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Gilmore, Linda, Cuskelly, Monica, Jobling, Anne, & Hayes, Alan  
(2009)

Maternal support for autonomy : relationships with persistence for children with Down syndrome and typically developing children.

*Research in Developmental Disabilities*, 30(5), pp. 1023-1032.

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<https://doi.org/10.1016/j.ridd.2009.02.005>

Running head: MATERNAL SUPPORT FOR AUTONOMY

**PUBLISHED IN: RESEARCH IN DEVELOPMENTAL DISABILITIES (2009)**

Maternal Support for Autonomy: Relationships with Persistence for Children with  
Down Syndrome and Typically Developing Children

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#### Acknowledgements

This research was supported by an Australian Postgraduate Award to the first author and a grant from the Australian Research Council. We are grateful to the children and mothers who participated in this study.

### Abstract

Maternal behaviors and child mastery behaviors were examined in 25 children with Down syndrome and 43 typically developing children matched for mental age (24-36 months). During a shared problem-solving task, there were no group differences in maternal directiveness or support for autonomy, and mothers in the two groups used similar verbal strategies when helping their child. There were also no group differences in child mastery behaviors, measured as persistence with two optimally challenging tasks. However, the two groups differed in the relationships of maternal style with child persistence. Children with Down syndrome whose mothers were more supportive of their autonomy in the shared task displayed greater persistence when working independently on a challenging puzzle, while children of highly directive mothers displayed lower levels of persistence. For typically developing children, persistence was unrelated to maternal style, suggesting that mother behaviors may have different causes or consequences in the two groups.

## Maternal Support for Autonomy: Relationships with Persistence for Children with Down Syndrome and Typically Developing Children

There is evidence that mothers of children with disabilities behave differently in interactions with their child, compared with mothers whose children are developing typically. In particular, they are frequently described as being more directive, controlling or intrusive (Glenn, Dayus, Cunningham, & Horgan, 2001; Pérez-Pereira & Conti-Ramsden, 2001; Roach, Stevenson Barratt, Miller, & Leavitt, 1998). Rather than necessarily being a negative quality, maternal direction may be functional for some children with disabilities (Adenzato, Ardito & Izard, 2006; Marfo, 1990). Although too few or too many directives may produce poorer outcomes (Doussard-Roosevelt, Joe, Bazhenova, & Porges, 2003), the quality of directiveness is likely to be more important than its quantity (Hughes, Dote-Kwan, & Dolendo, 1999) particularly in relation to the balance of demandingness with responsiveness (Baumrind, 1996). When combined with sensitivity, maternal directiveness has been associated with positive outcomes for children with Down syndrome (Crawley & Spiker, 1983) and those with vision impairments (Adenzato et al., 2006). It is possible that different types of maternal behavior produce similar outcomes for children with and without disabilities.

One potential consequence of maternal over-directiveness is reduced child engagement in mastery behaviors. If autonomy is not encouraged and children learn to rely on others for direction, they are likely to be less persistent when required to work independently. Deci and Ryan (1987) have argued that external control reduces children's feelings of self-determination, thereby undermining their intrinsic motivation to achieve mastery. Motivation for mastery has been identified as central to achievement (Broussard & Garrison, 2004; Wentzel & Wigfield, 1998) and the most important contribution to mastery behavior is persistence (Morgan, Harmon & Maslin-

Cole, 1990). Persistence in the face of initial failure is essential for learning. Children with Down syndrome have been identified as being less motivated to achieve than their typically developing peers (Ruskin, Mundy, Kasari & Sigman, 1994; Wishart, 1991, 1993), although some work with younger children has found few differences (Gilmore, Cuskelly, & Hayes, 2003; Glenn et al., 2001; Hughes & Kasari, 2000). One explanation for lower motivation, if it is confirmed, is that over time maternal directiveness undermines children's willingness to persist independently when they meet a challenge.

The present study aimed to examine maternal behaviors and their relationships with children's mastery behaviors in a group of children with Down syndrome and a group of typically developing children of the same mental age. Specifically, the research questions were: (1) Are there group differences in maternal directiveness, sensitivity and support for autonomy during a shared problem-solving task? (2) What relationships exist among maternal behaviors and children's mastery behaviors (operationalised as persistence) in the two groups?

## Method

### *Participants*

The participants were 25 children (15 girls) with Down syndrome whose ages ranged from 4 years 2 months to 6 years 8 months ( $M = 63.8$  months,  $SD = 8.77$  months), 43 typically developing children (20 girls), aged between 2 years 1 month and 3 years 1 month ( $M = 30.81$  months,  $SD = 3.66$  months) and their mothers. All children with Down syndrome had Trisomy 21. As shown in Table 1, the two groups were matched for mental age (mean MA = 30 months) and demographic characteristics. There were no significant group differences in parent education or occupation, and there were similar proportions of first-born children (40% in the Down syndrome group, and 49% of the typically developing group). All children came from intact family units, with the

exception of one child with Down syndrome and two typically developing children whose mothers were single or divorced, and most were at least second generation Australian.

<Table 1 here>

### *Instruments*

#### *Maternal style.*

Maternal style was determined using two approaches described below. Both were based on observations of mothers' behavior as they interacted with their child on a predetermined task: the Goodman Lock Box (Goodman, 1981). The Lock Box is an unstructured but challenging exploratory task on which children's spontaneous problem solving approaches can be observed. It consists of a wooden box containing 10 compartments, each containing a different toy and fastened with a different type of lock.

The Mother-Child Rating Scale (Crawley & Spiker, 1982) is a global rating scale that has been used successfully with mothers of children with disabilities. From the six original maternal sub-scales, two (Directiveness and Sensitivity) were chosen and one new sub-scale was developed to rate Autonomy Support. Directiveness ratings are based on the degree to which a mother tries to control or guide her child's behavior, while the Sensitivity sub-scale reflects the mother's awareness of her child's cues or signals. Ratings on the Autonomy Support sub-scale represent the mother's efforts to encourage her child's independent attempts, either by allowing the child time to try the task before offering help, or by encouraging the child to attempt the task alone before providing assistance.

Descriptors for the five rating points on the Directiveness and Sensitivity sub-scales were adapted slightly so that they related more specifically to the task being used in the current study and a set of descriptors was compiled for the new Autonomy Support sub-

scale (see Appendix 1). The coding system was tested by two researchers, disagreements and inconsistencies were resolved through discussion, and the descriptors were refined.

Maternal Verbal Strategies during the shared task were coded using categories developed by Diaz, Neal and Vachio (1991). The categories comprised commands, directives, competence attributions, corrections, motivational statements, relinquishing statements, conceptual questions, perceptual questions, verbalisation of plans, labelling, and play (see Diaz et al. for definitions of these categories). Following Diaz et al., the categories were condensed into four variables: (1) Controlling (comprising commands, directives and perceptual questions), (2) Distancing (conceptual questions, verbalisation of plans and relinquishing statements), (3) Attention Focusing (labelling, motivational statements and seemingly irrelevant statements) and (4) Competence Attributions. Diaz et al. retained the category of Competence Attributions, which loaded similarly on the first two factors, as a separate dependent variable because of its conceptual relevance for teaching young children.

#### *Child measures.*

Two structured mastery tasks developed by Morgan, Busch-Rossnagel, Maslin-Cole, and Harmon (1992) for children aged 15 to 36 months were used to provide measures of children's persistence. The tasks consist of jigsaw puzzles and shape-sorters, each with six levels of difficulty to ensure that individual children complete tasks that are optimally challenging (i.e., not too easy and not too difficult).

Each mastery task is presented for a 4-minute period and the examiner records whether or not the child's behavior is task-directed in each 15-second interval. Scores are calculated for persistence (the number of intervals recorded as task-directed) with a

possible range of 0-16. The examiner also notes solutions (i.e., correct placements of puzzle pieces or shapes) when they are achieved.

The Bayley Scales of Infant Development – Second Edition (Bayley, 1993) is a standardised developmental assessment instrument for infants and young children between the developmental ages of one month and 42 months. It comprises a mental scale, a motor scale and a behavior rating scale. In this study, results from the mental scale were used to ensure that the two groups contained children with similar mental ages.

### *Procedure*

The study was part of a larger project investigating motivation and self-regulation in children with Down syndrome. In the first session, the mastery tasks were administered in accordance with Morgan et al.'s (1992) procedures. Mothers were present but were asked not to assist their child in any way. Scores were derived for persistence on each of the two tasks and measures of success on these tasks were also obtained.

In the second session, children were presented with the Lock Box and the instruction: *Here's the surprise box, with doors to open and toys to play with.* Mothers were asked not to help or encourage their child. A measure of success (i.e., number of doors unlocked) was obtained for this task. At the third session, usually one week later, mothers were asked to help their child to unlock the doors, but without physically touching any of the locks themselves. If mothers asked for more information about their role or what form of assistance they should offer, they were told that they should just do whatever they thought was best for their child.

Maternal behaviors were coded from videotapes of this third session using two different methods: global ratings of directiveness, sensitivity and support for autonomy on the Mother-Child Rating Scale (Crawley & Spiker, 1982) and specific ratings of



maternal verbal strategies using the categories developed by Diaz et al. (1991). Initially, a researcher (the first author) viewed the entire session through twice, then rated each mother on the three Crawley and Spiker sub-scales. A research assistant then coded 14 randomly selected videotapes (5 children with Down syndrome and 9 comparison children, representing 20% of the sample) and, following the method used by Crawley and Spiker, inter-observer reliability was estimated by calculating the percentages of agreement within one point for each maternal characteristic. Reliability was 100% on each of the three sub-scales.

Following this, two research assistants independently coded each maternal utterance from prepared transcripts of the five minute observation of the Lock Box session, using the Diaz et al. (1991) categories. The quality of sound on four videotapes (two typically developing children and two children with Down syndrome) was insufficient for maternal verbalisations to be coded with accuracy. On the remaining 64 transcripts, there were high levels of agreement between the two researchers, ranging from 84% (for the category of conceptual questions) to 100% (for competence attributions and labelling). Discrepancies in ratings were discussed with the first author and resolved before totals were calculated for each category.

## Results

### *Maternal Behaviors*

For both groups, ratings of maternal Directiveness were negatively related to Sensitivity ( $r = -.75$  in the Down syndrome group and  $r = -.84$  for the typically developing group) and Autonomy Support ( $r = -.86$  Down syndrome;  $r = -.87$  typically developing). Sensitivity and Autonomy Support were positively related ( $r = .65$  Down syndrome;  $r = .73$  typically developing).

The measure of Sensitivity was skewed towards more positive scores. In the typically developing group, only four mothers obtained the lower two of the five ratings, and only one mother in the Down syndrome group scored in this range. In addition, no mother scored highly on both Directiveness and Sensitivity. Given the limited variability of this measure and its high correlations with the other two maternal measures, Sensitivity was not used in further analyses.

The high negative correlations of Directiveness and Autonomy Support suggested that these measures reflect opposite ends of a continuum of maternal behaviors. Thus, it was decided to divide the group according to maternal style. The supportive group comprised mothers who were low or moderate on Directiveness (scores of 1, 2 or 3) and also high or moderate on Autonomy Support (scores of 3, 4 or 5). The directive group consisted of mothers who were rated high on Directiveness (scores of 4 or 5) and low on Autonomy Support (scores of 1 or 2). A few mothers who were high (4-5) on Directiveness and moderate (3) on Autonomy Support ( $n = 3$ ), or low (1-2) on Autonomy Support combined with moderate (3) on Directiveness ( $n = 3$ ), were also included in this group.

A chi square analysis showed no significant differences in the proportions of supportive and directive mothers within the Down syndrome group compared with the typically developing group,  $\chi^2(df = 1) = .56, p = .46$ . In the supportive group, there were 14 mothers of children with Down syndrome (56% of the Down syndrome sample) and 28 mothers of typically developing children (65% of the typically developing group).

A 2 x 2 (group x maternal style) MANOVA was used to examine maternal verbal strategy use with the four verbal strategy sub-scales (Controlling, Distancing, Attention Focusing, and Competence Attributions) as dependent variables. There was no significant interaction,  $F(4,57) = 1.68, p = .17, \eta^2 = .11$ , and no main effect for group,

$F(4,57) = 1.94, p = .12, \eta^2 = .12$ ; however, there was a significant effect for maternal style,  $F(4,57) = 14.34, p < .001, \eta^2 = .50$ . The univariate analyses showed that supportive mothers used fewer controlling and fewer attention focusing strategies than did directive mothers (see Table 2). These two strategies were found to be correlated ( $r = .63, p < .001$ ) and Controlling was also correlated with Competence Attributions ( $r = .43, p < .001$ ). There was also a lower, but significant, correlation between the use of Attention Focusing and Distancing ( $r = .32, p = .009$ ).

<Table 2 here>

### *Child Persistence*

Using independent samples t tests, there were no group differences in persistence on the two mastery tasks (puzzle and shape-sorter). As competence may influence persistence we also checked for group differences on these tasks and found that there were no significant differences on children's success with the puzzle or with the shape sorter. Means and standard deviations for all measures are reported in Table 3. Measures of persistence across both tasks were strongly correlated for the children with Down syndrome ( $r = .60, p = .001$ ) but were unrelated for typically developing children ( $r = .17, ns$ ). We therefore examined persistence across these two tasks separately in subsequent analyses.

<Table 3 here>

### *Maternal Behaviors and Children's Persistence*

In order to investigate the association between maternal style and child persistence we conducted two separate analyses of variance with the two measures of persistence as the dependent variables and group and maternal style as the independent variables. As competence on each task was positively related to persistence on that task (puzzle  $r = .71, p < .001$  and .51,  $p < .001$  Down syndrome and typically developing, respectively;

shape-sorter  $r = .69, p < .001$  and  $.60, p < .001$  Down syndrome and typically developing, respectively) and as maternal behavior may be influenced by child competence, we entered the relevant task competence score into each analysis as a covariate.

There was a significant interaction between the two independent variables for persistence on the puzzle task,  $F(1, 63) = 4.00, p = .05, \eta^2 = .06$ . In the Down syndrome group, supportive mothers had children who were more persistent on the puzzle task than did directive mothers (Supportive:  $M = 13.07, SD = 2.23$ ; Directive:  $M = 7.55, SD = 4.89$ ), while maternal style made little difference to typically developing children (Supportive:  $M = 9.61, SD = 3.76$ ; Directive:  $M = 9.40, SD = 4.82$ ). When MA was used as the covariate rather than puzzle competence, a similar result was found,  $F(1, 63) = 5.57, p = .02, \eta^2 = .08$ . The ANCOVA with persistence on the shape sorter task as the dependent variable identified no significant differences between groups, or on the basis of maternal style, and there was no significant interaction,  $F(1, 63) = .67$ .

The maternal verbal strategy of Controlling was moderately and negatively correlated with persistence for children with Down syndrome on the puzzle task,  $r = -.66, p < .01$ , but the correlation on the shape-sorter did not reach significance,  $r = -.31$ . There were no significant correlations between these measures for typically developing children,  $r = .07$  and  $r = -.06$ , respectively, and there were no significant correlations between child persistence and any of the other verbal strategies employed by mothers for either group.

## Discussion

### *Maternal Style*

The results of this study show no differences in maternal style between mothers of children with Down syndrome and mothers of typically developing children. Each

group contained similar proportions of supportive and directive mothers. Moreover, transcripts of the sessions show that supportive and directive mothers in each group used similar types of verbal strategies during a shared problem solving task. In both groups, directive mothers used high numbers of controlling and focusing behaviors, with the positive correlation of these two types of strategies suggesting that focusing behaviors serve a controlling, rather than supportive function.

The lack of group differences in maternal behaviors using both global ratings and more fine-grained analyses of verbal strategies is contrary to much of the previous research that has reported more directive and less supportive behaviors in parents of children with disabilities (e.g., Glenn et al., 2001; Pérez-Pereira & Conti-Ramsden, 2001; Roach et al., 1998). Consistent with the pattern seen in typically developing populations (Guzell & Vernon-Feagans, 2004; Murray & Hornbaker, 1997) maternal sensitivity and directiveness are negatively related for both groups. Although some studies have suggested that maternal directiveness represents a positive quality for children with disabilities if combined with sensitivity (Crawley & Spiker, 1983, Marfo, 1992; Pine, 1992), this combination is not evident in the current study. The strong negative correlations of directiveness with both support for autonomy and sensitivity suggest that directiveness, as defined in this study, reflects maternal control and intrusiveness.

There are several possible reasons for the differences in findings about maternal style between the present study and previous work. Inconsistent operational definitions of maternal behaviors such as directiveness create difficulties when comparing results across studies (Marfo, 1991). Even when the same measures are used, other differences in methodology may account for varying findings. For instance, using the same rating scale, Crawley and Spiker (1983) found significant correlations between directiveness

and sensitivity for some mothers, while this is not the case in the current study. However, the children in the earlier study were younger with a mean CA of only two years and maternal behavior was observed during an unstructured play session. By contrast, the mean age of children in the currently reported study is more than five years, and behaviors were coded during a problem-solving task. It is likely that directiveness has different intent and meaning for children of different ages and when the goals of the interaction differ, producing discrepant results among studies with different methodologies.

The contexts in which mother-child interactions are observed may also explain why some studies have found that mothers of children with Down syndrome are more directive than are mothers of typically developing children. Previous studies have often measured maternal directiveness during free play whereas the present study used a shared problem-solving task. It has been suggested that mothers of typically developing children reserve their use of directive behavior for structured teaching situations whereas mothers of children with Down syndrome are directive across all contexts, including play sessions (Hughes & Kasari, 2000; Landry, Garner, Pirie, & Swank, 1994). If this is the case, then it is not surprising that similar levels of maternal directiveness were observed in the joint problem-solving situations used in the present study whereas differences were identified in previous studies of unstructured play (e.g., Cielinski, Vaughn, Seifer, & Contreras, 1995; Roach et al., 1998; Tannock, 1988).

Also of potential importance is the historical context of the present study. Much of the previous research about maternal directiveness was undertaken in the 1970s and 1980s. Since that time, parents of children with disabilities have had greater access to early interventions where an important goal is to enhance a child's capacity for self-determination and independence in adult life. Recognising that an intensive focus on

structured teaching may produce directive styles that undermine autonomy (Iarocci, Virji-Babul, & Reebye, 2006) early intervention programmes may now be promoting parent styles that more closely resemble those displayed by caregivers of typically developing children. Although less research on mother-child interactions has been conducted in recent years, a study by Hughes and Kasari (2000) found no differences in caregiver directiveness or responsiveness for children with Down syndrome and typically developing children of the same mental age as those in the current study.

#### *Maternal Style and Child Persistence*

Despite the fact that there are no differences in maternal behaviors or child persistence in the two groups, it seems that maternal support for autonomy and directiveness differ in terms of their causes and/or consequences for children with Down syndrome compared with typically developing children. Children with Down syndrome whose mothers are more supportive of their autonomy in a shared problem-solving task display greater persistence when working independently on a challenging puzzle, while children of highly directive mothers are not very persistent. By contrast, for typically developing children task persistence is quite unrelated to maternal support or directiveness.

These results raise three intriguing questions. First, what direction of effect is operating in the Down syndrome group? That is, does maternal behavior occur in response to observations of children's persistence, or does it produce particular levels of persistence? Second, why is this relationship evident only in the Down syndrome group? And third, why is maternal behavior related to persistence on the puzzle task, but not on the shape-sorter?

The fact that the children with Down syndrome display similar levels of persistence on the two tasks suggests that persistence may reflect a consistent way of approaching

challenging tasks, whereas for typically developing children persistence appears to be more task specific, possibly because they are younger. Through their involvement in early intervention programmes, mothers of children with Down syndrome learn to observe their children's behavior and respond in ways that promote positive developmental outcomes. Thus, it is possible that the mothers of children with Down syndrome in this sample had observed their child's consistent approach to tasks over time and across multiple settings and were responding with the kind of support or direction they believed their child needed. By contrast, the behavior of mothers of typically developing children is unrelated to child persistence, either because persistence is not a consistent behavior across time and settings and/or because mothers of typically developing children are not particularly aware of their child's persistence, its significance for competence and their potential role in enhancing it.

The alternative explanation for the relationship of mother behavior and child persistence is that maternal behaviors influence children's level of task persistence rather than occur in response to it. Mother behaviors may originate in their individual personality style or they may make deliberate choices about the need to behave in particular ways that they presume to be optimum for promoting child development. Behaviors that are supportive of autonomy then promote children's persistence, while directiveness undermines their ability to persist independently. If this direction of effect is operating, then it would seem that maternal style as observed in this study has little effect on the persistence of typically developing children, even when it involves constant directives and few opportunities for autonomy. Children with Down syndrome, on the other hand, appear to be much more vulnerable to the influence of maternal behaviors, both positively and negatively. This may be because they are older and have thus had more time for patterns of influence to be developed or because they are



exposed to a narrower range of influence than are typically developing children. It is possible also that children with Down syndrome have an innate tendency towards passivity and dependence on others (Fidler, 2006), or perhaps their cognitive impairments create increased vulnerability to the influence of others.

As mentioned earlier, Hughes and Kasari (2000) have argued that mothers of typically developing children are likely to be less directive in play based situations than are mothers of children with Down syndrome, but equally directive when working with their child on a problem solving activity. If this is the case, then it is likely that our measure of maternal behavior is a better reflection of the usual behavior of the mothers of a child with Down syndrome than it is of the mothers of the children who are developing typically. The mothers of typically developing children who were judged to be directive in this study may not be directive in contexts other than those involving teaching, whereas the directive (and the supportive) mothers of children with Down syndrome are likely to display those behavioral patterns across many interactions with their child, an explanation that would account for the significant links to child persistence only in this group.

Interestingly, although children with Down syndrome displayed similar levels of persistence on the two tasks, maternal behaviors were related to persistence only on the puzzle task and not on the shape-sorter. Clearly, behavioral expressions of persistence differ depending on the tasks and contexts. While persistence may at times involve the ability to persevere with challenging and enjoyable problems, at other times persistence with repetitive or disagreeable activities may be essential in order to achieve greater success. The puzzle and shape-sorter tasks used in the current study are similar in that each involves problem solving in the initial stages: working out where the first piece fits into the puzzle frame and discovering which way to manipulate the shape so that it goes

into the slot on the shape-sorter box. The puzzle continues to require problem solving with each subsequent piece, until only two or three pieces remain and decisions about placement are simpler. By contrast, the shape-sorter task has 10 identical shapes, so after the first few are inserted most children have mastered the task and the goal then becomes to complete it by repetitively inserting the shapes.

It is easy to understand how maternal support for autonomy could enhance the development of children's independent attempts with optimally challenging problem-solving tasks such as jigsaw puzzles, while directive behavior would undermine their ability to persist without constant direction. On more repetitive tasks, however, this kind of maternal input may well be considerably less important, accounting for the lack of significant relationships.

The finding that mother behaviors are related to persistence only on the puzzle task has potential implications for our previous discussion about whether maternal behaviors are the cause of, or a response to, children's task persistence. It seems to suggest that the more likely direction of effect is from mother to child, rather than the reverse. If maternal support or directiveness occurred in response to observations of children's persistence, or lack of it, then we would probably expect to see a relationship of maternal behaviors with persistence on both tasks. The fact that this did not happen suggests that mother behavior influences child persistence with problem-solving, but is less important for their persistence with more repetitive tasks. To some extent, however, it is likely that both directions of effect are operating in a dynamic reciprocal transaction: supportive mother behaviors enhance child persistence which in turn encourages mothers to be even more supportive of autonomy, and directive behaviors undermine child persistence so that children become increasingly dependent on such direction.

*Limitations and Implications*

The results of the current study should be interpreted with some caution for several reasons. The fact that the two groups were matched for mental age means that the children with Down syndrome were considerably older. Differential associations may thus have been due to age differences between the two samples. A study of maternal control and intrinsic motivation in typically developing 6 and 7 year old children found negative correlations (Deci, Driver, Hotchkiss, Robbins, & Wilson, 1993) suggesting that maternal influence may accumulate over time or only become significant for older children. Unless free play situations are used, comparisons based on chronological age are difficult to achieve because of the need to ensure that tasks are appropriate for the developmental levels of each group. A challenge for future research is the design of studies that incorporate both MA and CA matches in order to disentangle the effects of age and ability.

Another caution involves the fact that it is not possible to determine whether maternal behaviors occurred as isolated events or whether they were well-established patterns of interaction. Nor is it possible to know the extent to which behaviors in the laboratory setting reflect behaviors that occur in more naturalistic environments. Because behaviors such as directiveness may not be stable and consistent over time (Guzell & Vernon-Feagans, 2004), multiple measurements of maternal and child behaviors would provide a stronger framework for examining effects, with longitudinal studies that span more than one point in time likely to be of particular value. In addition, the possibility that parent behaviors change to some extent when they are being observed by experimenters suggests the importance of assessing behaviors in multiple contexts and/or in more naturalistic environments. Future studies that focus on exploring why some parents are more supportive or directive than others would be

useful. Guzell and Vernon-Feagans (2004), for example, found that parent with lower perceived control over their child displayed greater directiveness. Variables such as maternal age, marital status or cultural background may also influence interactional style and these factors could be considered in future studies. The fact that the current sample was not racially diverse means that the findings may not apply in other cultural groups.

Despite these limitations, the findings from this study demonstrate both similarities and differences for children with Down syndrome compared with typically developing children. While there are no group differences in persistence or in maternal style, there are intriguing differences in the associations of child persistence with maternal behaviors. These relationships highlight the potential importance of the mother-child dyad for the optimum development of children with Down syndrome. This finding has implications for practitioners, suggesting that early interventions which encourage more autonomy supportive and less directive mother behaviors may have significant benefits for children's motivation, and consequently their competence. The most important question for future investigation is the extent to which such interventions can produce enduring changes in children's persistence and competence.

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## Appendix

### Descriptors for Autonomy Support

Autonomy Support is a rating of the extent to which mother encourages child's independent attempts, either by allowing child time to attempt task before offering help, or by encouraging child to attempt the task alone first. A mother low on autonomy support would provide help automatically regardless of whether the child needed or requested guidance. Based on Crawley and Spiker (1982), the following codes are used:

1. Directives are constant throughout session. Mother never waits for child to try lock alone first and does not encourage child to try independently before offering help.
2. Many directives, but mother sometimes allows child to try before giving instructions. May sometimes encourage child to try alone first.
3. Mother often encourages independent attempts and allows time. About half the directives are in response to child's help-seeking cues, lack of interest, or lack of success, and half are offered automatically.
4. Mother almost always waits or encourages independent attempts before offering help. May be directive after child has persisted alone for some time without success, or after child requests help.
5. Mother always waits for child to attempt locks alone. Directives are only offered in response to child's frustration or distress, or pleas for help. Mother always first encourages child to make independent attempts.

Table 1

*Demographic Characteristics of the Participants*

Characteristic	Group	
	Down syndrome (n = 25) Mean (SD)	Typically developing (n = 43) Mean (SD)
Chronological age (months)	63.80 (8.77)	30.81 (3.66)
Mental age (months)	30.00 (5.24)	29.88 (4.12)
Maternal education	3.64 (2.31)	4.09 (2.56)
Paternal education	4.08 (2.10)	5.10 (2.46)
Maternal occupation	4.84 (1.72)	4.74 (1.66)
Paternal occupation	5.44 (1.94)	5.67 (2.20)

*Note.* Parent education was rated on an 8-point scale on which 1 represented education up to Grade 10, and 8 was equivalent to a postgraduate diploma/degree. Occupational status was ranked using the Australian Standard Classification of Occupations (Australian Bureau of Statistics, 1992) and re-coded so that the direction of the scale mirrored that of education: 1 denoted labourers and related workers and 8 signified managers/ administrators. Occupational rankings for mothers who were not employed outside the home at the time of the study were based on their most recent occupation.

Table 2

*Means (Standard Deviations) for Number of Verbal Strategies by Type used by Supportive Mothers and Directive Mothers*

Strategies	Supportive Mothers	Directive Mothers	F	Partial Eta Squared
Controlling	21.36 (13.33)	54.32 (20.35)	54.35***	.475
Distancing	4.79 (3.80)	5.24 (4.47)	0.71	.012
Attention Focusing	21.74 (13.77)	33.56 (10.09)	14.39***	.193
Competence Attributions	2.56 (2.33)	3.72 (3.45)	1.15	.019

\*\*\*  $p < .001$ .

Table 3

*Means (Standard Deviations) for Measures of Child Persistence and Competence*

Measure	Group	
	Down syndrome	Typically developing
Puzzle persistence <sup>a</sup>	10.64 (4.53)	9.53 (4.11)
Shape-sorter persistence <sup>a</sup>	10.40 (4.57)	9.05 (4.40)
Puzzle competence <sup>b</sup>	541 (74)	509 (70)
Shape-sorter competence <sup>b</sup>	591 (71)	575 (55)

<sup>a</sup> Range of possible scores 0-16.<sup>b</sup> Maximum score obtainable is 700.