A comparative study of mastery motivation in young children with Down’s syndrome: similar outcomes, different processes?

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Abstract

Background
Findings from previous research into motivation in young children with Down’s syndrome (DS) have been mixed. Some studies have suggested that development is merely delayed, while others have proposed that there are inherent differences or deficits. Using the mastery motivation paradigm, studies of young children have often found that those with DS are just as persistent and goal-directed as typically developing children of the same mental age (MA).

However, research involving children with DS with MAs above 2 years is very limited. The major aim of the present study was to extend previous research by focusing on children with MAs between 24 and 36 months. A secondary aim was to investigate issues which would advance conceptual knowledge about the construct of mastery motivation.

Method
The participants were 25 children with DS and 43 typically developing children, matched for MA (24–36 months). The main measures of mastery motivation were persistence with structured mastery tasks (i.e. puzzles and shape-sorters) and maternal reports.

Results
With the challenging tasks, children with DS were just as persistent as the typically developing children. Correlations of persistence measures in the group with DS suggested that persistence for these children represented a more generalized approach rather than a task-specific response. Maternal ratings of persistence were lower in the group with DS.

Conclusions
The main conclusion was that children with DS in the MA range of 24–36 months do not differ in their persistence with challenging tasks when compared with typically developing children of the same MA. The implication is that motivational development is delayed for children with DS, rather than deficient. However, there were some indications of possible differences in the processes underlying mastery behaviour in the two groups. The study addresses a number of conceptual and methodological issues associated with mastery motivation research, and stresses the important contribution that future longitudinal studies could make.

Introduction
For children with Down’s syndrome (DS), the typical course of development is delayed or disrupted in many ways. In some aspects, development appears to progress through the same stages and sequences as those of typically developing children, although at a slower rate. However, in other respects, it seems that development is affected by innate differences or deficits rather than merely delays (Wishart 1999). It is also possible that children with DS attain particular developmental achievements through different pathways from those followed by normally developing children.

Previous research in the area of motivation has suggested that children with DS experience both delays and deficits in their development. Most investigations of motivation in young children have based their work on the mastery motivation paradigm, which defines motivated behaviour as persistent, goal-directed behaviour (Messer 1993). Several studies have found that, provided young children with DS are compared to those of the same developmental age, they display similar levels of persistent, goal-directed behaviour. This is a relatively consistent finding with no differences found at mental ages (MAs) of 6 months (MacTurk et al. 1985), 17 months (Ruskin et al. 1994) and 34 months (Landry et al. 1998).

By contrast, other researchers have argued that the development of motivation for young children with DS is not only delayed, but also ‘fundamentally different’ (Wishart 1999). In studies of operant learning, object concept development and cognitive test performance, children with DS have demonstrated a range of counterproductive behaviours, including task avoidance, lack of initiative, low persistence with difficult tasks and unstable performance over time (Wishart & Duffy 1990; Wishart 1991, 1993). Vietze et al. (1983) found that, although infants with DS engaged in the same amount of exploratory behaviour as typically developing children of the same MA (6 months), they displayed significantly less goal-directed behaviour. In another study of 44 children with intellectual disability (39 of whom had DS), Schwethelm & Mahoney (1986) established that, although mastery behaviour followed the same developmental course as that of typically developing children, the children with disabilities were delayed in comparison even to those of the same MA. In other qualitative aspects of mastery behaviour, young children with DS reportedly spend less time attending (Landry & Chapeski 1990), are engaged for shorter periods (Brooks-Gunn & Lewis 1982; Krakow & Kopp 1982), and are more limited in their integration and generalization of different motivational behaviours (MacTurk et al. 1985).
Ruskin et al. (1994) sought to explain the discrepant findings between studies which have found no differences in mastery motivation for children with DS compared with children of the same developmental age, and others which have identified variances. Suggesting that deficits in mastery motivation might not be evident in some studies because of the methods used for measurement, the above authors included a more specific calculation of the longest period of continuous task engagement in addition to the commonly used frequency measure of persistence with goal-directed behaviour. The children in Ruskin et al.’s (1994) study had mean MAs of 16.73 months [DS, mean chronological age (CA) = 22.63 months] and 16.68 months (typically developing, mean CA = 14.08 months). Although there were no group differences in the frequency of goal-directed behaviour with effect production and sensorimotor toys, other findings were interpreted by the above authors as indicating ‘compelling group differences’ (p. 506). The typically developing children displayed significantly longer uninterrupted strings of goal-directed behaviour and their parents rated them as significantly more persistent.

Positive affect during task-directed behaviour has been identified by some authors as an important indicator of mastery motivation (e.g. Morgan et al. 1990). Ruskin et al. (1994) reported that the typically developing children showed more positive affect associated with goal-directed mastery than children with DS. However, interpreting this difference as indicative of low motivation in children with DS may be inappropriate since these children have been observed to show less affect (Cicchetti & Sroufe 1976; Brooks-Gunn & Lewis 1982). Failure to express emotion does not necessarily mean that emotion has not been experienced. Hauser-Cram (1993) found that positive affect was not correlated with other measures of mastery behaviour in children with DS (MA = 19.1 months).

Only two published studies of motivation in children with DS above a MA of 24 months were found. Landry et al. (1998) investigated goal-directed play in children with DS (aged 4–7 years) and a comparison group of typically developing children, matched for MA (mean MA = 34 months). Using a circus toy with animal shape blocks and locked doors, they found that both groups of children spent the same amount of time in independent goal-directed activity. The other study included only four children with DS and four typically developing children (Vlachou & Farrell 2000), and it is difficult to draw valid and generalizable conclusions about the impact that DS may have on behaviour from such a small sample. In summary, findings from studies of young children with DS have provided evidence of both similarities and differences in motivation compared with typically developing children. Research in the early childhood period has often found that infants and young children are just as persistent and goal-directed in their approaches to challenging tasks as typically developing children of the same MA. However, differences have been noted in areas such as sustained task engagement (Ruskin et al. 1994), levels of mastery behaviour (Vietze et al. 1983) and parental ratings of children’s mastery motivation (Ruskin et al. 1994). In relation to the affective component of mastery motivation, children with DS reportedly display less pleasure associated with task-directed behaviour (Ruskin et al. 1994).

These findings come from a relatively small number of studies, most of which have focused on children with MAs under 2 years. Some studies have had small sample sizes (e.g. MacTurk et al. 1985; Vlachou & Farrell 2000), while others have depended on comparison groups from earlier studies (e.g. Vietze et al. 1983; Schwethelm & Mahoney 1986). In addition, anecdotal and clinical reports have been used to support the view that children with DS are deficient in motivation (e.g. Rast & Meltzoff 1995), a conclusion not unanimously supported by the published research.

Although most previous studies have used the paradigm of mastery motivation, few have focused explicitly on issues which would advance understanding of the construct. Mastery motivation is usually conceptualized as having two elements – behavioural and emotional – which are operationalized as persistence and positive affect during goal-directed activity, respectively. It is assumed that mastery motivation is reflective of a general disposition in children and this view is supported by the findings that early mastery motivation is predictive of later competence (Jennings et al. 1984; Hauser-Cram et al. 1997).

However, few studies have examined concurrent relationships of behaviour across tasks. MacTurk et al. (1995) reported internal consistency across three tasks at 3.5 years as 0.45 and across four tasks at 4.5 years as 0.72. However, inter-correlations of concurrent tasks appear to have been calculated rarely and some researchers have simply averaged across tasks without reporting individual scores (e.g. Jennings et al. 1984). In her study of 3-year-old children with DS, Hauser-Cram (1993) found that measures of persistence across tasks were uncorrelated.

Two conceptual and methodological issues have been identified which require empirical investigation. First, to determine whether mastery behaviour reflects a unitary characteristic or is task specific in early childhood requires correlational analyses among multiple measures. Secondly, claims of a conceptual relationship between the instrumental and expressive components of mastery motivation require empirical support.

The present study aimed to extend previous research by examining group differences in mastery behaviour for children with and without DS above the MA of 24 months. A second aim was to advance conceptual knowledge about the construct by investigating issues related to the task specificity of mastery motivation, and the relationship of persistence and affect.

Subjects and methods

Participants

The participants were 25 children (15 girls) with DS whose ages ranged from 4 years to 6 years 8 months, and 43 typically developing children (20 girls) aged between 2 and 3 years. All children with DS had trisomy 21. The two groups were matched for MA (mean MA = 30 months). Mental age and demographic characteristics did not differ, while chronological age was significantly different (t = -21.71, d.f. = 66, P =<0.001). The characteristics of the two groups are presented in Table 1.
Table 1 Descriptive characteristics of the sample: (SD) standard deviation*

<table>
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<tr>
<th>Characteristic</th>
<th>Group</th>
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<td>Down’s syndrome (n=25)</td>
<td>Typically developing (n=43)</td>
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<tr>
<td></td>
<td>Age (months):</td>
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<td></td>
<td>chronological age</td>
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<td></td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>paternal</td>
<td>4.08</td>
<td>5.10</td>
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<tr>
<td></td>
<td>Occupation:</td>
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<td></td>
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<td>maternal</td>
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<td>4.74</td>
</tr>
<tr>
<td></td>
<td>paternal</td>
<td>5.44</td>
<td>5.67</td>
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</table>

*Parent education was rated on an eight-point scale: (1) education up to grade 10; and (8) equivalent to a postgraduate diploma/degree. Occupational status was ranked using the Australian Standard Classification of Occupations (ABS 1992) and re-coded so that the direction of the two scales was the same: (1) labourers and related workers; and (8) managers/administrators. Occupational rankings for mothers who were not employed outside the home at the time of the present study were based on their most recent occupation.

Tasks and instruments
Structured Mastery Tasks for 15–36-Month-Old Children

The Structured Mastery Tasks for 15–36-Month-Old Children (Morgan et al. 1992a) provide measures of children’s mastery motivation. They comprise three sets of activities (i.e. jigsaw puzzles, shape-sorters and cause-and-effect toys), each with six levels of difficulty to ensure that individual children are assessed on tasks which are optimally challenging.

Two tasks were used in the present study: jigsaw puzzles (hereafter referred to as puzzles) and shape-sorters. An initial attempt was made to include cause-and-effect toys as well, but it became apparent in the early stages that they posed difficulties. In particular, the commercially produced cause-and-effect toys recommended by Morgan et al. (1992a) were familiar to some children, and consequently, were an inappropriate measure of mastery motivation for them. The puzzles were specially made according to Morgan et al.’s (1992a) specifications. The three highest levels were used in the present study because of their appropriateness for the developmental age range of participants as determined in the task manual.

The shape-sorter task was also specially constructed in accordance with Morgan et al.’s (1992a) specifications. It consisted of a box with a set of inserts which could be positioned to produce six different versions of the box, graded in shape complexity, each with a single cut-out shape uppermost, and a set of 10 (plus one for demonstration) identically shaped blocks for each shape. Based on the children’s developmental ages, the three highest levels of increasingly complex shapes were selected for the present study.

Each mastery task is coded for a 4-min period while the child is engaged with the task. The examiner records the most prevalent behaviour during each 15 s interval, as well as noting solutions when they are achieved and displays of positive affect. Task-directed codings are made when the child displays focused and purposeful behaviours directed towards achieving success with the task. Scores are calculated for persistence (the number of intervals recorded as task-directed) and pleasure (the number of task-directed intervals during which positive affect is displayed). The range of scores is 0–16, with higher scores reflecting greater persistence and task pleasure. In order to make appropriate procedural decisions about level changes and task termination, it was necessary for the examiner to undertake the initial coding live. Codings for task persistence were later checked against videotapes of the sessions. The affect measure could only be rated live because the video camera was focused on the task rather than the child’s face.

In addition to the conventional method of scoring the mastery motivation tasks, a score that represented the longest string of consecutive goal-directed behaviours on each task was calculated for each participant. This provided a measure of task engagement similar to the one used by Ruskin et al. (1994), although the individual units were longer (15 s) for consistency with the recommended intervals for coding persistence.
Relatively high levels of inter-observer reliability have been reported for Morgan et al.’s (1992a) measures of mastery motivation (e.g. 0.81 to 0.96 for task persistence). In the present study, inter-rater reliability was checked by a second rater who coded the structured mastery tasks from videotapes of the sessions. Reliability ratings were undertaken for a randomly selected 20% of each group. Kappas for persistence were 0.80 on the puzzle task and 0.82 for the shape-sorter task. Ratings were examined separately for each group and no differences were evident. Inter-rater reliability for the affect measure could not be obtained from the videotapes.

Dimensions of Mastery Questionnaire
The Dimensions of Mastery Questionnaire (DMQ) (Expanded Version, DMQ-E) (Morgan et al. 1992b) provides ratings of parental perceptions of a toddler’s or pre-schooler’s mastery motivation. Two out of the five DMQ scales were used in the present study. The object persistence scale provided maternal ratings of the degree of persistence displayed by children with instrumental tasks such as those measured in this study. The mastery pleasure scale provided ratings of the pleasure children experienced during the process of achieving mastery. Items were rated on a four-point scale ranging from ‘not at all typical’ to ‘very typical’ with high scores representing high levels of persistence or pleasure.

Morgan et al. (1992b) reported acceptable to good internal consistency (Cronbach’s alphas ranging from 0.69 to 0.86 for mothers of low-risk children and 0.70 to 0.87 for high-risk children). Construct validity of the DMQ has been supported through factor analysis of items. Moderate correlations of DMQ scales with other measures of mastery motivation have offered some support for criterion validity, although correlations of DMQ and laboratory measures of persistence have been variable. In the present study, Cronbach’s alphas for the DMQ were 0.85 for object persistence and 0.67 for mastery pleasure.

Bayley Scales of Infant Development – Second Edition
The Bayley Scales of Infant Development – Second Edition (BSID-II; Bayley 1993) is a standardized developmental assessment instrument for infants and young children between the developmental ages of one and 42 months. It is comprised of a mental scale, a motor scale, and a scale for rating observations of behaviours such as attention and persistence, the Behaviour Rating Scale (BRS). In the present study, results from the mental scale were used, as well as a behavioural rating for persistence that provided an additional measure of persistence under somewhat different conditions. Persistence was rated on a five-point scale: (1) consistently lacks persistence; (3) lacks persistence half the time; and (5) consistently persistent. Inter-rater reliability was not available for this measure.

Procedure
Sessions were conducted and videotaped in the child study laboratory of the Fred and Eleanor Schoell Special Education Research Centre, Graduate School of Education, University of Queensland, Brisbane, Queensland, Australia. On arrival, children were introduced to an engaging but unrelated task which they undertook for about 15 min while their mothers completed the DMQ. The mastery tasks were then administered strictly in accordance with Morgan et al.’s (1992a) procedures. The BSID-II assessment was conducted in a separate session.

Results
Method of analysis
Group differences in scores for persistence and affect were analysed using independent samples t-tests. This method of analysis was chosen in preference to multivariate analysis because the measures were considered to be relatively independent. Even for the two structured mastery tasks, it was decided that there was insufficient evidence from previous studies about their empirical relationship to consider them in combination. Effect sizes were also calculated for all measures. The relationships among the measures were analysed separately for each group using Pearson correlations. Because multiple analyses were undertaken, it was decided to accept a P-value of 0.01 as significant in order to reduce the possibility of type 1 errors.

Group differences in persistence
Persistence was the main measure of mastery motivation used in this study. There were four measures of this variable: the two structured mastery tasks (puzzles and shape-sorters), the DMQ, and the global persistence rating on the BRS. Means and standard deviations for all measures are shown in Table 2.

Table 2 Means and standard deviations (SDs) for measures of persistence with t-values, significance levels and effect sizes: (d.f.) degree of freedom; (DMQ) Dimensions of Mastery Questionnaire; (BRS) Behaviour Rating Scale; and (NS) not significant

<table>
<thead>
<tr>
<th>Group</th>
<th>Down’s syndrome (n=25)</th>
<th>Typically developing (n=43)</th>
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<td><strong>Down’s syndrome (n=25)</strong></td>
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4
<table>
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<tr>
<th>Measure</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>d.f.</th>
<th>t-value</th>
<th>P-value</th>
<th>Effect size</th>
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<tr>
<td><strong>Structured mastery tasks:</strong></td>
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<tr>
<td>PZ</td>
<td>10.64</td>
<td>4.53</td>
<td>9.53</td>
<td>4.11</td>
<td>66</td>
<td>-1.03</td>
<td>NS</td>
<td>-0.27</td>
</tr>
<tr>
<td>SS</td>
<td>10.40</td>
<td>4.57</td>
<td>9.05</td>
<td>4.40</td>
<td>66</td>
<td>-1.21</td>
<td>NS</td>
<td>-0.31</td>
</tr>
<tr>
<td>DMQ object persistence†</td>
<td>32.52</td>
<td>7.36</td>
<td>36.14</td>
<td>4.70</td>
<td>66</td>
<td>2.48</td>
<td>0.016</td>
<td>0.77</td>
</tr>
<tr>
<td>BRS persistence‡</td>
<td>4.08</td>
<td>0.81</td>
<td>4.26</td>
<td>0.62</td>
<td>66</td>
<td>1.00</td>
<td>NS</td>
<td>0.29</td>
</tr>
</tbody>
</table>

* Possible range of scores from 0 to 16 with high scores indicating high levels of persistence.
† Score obtained from 12 items rated on a four-point scale with high scores representing high levels of persistence.
‡ Persistence rated on five-point scale with high scores indicating high levels of persistence.

Using independent samples t-tests, there were no significant group differences on the measures of persistence obtained from either of the structured mastery tasks. The BRS also showed no differences in persistence between the children with DS and the typically developing children. On the DMQ, mothers of children with DS rated their children as significantly lower on object persistence (the rating most reflective of task-directed behaviours measured by the structured laboratory tasks). Analysis of the task engagement measure that was derived from the length of goal-directed strings of behaviour indicated no significant differences between the two groups in the duration of sustained task-directed activity with either mastery task.

For the group of children with DS, all correlations among measures of persistence were significant or showed a trend towards significance, with the exception of the relationship between maternal ratings on the DMQ and puzzle persistence (see Table 3). There were no significant relationships among the measures for typically developing children.

**Table 3 Pearson correlations for measures of persistence:**

<table>
<thead>
<tr>
<th>Group</th>
<th>Measure</th>
<th>PZ</th>
<th>SS</th>
<th>DMQ</th>
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<tbody>
<tr>
<td>DS</td>
<td>SS</td>
<td>0.60**</td>
<td></td>
<td></td>
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<tr>
<td>TD</td>
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<td>0.17</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>DMQ</td>
<td>0.32</td>
<td>0.42*</td>
<td></td>
</tr>
<tr>
<td>TD</td>
<td></td>
<td>-0.16</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>DS</td>
<td>BRS</td>
<td>0.48**</td>
<td>0.66**</td>
<td>0.45*</td>
</tr>
<tr>
<td>TD</td>
<td></td>
<td>0.09</td>
<td>0.14</td>
<td>0.09</td>
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</tbody>
</table>

* P < 0.05; ** P < 0.01

Group differences in positive affect

Because the measure of affect was not normally distributed, a Mann–Whitney U-test was used to establish that there were no significant differences in displayed affect between the two groups. An independent samples t-test showed that maternal ratings of mastery pleasure did not differ for the two groups. For typically developing children, there was a significant correlation between affect displayed on the two mastery tasks (r = 0.41, P <0.01), and a trend towards significance for the correlation of shape-sorter affect and maternal ratings of task pleasure (r = 0.34, P < 0.05). There were no significant relationships among these measures for children with DS.

The relationships between affect and persistence on each task were analysed using Spearman correlations. These two aspects of mastery motivation were unrelated for typically developing children. For children with DS, there was a significant correlation of persistence and affect on the shape-sorter task (r = 0.54, P < 0.01) and a trend towards significance on the puzzle task (r = 0.42, P < 0.05).

**Discussion**
For the children with DS, there are both similarities and differences in their mastery behaviour when compared with typically developing children. Similarities are evident in task persistence and in displays of positive affect associated with persistence. Differences are apparent too, with the children with DS showing higher cross-task correlations of persistence, higher correlations of persistence and positive affect, and lower maternal ratings of persistence. These differences suggest that, although mastery behaviour appears the same for the two groups, different processes may be associated with its development. The findings contribute to knowledge about the construct of mastery motivation, particularly in relation to the issue of whether mastery behaviour reflects a unitary characteristic or is task-specific, and in relation to the hypothesized relationship between the instrumental and expressive components of the construct.

Task persistence
The findings from the present study are consistent with those of MacTurk et al. (1985), Landry et al. (1998) and Ruskin et al. (1994) in demonstrating no group differences in task persistence for children with DS when compared with typically developing children of the same MA. This finding is consistent both for the structured mastery tasks and for the behavioural rating obtained from the BSID-II assessment. These results seem to suggest that motivational development in young children with DS is delayed, rather than inherently deficient, although this conclusion may be a misleading one if different underlying processes are operating in the two groups.

The claim by Ruskin et al. (1994) that there were striking motivational deficits in children with DS (despite their finding of no overall group differences in frequency measures of persistence) was based largely on evidence that typically developing children had significantly longer periods of continuous task engagement. Ruskin et al. (1994) did not provide a rationale for giving such emphasis to their measure of sustained task engagement, and without an examination of the predictive validity of the various measures of mastery motivation, it is difficult to decide which measures should be considered most meaningful.

The conflicting findings between the present research and Ruskin et al.’s (1994) study for the length of task engagement may be explained by differences in the designs. It is possible that, if the shorter strings used by the above authors had been examined, group differences would have been detected. For instance, a child might have been distracted for 7 s in a 15-s interval, but still be coded as task directed in the present study, while Ruskin et al. (1994) would have recorded the end of a string at this time. Another design difference was the method chosen to assess task persistence. The present study used an individualized method that is a more effective way of controlling for cognitive differences because children are assessed on tasks which are individually challenging, rather than those which are presumed to be challenging for all children of a certain developmental age (Morgan et al. 1990). It is possible that the children with DS in Ruskin et al.’s (1994) study did not display the same duration of episodes of persistence as typically developing children because the tasks were either too difficult or too easy for them. In addition, the children in the present study were older, having a mean MA of 30 months, compared with 16 months. An intriguing possibility is that children with DS may develop the capacity for more sustained task engagement over time, perhaps as a result of their experiences. Interestingly, there was considerable individual variation within both groups in the present study, with some children in each group scoring highly on persistence and others achieving very low scores. The notable group difference was that there was no significant correlation of persistence across the two tasks for typically developing children. By contrast, children with DS tended to display the same degree of persistence with both tasks. This suggests that, although both groups displayed similar ranges of individual variation, the explanations for very high or very low persistence could be different. For typically developing children, lack of interest or limited skill with a specific task may have accounted for low persistence on that task. For children with DS, persistence scores may have reflected a more generalized approach to tasks, ranging from a relatively passive, helpless approach in the case of children with low scores, to a more active, enthusiastic approach in those who were classified as highly persistent. There is some evidence that both typically developing children (MacTurk et al. 1995) and children with DS (Dayus 1999) demonstrate more consistency across tasks with age. Since the children with DS in the present study were older, they had accumulated additional years of experience which may have influenced their approach.

Maternal perceptions of children’s persistence
Significant differences were found between maternal ratings of persistence in the two groups, with mothers of typically developing children rating their children higher. Similar findings were obtained by Dayus (1999) and Ruskin et al. (1994). It is possible that maternal ratings, being based on a wider range of child behaviours than could be assessed in the laboratory, reflected actual differences in persistence between the groups. Children with DS may be less persistent than typically developing children of the same MA, but the relatively restricted range of laboratory measures might not have identified that group difference.

Another factor potentially contributing to the group difference in maternal ratings is that the mothers of the group with DS may have tended to base their ratings on comparisons of their child with her or his same-age peers, or against higher expectations associated with pre-school or school attendance. As a result of using these criteria, the children may have been rated more harshly than typically developing children of the same MA.

It is also possible that the group difference on this measure occurred because mothers of typically developing children were overestimating their children’s persistence while mothers of children with DS provided more realistic ratings, perhaps because of having had more experience in observing and evaluating their children’s behaviour.

Positive affect: A measure of mastery motivation?
Although positive affect was not displayed by all the children in the sample, similar percentages of children in both groups showed some affect associated with task-directed behaviour. Furthermore, these proportions of the total sample were consistent with those reported in other studies (Morgan et al. 1992a; Busch-Rossnagel et al. 1993) and there were no differences in the amount of positive affect displayed by children in the two groups. This is an interesting finding.
because numerous studies have identified affective behaviour as an area of deficit in children with DS (Gunn et al. 1981; Thompson et al. 1985; Kasari et al. 1990). Studies of children with DS have reported low levels of positive affect during mastery motivation tasks (Hauser-Cram 1993) and significant differences compared with the higher scores for typically developing children of the same developmental age (Ruskin et al. 1994). One possible explanation for the conflicting findings is that the children in the present study were older. There is some evidence of increases in displays of task pleasure in typically developing children above 2 years of age (Redding et al. 1988), although the absence of studies means that no similar evidence is available about positive affect in children with DS.

The significant correlation between persistence and affect on the shape-sorter task and the trend towards significance for the puzzles provide some empirical support for a conceptual link between the components of instrumental and expressive mastery motivation. This relationship was found only for the children with DS. Although children in both groups displayed the same amount of pleasure, only in the group with DS did more persistent children show more positive affect associated with their mastery behaviour. However, it is difficult to interpret this measure because positive affect may reflect desire for social approval in some children, possibly because of previous experiences of social reinforcement, rather than inherent mastery pleasure.

Conclusions

The findings from the present study have extended previous research with younger children. The evidence presented here indicates that children with DS in the MA range of 24–36 months do not differ in their persistence with challenging tasks when compared with typically developing children of the same MA. Neither do they differ in the amount of positive affect they display during mastery behaviour. The implication of these findings is that there may be no inherent motivational deficits associated with DS.

However, there are indications of some differences in the processes underlying mastery behaviour in the two groups. While persistence appears to be task specific for typically developing children, it is impossible to determine whether the different across-task correlations in the group with DS are caused by an undifferentiated intrinsic drive, compliance or a general disposition towards tasks that has developed through experience. These alternative explanations for children’s performance highlight the difficulties associated with inferring motives from observed behaviours.

The present study finds some support for the conceptual link of the two mastery motivation components, i.e. instrumental and expressive, in the correlation of their measures, persistence and affect. However, this association is evident only for children with DS and is weakened by the difficulties associated with interpreting what positive affect actually reflects, i.e. intrinsic satisfaction or a search for social approval.

The findings from this investigation of mastery behaviour provide some suggestions to guide future research efforts. It would be useful to obtain measures from a wider range of structured tasks in a variety of contexts in order to provide a more complete picture of children’s mastery behaviour. A more complex coding system is required to differentiate qualitative differences in approach. In addition to persistence and affect, quality of task engagement may be an important factor. During mastery sessions, there were some notable qualitative differences in approach amongst children whose behaviour was coded as persistent. Some children persisted, but with very little obvious enthusiasm, whilst others persisted with total engagement and absorption in the task. Despite these qualitative differences, both received identical scores for persistence because their behaviours were classified as task directed. A more complex coding system might also tease out the meaning of positive affect by, for instance, including the direction of each child’s gaze when expressing pleasure to suggest whether affect reflected an internal or external orientation. Given that group differences were evident in the relationship of affect with persistence, future studies should ensure that reliability ratings are available for the affect measure. Some difficulties in interpretation were a result of the CA difference between the groups. Although the inclusion of an additional comparison group matched for CA would control for differences in years of experience, there is no way of controlling for the different environments, such as early intervention programmes, which are experienced by children with DS compared with their typically developing peers. This issue presents a significant challenge to researchers who are investigating questions about developmental delay versus difference.

An important focus of future research should be to extend the findings from early childhood into middle childhood and beyond. Data about predictive validity are required to determine the most meaningful ways of conceptualizing and measuring mastery motivation in early childhood, and the influence of different experiences and environments on children’s motivation needs to be monitored. Thus, longitudinal studies would make an important contribution both in validating the construct of mastery motivation and also in guiding interventions to enhance children’s mastery motivation.

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