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Maternal Parenting Stress and Mothers' Reports of their Infants' Mastery Motivation

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Abstract

Mastery motivation is a psychological force that stimulates an individual to attempt to master a task that is challenging to him or her. This prospective longitudinal study examined the relationship between maternal stress, using the Parenting Stress Index-Short Form, and infant mastery motivation, using the Dimensions of Mastery Questionnaire, for 150 mother-infant pairs assessed at both 6- and 18-months of age. Infants of mothers with elevated stress levels at 6 months tended to show lower mastery motivation at 18 months (standardized beta = $-.46$, $p=.001$). Conversely, infants with lower general competence (standardized beta = $-.24$, $p=.021$) and lower persistence during social interactions with other children (standardized beta = $-.18$, $p=.037$) at 6 months of age had mothers with elevated total stress at 18 months of age. Implications for programs which simultaneously intervene with child and mother are discussed.

Keywords

maternal stress; mastery motivation; infant temperament; mother-infant interaction

1. Introduction

For children, long-term skill development is dependent on a number of factors. While children's native abilities and the role of environment have received the most attention, equally important, but far less studied, is the intrinsic motivation children possess to master and affect their environment through learning, exploring, and problem solving. This inherent drive, which consists of both affective (e.g. pleasure from learning) and persistence components, is referred to as mastery motivation. When measured in preschoolers (3–5 year-olds), mastery motivation is predictive both of current readiness to learn (Wise, 2007a;

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Turner & Johnson, 2003) and long-term improvements in mental age and social, communication and daily living skills (Hauser-Cram et al., 2001). Given the critical influence of mastery motivation on childhood development, factors that influence the early development of mastery motivation deserve attention. This report focuses on the effects of one of those influences, parenting stress, on early development of mastery motivation in children at 6 and 18 months of age.

White (1959) was one of the first to challenge psychologists to consider children's behaviors such as play, interests, and exploration as self-initiated efforts intended to have an effect on their environment. He used the term *competence* to refer to a child's capacity to interact effectively with the environment and argued that motivation for competence involved discovering the reciprocal effects between the child and the environment—termed *effectance motivation*. While White's work began a dialogue regarding the existence of motivation for competence, he did not offer *how* effectance motivation might be measured.

Almost 20 years later Harter (1978) translated the concept of effectance motivation into researchable hypotheses and measures. While noting that many factors and characteristics of the children themselves likely influence motivation (i.e., intrinsic motivation, optimal task challenge levels, and the internalization of self-reward and mastery goals), she also stressed the importance of acknowledging the dependency of infants and children on their primary caretakers as a source of information and feedback (i.e., positive reinforcement and the child's perceived competence) for mastery attempts. She argued that, for optimal development, reinforcement of attempts and successes must begin in early infancy and continue during the first few years of life. Support for the importance of these early interactions came when Yarrow and colleagues (Yarrow, Klein, Lomonaco, & Morgan, 1975) demonstrated that early infant cognitive-motivational scores predicted Stanford-Binet IQ scores at three-and-a-half years of age. In a subsequent study looking specifically at infants' *persistence*, a component of motivation, they (Yarrow, Morgan, Jennings, Harmon, & Gaiter, 1982) found moderately high correlations between motivation scores and cognitive development. These results led them to propose a reciprocal relationship between persistence and competence, noting that infants who persistently try to solve problems might become more competent, derive more satisfaction from working on skills, and would, therefore, be more likely to practice them. In addition to the relationship between motivation and cognition, these findings also highlighted the importance of understanding individual differences in intrinsic motivation.

Although it may be difficult to separate cognition and motivation, Morgan, Harmon, and Maslin-Cole (1990) argued that the assessment of motivation is most appropriate when tasks are developmentally appropriate, moderately challenging, and varied in difficulty. Proposing that effectance motivation, as described by White (1959) and Harter (1978), refers to the broader range of mastery-related behaviors that children engage in during development, they coined the term *mastery motivation* to describe the psychological force that spurs individuals to attempt independently, with focus and persistence, to solve a problem or master a skill or task that they find moderately challenging.

While the concept of effectance motivation originated from the ideas of White (1959), Harter (1978), and Yarrow, et al. (1982; 1975), the concept of mastery motivation, described by Morgan, et al. (1990) is more clearly defined. Unlike White's (1959) *competence*, which was used to describe what a child could already do, mastery motivation includes a child's *attempts* to solve a problem, regardless of whether completion is successful. Morgan, et al.'s (1990) concept of mastery motivation also includes a child's independent, unassisted attempts to master a task or problem using his or her own resources, persistence (focused

behavior to reach a goal or obtain a skill) and attempts at problem solving or skill mastery in order to gain control over the environment.

Morgan et al.'s (1990) theory describes mastery motivation as a child's motivation to become competent at a task, but they acknowledge characteristics inherent to the tasks that must be considered if one is to accurately measure mastery motivation. First, the task must be at least moderately challenging: If the task is not challenging, there will be nothing to master. Additionally, problems and tasks used to measure mastery motivation must be challenging to a child's own developmental level and, thus, individually challenging, highlighting the individual differences component of mastery motivation.

In summary, Morgan et al.'s (1990) concept of mastery motivation applies to all domains of behavior, in both the social and inanimate environment. Additionally, they assert that a) mastery motivation is primarily intrinsic, b) there are individual differences in mastery motivation due to genetic and environmental factors, and c) the strength of mastery motivation may vary from one domain of behavior to another. As mastery motivation measured at 1-year of age already predicts later mastery motivation (Marsland, 2005), this report focuses on the early development of mastery motivation from 6- to 18- months of age.

Environmental factors also contribute to child development, and influence parent-child interactions and mastery motivation. While environmental events beyond parent-child interactions may influence the development of mastery motivation (van der Pal et al., 2008; Majnemer, Shevell, Law, Poulin, & Rosenbaum, 2010), Harter (1978) stressed the importance of acknowledging the dependence of the very young child on the primary caretaker. The degree to which the primary caretaker positively responds to infant distress (Young & Hauser-Cram, 2006), provides positive feedback for mastery attempts (Turner & Johnson, 2003), and avoids negative feedback (including interference with attempts at autonomy (Marsland, 2005)) are correlated with the child's level of mastery motivation. For example, in preschool children, parenting style and socioeconomic status are both correlated with school readiness; mastery motivation is a key mediator in this relationship (Wise, 2007b).

Many factors may interfere with the ability of the primary caretaker to support and encourage their developing child. For example, parental distress is associated with mothers reporting their infants as more difficult (Mantymaa, Puura, Luoma, Salmelin, & Tamminen, 2006), and maternal depression (a correlate of stress) is negatively associated with infant persistence, a component of mastery motivation (Redding, Harmon, & Morgan, 1990). A particular type of maternal stress that may impact infant mastery motivation is parenting stress. Parenting stress measures (i.e., Parenting Stress Index (Abidin, 1995)) reflect stressors specific to parenting a particular child include: a child domain reflecting child self-regulation and how easy (or difficult) a child is to manage from the parent's perspective; a parent-child interaction domain reflecting the ability of the child to "reward" the parent and the parent's perception of the child's "acceptability" of the parent; and a parental domain arising from self-perceived competence as a parent, feelings of depression about being a parent, and spousal support in parenting (Morgan, Busch-Rossnagel, Barrett, & Wang, 2009). Parenting stress is correlated with infant temperamental difficulty (Gelfand, Teti, & Fox, 1992), with infant temperament then predictive of mastery motivation (Gelfand et al., 1992; Morrow & Camp, 1996). Highly stressed mothers, and in particular mothers where the stress is directly related to parenting the child, may have decreased ability to care for their children in a caring, sensitive, and skilled manner due to limited time, attention, and energy for raising children when consumed by worries (Mantymaa et al., 2006; Gelfand et al., 1992). Mothers who are experiencing high levels of parenting-related stress may be less able to provide a positive atmosphere for their children to engage in mastery behaviors.

While it is feasible that early maternal stress impacts later development of master motivation, it is equally feasible that the effect is in the opposite direction, where early characteristics of the child predict later maternal stress. For example, a longitudinal study of children with developmental disabilities suggests that lower mastery motivation in 3-year-old children predicts a greater increase in father stress over the following 7 year period (Hauser-Cram et al., 2001). To our knowledge, this directional effect from child mastery motivation to parental stress has not been assessed in normally developing infants.

This is the first report exploring the relationship between infant mastery motivation and early maternal parenting stress. We hypothesized that maternal parenting stress and infant mastery motivation would inversely correlate and that this would be true at 6- and 18-months of infancy, and across time (e.g. early parenting stress would predict later mastery motivation difficulties and vice-versa).

2. Methods

2.1 Participants

One-hundred-eighty, primarily English-speaking, mother-infant dyads were recruited from a large metropolitan area through the state's Department of Vital Statistics as part of an ongoing longitudinal study of early infant development. Mother-infant dyads were excluded if mother reported a history of current substance abuse. Infants were also excluded based on low Apgar scores, any major medical diagnosis, or developmental delays. Data presented here were collected when the infants were 6 and 18 months of age. Of the 180 mother-infant dyads assessed at 6 months of age, 150 (83%) also completed an 18-month evaluation. Non-returning dyads did not significantly differ from returning dyads on infant gender or race/ethnicity (Caucasian Non-Hispanic versus other), or maternal or paternal years of education, socioeconomic status, or current employment status. Data analysis was limited to the 150 dyads who participated at both time points. Parenting stress and mastery motivation data was available at both 6- and 18-months for each of these 150 dyads.

2.2 Procedure

The mother-child pairs were participants in a longitudinal study relating physiological, developmental and relationship data over a 5-year period. During clinic visits at infants' ages 6 and 18 months, mothers completed the Dimensions of Mastery Questionnaire (DMQ17) and the PSI-Short Form (PSI-SF). During this visit infants were also administered a developmental exam (Mullen Scales of Early Learning). Infants born at less than 37 weeks were tested based on adjusted ages for pre-term dates.

2.3 Measures

2.3.1 Parenting Stress Index-Short Form (PSI-SF)—Measures of maternal stress were gathered using the PSI-SF. Mothers were asked to respond to 36 statements that best described their current state (1 = "I strongly agree" to 5 = "I strongly disagree"). Four subscales plus a combined, or Total Stress, scale were computed. The Parental Distress subscale is a measure of distress the parent is feeling as it relates to parenting, including distress associated with diminished feelings of parenting competence, restrictions associated with parenting a small child, lack of social support, and depression. The Parent-Child Dysfunctional Interaction subscale measures how well the child meets the parent's expectations. i.e., are the interactions reinforcing and is the child a positive or negative element in the parent's life. The Difficult Child subscale focuses on behavioral characteristics of the child and whether they are seen as easy or difficult to manage, and are likely related to self-regulation in children younger than 18 months. The fourth subscale, Defensive Responding, attempts to measure bias in parental reporting, but scores on this

subscale cannot be interpreted in isolation. Rather, additional information garnered through other methods may be needed to understand this score, i.e., does the parent really feel as if parenting is under control or are they trying to minimize the amount of real stress they are feeling. For this reason, we chose not to use this scale in analyses presented in this study.

2.3.2 Dimensions of Mastery Questionnaire (DMQ)—The DMQ is a 45-item questionnaire which produces 6 subscales related to mastery motivation: 2 social persistence scales (social persistence with adults and social persistence with children), 2 instrumental persistence scales (persistence during object play and persistence in gross motor play), and 2 emotion scales (mastery pleasure mastery and negative reaction of failure). A 7th subscale, reflecting general competence of the child, is not considered reflective of mastery motivation, but is also computable. Each question is answered on a 5-point Likert scale and is the sum of between 5 and 9 questions.

3. Results

3.1 Parenting Stress and Mastery Motivation Subscales

Observed means and standard deviations for the parenting stress subscales are presented in Table 2 and for mastery motivation in Table 3. Parenting stress percentiles significantly correlated across the two time points; with a correlation of .66 for total score and from .52 to .68 for subscales (all p 's <.001; Table 2). For the Dimensions of Master Questionnaire, Cronbach's alphas for the subscales range from .70 to .88. Correlations across time were significant for all subscales ranging from .17 to .30 (all p -values ≤.04; Table 3). Mastery motivation improved from 6 to 12 months of age for all subscales ($t=2.9$ to 8.0 ; p -values <.005) except for Social Persistence with Adults and Social Persistence with Children which each showed no significant change over time ($t=1.1$ and 1.2 ; p -values =.23 and .28; Table 3).

3.2 Relationship Between Parenting Stress and Mastery Motivation at Each Time Point

The relationship between the parenting stress and the mastery motivation were first evaluated using correlations for each time point. At 6 months of age, maternal total stress only significantly correlated with the child's general competence ($r=-.23$; $p=.005$) and negative reaction to failure ($r=.16$; $p=.05$). Conversely, at 18 months of age, maternal total stress correlated with all 7 subscales: object persistence ($r=-.23$; $p=.005$), social persistence with adults ($r=-.19$; $p=.02$), social persistence with children ($r=-.27$; $p=.001$), gross motor persistence ($r=-.17$; $p=.04$), mastery pleasure ($r=-.31$; $p<.001$), general competence ($r=-.30$; $p<.001$), and negative reaction to failure ($r=.26$; $p=.001$). Correlations between parenting subscales and mastery motivation subscales for 6 and 18 months of age are presented in Table 4.

3.3 6-month and 18-month Interaction

For all subscales of both mastery motivation and parenting stress, 6- and 18-month values significantly correlate. Thus, any correlation between 6-month values on one questionnaire and 18-month values on another may be due to a direct relationship or may be mediated by a 18-month value (i.e. a relationship between 6-month parenting stress subscale Child Difficulties and 18-month mastery motivation may be because 6-month stress levels influence 18-month mastery motivation or may be because both measures are correlated with 18-month stress difficulties. To explore these possibilities, two linear regressions were completed. All parenting stress subscales (6- and 12-month) were simultaneously regressed onto 18-month total mastery motivation. Similarly, all mastery motivation subscales (6- and 18-month) were simultaneously regressed onto 18-month total parenting stress.

Results of the regression analysis are provided in Table 5. In short, 18-month mastery motivation is predicted by a combination of 18-month parent child difficult interaction and 6-month difficult child subscales of the Parenting Stress Index. Similarly, 18-month parenting stress is predicted by a combination of 18-month negative reaction to failure, 6-month general competence, 18-month mastery pleasure, and 6-month social persistence with children.

4. Discussion

4.1 Relationship between Parenting Stress and Mastery Motivation at 6- and 18-months of Age

The purpose of this study was to examine the relationship between maternal parenting stress and mastery motivation in their offspring. Many studies have shown that maternal affect correlates with infant behavior and development (Schaughency & Lahey, 1985; Redding et al., 1990; Gelfand et al., 1992; Luoma, Koivisto, & Tamminen, 2004; Mantymaa et al., 2006). This study suggests that, at 6-months of age, maternal reports of parenting stress are related to the child's competence but are only infrequently and weakly associated with mastery motivation. However, by 18-months maternal parenting stress is significantly correlated with all aspects of mastery motivation, with mothers' report of the degree of parent-child dysfunctional interaction the most consistently associated with each of the mastery motivation subscales.

The parenting stress Parent Child Difficult Interaction (PSI-PCDI) subscale focuses on the mother's perception that her child does not meet her expectations, and the interactions with her child are not reinforcing to her as a mother. Mothers who score high the PSI-PCDI subscale typically report feeling rejected by their child, or are disappointed in and feel alienated from the child. High scores suggest that the mother-infant bond is threatened or has never been sufficiently established (Abidin, 1995). If the mother-infant relationship is dysfunctional, mothers may not provide the reinforcement needed to encourage children to attempt to solve problems or challenging tasks, thus leading to less competent infants. High PSI-PCDI scores provide a place for intervention to improve the mother-child bond (Abidin, 1995).

4.2 The Bi-directional Effect of Early Parenting Stress on 18-month Mastery Motivation and Early Competency and Social Persistence on 18-month Parenting Stress

The finding that maternal parenting stress and child mastery motivation are correlated when the child is 18 months of age but have little relationship when the child is 6 months of age raises an important question. Is the relationship limited to 18 months of age because younger infants and maternal stress levels have minimal impact on each other or because the effects take time to develop? The regression analyses suggest the latter explanation as more likely. The child's 18-month mastery motivation level is not only reflective of mother's stress level (specifically her perception of the parent-child relationship), but also reflected in mothers' descriptions of their reported stress on the Difficult Child subscale at 6-months of age. The Difficult Child subscale focuses on behavioral characteristics of children that make them easy or difficult to manage (Abidin, 1995). The characteristics encompass both the temperament of the child and learned patterns of defiant, noncompliant, and demanding behavior (Breen & Barkley, 1988; Webster-Stratton, 1988). High Parental Stress and Difficult Child scores suggest problems in self-regulatory processes and are related to temperamental or physiological problems (Abidin, 1995). It seems plausible that children with difficult temperaments and problems with self-regulation may slowly impact the parent-child relationship leading to higher reported maternal parenting stress by 18-months of age. Intervention in the form of the parent-education classes focused on management

strategies have been helpful for decreasing Parental Stress and Difficult Child scores (Abidin, 1995) and may be an appropriate intervention strategy.

While the results suggest an impact of 6-month maternal parenting stress on later mastery motivation, an effect in the opposite direction of a child's early behavior on maternal stress is equally plausible. A second regression suggests that 18-month maternal total parenting stress may be reflective not only of the child's current emotional tendencies (i.e. higher mastery pleasure and lower negative reaction to failure associated with lower parenting stress), but also associated with attributes of the child at 6-months of age, including general competence and social persistence. Stress is a risk factor for depression (Tennant, 2002). These results suggest that early evaluation of a child's developmental and social milestones, with early intervention when indicated, may have long-term benefits on maternal parenting stress decreasing mother's risk for depression and associated psychopathology.

4.3 Limitations

One limitation to this study is that the measures used are based upon maternal reports of their infants. Maternal affect can influence parental perception of child behavior (Luoma et al., 2004; Najman et al., 2001); thus, in future studies, it would be useful to include ratings from trained raters' or other adults familiar with the infant along with maternal reports of infant mastery behaviors. However, studies in school-age children demonstrate reasonable parent-teacher agreement on mastery motivation assessment (Morgan et al., 2009) suggesting that maternal report is a reasonable measurement method for mastery motivation.

5. Conclusion

In summary, mothers who reported higher levels of parenting stress were more likely to rate their infants lower on dimensions of mastery motivation. In particular, mothers who reported their child as having self-regulatory problems at 6-months of age, and the interaction with their child as "difficult" at 18-months of age also reported their children as having lower mastery motivation at 18-months of age. Conversely, lower general competence of the infant at 6-months of age is associated with greater maternal parenting stress at 18-months of age. This evidence for bidirectional influence between mother and child suggests that interventions which combine simultaneously focus on the mother and the child may have long-term benefit for both the mother and the child.

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Table 1**Parent Characteristics (N=150 parental dyads)**

	Mother	Father
Education (yrs)		
Mean (standard deviation)	15 (3)	16 (3)
Range	6–20	6–20
<12	14 (9%)	14 (9%)
12	11 (7%)	17 (11%)
13–15	29 (19%)	28 (19%)
16	48 (32%)	57 (38%)
>16	45 (30%)	28 (19%)
Unknown	3 (2%)	6 (4%)
Socio-economic index		
Mean (standard deviation)	46 (23)	55 (23)
Range	15–97	17–97
Scores <35 (%)	71 (47%)	35 (23%)
Scores 35–60 (%)	28 (19%)	41 (27%)
Scores >60 (%)	48 (32%)	66 (44%)
Unknown	3 (2%)	8 (5%)
Current employment status		
Full-time	45 (30%)	127 (85%)
Part-time	32 (21%)	6 (4%)
Not currently employed*	69 (46%)	9 (6%)
Unknown	4 (3%)	8 (5%)

Note: The Socio-economic Index is based on The Socioeconomic Index of Occupations (Nakao & Treas (1992;1994). 503 occupations are included and are scored in a potential range of 0–100. Managerial and professional occupations generally have scores above 60; technical, sales, and administrative support occupations generally score between 35 and 60; service, agricultural, and labor occupations generally have scores below 35. Scores are based on the highest occupation value achieved across an individual's life. All values represent raw, nonstandardized scores.

* "Not Currently Employed" includes voluntary unemployment to care for the infant.

Table 2

Parenting Stress Index Percentiles.

Parenting stress scales	6 months		18 months		6–12 month correlation	
	M	SD	M	SD	r	P
Parental distress	37	28	36	27	.56	<.001
Parent child dysfunctional interaction	31	25	34	27	.68	<.001
Difficult child	25	24	33	30	.55	<.001
Total score	29	27	32	31	.66	<.001

Table 3

Dimensions of Mastery Questionnaire (DMQ17) Scores

DMQ17 Component	6 months		18 months		6–18 month correlation		6–18 month difference	
	M	SD	M	SD	r	P	t	P
<i>Object-oriented persistence</i>	3.5	0.5	3.6	0.5	.29	<.001	3.9	<.001
<i>Social persistence with adults</i>	3.9	0.7	4.0	0.6	.21	.01	1.2	.23
<i>Social persistence with children</i>	3.7	0.7	3.8	0.7	.17	.04	1.1	.28
<i>Gross motor persistence</i>	3.4	0.6	3.9	0.5	.19	.03	8.0	<.001
Mastery pleasure	3.9	0.6	4.3	0.6	.30	<.001	6.7	<.001
General competence	3.7	0.5	3.9	0.5	.25	.002	4.7	<.001
Negative reaction to failure	2.8	0.8	3.0	0.8	.26	.001	2.9	.004

Note. Means and standard deviations for DMQ17 components. All values represent raw, non-standardized scores.

Table 4

Correlations Between Dimensions of Mastery Questionnaire (DMQ) and Parenting Stress Index (PSI) at 6 and 18 Months of Age. (6-month DMQ as correlated with 6-Month PSI and 18-Month DMQ as Correlated With 18-month PSI.

		Parental distress	Parent-child difficult interaction	Difficult child	PSI total
Object-oriented persistence	6 month	-.09	-.18*	-.07	-.10
	18 month	-.06	-.28**	-.18*	-.23**
Social persistence with adults	6 month	.05	-.10	.04	.01
	18 month	-.15	-.26**	-.11	-.19*
Social persistence with children	6 month	-.12	-.18*	-.01	-.08
	18 month	-.29**	-.28**	-.16	-.27**
Gross motor persistence	6 month	.00	-.08	-.05	-.01
	18 month	-.07	-.21*	-.10	-.17*
Mastery pleasure	6 month	.01	-.17*	-.07	-.05
	18 month	-.23**	-.36**	-.21**	-.31**
Negative reaction to failure	6 month	.16	.14	.19*	.18*
	18 month	.17*	.21*	.32**	.26**
General competence	6 month	-.22*	-.28**	-.15	-.22**
	18 month	-.19*	-.37**	-.25**	-.30**

* $p < .05$;

** $p < .01$

Table 5

Regression coefficients for PSI-SF subscales at 6- and 18-months onto 18-month total mastery motivation; and regression coefficients for mastery motivation subscales at 6- and 18-months onto 18-month total parenting stress index

	Standardized β	<i>p</i> -value
18-month total master motivation		
18-month parent-child difficult interaction	-.46	.001
6-month difficult child	.26	.018
6-month parental distress	-.09	.42
6-month parent-child difficult interaction	-.05	.68
18-month difficult child	.05	.70
18-month parental distress	.02	.89
18-month total parenting stress		
18-month negative reaction to failure	.26	.001
6-month general competence	-.24	.021
18-month mastery pleasure	-.23	.023
6-month social persistence with children	-.18	.037
18-month social persistence with children	-.18	.056
18-month social persistence with adults	.13	.20
6-month object persistence	.10	.44
18-month object persistence	-.10	.44
18-month general competence	-.09	.37
6-month gross motor persistence	.09	.48
6-month negative reaction to failure	.05	.52
18-month gross motor persistence	.04	.71
6-month social persistence with adults	.03	.72
6-month mastery pleasure	.01	.96