. Specifically, we examined the influence of maternal age, maternal supports, and the behavioral phenotype of the adult with Down syndrome on maternal well being, as measured by life satisfaction, the quality of the mother’s relationship with her son or daughter with Down syndrome, maternal pessimism about the son or daughter’s future, and subjective caregiving burden, in a sample of mothers of adults with Down syndrome. We hypothesized that (a) mothers who were older when they gave birth to their child with Down syndrome will have better well being, (b) mothers of adults with Down syndrome with larger social networks and who participate in parent support groups will have better well being, and (c) mothers of adults with higher levels of functional abilities and fewer behavior problems will have better well being. Support for the first two of these hypotheses would support the argument that the Down syndrome advantage is artifactual, whereas support of the latter hypothesis would suggest that the advantage is due, at least in part, to differential levels of parenting stress.

Method

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 intellectual and developmental disabilities (Krauss & Seltzer, 1999). From 1988 to 2000, eight waves of data were collected at 18-month intervals with an initial sample of 461 adults with intellectual and developmental disabilities who lived at home, 169 of whom had Down syndrome. At the second wave of data collection (1989–1990), mothers of 155 adults with Down syndrome continued to participate, and they formed the sample for the present analysis. The second wave of data collection was selected for analysis because it was the first point when behavior problems were measured.

At the time that they gave birth to their child with Down syndrome, the mothers in our sample 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 postsecondary education. They had between 1 and 9 children, including their son or daughter with Down syndrome ($M = 4.3, SD = 2.0$). 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 widowed. The median family income was between $15,000 and $19,999, which was typical for older household incomes at that time (U.S. Census Bureau, 2005). The adult child with Down syndrome ranged in age from 17 to 56 years ($M = 32.4, SD = 7.4$). Nearly two-thirds were males (61.3%) and three-fourths had mild or moderate intellectual disability (76.5%) and the remain-
ing adults had severe or profound intellectual disability.

**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 Down syndrome, pessimism about her adult child's future, and subjective caregiving burden. Differences between the mothers of adults with Down syndrome and mothers of adults with other types of intellectual and developmental disabilities have already been published (Seltzer et al., 1993), supporting the Down syndrome advantage. The present sample included 92% of the mothers in Seltzer et al.'s sample, and the between-group Down syndrome advantage was also evident in the current sample (data available from first author [A. E.]). We also checked whether the range of scores for these outcome variables in this sample with Down syndrome was restricted, or whether the range overlapped with the scores of the group with intellectual and developmental disabilities but without Down syndrome in the same study (data available from first author). There was no restriction of range in the data from mothers of adults with Down syndrome relative to mothers of adults with other types of intellectual and developmental disabilities.

The Philadelphia Geriatric Center Morale Scale (PGC; Lawton, 1972) 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" (p. 148). This 17-item scale consists of yes or no questions and had an internal consistency coefficient of .84 in the larger longitudinal study (Krauss & Seltzer, 1993) and .81 in the current sample.

The Positive Affect Index (PAI; Bengtson & Schrader, 1982) was used to measure the mother's perception of the quality of her relationship with her adult son or daughter. This 10-item scale assesses the mother's feelings toward her child and her perception of her child's feelings toward 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 (Friedrich et al., 1983) was used to measure maternal pessimism about her child's future. 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 (Zarit et al., 1980) is a 29-item measure of subjective burden related to caregiving, rated on a 3-point scale. 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 was measured using 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 Down syndrome 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 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 intellectual and developmental disabilities (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 was .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 ($M = 2.3$, $SD = 0.4$).

We used the Inventory for Client and Agency Planning (ICAP; Bruininks, Hill, Weatherman, & Woodcock, 1986; later known as the Scales of Independent Behavior–Revised [SIB-R; Bruininks, Woodcock, Weatherman, & Hill, 1996]) to measure behavior problems. 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 subclinical (90–110), marginally serious (111–120), moderately serious (121–130), serious (131–140), or very serious ($\geq 141$). 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**

We used multiple hierarchical regression 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, were redundant with the theoretically important variable of age of the mother at the birth of her child with Down syndrome. Because there was 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 Down syndrome 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. Intercorrelations 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 at the birth of the child with Down syndrome 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 Down syndrome, which was 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 Down syndrome, with better child health predicting a better quality relationship. Neither maternal age when she gave birth to her child with Down syndrome nor social

<p>| Table 1. Mean, Standard Deviation, and Range of Study Variables |
|-----------------|-----|------|--------|
| Variable        | $M$ | $SD$ | 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 |</p>
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<td>2. Family income</td>
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<td>10. Size of social network</td>
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<td>11. Attend parent group</td>
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<td>14. Life satisfaction</td>
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*p < .05.
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, which was 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 Down syndrome 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, by Step 4, maternal marital status and child age, gender, and health were significant predictors of subjective burden. Moth-

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**Table 3. Hierarchical Regression Analysis for the Prediction of Life Satisfaction and Relationship Quality**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Life satisfaction</th>
<th>Relationship with adult child</th>
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<tr>
<td></td>
<td>Step 1</td>
<td>Step 2</td>
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<tr>
<td>Number of children</td>
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<td>Family income</td>
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<td>Marital status</td>
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<td>Maternal education</td>
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<td>Maternal health</td>
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<td>.42**</td>
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<td>Child gender</td>
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<td>Child health</td>
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<td>.01</td>
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<tr>
<td>Child age</td>
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<td>.13</td>
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</tbody>
</table>

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 -.06

Behavior problems -.26** -.26** -.35**

\( \Delta R^2 \) .24** .01 .00 .06* .11** .00 .00 .12**

Note. DS = Down syndrome. 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. \( \beta \) coefficients presented in table.

*\( p < .05 \). **\( p < .01 \).
ers not currently married (primarily widows) were more burdened than those who were married, and mothers of daughters with Down syndrome 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 Down syndrome 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.

Table 4. Hierarchical Regression Analysis for the Prediction of Pessimism and Subjective Burden

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pessimism</th>
<th>Burden</th>
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<td></td>
<td>Step 1</td>
<td>Step 2</td>
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<tr>
<td>Step 1: Maternal and child background characteristics</td>
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<tr>
<td>Child health</td>
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<td>-.06</td>
</tr>
<tr>
<td>Child age</td>
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<td>-.13</td>
</tr>
<tr>
<td>Step 2: Age variable</td>
<td></td>
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<tr>
<td>Maternal age at birth of child with DS</td>
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<td>.02</td>
</tr>
<tr>
<td>Step 3: Maternal social support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of social network</td>
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<td>-.17</td>
</tr>
<tr>
<td>Attend parent group</td>
<td>-.04</td>
<td>-.02</td>
</tr>
<tr>
<td>Step 4: Child behavioral phenotype</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional abilities</td>
<td>-.12</td>
<td></td>
</tr>
<tr>
<td>Behavior problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔR²</td>
<td>.06</td>
<td>.00</td>
</tr>
</tbody>
</table>

Note. DS = Down syndrome. 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. β coefficients presented in table.

* p < .05. ** p < .01.

Discussion

We examined, in a within-group analysis of mothers of adults with Down syndrome, whether artifactual or valid factors accounted 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 intellectual and developmental disabilities 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 intellectual and developmental disabilities than either analytic approach alone. In general, we found that, among mothers of adults with Down syndrome, 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 have differentiated such mothers from their counterparts whose children had other types of intellectual and developmental disabilities 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 have been considered to be valid.

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

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 Down syndrome behavioral phenotype were found to contribute to maternal subjective burden, suggesting that accounting for the Down syndrome advantage with respect to subjective burden was 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. Because child and maternal age were 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 reported more burden is new. A closer examination on an item level of gender differences in perceived caregiving burden suggested that this finding was driven by maternal feelings of not receiving needed support from family and having to manage multiple roles (e.g., family, work). The impact of the gender of the child with Down syndrome on maternal well being warrants additional 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 Down syndrome 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 have played 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 [A. E.]). However, maternal health did not play a significant role in predicting the quality of the relationship with the mother’s 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 Down syndrome as they age, as well as to their mothers, because our past research has documented the health declines that accompany advancing age in adults with Down syndrome (Esbensen, Seltzer, & Krauss, 2008).

One limitation of this analysis is that it was based on a sample of mothers of adult children with Down syndrome, by taking advantage of a previously collected dataset. We do not know if the same pattern of findings would have been observed among mothers at earlier stages of the life course of their child. It may be that maternal age at the time of the 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) have suggested that if maternal age confers an early advantage to mothers of children with Down syndrome, this advantage should become magnified over time. Given the longer lifespan of adults with Down syndrome 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 Down syndrome advantage (Cohen, Underwood, & Gottlieb, 2000). Another limitation in this study is that the current sample was based on a volunteer, largely Caucasian sample. The current sample also relied on only maternal informants and concurrent measures, which introduces shared method variance to the analyses, possibly masking other significant findings. Furthermore, the models accounted for only a portion of the variance in maternal well being (range 22%–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 Down syndrome.

An additional explanation for the Down syndrome advantage is that some of the groups to which mothers of individuals with Down syndrome have been compared may themselves bear biological vulnerability to poor well-being outcomes, separate from any reactive effects of parenting. Whereas Down syndrome is a sporadic condition, not passed on from the parent to the child, this is not the case for all types of intellectual and developmental disabilities. For example, some mothers of individuals with autism spectrum disorders 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 autism spectrum disorder. Similarly, mothers of children with fragile X syndrome have either the full mutation of fragile X or the premutation, both of which have been shown to have mental health comorbidities independent of parenting stress (Seltzer et al., 2009). It is possible that, as a group, mothers of individuals with Down syndrome may have better well-being profiles than mothers of individuals with autism spectrum disorder or fragile X syndrome in part because of differential biological vulnerability as well as differential levels of parenting stress.

This study contributes to the understanding of the Down syndrome advantage. Our findings suggest that a diagnosis of Down syndrome 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 Down syndrome 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 Down syndrome advantage among mothers of younger children and adolescents. The better we understand what accounts for the Down syndrome advantage, the better we will be able to inform and support families of individuals with Down syndrome.

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Erratum


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