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# Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being

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*Human beings can be proactive and engaged or, alternatively, passive and alienated, largely as a function of the social conditions in which they develop and function. Accordingly, research guided by self-determination theory has focused on the social-contextual conditions that facilitate versus forestall the natural processes of self-motivation and healthy psychological development. Specifically, factors have been examined that enhance versus undermine intrinsic motivation, self-regulation, and well-being. The findings have led to the postulate of three innate psychological needs—competence, autonomy, and relatedness—which when satisfied yield enhanced self-motivation and mental health and when thwarted lead to diminished motivation and well-being. Also considered is the significance of these psychological needs and processes within domains such as health care, education, work, sport, religion, and psychotherapy.*

**T**he fullest representations of humanity show people to be curious, vital, and self-motivated. At their best, they are agentic and inspired, striving to learn; extend themselves; master new skills; and apply their talents responsibly. That most people show considerable effort, agency, and commitment in their lives appears, in fact, to be more normative than exceptional, suggesting some very positive and persistent features of human nature.

Yet, it is also clear that the human spirit can be diminished or crushed and that individuals sometimes reject growth and responsibility. Regardless of social strata or cultural origin, examples of both children and adults who are apathetic, alienated, and irresponsible are abundant. Such non-optimal human functioning can be observed not only in our psychological clinics but also among the millions who, for hours a day, sit passively before their televisions, stare blankly from the back of their classrooms, or wait listlessly for the weekend as they go about their jobs. The persistent, proactive, and positive tendencies of human nature are clearly not invariantly apparent.

The fact that human nature, phenotypically expressed, can be either active or passive, constructive or indolent, suggests more than mere dispositional differences and is a function of more than just biological endowments. It also bespeaks a wide range of reactions to social environments

that is worthy of our most intense scientific investigation. Specifically, social contexts catalyze both within- and between-person differences in motivation and personal growth, resulting in people being more self-motivated, energized, and integrated in some situations, domains, and cultures than in others. Research on the conditions that foster versus undermine positive human potentials has both theoretical import and practical significance because it can contribute not only to formal knowledge of the causes of human behavior but also to the design of social environments that optimize people's development, performance, and well-being. Research guided by self-determination theory (SDT) has had an ongoing concern with precisely these issues (Deci & Ryan, 1985, 1991; Ryan, 1995).

## Self-Determination Theory

SDT is an approach to human motivation and personality that uses traditional empirical methods while employing an organismic metatheory that highlights the importance of humans' evolved inner resources for personality development and behavioral self-regulation (Ryan, Kuhl, & Deci, 1997). Thus, its arena is the investigation of people's inherent growth tendencies and innate psychological needs that are the basis for their self-motivation and personality integration, as well as for the conditions that foster those positive processes. Inductively, using the empirical process, we have identified three such needs—the needs for competence (Harter, 1978; White, 1963), relatedness (Baumeister & Leary, 1995; Reis, 1994), and autonomy (deCharms, 1968; Deci, 1975)—that appear to be essential for facilitating optimal functioning of the natural propensities for growth and integration, as well as for constructive social development and personal well-being.

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Much of the research guided by SDT has also examined environmental factors that hinder or undermine self-motivation, social functioning, and personal well-being. Although many specific deleterious effects have been explored, the research suggests that these detriments can be most parsimoniously described in terms of thwarting the three basic psychological needs. Thus, SDT is concerned not only with the specific nature of positive developmental tendencies, but it also examines social environments that are antagonistic toward these tendencies.

The empirical methods used in much of the SDT research have been in the Baconian tradition, in that social contextual variables have been directly manipulated to examine their effects on both internal processes and behavioral manifestations. The use of experimental paradigms has allowed us to specify the conditions under which people's natural activity and constructiveness will flourish, as well as those that promote a lack of self-motivation and social integration. In this way, we have used experimental methods without accepting the mechanistic or efficient causal meta-theories that have typically been associated with those methods.

In this article we review work guided by SDT, addressing its implications for three important outcomes. We begin with an examination of intrinsic motivation, the prototypic manifestation of the human tendency toward learning and creativity, and we consider research specifying conditions that facilitate versus forestall this special type of motivation. Second, we present an analysis of self-regulation, which concerns how people take in social values and extrinsic contingencies and progressively transform them into personal values and self-motivations. In that discussion, we outline different forms of internalized motivation, addressing their behavioral and experiential

correlates and the conditions that are likely to promote these different motivations. Third, we focus on studies that have directly examined the impact of psychological need fulfillment on health and well-being.

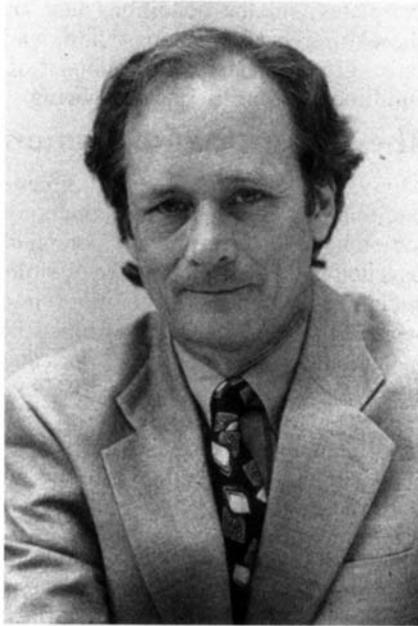
## The Nature of Motivation

Motivation concerns energy, direction, persistence and equifinality—all aspects of activation and intention. Motivation has been a central and perennial issue in the field of psychology, for it is at the core of biological, cognitive, and social regulation. Perhaps more important, in the real world, motivation is highly valued because of its consequences: Motivation produces. It is therefore of preeminent concern to those in roles such as manager, teacher, religious leader, coach, health care provider, and parent that involve mobilizing others to act.

Although motivation is often treated as a singular construct, even superficial reflection suggests that people are moved to act by very different types of factors, with highly varied experiences and consequences. People can be motivated because they value an activity or because there is strong external coercion. They can be urged into action by an abiding interest or by a bribe. They can behave from a sense of personal commitment to excel or from fear of being surveilled. These contrasts between cases of having internal motivation versus being externally pressured are surely familiar to everyone. The issue of whether people stand behind a behavior out of their interests and values, or do it for reasons external to the self, is a matter of significance in every culture (e.g., Johnson, 1993) and represents a basic dimension by which people make sense of their own and others' behavior (deCharms, 1968; Heider, 1958; Ryan & Connell, 1989).

Comparisons between people whose motivation is authentic (literally, self-authored or endorsed) and those who are merely externally controlled for an action typically reveal that the former, relative to the latter, have more interest, excitement, and confidence, which in turn is manifest both as enhanced performance, persistence, and creativity (Deci & Ryan, 1991; Sheldon, Ryan, Rawsthorne, & Ilardi, 1997) and as heightened vitality (Nix, Ryan, Manly, & Deci, 1999), self-esteem (Deci & Ryan, 1995), and general well-being (Ryan, Deci, & Grolnick, 1995). This is so even when the people have the same level of perceived competence or self-efficacy for the activity.

Because of the functional and experiential differences between self-motivation and external regulation, a major focus of SDT has been to supply a more differentiated approach to motivation, by asking what kind of motivation is being exhibited at any given time. By considering the perceived forces that move a person to act, SDT has been able to identify several distinct types of motivation, each of which has specifiable consequences for learning, performance, personal experience, and well-being. Also, by articulating a set of principles concerning how each type of motivation is developed and sustained, or forestalled and undermined, SDT at once recognizes a positive thrust to human nature and provides an account of passivity, alienation, and psychopathology.



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## Intrinsic Motivation

Perhaps no single phenomenon reflects the positive potential of human nature as much as intrinsic motivation, the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn. Developmentalists acknowledge that from the time of birth, children, in their healthiest states, are active, inquisitive, curious, and playful, even in the absence of specific rewards (e.g., Harter, 1978). The construct of intrinsic motivation describes this natural inclination toward assimilation, mastery, spontaneous interest, and exploration that is so essential to cognitive and social development and that represents a principal source of enjoyment and vitality throughout life (Csikszentmihalyi & Rathunde, 1993; Ryan, 1995).

Yet, despite the fact that humans are liberally endowed with intrinsic motivational tendencies, the evidence is now clear that the maintenance and enhancement of this inherent propensity requires supportive conditions, as it can be fairly readily disrupted by various nonsupportive conditions. Thus, our theory of intrinsic motivation does not concern what causes intrinsic motivation (which we view as an evolved propensity; Ryan et al., 1997); rather, it examines the conditions that elicit and sustain, versus subdue and diminish, this innate propensity.

Cognitive evaluation theory (CET) was presented by Deci and Ryan (1985) as a subtheory within SDT that had the aim of specifying factors that explain variability in intrinsic motivation. CET is framed in terms of social and environmental factors that facilitate versus undermine intrinsic motivation, using language that reflects the assumption that intrinsic motivation, being inherent, will be catalyzed when individuals are in conditions that conduce toward its expression. In other words, it will flourish if

circumstances permit. Put in this way, the study of conditions that facilitate versus undermine intrinsic motivation is an important first step in understanding sources of both alienation and liberation of the positive aspects of human nature.

CET, which focuses on the fundamental needs for competence and autonomy, was formulated to integrate results from initial laboratory experiments on the effects of rewards, feedback, and other external events on intrinsic motivation, and was subsequently tested and extended by field studies in various settings. The theory argues, first, that social-contextual events (e.g., feedback, communications, rewards) that conduce toward feelings of competence during action can enhance intrinsic motivation for that action. Accordingly, optimal challenges, effectance-promoting feedback, and freedom from demeaning evaluations were all found to facilitate intrinsic motivation. For example, early studies showed that positive performance feedback enhanced intrinsic motivation, whereas negative performance feedback diminished it (Deci, 1975), and research by Vallerand and Reid (1984) showed that these effects were mediated by perceived competence.

CET further specifies, and studies have shown (Fisher, 1978; Ryan, 1982), that feelings of competence will not enhance intrinsic motivation unless accompanied by a sense of autonomy or, in attributional terms, by an internal perceived locus of causality (deCharms, 1968). Thus, according to CET, people must not only experience competence or efficacy, they must also experience their behavior as self-determined for intrinsic motivation to be in evidence. This requires either immediate contextual supports for autonomy and competence or abiding inner resources (Reeve, 1996) that are typically the result of prior developmental supports for perceived autonomy and competence.

In fact, most of the research on the effects of environmental events in intrinsic motivation has focused on the issue of autonomy versus control rather than that of competence. Research on this issue has been considerably more controversial. It began with the repeated demonstration that extrinsic rewards can undermine intrinsic motivation. Deci (1975) interpreted these results in terms of rewards facilitating a more external perceived locus of causality (i.e., diminished autonomy). Although the issue of reward effects has been hotly debated, a recent, comprehensive meta-analysis (Deci, Koestner, & Ryan, 1999) confirmed, in spite of claims to the contrary by Eisenberger and Cameron (1996), that all expected tangible rewards made contingent on task performance do reliably undermine intrinsic motivation.

Also, research revealed that not only tangible rewards but also threats, deadlines, directives, pressured evaluations, and imposed goals diminish intrinsic motivation because, like tangible rewards, they conduce toward an external perceived locus of causality. In contrast, choice, acknowledgment of feelings, and opportunities for self-direction were found to enhance intrinsic motivation because they allow people a greater feeling of autonomy (Deci & Ryan, 1985). Field studies have further shown that

teachers who are autonomy supportive (in contrast to controlling) catalyze in their students greater intrinsic motivation, curiosity, and desire for challenge (e.g., Deci, Nezlek, & Sheinman, 1981; Flink, Boggiano, & Barrett, 1990; Ryan & Grolnick, 1986). Students taught with a more controlling approach not only lose initiative but learn less effectively, especially when learning requires conceptual, creative processing (Amabile, 1996; Grolnick & Ryan, 1987; Utman, 1997). Similarly, studies showed that autonomy-supportive parents, relative to controlling parents, have children who are more intrinsically motivated (Grolnick, Deci, & Ryan, 1997). Such findings generalized to other domains such as sport and music in which supports for autonomy and competence by parents and mentors incite more intrinsic motivation (e.g., Frederick & Ryan, 1995).

Although autonomy and competence supports are highly salient for producing variability in intrinsic motivation, a third factor, relatedness, also bears on its expression. In infancy, intrinsic motivation is readily observable as exploratory behavior and, as suggested by attachment theorists (e.g., Bowlby, 1979), it is more evident when the infant is securely attached to a parent. Studies of mothers and infants have, indeed, shown that both security and maternal autonomy support predict more exploratory behavior in the infants (e.g., Frodi, Bridges, & Grolnick, 1985). SDT hypothesizes that a similar dynamic occurs in interpersonal settings over the life span, with intrinsic motivation more likely to flourish in contexts characterized by a sense of security and relatedness. For example, Anderson, Manoogian, and Reznick (1976) found that when children worked on an interesting task in the presence of an adult stranger who ignored them and failed to respond to their initiations, a very low level of intrinsic motivation resulted, and Ryan and Grolnick (1986) observed lower intrinsic motivation in students who experienced their teachers as cold and uncaring. Of course, many intrinsically motivated behaviors are happily performed in isolation, suggesting that proximal relational supports may not be necessary for intrinsic motivation, but a secure relational base does seem to be important for the expression of intrinsic motivation to be in evidence.

To summarize, the CET framework suggests that social environments can facilitate or forestall intrinsic motivation by supporting versus thwarting people's innate psychological needs. Strong links between intrinsic motivation and satisfaction of the needs for autonomy and competence have been clearly demonstrated, and some work suggests that satisfaction of the need for relatedness, at least in a distal sense, may also be important for intrinsic motivation. It is critical to remember, however, that people will be intrinsically motivated only for activities that hold intrinsic interest for them, activities that have the appeal of novelty, challenge, or aesthetic value. For activities that do not hold such appeal, the principles of CET do not apply, because the activities will not be experienced as intrinsically motivated to begin with. To understand the motivation for those activities, we need to look more deeply into the nature and dynamics of extrinsic motivation.

## Self-Regulation of Extrinsic Motivation

Although intrinsic motivation is an important type of motivation, it is not the only type or even the only type of self-determined motivation (Deci & Ryan, 1985). Indeed, much of what people do is not, strictly speaking, intrinsically motivated, especially after early childhood when the freedom to be intrinsically motivated is increasingly curtailed by social pressures to do activities that are not interesting and to assume a variety of new responsibilities (Ryan & La Guardia, in press).

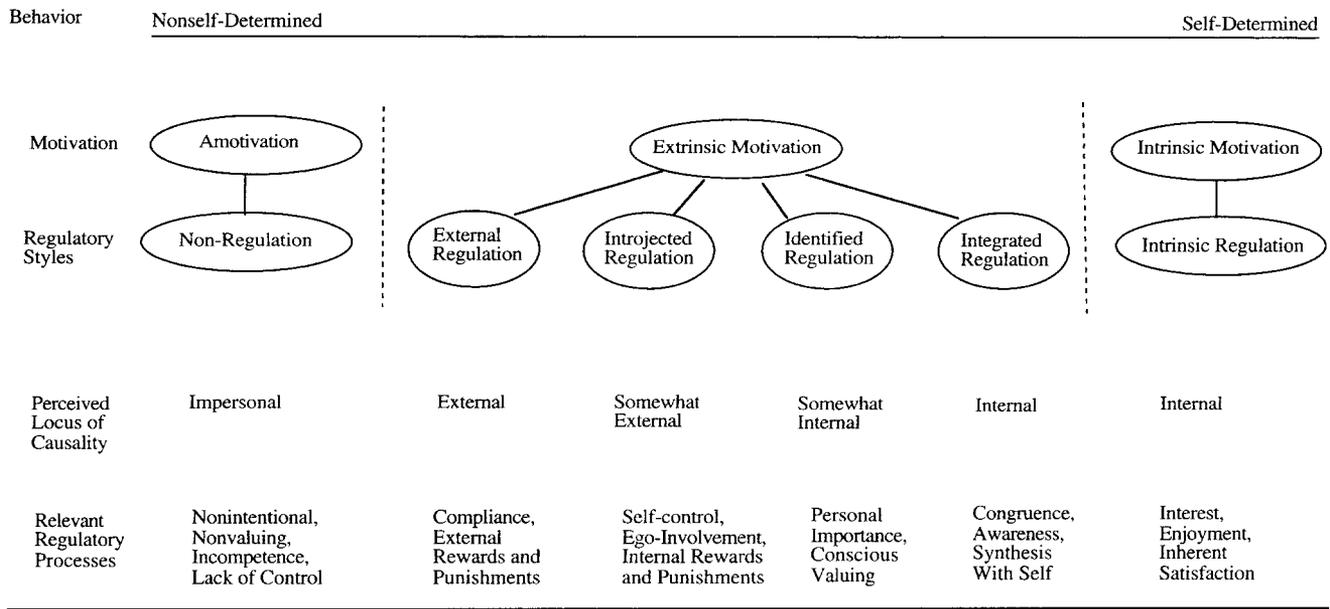
The real question concerning nonintrinsically motivated practices is how individuals acquire the motivation to carry them out and how this motivation affects ongoing persistence, behavioral quality, and well-being. Whenever a person (be it a parent, teacher, boss, coach, or therapist) attempts to foster certain behaviors in others, the others' motivation for the behavior can range from amotivation or unwillingness, to passive compliance, to active personal commitment. According to SDT, these different motivations reflect differing degrees to which the value and regulation of the requested behavior have been internalized and integrated. Internalization refers to people's "taking in" a value or regulation, and integration refers to the further transformation of that regulation into their own so that, subsequently, it will emanate from their sense of self.

Internalization and integration are clearly central issues in childhood socialization, but they are also continually relevant for the regulation of behavior across the life span. In nearly every setting people enter, certain behaviors and values are prescribed, behaviors that are not interesting and values that are not spontaneously adopted. Accordingly, SDT has addressed the issues of (a) the processes through which such nonintrinsically motivated behaviors can become truly self-determined, and (b) the ways in which the social environment influences those processes.

The term *extrinsic motivation* refers to the performance of an activity in order to attain some separable outcome and, thus, contrasts with *intrinsic motivation*, which refers to doing an activity for the inherent satisfaction of the activity itself. Unlike some perspectives that view extrinsically motivated behavior as invariably non-autonomous, SDT proposes that extrinsic motivation can vary greatly in its relative autonomy (Ryan & Connell, 1989; Vallerand, 1997). For example, students who do their homework because they personally grasp its value for their chosen career are extrinsically motivated, as are those who do the work only because they are adhering to their parents' control. Both examples involve instrumentalities rather than enjoyment of the work itself, yet the former case of extrinsic motivation entails personal endorsement and a feeling of choice, whereas the latter involves compliance with an external regulation. Both represent intentional behavior (Heider, 1958), but they vary in their relative autonomy. The former, of course, is the type of extrinsic motivation that is sought by astute socializing agents regardless of the applied domain.

**Figure 1**

*The Self-Determination Continuum Showing Types of Motivation With Their Regulatory Styles, Loci of Causality, and Corresponding Processes*



Within SDT, Deci and Ryan (1985) introduced a second subtheory, called organismic integration theory (OIT), to detail the different forms of extrinsic motivation and the contextual factors that either promote or hinder internalization and integration of the regulation for these behaviors. Figure 1 illustrates the OIT taxonomy of motivational types, arranged from left to right in terms of the degree to which the motivations emanate from the self (i.e., are self-determined).

At the far left of the self-determination continuum is amotivation, the state of lacking the intention to act. When amotivated, people either do not act at all or act without intent—they just go through the motions. Amotivation results from not valuing an activity (Ryan, 1995), not feeling competent to do it (Bandura, 1986), or not expecting it to yield a desired outcome (Seligman, 1975). To the right of amotivation in Figure 1 are five classifications of motivated behavior. Although many theorists have treated motivation as a unitary concept, each of the categories identified within OIT describes theoretically, experientially, and functionally distinct types of motivation. At the far right of the continuum is the classic state of intrinsic motivation, the doing of an activity for its inherent satisfactions. It is highly autonomous and represents the prototypic instance of self-determination. Externally motivated behaviors, by contrast, cover the continuum between amotivation and intrinsic motivation, varying in the extent to which their regulation is autonomous.

The extrinsically motivated behaviors that are least autonomous are referred to as *externally regulated*. Such behaviors are performed to satisfy an external demand or

reward contingency. Individuals typically experience externally regulated behavior as controlled or alienated, and their actions have an external perceived locus of causality (deCharms, 1968). External regulation is the type of motivation focused on by operant theorists (e.g., Skinner, 1953), and it is external regulation that was typically contrasted with intrinsic motivation in early laboratory and field studies.

A second type of extrinsic motivation is labeled *introjected regulation*. Introjection involves taking in a regulation but not fully accepting it as one's own. It is a relatively controlled form of regulation in which behaviors are performed to avoid guilt or anxiety or to attain ego enhancements such as pride. Put differently, introjection represents regulation by contingent self-esteem (Deci & Ryan, 1995). A classic form of introjection is ego involvement (deCharms, 1968; Nicholls, 1984; Ryan, 1982), in which people are motivated to demonstrate ability (or avoid failure) in order to maintain feelings of worth. Although internally driven, introjected behaviors still have an external perceived locus of causality and are not really experienced as part of the self. Thus, in some studies, external regulation (being interpersonally controlled) and introjected regulation (being intrapersonally controlled) have been combined to form a controlled motivation composite (e.g., Williams, Grow, Freedman, Ryan, & Deci, 1996).

A more autonomous, or self-determined, form of extrinsic motivation is *regulation through identification*. Identification reflects a conscious valuing of a behavioral goal or regulation, such that the action is accepted or owned as personally important. Finally, the most auto-

mous form of extrinsic motivation is *integrated regulation*. Integration occurs when identified regulations are fully assimilated to the self, which means they have been evaluated and brought into congruence with one's other values and needs. Actions characterized by integrated motivation share many qualities with intrinsic motivation, although they are still considered extrinsic because they are done to attain separable outcomes rather than for their inherent enjoyment. In some studies, identified, integrated, and intrinsic forms of regulation have been combined to form an autonomous motivation composite.

As people internalize regulations and assimilate them to the self, they experience greater autonomy in action. This process may occur in stages, over time, but we are not suggesting that it is a developmental continuum in the sense that people must progress through each stage of internalization with respect to a particular regulation. Rather, they can relatively readily internalize a new behavioral regulation at any point along this continuum depending on both prior experiences and current situational factors (Ryan, 1995). Nonetheless, the range of behaviors that can be assimilated to the self increases over time with increased cognitive capacities and ego development (Loevinger & Blasi, 1991), and there is evidence that children's general regulatory style does tend to become more internalized or self-regulated over time (e.g., Chandler & Connell, 1987).

Ryan and Connell (1989) tested the formulation that these different types of motivation, with their distinct properties, lie along a continuum of relative autonomy. They investigated achievement behaviors among school children and found that external, introjected, identified, and intrinsic regulatory styles were intercorrelated according to a quasi-simplex pattern, thus providing evidence for an underlying continuum. Furthermore, differences in the type of extrinsic motivation were associated with different experiences and outcomes. For example, the more students were externally regulated the less they showed interest, value, and effort toward achievement and the more they tended to disown responsibility for negative outcomes, blaming others such as the teacher. Introjected regulation was positively related to expending more effort, but it was also related to feeling more anxiety and coping more poorly with failures. In contrast, identified regulation was associated with more interest and enjoyment of school and with more positive coping styles, as well as with expending more effort.

Other studies in education extended these findings, showing that more autonomous extrinsic motivation was associated with more engagement (Connell & Wellborn, 1991), better performance (Miserandino, 1996), lower dropout (Vallerand & Bissonnette, 1992), higher quality learning (Grolnick & Ryan, 1987), and better teacher ratings (Hayamizu, 1997), among other outcomes.

In the realm of health care, greater internalization has been associated with greater adherence to medications among people with chronic illnesses (Williams, Rodin, Ryan, Grolnick, & Deci, 1998), better long-term maintenance of weight loss among morbidly obese patients (Williams et al., 1996), improved glucose control among dia-

betics (Williams, Freedman, & Deci, 1998), and greater attendance and involvement in an addiction-treatment program (Ryan, Plant, & O'Malley, 1995).

Demonstrations of positive outcomes being associated with more internalized motivation have also emerged in other diverse domains, including religion (Ryan, Rigby, & King, 1993), physical exercise (Chatzisarantis, Biddle, & Meek, 1997), political activity (Koestner, Losier, Vallerand, & Carducci, 1996), environmental activism (Green-Demers, Pelletier, & Menard, 1997), and intimate relationships (Blais, Sabourin, Boucher, & Vallerand, 1990), among others.

The advantages of greater internalization appear, then, to be manifold (Ryan et al., 1997), including more behavioral effectiveness, greater volitional persistence, enhanced subjective well-being, and better assimilation of the individual within his or her social group.

### **Facilitating Integration of Extrinsic Motivation**

Given the significance of internalization for personal experience and behavioral outcomes, the critical issue becomes how to promote autonomous regulation for extrinsically motivated behaviors. That is, what are the social conditions that nurture versus inhibit internalization and integration?

Because extrinsically motivated behaviors are not typically interesting, the primary reason people initially perform such actions is because the behaviors are prompted, modeled, or valued by significant others to whom they feel (or want to feel) attached or related. This suggests that relatedness, the need to feel belongingness and connectedness with others, is centrally important for internalization. Thus, OIT proposes that internalization is more likely to be in evidence when there are ambient supports for feelings of relatedness. For example, Ryan, Stiller, and Lynch (1994) showed that the children who had more fully internalized the regulation for positive school-related behaviors were those who felt securely connected to, and cared for by, their parents and teachers.

The relative internalization of extrinsically motivated activities is also a function of perceived competence. People are more likely to adopt activities that relevant social groups value when they feel efficacious with respect to those activities. As is the case with all intentional action, OIT suggests that supports for competence should facilitate internalization (Vallerand, 1997). Thus, for example, children who are directed to perform behaviors before they are developmentally ready to master them or understand their rationale would be predicted, at best, only to partially internalize the regulations, remaining either externally regulated or introjected.

Finally, the experience of autonomy facilitates internalization and, in particular, is a critical element for a regulation to be integrated. Contexts can yield external regulation if there are salient rewards or threats and the person feels competent enough to comply; contexts can yield introjected regulation if a relevant reference group endorses the activity and the person feels competent and related; but contexts can yield autonomous regulation only

if they are autonomy supportive, thus allowing the person to feel competent, related, and autonomous. To integrate a regulation, people must grasp its meaning and synthesize that meaning with respect to their other goals and values. Such deep, holistic processing (Kuhl & Fuhrmann, 1998) is facilitated by a sense of choice, volition, and freedom from excessive external pressure toward behaving or thinking a certain way. In this sense, support for autonomy allows individuals to actively transform values into their own.

Again, research results have supported this reasoning. For example, Deci, Eghrari, Patrick, and Leone (1994) demonstrated in a laboratory experiment that providing a meaningful rationale for an uninteresting behavior, along with supports for autonomy and relatedness, promoted its internalization and integration. Controlling contexts yielded less overall internalization, and the internalization that did occur in those contexts tended to be only introjected. Using parent interviews, Grolnick and Ryan (1989) found greater internalization of school-related values among children whose parents were more supportive of autonomy and relatedness. Strahan (1995) found that parents who were more autonomy-supportive promoted greater religious identification, as opposed to introjection, in their offspring. Williams and Deci (1996), using a longitudinal design, demonstrated greater internalization of biopsychosocial values and practices among medical students whose instructors were more autonomy-supportive. These are but a few of the many findings suggesting that supports for relatedness and competence facilitate internalization and that supports for autonomy also facilitate integration of behavioral regulations. When that occurs, people feel not only competent and related but also autonomous as they carry out culturally valued activities.

One further point needs to be made regarding the controversial issue of human autonomy. The concept of autonomy has often been portrayed as being antagonistic to relatedness or community. In fact, some theories equate autonomy with concepts such as individualism and independence (e.g., Steinberg & Silverberg, 1986), which do indeed imply low relatedness. But, within SDT, autonomy refers not to being independent, detached, or selfish but rather to the feeling of volition that can accompany any act, whether dependent or independent, collectivist or individualist. In fact, recent research in Korean and U.S. samples has found a more positive relation between autonomy and collectivistic attitudes than between autonomy and individualistic attitudes (Kim, Butzel, & Ryan, 1998). Furthermore, research has shown positive, rather than negative, links between relatedness to parents and autonomy in teenagers (Ryan & Lynch, 1989; Ryan et al., 1994). Clearly, then, we do not equate autonomy with independence or individualism.

### ***Alienation and Its Prevention***

SDT aims to specify factors that nurture the innate human potentials entailed in growth, integration, and well-being, and to explore the processes and conditions that foster the healthy development and effective functioning of individuals, groups, and communities. But a positive approach

cannot ignore pathology or close its eyes to the alienation and inauthenticity that are prevalent in our society and in others. Accordingly, we investigate nonoptimal (as well as optimal) developmental trajectories, much as is done in the field of developmental psychopathology (e.g., Cicchetti, 1991). We now turn to a brief consideration of that issue.

By definition, intrinsically motivated behaviors, the prototype of self-determined actions, stem from the self. They are unalienated and authentic in the fullest sense of those terms. But, as already noted, SDT recognizes that extrinsically motivated actions can also become self-determined as individuals identify with and fully assimilate their regulation. Thus, it is through internalization and integration that individuals can be extrinsically motivated and still be committed and authentic. Accumulated research now suggests that the commitment and authenticity reflected in intrinsic motivation and integrated extrinsic motivation are most likely to be evident when individuals experience supports for competence, autonomy, and relatedness.

It is the flip side of this coin, however, that speaks directly to the issues of alienation and inauthenticity and is relevant to such questions as why employees show no initiative, why teenagers reject their schools' values, and why patients adhere so poorly to treatment. SDT understands such occurrences in terms of the undermining of intrinsic motivation and, perhaps even more typically, the failure of internalization. To explain the causes of such diminished functioning, SDT suggests turning first to individuals' immediate social contexts and then to their developmental environments to examine the degree to which their needs for competence, autonomy, and relatedness are being or have been thwarted. We maintain that by failing to provide supports for competence, autonomy, and relatedness, not only of children but also of students, employees, patients, and athletes, socializing agents and organizations contribute to alienation and ill-being. The fact that psychological-need deprivation appears to be a principal source of human distress suggests that assessments and interventions would do well to target these primary foundations of mental health.

## **Psychological Needs and Mental Health**

As we have seen, both the cognitive evaluation and organismic integration components of SDT have led us to posit a parsimonious list of three basic psychological needs as a means of organizing and interpreting a wide array of empirical results, results that seemed not to be readily and satisfactorily interpretable without the concept of needs. Much of our more recent work has used the concept of three basic psychological needs to address new phenomena and, more particularly, to evaluate the postulate that these three needs are innate, essential, and universal.

By our definition, a basic need, whether it be a physiological need (Hull, 1943) or a psychological need, is an energizing state that, if satisfied, conduces toward health and well-being but, if not satisfied, contributes to pathology and ill-being. We have thus proposed that the basic needs for competence, autonomy, and relatedness must be satis-

fied across the life span for an individual to experience an ongoing sense of integrity and well-being or "eudaimonia" (Ryan & Frederick, 1997; Waterman, 1993). Accordingly, much of our research now focuses on the link between satisfaction of the basic psychological needs and the experience of well-being.

Specifying psychological needs as essential nutrients implies that individuals cannot thrive without satisfying all of them, any more than people can thrive with water but not food. Thus, for example, a social environment that affords competence but fails to nurture relatedness is expected to result in some impoverishment of well-being. Worse yet, social contexts that engender conflicts between basic needs set up the conditions for alienation and psychopathology (Ryan et al., 1995), as when a child is required by parents to give up autonomy in order to feel loved.

To suggest that the three needs are universal and developmentally persistent does not imply that their relative salience and their avenues for satisfaction are unchanging across the life span or that their modes of expression are the same in all cultures. The very fact that need satisfaction is facilitated by the internalization and integration of culturally endorsed values and behaviors suggests that individuals are likely to express their competence, autonomy, and relatedness differently within cultures that hold different values. Indeed, the mode and degree of people's psychological-need satisfaction is theorized to be influenced not only by their own competencies but, even more important, by the ambient demands, obstacles, and affordances in their sociocultural contexts. Thus, to posit universal psychological needs does not diminish the importance of variability in goals and orientations at different developmental epochs or in different cultures, but it does suggest similarities in underlying processes that lead to the development and expression of those differences.

Our recent investigations of the importance of basic psychological needs have addressed three questions: Are the pursuit and attainment of all culturally congruent aspirations and life values associated with well-being? Do need-related processes operate similarly within different cultural circumstances? Is within-person variability in basic need satisfaction related to variability in well-being indicators? We briefly consider some of this work.

First, we discuss the relation of personal goals to well-being. We have hypothesized that the pursuit and attainment of some life goals will provide relatively direct satisfaction of the basic needs, thus enhancing well-being (Ryan, Sheldon, Kasser, & Deci, 1996), whereas the pursuit and attainment of other goals does not contribute to and may even detract from basic need satisfactions, leading to ill-being. In accord with this reasoning, T. Kasser and Ryan (1993, 1996) examined individual differences in the emphasis people place on intrinsic aspirations (goals such as affiliation, personal growth, and community that directly satisfy basic needs) compared with extrinsic aspirations (goals such as wealth, fame, and image that at best indirectly satisfy the needs). They found, first, that placing strong relative importance on intrinsic aspirations was pos-

itively associated with well-being indicators such as self-esteem, self-actualization, and the inverse of depression and anxiety, whereas placing strong relative importance on extrinsic aspirations was negatively related to these well-being indicators. Ryan, Chirkov, Little, Sheldon, Timoshina, and Deci (1999) replicated these findings in a Russian sample, attesting to the potential generalizability of the findings across cultures.

These findings go beyond goal importance per se. Both Ryan, Chirkov, et al. and T. Kasser and Ryan (in press) have found that whereas self-reported attainment of intrinsic aspirations was positively associated with well-being, attainment of extrinsic aspirations was not. Further, Sheldon and Kasser (1998) found in a longitudinal study that well-being was enhanced by attainment of intrinsic goals, whereas success at extrinsic goals provided little benefit. Together, these results suggest that even highly efficacious people may experience less than optimal well-being if they pursue and successfully attain goals that do not fulfill basic psychological needs. We hasten to add, however, that the meaning of specific goals is culturally influenced, so that how specific goals relate to well-being can vary across cultures, although the relation between underlying need satisfaction and well-being is theorized to be invariant.

Clearly, there are many factors that lead people to emphasize certain life goals that may not be need fulfilling. For example, exposure to the commercial media can prompt a focus on materialism (Richins, 1987), which provides only fleeting satisfactions and could actually detract from basic need fulfillment and, thus, well-being. Prior deficits in need fulfillment (e.g., from poor caregiving) might also lead individuals to yearn for more extrinsic goals as a substitute or compensatory mechanism. In fact, T. Kasser, Ryan, Zax, and Sameroff (1995) found that teens who had been exposed to cold, controlling maternal care (as assessed with ratings by the teens, mothers, and observers) were more likely to develop materialistic orientations, compared with better nurtured teens who more strongly valued the intrinsic goals of personal growth, relationships, and community. In short, cultural and developmental influences produce variations in the importance of goals, the pursuit of which, in turn, yields different satisfaction of basic needs and different levels of well-being.

In other research, we have examined the relations of people's reports of need satisfaction to indicators of well-being in various settings. For example, V. Kasser and Ryan (in press) found that supports for autonomy and relatedness predicted greater well-being among nursing home residents. Baard, Deci, and Ryan (1998) showed that employees' experiences of satisfaction of the needs for autonomy, competence, and relatedness in the workplace predicted their performance and well-being at work. Such research shows that within specific domains, especially those central to the lives of individuals, need satisfaction is correlated with improved well-being.

A more compelling way of demonstrating the essential relations between need fulfillments and mental health has been the examination of role-to-role and day-to-day fluctu-

tuations in basic need satisfaction and their direct effects on variability in well-being, while controlling for individual differences and various confounding variables. For example, Sheldon et al. (1997) demonstrated that satisfaction in each of several life roles (e.g., student, employee, friend), relative to the individual's own mean satisfaction, was attributable to the degree to which that role supports authenticity and autonomous functioning. Similarly, in a study that examined daily variations in well-being, Sheldon, Reis, and Ryan (1996) used hierarchical linear modeling to show that within-person daily fluctuations in the satisfaction of autonomy and competence needs predicted within-person fluctuations in outcomes such as mood, vitality, physical symptoms, and self-esteem. In a more recent study, Reis, Sheldon, Gable, Roscoe, and Ryan (in press) found that variations in the fulfillment of each of the three needs (i.e., competence, autonomy, and relatedness) independently predicted variability in daily well-being. These studies support the view that basic psychological needs are determinative with regard to optimal experience and well-being in daily life.

## Conclusions

Debates concerning the activity or passivity, responsibility or indolence, of human beings have been perennial (Kohn, 1990). As psychology has become more advanced, both in terms of our understanding of evolution and neurobiology and of social behavior and its causation, ample support for both perspectives could be garnered. SDT addresses this issue by attempting to account for both the activity and the passivity, the responsibility and the indolence. To do this, we have assumed that humans have an inclination toward activity and integration, but also have a vulnerability to passivity. Our focus, accordingly, has been to specify the conditions that tend to support people's natural activity versus elicit or exploit their vulnerability.

Our early investigations focused on the social conditions that enhance versus diminish a very positive feature of human nature, namely, the natural activity and curiosity referred to as intrinsic motivation. We found that conditions supportive of autonomy and competence reliably facilitated this vital expression of the human growth tendency, whereas conditions that controlled behavior and hindered perceived effectance undermined its expression. Subsequently, we investigated the acquisition and regulation of nonintrinsically motivated behaviors and, here too, we found evidence of the dramatic power of social contexts to enhance or hinder the organismic tendency to integrate ambient social values and responsibilities. Contexts supportive of autonomy, competence, and relatedness were found to foster greater internalization and integration than contexts that thwart satisfaction of these needs. This latter finding, we argue, is of great significance for individuals who wish to motivate others in a way that engenders commitment, effort, and high-quality performance.

Yet, our primary concern throughout this program of research has been the well-being of individuals, whether they are students in classrooms, patients in clinics, athletes on the playing field, or employees in the workplace. As

formulated by SDT, if the social contexts in which such individuals are embedded are responsive to basic psychological needs, they provide the appropriate developmental lattice upon which an active, assimilative, and integrated nature can ascend. Excessive control, nonoptimal challenges, and lack of connectedness, on the other hand, disrupt the inherent actualizing and organizational tendencies endowed by nature, and thus such factors result not only in the lack of initiative and responsibility but also in distress and psychopathology.

Knowledge concerning the nutrients essential for positive motivation and experience and, in turn, for enhanced performance and well-being has broad significance. It is relevant to parents and educators concerned with cognitive and personality development because it speaks to the conditions that promote the assimilation of both information and behavioral regulations. It is also relevant to managers who want to facilitate motivation and commitment on the job, and it is relevant to psychotherapists and health professionals because motivation is perhaps the critical variable in producing maintained change. Thus, by attending to the relative presence or deprivation of supports for basic psychological needs, practitioners are better able to diagnose sources of alienation versus engagement, and facilitate both enhanced human achievements and well-being.

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## Children's Achievement Moderates the Effects of Mothers' Use of Control and Autonomy Support

Florrie Fei-Yin Ng, Gwen A. Kenney-Benson, and Eva M. Pomerantz

Two studies investigated the effects of parents' control and autonomy support on low- and high-achieving children. In Study 1, mothers' ( $N = 110$ ) involvement with children (7 to 10 years old) in the context of a challenging task was observed. During this interaction, mothers' control predicted diminished engagement and their autonomy support predicted enhanced performance for low-achieving children more than for high-achieving children. In Study 2, mothers' ( $N = 121$ ) responses to children's (9 to 12 years old) failure were assessed with a daily checklist. Children's grades were obtained at this time and 6 months later. Mothers' controlling responses predicted decreased performance and their autonomy-supportive responses predicted increased performance over time for low achievers more than for high achievers.

Much research suggests that parents' use of control has negative effects on children's motivation, which may lead to decrements in children's performance. In contrast, parents' use of autonomy support appears to have positive effects along these lines (for a review, see Grolnick, 2003). These effects have largely been attributed to the possibility that parents' use of control undermines children's feelings of autonomy and competence, whereas parents' use of autonomy support enhances such feelings (e.g., Deci & Ryan, 1985; Grolnick, Deci, & Ryan, 1997). In particular, when parents attempt to control children, parents may deprive children of feeling that they are autonomous agents effective at acting on their surroundings, thereby leading children to disengage from their environment as they lose intrinsic interest. In contrast, when parents support children's autonomy, they allow children to take initiative, which cultivates the feeling in children that they are in charge and capable of influencing their sur-

roundings; such feelings heighten children's intrinsic interest, leading them to be engaged with their environment.

Because low-achieving children have more negative experiences with competence than do high-achieving children, they may be more sensitive to issues of competence, which may cause parents' use of control and autonomy support to have a greater influence on them than on high-achieving children. Thus, in line with Parent  $\times$  Child models of socialization in which the effects on children of parents' practices are dependent on children's attributes (e.g., Colder, Lochman, & Wells, 1997; Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Grusec, 2002; Kochanska, 1993), children's achievement may moderate the effects of parents' use of control and autonomy support on their motivation, in turn affecting their later performance. The goal of the current research was to examine this possibility in the context of parents' use of diverse types of control and autonomy support.

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### Parents' Use of Control and Autonomy Support

Early on in the study of parents' socialization of children, parents' use of control was identified as a key dimension (Becker, 1964; Maccoby & Martin, 1983; Rollins & Thomas, 1979). Hence, there is an extensive body of theory and research on multiple forms of parental control (see Pomerantz & Ruble, 1998a; Rollins & Thomas, 1979; Steinberg, 1990, for reviews). Research concerned with the role of parents' use of control in children's motivation has generally drawn from Deci and Ryan's (1987; see also

Grolnick & Ryan, 1989) self-determination theory, in which control is defined as the exertion of pressure by parents to push children toward particular outcomes, such as doing well in school. Parents often exert pressure in the context of their involvement with children by regulating children's behavior with commands, directives, instructions, orders, and restrictions. Parents can also be controlling in terms of how they respond to children's performance; for example, they may punish children when they fail.

Complementing the attention to parents' use of control has been attention to parents' use of autonomy support (e.g., Grolnick, Gurland, DeCoursey, & Jacob, 2002; Grolnick & Ryan, 1989; Pomerantz & Ruble, 1998b). In the context of self-determination theory, autonomy support has been defined as an orientation toward allowing children to explore their own environment, deciding for themselves what is important. Autonomy support also entails the provision of resources that make independent work possible (Grolnick, 2003; Grolnick et al., 2002; Grolnick & Ryan, 1989; Pomerantz & Ruble, 1998a, 1998b). Parents may support children's autonomy in the context of their involvement with children by attending to children's work but allowing them to work on their own, often helping them to generate their own strategies for solving the challenges they encounter. Parents may also respond to children's performance in an autonomy-supportive manner by discussing learning strategies with children when they have failed, which may allow children to develop important skills they may use on their own in the future. Although parents may often use autonomy support in place of control (e.g., Grolnick & Ryan, 1989), they may sometimes use the two together (e.g., Pomerantz & Ruble, 1998b).

### Moderating Role of Children's Achievement

Parents' frequent use of control and infrequent use of autonomy support may be most likely to reduce motivation and, subsequently, performance among children who are particularly sensitive to issues of competence. Because low-achieving children receive more feedback that they lack competence in school than do high-achieving children, they perceive themselves as less competent than do high-achieving children (e.g., Frome & Eccles, 1998; Guay, Marsh, & Boivin, 2003; Pomerantz & Saxon, 2001). Low-achieving children may thus be more sensitive to issues of competence than are their high-achieving counterparts. As a consequence, parents' use of control may be particularly detrimental for low-achieving children. When parents use control with

low-achieving children, they may highlight such children's feelings of incompetence, thereby failing to provide them with an opportunity to fulfill their need to feel competent. Conversely, parents' use of autonomy support may be particularly beneficial for low-achieving children because it allows them to meet their need to feel competent. For children doing well in school, parents' use of control and autonomy support may not be as influential because these children's need to feel competent has already been fulfilled through other avenues.

In line with the idea that children's sensitivity to issues of competence moderates the effects on children of parents' use of control and autonomy support, parents' use of control appears to heighten vulnerability to depression to a greater extent among children who view their competence negatively than among those who view their competence positively (Pomerantz, 2001). Although no research has examined whether children's achievement per se moderates the effects of parents' use of control and autonomy support, research has indicated that it plays a role in the effects of teachers' perceptions of children's competence. Teachers' perceptions of children's competence predict subsequent performance more strongly among low-achieving children than among high-achieving children (Madon, Jusim, & Eccles, 1997).

### Overview of the Current Research

The central goal of the current research was to examine the idea that children's achievement moderates the effects of parents' use of control and autonomy support on children's subsequent engagement and achievement. It was anticipated that low-achieving children would be more susceptible than high-achieving children to the effects of parents' use of control and autonomy support. This idea was tested in two studies of mothers and their elementary school children. We focused on the elementary school years because this is a time when academics are particularly central to children's lives. Moreover, children's performance during this period may set the trajectory for their later achievement. Across the two studies, mothers' use of diverse types of control and autonomy support was investigated. Because mothers may use control and autonomy support independently of one another (e.g., Pomerantz & Ruble, 1998b), the two were examined separately. In both studies, longitudinal designs were employed to investigate the effects on children of mothers' use of control and autonomy support. This was an important endeavor because it provided a

window into the direction of effects. The effects of mothers' use of control and autonomy support on children were studied over various periods, affording the opportunity to explore the timing of the effects.

## STUDY 1

The idea that the effects of parents' use of control and autonomy support on children are dependent on children's achievement was investigated in Study 1 in a semistructured interaction between mothers and children in the laboratory. The focus was on mothers' use of control and autonomy support as manifested in their involvement with children in the context of a challenging task. Mothers' use of control and autonomy support along with children's engagement and performance were coded every 2 min for 14 min, allowing for the examination of the effects of mothers' use of control and autonomy support on children 2 min later. Although most research on parenting has focused on long-term effects (e.g., 6 months, 1 year, or 5 years), research manipulating parents' use of control and autonomy support has found that it also has immediate effects (Grolnick et al., 2002), suggesting that this is a meaningful period. The design of Study 1 also allowed us to ensure that mothers' use of control and autonomy support did not affect low- and high-achieving children differently simply because mothers use control and autonomy support differently with the two. For example, it was thought possible that mothers accompany their use of control with negative affect when they use it with low-achieving children but do not do so when they use it with high-achieving children. To this end, mothers' affective expression toward children was assessed in the semistructured interaction.

## Method

### *Participants*

Participants were 110 mother-child dyads (55 mother-daughter dyads, 55 mother-son dyads) from the central Illinois area. Children ranged in age from 7 to 10 years ( $M = 8.21$ ,  $SD = .97$ ); mothers ranged in age from 23 to 52 years ( $M = 37.93$ ,  $SD = 5.15$ ). Eighty-nine percent of mothers were married, with the remaining 11% single, divorced, or widowed. Mothers had from one to five children ( $M = 2.63$ ,  $SD = .85$ ). Mothers were generally well educated: Thirty-five percent had an advanced degree (e.g., master's, doctoral), 35% had completed college, and 30% had a high school diploma.

Seventy-five percent of mothers worked at least part-time outside of the home. The sample was racially homogeneous: Ninety-six percent were European American, with the remaining 4% African American or Hispanic.

### *Procedure*

Mothers and children took part in a 14-min semistructured interaction designed to mirror the homework situation in that mothers and children were told that children's skills would later be tested. Mothers and children were given a booklet containing a series of digit-search tasks, which were described as assessing children's cognitive abilities. For each task, a list of digit strings was presented next to a grid of digits. The goal was to find in the grid each string presented in the list. The digit-search tasks were challenging for children; none of the children completed the full set of tasks. It was emphasized to mothers that they could assist children as much or as little as they wanted. There were magazines and a couch in the room to give mothers the opportunity to withdraw from the interaction as they might do at home. The interaction was videotaped for later coding.

### *Measures*

The means and standard deviations for the measures are presented in Table 1. The correlations between the measures are presented in Table 2.

### *Maternal Behavior*

Two trained coders, blind to the hypotheses, rated the videotaped interactions for mothers' use of control and autonomy support as well as their expression of negative and positive affect. Control was operationalized as mothers' exertion of pressure in an intrusive manner to push children toward a particular outcome and attempts to regulate children's behavior. Control was expected to manifest itself in maternal behaviors such as taking the pencil from children, finding and circling numbers without children's assistance, and directives such as "take your hand off the page." The operationalization of mothers' autonomy support focused on mothers who allowed children to work on their own, indicating that children are in charge and capable. Maternal behavior such as sitting on hands while attending to children's progress and providing silent nods of approval without directly expressing an opinion were used as indicators of autonomy

Table 1  
Means and Standard Deviations for Study 1

| Measure             | Entire sample | Initially low achieving | Initially average achieving | Initially high achieving |
|---------------------|---------------|-------------------------|-----------------------------|--------------------------|
| Maternal variables  |               |                         |                             |                          |
| Control             | 1.66 (0.64)   | 1.78 (0.65)             | 1.61 (0.67)                 | 1.55 (0.53)              |
| Autonomy support    | 3.26 (0.72)   | 3.15 (0.68)             | 3.35 (0.79)                 | 3.29 (0.62)              |
| Negative affect     | 1.05 (0.15)   | 1.08 (0.16)             | 1.05 (0.17)                 | 1.01 (0.03)              |
| Positive affect     | 1.60 (0.36)   | 1.55 (0.33)             | 1.60 (0.40)                 | 1.70 (0.32)              |
| Child variables     |               |                         |                             |                          |
| Engagement          | 4.80 (0.31)   | 4.69 (0.43)             | 4.83 (0.20)                 | 4.87 (0.18)              |
| Initial achievement | 2.17 (1.58)   | .63 (0.49)              | 2.50 (0.51)                 | 4.62 (0.97)              |
| Achievement (total) | 6.35 (3.34)   | 3.65 (2.26)             | 7.35 (2.47)                 | 9.71 (2.57)              |
| N                   | 110           | 44                      | 45                          | 21                       |

Note. With the exception of the achievement variables, the possible range for the variables is 1 to 5, with higher numbers denoting heightened behavior. Initial achievement ranged from 0 to 7 and total achievement ranged from 0 to 17, with higher numbers indicating better performance. Numbers not in parentheses are means; numbers in parentheses are standard deviations. Means and standard deviations are for each variable over the entire 14-min interaction, with the exception of children's initial achievement, which is for the first 4 min only. The three initial achievement groups were determined by a tertile split on children's initial achievement.

support. For both control and autonomy support, contextual information was taken into account. For example, a mother who found and circled a digit string herself was considered less controlling if her child requested she provide assistance than if her child did not make such a request. Negative affect was operationalized as mothers' general use of hostility and criticism in their interactions with children. Negative affect included behaviors such as frowning at children, looking at children with dismay, and stating in an emotional tone, "You're doing it wrong." Positive affect was operationalized as general displays of warmth and approval by mothers toward children. Specific behaviors such as smiling, laughing, and stating in an emotional tone, "Wow! Way to go," were used as indicators of positive affect. The 14-min interaction was divided into seven

2-min observations. For each, the two coders rated mothers on the four behaviors ranging from 1 (*extremely low or never*) to 5 (*extremely high or very frequently*). Coders met on a weekly basis to discuss disagreements. To adjust for chance agreements, interrater reliability was calculated using gamma. The two coders showed substantial agreement ( $\gamma = .84$  for control,  $.76$  for autonomy support,  $.92$  for negative affect, and  $.90$  for positive affect). For each of the four behaviors, the ratings of both coders were averaged.

Child Behavior

Two additional trained coders, also blind to the hypotheses, focused on children's engagement and performance. Engagement in the task was oper-

Table 2  
Intercorrelations for Study 1

| Measure                | 1        | 2       | 3      | 4   | 5       | 6       |
|------------------------|----------|---------|--------|-----|---------|---------|
| Maternal variables     |          |         |        |     |         |         |
| 1. Control             | —        |         |        |     |         |         |
| 2. Autonomy support    | -.51**** |         |        |     |         |         |
| 3. Negative affect     | .46****  | -.30*** |        |     |         |         |
| 4. Positive affect     | -.17*    | -.17*   | -.13   |     |         |         |
| Child variables        |          |         |        |     |         |         |
| 5. Engagement          | -.32***  | .21**   | -.19** | .11 |         |         |
| 6. Initial achievement | -.12     | .07     | -.14   | .14 | .22**   |         |
| 7. Achievement (total) | -.27***  | .39**** | -.21** | .06 | .33**** | .73**** |

Note. Correlations are for each variable over the entire 14-min interaction, with the exception of children's initial achievement, which is for the first 4 min only.  
\* $p < .10$ . \*\* $p < .05$ . \*\*\* $p < .01$ . \*\*\*\* $p < .001$ .

ationalized as children's focus on and involvement with the task. Children demonstrated engagement through facial expressions indicating concentration or through verbal comments focused on strategy (e.g., "I need to find all zero fours") or self-encouragement (e.g., "It's hard, but I can do it"). During each of the seven 2-min observations, the two coders rated children on their engagement in the task ranging from 1 (*extremely low or never*) to 5 (*extremely high or very frequently*). Disagreements between the two coders were discussed weekly. The two showed substantial agreement ( $\gamma = .80$ ). The ratings of both coders for children's engagement were averaged. Children's achievement was based on the number of digit strings children found on their own during each of the 2-min observations. Their initial achievement was based on the first two observations (i.e., 4 min) of the interaction. We chose to focus on the first two observations rather than only the first because many mothers and children were still orienting themselves to the task during the first minute or two; thus, children's performance during this first observation may not have been a fully accurate reflection of their achievement level. The two coders overlapped on 17% of the interactions. To adjust for chance agreements, interrater reliability was calculated using Cohen's kappa ( $\kappa = .83$ ). Each coder rated half of the remaining 83% of the sample. The counts of one coder were used for half of the interactions and the counts of the other coder were used for the other half.

## Results

### *Preliminary Analyses*

Preliminary analyses were conducted to examine whether across the 14-min interaction mothers used control or autonomy support more often and whether this differed as a function of children's grade in school or their sex. To this end, a mixed-model multivariate analysis of variance (MANOVA) was conducted with type of behavior (control or autonomy support) as the within-participant factor and children's grade in school and their sex as between-participants factors. The effect of type of behavior was the only effect to emerge,  $F(1, 100) = 136.83$ ,  $p < .001$ . In line with prior research on similar samples (e.g., Nolen-Hoeksema, Wolfson, Mumme, & Guskin, 1995; Pomerantz & Ruble, 1998b), mothers used control significantly less often than autonomy support with children (see Table 1). As shown in Table 2, neither mothers' use of control nor their use of autonomy support was related to children's initial

achievement. When the relations between children's initial achievement and mothers' initial use of control and autonomy support were examined, an almost identical pattern was observed,  $r_s(108) = -.15$  and  $.11$ , *ns*. Thus, mothers did not use control or autonomy support more or less with initially low-achieving children than with initially high-achieving children. It is also of note that although initial achievement was significantly associated with engagement, this relation was not strong.

### *Predicting Engagement and Performance Over 14 Min: Hierarchical Linear Modeling*

To examine our central proposal that the effects on children of parents' use of control and autonomy support are moderated by children's initial achievement, we used hierarchical linear modeling (HLM). Bryk and Raudenbush's (1992) procedure was employed with HLM5 (Bryk, Raudenbush, & Congdon, 2000). Although this data-analytic strategy has been used successfully in several areas (e.g., Bolger, Zuckerman, & Kessler, 2000; Fuligni, Yip, & Tseng, 2002), it has rarely been used to examine socialization (for an exception, see Pomerantz & Eaton, 2001). However, because the parent-child interaction data in the current research are multilevel in nature (there are seven 2-min observations nested within dyads), HLM is a useful data-analytic strategy for investigating the hypotheses guiding the research.

In HLM, effects are examined at the within-dyad and between-dyad levels. At the within-dyad level, represented by the seven 2-min observations, a lagged design in which mothers' behavior (i.e., control or autonomy support) predicted children's behavior (i.e., engagement or achievement) 2 min later, adjusting for children's earlier behavior, was employed. For each dyad, there are individual regression parameters (i.e., intercepts and slopes) representing the unique relation between mothers' and children's behavior over time. Thus, HLM provides a test of whether the within-dyad relation between mothers' and children's behavior from one 2-min observation to the next, adjusting for children's behavior during the prior observation, is significant ( $g_{10}$ ). At the between-dyad level, represented by children's initial achievement, children's achievement during the first 4 min of the interaction was used to predict the within-dyad individual intercepts and slopes. Essentially, this provides a test of whether the slopes representing the relation between mothers' and children's behavior vary as a function of children's initial achievement ( $g_{11}$ ). In predicting children's engagement and achievement, separate analyses

were conducted for mothers' use of control and autonomy support, yielding a total of four analyses. All independent variables were mean centered (see Bryk et al., 2000). Interactions were decomposed following Aiken and West's (1991) guidelines.

### Maternal Control

The findings were consistent with the idea that the effect of parents' use of control on children's engagement depends on children's initial achievement. Although mothers' use of control predicted a marginal decrease in children's engagement over time,  $g_{10} = -.04$ ,  $t(109) = 1.78$ ,  $p = .07$ , this was moderated by children's initial achievement,  $g_{11} = .03$ ,  $t(108) = 2.06$ ,  $p < .05$ . As shown in Figure 1, mothers' use of control significantly predicted decreased engagement among low-achieving children (1 SD below the mean),  $g_{10} = -.09$ ,  $t(108) = 2.70$ ,  $p < .01$ , and marginally predicted it among average-achieving children (at the mean),  $g_{10} = -.04$ ,  $t(108) = 1.77$ ,  $p = .08$ , but it did not predict it among high-achieving children (1 SD above the mean),  $g_{10} = .01$ ,  $t(108) < 1$ .

We next examined the possibility that mothers' use of control could have a more negative effect on the engagement of low-achieving children than of high-achieving children because mothers administered control differently to the two. The moderating effect of children's initial achievement was not accounted for by mothers' affective expression at the within-dyad level,  $g_{11s} > .03$ ,  $ts(108) > 2.35$ ,  $ps < .05$ , or at the between-dyad level,  $g_{11s} > .03$ ,  $ts(107) > 1.85$ ,  $ps < .05$ . It is surprising that although there was a marginal effect of mothers' use of control on children's achievement over time,  $g_{10} = -.08$ ,  $t(109) = 1.78$ ,  $p = .07$ , this was not moderated by children's initial achievement,  $g_{11} = .04$ ,  $t(108) = 1.27$ ,  $ns$ .

### Maternal Autonomy Support

Although mothers' use of autonomy support did not predict children's engagement over time on its own,  $g_{10} = .02$ ,  $t(109) = 1.32$ ,  $ns$ , or in conjunction with children's initial achievement,  $g_{11} = -.01$ ,  $t(108) = 1.15$ ,  $ns$ , it did predict children's achievement over time,  $g_{10} = .11$ ,  $t(109) = 2.40$ ,  $p < .02$ . This effect was moderated, albeit marginally, by children's initial achievement,  $g_{11} = -.05$ ,  $t(108) = 1.78$ ,  $p = .08$ . Mothers' use of autonomy support significantly predicted increased achievement among low-achieving children,  $g_{10} = .20$ ,  $t(108) = 3.11$ ,  $p < .01$ , and average-achieving children,  $g_{10} = .11$ ,  $t(108) = 2.61$ ,  $p < .01$ , but not among high-achieving children,  $g_{10} = .03$ ,  $t(108) < 1$ . The moderating effect of

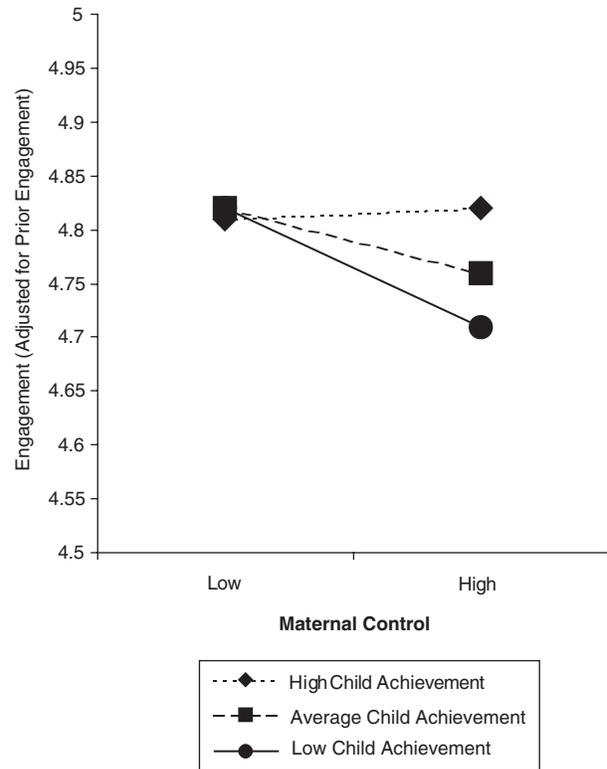


Figure 1. Children's engagement as a function of mothers' prior use of control and children's initial achievement (Study 1). Low control is 1 SD below mean control; high control is 1 SD above mean control. Low achievement is 1 SD below mean achievement; average achievement is mean achievement; high achievement is 1 SD above mean achievement. Slopes are estimated from the hierarchical linear modeling analyses.

children's initial achievement was not accounted for by mothers' affective expression at the within-dyad level,  $g_{11s} > .05$ ,  $ts(108) > 1.73$ ,  $ps < .09$ , or at the between-dyad level,  $g_{11s} > .05$ ,  $ts(107) > 1.85$ ,  $ps < .06$ .

### Stability of Child Achievement and Engagement

It was possible that the tendency for mothers' use of control and autonomy support to have stronger effects among initially low-achieving children than it did among initially high-achieving children could simply be because the engagement and achievement of initially low-achieving children were less stable over time than for initially high-achieving children. To address this issue, we conducted two sets of analyses. First, we used HLM to examine the extent to which children's engagement and achievement changed over the 14-min interaction as a function of children's initial achievement. Although children's initial achievement did not moderate the extent to

which their engagement changed,  $g_{11} = .00$ ,  $t(108) < 1$ , it did moderate the extent to which their achievement changed,  $g_{11} = -.07$ ,  $t(108) = 5.52$ ,  $p < .001$ . However, the achievement of initially low-achieving children,  $g_{10} = .04$ ,  $t(108) = 1.36$ , *ns*, was more stable than that of initially average- and high-achieving children,  $g_{10s} > .08$ ,  $ts(108) > 3.60$ ,  $ps < .01$ . Second, we examined the correlations from one 2-min segment to the next for the engagement and achievement of initially low-achieving (bottom third of the sample,  $n = 44$ ), average-achieving (middle third of the sample,  $n = 45$ ), and high-achieving (top third of the sample,  $n = 21$ ) children separately. There was no trend for the engagement and achievement of initially low-achieving children to be any less stable from segment to segment than those of their initially high-achieving counterparts. For initially low-, average- and high-achieving children, average  $rs(108) = .58$ ,  $.37$ , and  $.19$ , respectively, for engagement, and average  $rs(108) = .08$ ,  $-.08$ , and  $-.07$ , respectively, for achievement.

### Summary and Discussion

We proposed that the strength of the effects of parents' use of control and autonomy support on children would depend on children's initial achievement. In line with this idea, mothers' use of control as manifested in their involvement with children in the context of a challenging task predicted decreased engagement among initially low-achieving children during their 14-min interaction with their mothers; such a trend, however, was not evident for initially high-achieving children. Similarly, mothers' use of autonomy support predicted increased achievement among initially low-achieving children but not among initially high-achieving children. The moderating effect of children's initial achievement was not accounted for by differences in mothers' affective expression or in the stability of children's achievement or engagement.

It was surprising that although there was a marginal trend for mothers' use of control to predict decreased achievement among children, this trend was not moderated by children's initial achievement. This may have been because the task on which mothers and children worked was a novel one. Mothers' use of control around such a task may have detracted from the mastery of even high-achieving children because it inhibited them from developing the necessary skills to achieve on their own. It was also surprising that autonomy support did not predict engagement over time. This may have been because mothers mainly used autonomy support with chil-

dren initially engaged in the task, with such support simply maintaining their engagement. Regardless, it appears that mothers' use of control and autonomy support may not always affect children's achievement through engagement. Indeed, it is possible that other factors, such as the development of effective strategies, may be important.

Mothers' use of control and autonomy support did not differ as a function of children's age or sex. In terms of children's age, this was surprising in light of the possibility that parents may use heightened control when children are younger and less able to do the task. However, parents may be more likely to use structure with younger children to help them master the task (Parke & Bhavnagri, 1989), but such structure may become controlling only when parents are worried about children's performance (Pomerantz & Eaton, 2001). The lack of mothers' differential treatment of girls and boys was also surprising in light of research finding that mothers are more controlling and less autonomy supportive with girls than with boys (e.g., Pomerantz & Ruble, 1998b). However, such differential treatment of girls and boys has not always been found (e.g., Nolen-Hoeksema et al., 1995). This inconsistency may reflect the fact that parents' differential use of control and autonomy support depends on parents' endorsement of gender-stereotypical beliefs (Bumpus, Crouter, & McHale, 1999; Pomerantz, Ng, & Wang, in press).

### STUDY 2

The key purpose of Study 2 was to investigate whether the findings of Study 1 would generalize to parents' use of control and autonomy support as manifested in their responses to children's failure.<sup>1</sup> Parents' use of control and autonomy support may be of particular import when children have failed because such situations may trigger feelings of incompetence. We focused on two controlling responses to failure: punishment (e.g., withdrawal of privileges) and reprimands (e.g., "I am disappointed in you"). These responses place external pressure on children because they link children's performance to external incentives, thereby undermining their feelings of autonomy and competence. We also examined parents' use of an autonomy-supportive response to children's failure: discussing children's failure with them (e.g., talking with children about how to maximize their studying time). Such a response may aid children in generating learning strategies, which allows them to feel au-

tonomous and competent in confronting challenge in the future.

Study 2 also extended the findings of Study 1 by focusing on parents' daily interactions with children. Although the context of the semistructured interaction used in Study 1 was beneficial in that it allowed us to ensure that mothers were not administering control or autonomy support differently to low- and high-achieving children, it had several drawbacks. Most notable, it did not provide information about parents' use of control and autonomy support in their everyday interactions with children on tasks with which parents and children have a history of experience. Parents' use of control and autonomy support in such interactions has rarely been examined (for some exceptions, see Pomerantz & Eaton, 2001; Pomerantz & Ruble, 1998b). Study 2 also extended the findings of Study 1 by examining whether the immediate effects of mothers' use of control and autonomy support on low-achieving children continue over longer periods than that investigated in Study 1.

In Study 2, children were followed over 6 months in a two-wave longitudinal design. At both waves, children's achievement in school was assessed. During the first wave, mothers also completed a 2-week daily checklist in which they reported on children's performance as well as on their use of controlling and autonomy-supportive responses when children failed. We examined mothers' responses to children's failure in several areas (e.g., academics and peer relations) because it is likely that the effects of mothers' responses to children's failure in one area spill over to affect children in another area. Parents' and teachers' appraisals of children's competence in a particular area are often related to children's self-appraisals in that area as well as in other areas (Cole, Maxwell, & Martin, 1997). Cole et al. (1997) speculated that this is because children often receive competence-related feedback that crosses areas; for example, parents may respond to children's failure in the social area by telling children that if they would stop fighting in school and concentrate on their studies they would receive better grades.

Two approaches were taken to investigate how children's achievement moderates the effects of parents' controlling and autonomy-supportive responses to children's failure on children's subsequent achievement. In the first, we examined the effects of mothers' use of such responses on children's achievement 6 months later, focusing on the moderating role of children's initial achievement. In the second approach, we explored the effects on a

day-to-day basis. Specifically, we looked at whether mothers' responses to children's failure predict children's performance the following day and if these relations are moderated by children's achievement. Here, we examined children's performance across multiple areas because of the possibility that parents' responses may cross areas, thereby affecting children in multiple areas.

## Method

### *Participants*

Participants were 121 mothers and their children (52 mother–daughter dyads, 69 mother–son dyads) from two central Illinois towns. This is a subset of the sample described in Pomerantz and Eaton (2001). Only mother–child dyads with data for all of the variables examined in the present research were included. Children ranged in age from 9 to 12 years ( $M = 11.00$ ,  $SD = 0.84$ ). Mothers ranged in age from 27 to 51 years ( $M = 38.02$ ,  $SD = 4.54$ ). Most mothers were married (90%), with from one to seven children ( $M = 2.66$ ,  $SD = 1.00$ ). Only 12% of mothers had an advanced degree (e.g., master's, doctoral), 24% had completed college, and 64% had a high school diploma. Seventy-six percent of mothers worked at least part-time outside the home. The sample was entirely European American.

### *Procedure*

There were two waves of data collection 6 months apart. The first wave took place in the spring; the second took place in the fall. During the first wave, mothers completed a daily checklist for 5 to 14 days ( $M = 13.49$  days,  $SD = 1.60$ ) every night before they went to bed. Eighty-four percent of mothers ( $n = 101$ ) completed the checklist for the full 14 days, 13% ( $n = 16$ ) completed the checklist for 10 to 13 days, and the remaining 3% ( $n = 4$ ) completed the checklist for 5 to 8 days. Mothers were instructed to consider all of the interactions in which they and their participating child engaged within the last 24-hr period. If mothers were unable or forgot to complete the checklist before going to bed, they were instructed to do so as soon as possible. In both waves, children's grades were obtained from schools.

### *Measures*

The means and standard deviations for the measures are presented in Table 3. The correlations between the measures are presented in Table 4.

*Child Achievement*

*Grades.* Children's grades in language arts, math, science, and social studies were obtained in the first and second waves of data collection. Children's grades in language arts were based on their grades in English, reading, and spelling, except during Wave 2 for children initially in sixth grade who received only one grade for language arts during Wave 2. The grades were converted to numbers (0 = F to 12 = A+). Because each wave spanned two school quarters, the mean of the grades of the two quarters was taken as an index of children's achievement at that wave ( $\alpha = .92$  for Wave 1 and  $.94$  for Wave 2), with higher numbers indicating higher achievement.

*Daily performance.* In the context of the daily checklist, mothers reported on children's performance. Mothers indicated if children had done something good in the academic (e.g., did well on an assignment; 26% of all successes), social (e.g., resolved a conflict; 33% of all successes), or another (e.g., did their chores; 41% of all successes) area. Mothers also indicated if children had done something poorly in the academic (e.g., did poorly on an assignment; 16% of all failures), social (e.g., got into a fight; 45% of all failures), or another (e.g., did not do their chores; 39% of all failures) area. Each time a success occurred in an area (e.g. did well on an assignment) on a given day, a 1 was assigned; each time a failure occurred in an area (e.g., did poorly on an assignment) on a given day, a -1 was assigned; otherwise a 0 was assigned. The mean of success and failure in the three areas was then taken as an index

of performance on that day, with higher numbers indicating better performance. Reliability of children's daily performance was calculated using the mean of success and failure in each of the three areas for half of each of the 2 weeks (Monday to Wednesday and Thursday to Sunday) as items, yielding 12 items ( $\alpha = .80$ ).

*Maternal Controlling and Autonomy-Supportive Responses to Children's Failure*

Mothers' responses to children's failure were assessed with a modified version of the daily checklist developed by Pomerantz and Ruble (1998b). Each time mothers indicated that children had a failure, they indicated whether they engaged in one or more of the three responses given on the checklist. The controlling responses were *punishment* (e.g., withdrawing privileges from children; 8% in the academic area, 49% in the social area, and 43% in another area) and *reprimands* (e.g., telling children they were disappointed with them; 11% in the academic area, 38% in the social area, and 51% in another area). We did not combine these two controlling responses given that they were not associated, possibly because parents used one or the other (see Table 4). The autonomy-supportive response was *discussion* (e.g., discussing with children why they had trouble; 23% in the academic area, 46% in the social area, and 31% in another area). Each time mothers indicated that children had a failure, a 1 was assigned if they used a particular response (e.g., punishment) and a 0 if they did not. For each

Table 3  
Means and Standard Deviations for Study 2

| Measure                       | Entire sample | Initially low achieving | Initially average achieving | Initially high achieving |
|-------------------------------|---------------|-------------------------|-----------------------------|--------------------------|
| <b>Maternal variables</b>     |               |                         |                             |                          |
| Controlling responses         |               |                         |                             |                          |
| Punishment                    | 0.15 (0.23)   | 0.16 (0.20)             | 0.19 (0.27)                 | 0.10 (0.20)              |
| Reprimands                    | 0.38 (0.35)   | 0.35 (0.32)             | 0.35 (0.34)                 | 0.45 (0.38)              |
| Autonomy-supportive responses |               |                         |                             |                          |
| Discussion                    | 0.64 (0.33)   | 0.67 (0.30)             | 0.61 (0.35)                 | 0.64 (0.35)              |
| <b>Child variables</b>        |               |                         |                             |                          |
| Wave 1 achievement            | 8.89 (1.73)   | 7.00 (1.20)             | 9.08 (0.42)                 | 10.78 (0.40)             |
| Wave 2 achievement            | 9.08 (1.91)   | 7.31 (1.84)             | 9.36 (1.11)                 | 10.71 (0.55)             |
| Daily performance             | 0.26 (0.21)   | 0.22 (0.21)             | 0.25 (0.21)                 | 0.31 (0.21)              |
| N                             | 121           | 42                      | 41                          | 38                       |

*Note.* With the exception of the achievement variables, the possible range for the variables is 0 to 1, with higher numbers denoting heightened behavior. The achievement variables range from 0 (F) to 12 (A+). Numbers not in parentheses are means; numbers in parentheses are standard deviations. Means and standard deviations are for each variable over the entire daily checklist period, with the exception of children's achievement. The three initial achievement groups were determined by a tertile split on children's Wave 1 achievement.

Table 4  
Intercorrelations for Study 2

|                              | 1      | 2        | 3     | 4       | 5       | 6 |
|------------------------------|--------|----------|-------|---------|---------|---|
| Maternal variables           |        |          |       |         |         |   |
| Controlling responses        |        |          |       |         |         |   |
| 1. Punishment                | —      |          |       |         |         |   |
| 2. Reprimands                | -.11   | —        |       |         |         |   |
| Autonomy-supportive response |        |          |       |         |         |   |
| 3. Discussion                | -.12   | -.58**** | —     |         |         |   |
| Child variables              |        |          |       |         |         |   |
| 4. Wave 1 achievement        | -.10   | .10      | -.03  | —       |         |   |
| 5. Wave 2 achievement        | -.11   | -.01     | .12   | .81**** | —       |   |
| 6. Daily performance         | -.19** | -.01     | .22** | .25***  | .32**** | — |

Note. Correlations are for each variable over the entire daily checklist period, with the exception of children's achievement.  
\*\*\* $p < .01$ . \*\*\*\* $p < .001$ .

response, the sum was taken and divided by the number of failures, with higher numbers representing more frequent use of the response. As was the case for children's performance, reliability of mothers' responses was calculated using the mean for each of the three areas for half of each of the 2 weeks as items, yielding 12 items ( $\alpha$ s = .76 for punishment, .85 for reprimands, and .70 for discussion).

## Results

### Preliminary Analyses

To examine the types of responses to children's failure mothers used most often across the 2 weeks of the daily checklist, we conducted a mixed-model MANOVA with type of response as the within-participants factor. Children's grade in school and their sex were also included as between-participant factors to explore whether they affected mothers' responses. The MANOVA for mothers' responses to children's failure yielded only a significant effect for type of response,  $F(2, 115) = 87.76, p < .001$ . As in Study 1, mothers were most likely to use autonomy-supportive responses (see Table 3): When children failed, mothers discussed it with them more often than reprimanding or punishing them,  $t(121) > 4.50, ps < .001$ , but mothers reprimanded children often, using this response more often than punishment,  $t(121) = 5.90, p < .001$ .

There were few differences among low-achieving children and high-achieving children during Wave 1. As shown in Table 4, none of mothers' responses to children's failure was significantly related to children's achievement at Wave 1. Thus, low-achieving children did not experience a particular response to their failure more than did high-achieving children. It is also of note that children's achievement at Wave 1 was only modestly associated with their daily

performance at this time (see Tables 3 and 4), in part because daily performance was assessed in other areas in addition to the academic area.

### Predicting Performance Over 6 Months: Hierarchical Multiple Regression

To examine the moderating role of children's initial achievement in the effects of control and autonomy support over an extended period, the relation between mothers' responses to children's failure and children's achievement 6 months later was explored with hierarchical multiple regression (HMR). In a set of three regression analyses (one for each of mothers' responses to failure), children's grades at Wave 2 were predicted first from their grades at Wave 1 and mothers' response to their failure at this time (Step 1). This step was followed by the target interaction between children's grades at Wave 1 and mothers' response at this time (Step 2).<sup>2</sup> All independent variables were mean centered (see Aiken & West, 1991). Interactions were decomposed following Aiken and West's (1991) guidelines.

### Maternal Controlling Responses

It was anticipated that children's initial achievement would moderate mothers' use of controlling responses to children's failure on their achievement 6 months later. Indeed, mothers' use of punishment on its own was not a significant predictor of children's achievement 6 months later,  $\beta = -.03, t(119) < 1$ , but this response interacted, albeit marginally, with children's initial achievement,  $\beta = .12, t(118) = 1.82, p = .07$ . There was a marginal negative association between mothers' use of punishment and subsequent achievement among low-achieving (1 SD below the mean) children,  $\beta = -.23, t(118) = 1.87, p = .06$ , but

not among average-achieving (at the mean) children,  $\beta = -.10$ ,  $t(118) = 1.49$ , *ns*, or high-achieving (1 *SD* above the mean) children,  $\beta = .03$ ,  $t(118) < 1$ .

A similar, and stronger, pattern emerged for mothers' use of reprimands in response to children's failure. The marginal trend for mothers' use of reprimands to predict lower achievement among children 6 months later,  $\beta = -.10$ ,  $t(119) = 1.93$ ,  $p = .06$ , was significantly moderated by children's initial achievement,  $\beta = .14$ ,  $t(118) = 2.35$ ,  $p < .05$ . As shown in Figure 2, there was a significant negative association between mothers' use of reprimands and subsequent achievement among low-achieving children,  $\beta = -.34$ ,  $t(118) = 2.99$ ,  $p < .01$ , and average-achieving children,  $\beta = -.18$ ,  $t(118) = 2.94$ ,  $p < .01$ , but not among high-achieving children,  $\beta = -.02$ ,  $t(118) < 1$ , *ns*.

#### Maternal Autonomy-Supportive Responses

It was expected that mothers' autonomy-supportive responses to children's failure would enhance achievement 6 months later for children initially doing poorly in school more than for those initially doing well. There was a main effect of mothers' use of discussion,  $\beta = .16$ ,  $t(119) = 3.05$ ,  $p < .01$ , such that the more mothers discussed children's failure with them, the higher children's achievement was 6 months later. Yet, children's achievement at Wave 1 moderated this effect,  $\beta = -.22$ ,  $t(118) = 3.68$ ,  $p < .001$ . As shown in Figure 3, there was a significant association between mothers' discussion and children's subsequent achievement among low-achieving children,  $\beta = .54$ ,  $t(118) = 4.69$ ,  $p < .001$ , and average-achieving children,  $\beta = .28$ ,  $t(118) = 4.75$ ,  $p < .001$ , but not among high-achieving children,  $\beta = .03$ ,  $t(118) < 1$ , *ns*.

#### Summary

In line with the findings of Study 1, children's initial achievement moderated the effects of mothers' controlling and autonomy-supportive responses to their failure on their subsequent achievement. The HMR analyses consistently showed that mothers' responses to children's failure predicted achievement 6 months later to a greater extent among children not doing very well in school than among those doing very well in school. Specifically, mothers' controlling responses to children's failure were most likely to predict decrements in achievement 6 months later for children initially not doing very well in school; mothers' autonomy-supportive responses to children's failure also were most likely to predict enhanced achievement over time for children initially not doing very well in school.

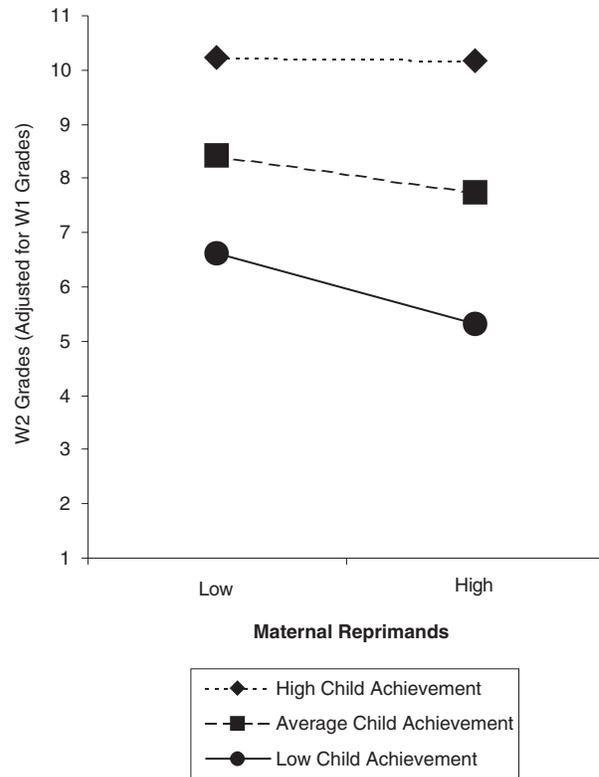


Figure 2. Children's achievement at Wave 2 (W2) as a function of mothers' use of reprimands and children's achievement at Wave 1 (W1; Study 2). Low reprimands is 1 *SD* below mean reprimands; high reprimands is 1 *SD* above mean reprimands. Low achievement is 1 *SD* below mean achievement; average achievement is mean achievement; high achievement is 1 *SD* above mean achievement. Slopes are estimated from the hierarchical multiple regression analyses.

#### Predicting Performance Over 2 Weeks: HLM

We next employed HLM to investigate the day-to-day processes involved in the effects of mothers' responses to children's failure. The goal of these analyses was to replicate on a day-to-day basis the patterns we found for mothers' responses to children's failure over 6 months. To this end, HLM analyses were conducted. At the within-dyad level, a 1-day lagged design was employed to examine the extent to which children's performance could be predicted from mothers' responses the previous day, adjusting for children's performance that day. At the between-dyad level, children's achievement at Wave 1 was used to predict the unique intercepts and slopes of each dyad from the first level. We conducted three separate analyses—one for each of the three responses.<sup>3</sup> All independent variables were mean centered (see Bryk et al., 2000); significant interactions were decomposed following Aiken and West's (1991) guidelines. Ten mother-child dyads

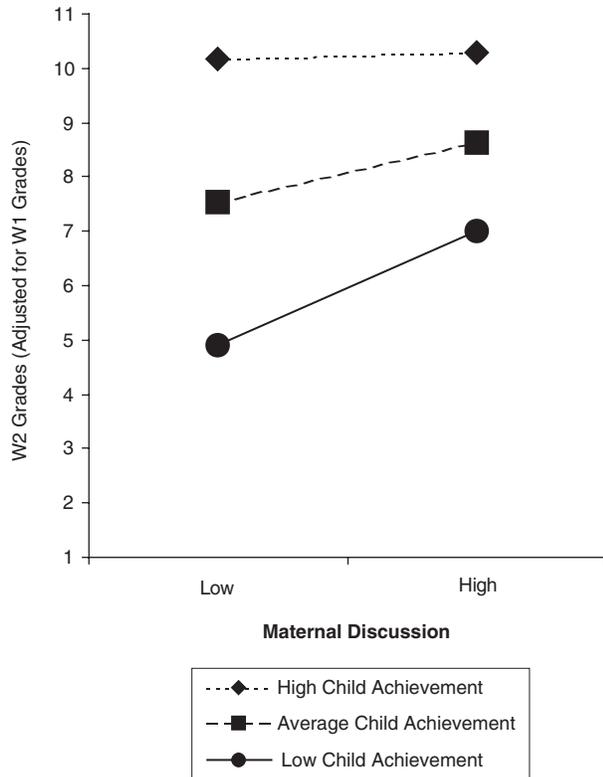


Figure 3. Children's achievement at Wave 2 (W2) as a function of mothers' use of discussion and children's achievement at Wave 1 (W1; Study 2). Low discussion is 1 *SD* below mean discussion; high discussion is 1 *SD* above mean discussion. Low achievement is 1 *SD* below mean achievement; average achievement is mean achievement; high achievement is 1 *SD* above mean achievement. Slopes are estimated from the hierarchical multiple regression analyses.

could not be included in the HLM analysis because of low frequencies or low variance in mothers' daily checklist.

#### Maternal Controlling Responses

The effects of mothers' controlling responses to children's failure on children's performance the next day were similar to those found for such responses on children's achievement 6 months later. The marginal association between mothers' use of punishment and children's performance the next day,  $g_{10} = -.04$ ,  $t(110) = 1.69$ ,  $p < .10$ , was moderated by children's achievement at Wave 1,  $g_{11} = .05$ ,  $t(109) = 2.98$ ,  $p < .01$ . As shown in Figure 4, mothers' use of punishment significantly predicted decreased performance the following day among low-achieving children,  $g_{10} = -.08$ ,  $t(109) = 4.45$ ,  $p < .001$ , and marginally did so among average-achieving children,  $g_{10} = -.04$ ,  $t(109) = 1.69$ ,  $p < .10$ . However, it was not related to high-achieving children's performance the following day,  $g_{10} = .01$ ,  $t(109) < 1$ .

Mothers' use of reprimands did not predict children's performance the following day on its own,  $g_{10} = .01$ ,  $t(110) < 1$ , but it did do so, albeit marginally, in conjunction with children's achievement at Wave 1,  $g_{11} = .03$ ,  $t(109) = 1.88$ ,  $p < .06$ . Decomposition of the interaction indicated that mothers' use of reprimands was not significantly associated with performance the following day among low-achieving children,  $g_{10} = -.02$ ,  $t(109) < 1$ , or average-achieving children,  $g_{10} = .01$ ,  $t(109) < 1$ , but was marginally associated with higher performance the next day among high-achieving children,  $g_{10} = .05$ ,  $t(109) = 1.75$ ,  $p = .08$ .

#### Maternal Autonomy-Supportive Responses

On its own, mothers' use of discussion marginally predicted enhanced performance among children the next day,  $g_{10} = .03$ ,  $t(110) = 1.76$ ,  $p = .08$ . However, consistent with the analyses predicting children's achievement over 6 months, this was moderated by children's initial achievement,  $g_{11} = -.03$ ,  $t(109) = 2.07$ ,  $p < .05$ . As shown in Figure 5, mothers' discussion significantly predicted increased performance the following day among low-achieving children,  $g_{10} = .06$ ,  $t(109) = 2.72$ ,  $p < .01$ , and marginally did so among average-achieving children,  $g_{10} = .03$ ,  $t(109) = 1.76$ ,  $p = .08$ , but did not do so among high-achieving children,  $g_{10} = -.01$ ,  $t(109) < 1$ .

#### Stability of Child Performance

As in Study 1, it was possible that the tendency for mothers' use of control and autonomy support to have stronger effects among initially low-achieving children than it did among initially high-achieving children could be because the performance of initially low-achieving children was less stable over time than that of initially high-achieving children. To address this issue, we conducted two sets of analyses identical to those conducted in Study 1. First, we used HLM to examine the extent to which children's performance changed over the 10 days as a function of children's initial achievement. There were, however, no differences in change due to children's initial achievement,  $g_{11S} = .00$ ,  $ts(108) < 1$ . Second, we examined the correlations from one day to the next for initially low-achieving (bottom third of the sample,  $n = 42$ ), average-achieving (middle third of the sample,  $n = 41$ ), and high-achieving (top third of the sample,  $n = 38$ ) children separately. There was little evidence that the performance of initially low-achieving children was any less stable from day to day than that of their initially high-achieving counterparts (average  $r$ s = .28, .32, and .26

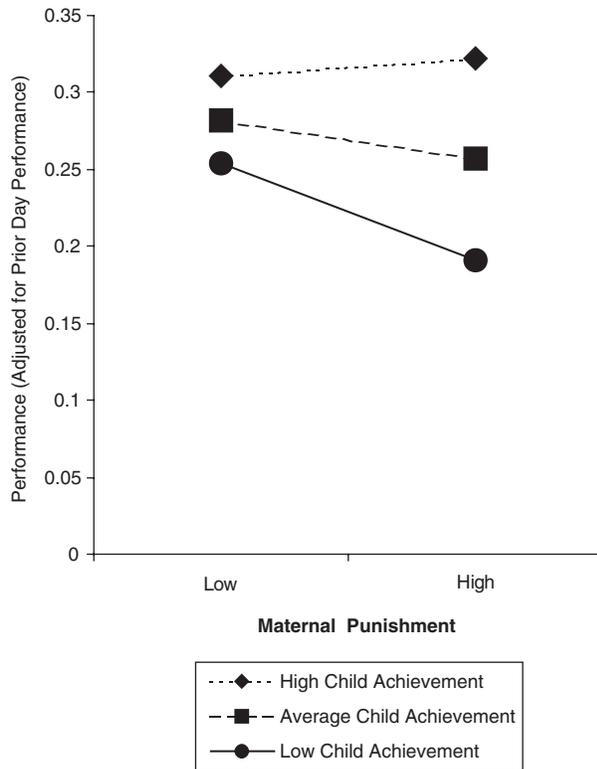


Figure 4. Children's daily performance as a function of mothers' use of punishment the prior day and children's achievement at Wave 1 (Study 2). Low punishment is 1 *SD* below mean punishment; high punishment is 1 *SD* above mean punishment. Low achievement is 1 *SD* below mean achievement; average achievement is mean achievement; high achievement is 1 *SD* above mean achievement. Slopes are estimated from the hierarchical linear modeling analyses.

for initially low-, average-, and high-achievers, respectively).

### Summary

By and large, the patterns found for the effects of mothers' responses to children's failure over 6 months were replicated on a day-to-day basis. Children's achievement at Wave 1 moderated the effects of mothers' responses to children's failure on children's performance across a variety of areas the next day. Consistent with expectations, mothers' responses generally predicted children's performance the next day mainly among children not doing well in school, with the controlling response of punishment, though not of reprimands, having negative effects and the autonomy-supportive response of discussion having positive effects. There was no support for the possibility that the moderating effect of children's achievement was due to differences in the stability of their performance over the 2 weeks.

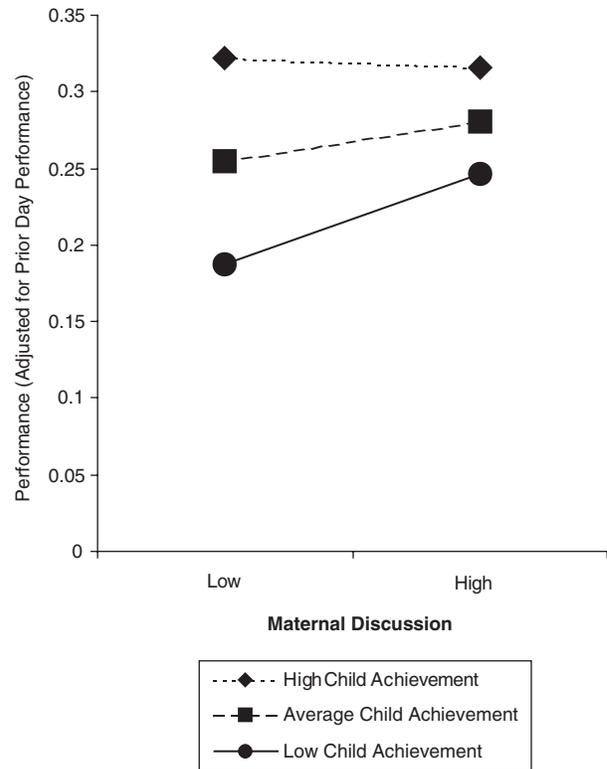


Figure 5. Children's daily performance as a function of mothers' use of discussion the prior day and children's achievement at Wave 1 (Study 2). Low discussion is 1 *SD* below mean discussion; high discussion is 1 *SD* above mean discussion. Low achievement is 1 *SD* below mean achievement; average achievement is mean achievement; high achievement is 1 *SD* above mean achievement. Slopes are estimated from the hierarchical linear modeling analyses.

### Summary and Discussion

The findings of Study 2 add to those of Study 1 in that they show that children's achievement moderates the effects of mothers' use of control and autonomy support not only in the immediate course of mothers and children's interactions, but also over days and months. Moreover, Study 2 indicates that the moderating role of children's achievement is not limited to a semistructured situation created in the laboratory but generalizes to mothers' and children's daily interactions, with implications for children's actual grades. Study 2 is also an important addition to Study 1 because the two studies taken together demonstrate that the effects of mothers' use of control and autonomy support on low-achieving children is evident for a variety of forms of control and autonomy support, that is, as manifested in mothers' involvement with children in the context of challenging tasks (Study 1) and in mothers' responses to children's failure in a variety of areas (Study 2). As in

Study 1, mothers did not use controlling and autonomy-supportive responses differently with children as a function of their age or sex.

### GENERAL DISCUSSION

In the current research, we drew from Parent  $\times$  Child models of socialization in which the effects of parents' practices on children depend on children's attributes (e.g., Collins et al., 2000; Grusec, 2002; Kochanska, 1993). We were also guided by self-determination theory in which parents' use of control and autonomy support is posited to influence children by shaping their feelings of autonomy and competence (Deci & Ryan, 1987; Grolnick & Ryan, 1989). The key proposal guiding our research was that the effects of parents' use of control and autonomy support are moderated by children's sensitivity to issues of competence. Because low-achieving children often feel less competent than do high-achieving children (e.g., Frome & Eccles, 1998; Guay et al., 2003; Pomerantz & Saxon, 2001), they may be more sensitive to competence issues. As a consequence, they may be more susceptible to the negative effects of control and the positive effects of autonomy support. In line with this idea, in two studies, mothers' use of control generally had more negative effects among low-achieving children than among high-achieving children. Conversely, mothers' use of autonomy support generally had the most positive effects for low-achieving children. These trends were evident for mothers' use of control and autonomy support as manifested in their involvement with children in the context of a challenging task (Study 1) and in their responses to children's failure (Study 2). The moderating effect of children's achievement was evident over multiple periods: 14 min, 2 weeks, and 6 months.

Although the moderating role of children's achievement on the effects of mothers' use of control and autonomy support appears to be robust, several issues need to be given further attention. For one, it is possible that mothers somehow administer control and autonomy support differently to low- and high-achieving children. In Study 1, we took a step toward ruling out this possibility by adjusting for mothers' affective expression. This did not account for the effects of mothers' use of control or autonomy support. However, it is possible that there are other aspects of mothers' interactions with children that could be influential. For example, it is plausible that the content of mothers' controlling and autonomy-supportive responses to children's failure may differ for low and high achievers. Unfortunately, we were

not able to assess this in the daily checklist employed in Study 2. Not knowing the content of mothers' responses to children's failures is particularly problematic in terms of mothers' use of discussion in response to children's failure because it is unclear exactly what mothers discussed and how they discussed it. For example, if mothers were simply talking at children, their discussion may have been controlling. Indeed, in research examining the use of control and autonomy support in teacher-student contexts, talking to students has been identified as reflective of control (Deci, Spiegel, Ryan, Koestner, & Kauffman, 1982), whereas listening to them has been identified as reflective of autonomy support (Reeve, Bolt, & Cai, 1999).

It may appear at first that the reason mothers' use of control and autonomy support rarely predicted engagement or performance for high achievers is that these children were already doing so well; that is, there may have been a ceiling effect. Although this issue needs to be pursued further, a ceiling effect is an unlikely account of the current findings. Mothers' controlling responses predicted a decrease in engagement and performance for low-achieving children but not for high-achieving children who generally had nowhere to go but down. It is possible that the positive effects of mothers' autonomy-supportive responses could be limited because of high-achieving children's stellar performance. However, the moderating effect of children's initial achievement on mothers' autonomy-supportive response to failure was found even for children's daily performance, which was only modestly associated with their achievement as it crossed a variety of areas.

We proposed that parents' use of control and autonomy support influences low-achieving children more than their high-achieving counterparts because low-achieving children are more sensitive to issues of competence. These children may have an unfulfilled need to feel competent; parents' use of control further aggravates this need, whereas their use of autonomy support allows children to fulfill it. This is in line with the finding that parents' use of control is more likely to heighten depression over time among children viewing their competence negatively than among children viewing their competence positively (Pomerantz, 2001). However, it is possible that there may be other mechanisms underlying the moderating role of children's achievement. Most notable, children doing poorly in school may not only feel incompetent but may also be extrinsically motivated (see Ryan & Deci, 2000, for a review). As a consequence of such a motivational

orientation, they may be particularly sensitive to external input, such as that provided by parents' use of control and autonomy support (see Black & Deci, 2000; Guay, Boggiano, & Vallerand, 2001). Consistent with this idea, among college students, the positive effects on performance of perceiving instructors as autonomy supportive are stronger for students pursuing their studies for controlled reasons than for students pursuing their studies for autonomous reasons (Black & Deci, 2000). Similarly, elementary school children's perceptions of their teachers as autonomy supportive are more likely to predict enhanced feelings of competence 1 year later among extrinsically motivated children than among intrinsically motivated children (Guay et al., 2001).

A key direction for future research will be to examine the moderating role of children's achievement on the effects of parents' use of control and autonomy support on dimensions of functioning other than those examined in the current research. Although mothers' use of control and autonomy support did not have a strong effect on high-achieving children's subsequent engagement and performance, it is plausible that it has consequences for high-achieving children on more psychological dimensions of functioning, such as the extent to which they are intrinsically versus extrinsically motivated. There is evidence suggesting that mothers' use of control and autonomy support may influence these children's perceptions of competence. Black and Deci (2000) found that although college students' perceptions of their instructors as autonomy supportive do not predict the grades of students with an autonomous orientation, such perceptions do predict their perceptions of competence. However, research with elementary school children shows that perceptions of teachers as autonomy supportive do not exert much of an effect on children's perceptions of competence among intrinsically motivated children (Guay et al., 2001). The question of whether parents' use of control and autonomy support influences the extent to which high-achieving children are intrinsically versus extrinsically motivated still needs to be examined.

We drew from self-determination theory (Deci & Ryan, 1987; Grolnick & Ryan, 1989) in our conceptualization of control and autonomy support and their effects. A key postulate of this theory is that parents' use of control and autonomy support shapes children's development by influencing their feelings of autonomy and competence. The current research is consistent with this notion in that it reveals that children who may feel incompetent are particularly sensitive to parents' use of control and

autonomy support. Moreover, these findings are in line with self-determination theory in suggesting that children's functioning depends on their fulfillment of competence needs, whether it be by parents or other sources, such as feedback about their performance. However, the current research also points to the possibility that self-determination theory needs to incorporate the idea that not all children come to their interactions with their parents with the same needs. As a consequence, parents' use of control and autonomy support may not play a pivotal role in all children's development.

Two key limitations of the current research warrant interpreting the findings with caution. First, although the daily checklist method used in Study 2 is useful in that it provides a window into mothers' and children's daily interactions, it relies on mothers' own reports. Hence, the daily checklist has many of the problems, such as memory biases and self-presentational biases, of other self-report methods, albeit to a lesser extent (Bolger, Davis, & Rafaeli, 2003). Moreover, as noted earlier, the daily checklist, unlike the semistructured observation used in Study 1, does not provide detailed information about the nature of mothers' practices. Second, the mothers and children participating in the research were almost all European American living in generally middle-class communities in the central United States. Although there are similarities in the socialization of children from diverse backgrounds and communities, there are also differences (Chao & Tseng, 2002; Harwood, Leyendecker, Carlson, Asencio, & Miller, 2002). Consequently, the generalizability of these findings to groups other than the middle-class European Americans studied here needs to be explored.

The focus of the current research was on how the effects of parents' use of control and autonomy support are moderated by children's initial achievement over the short (i.e., 14 min and 2 weeks) and long (i.e., 6 months) term. Across a variety of types of control and autonomy support, mothers' use of control and autonomy support had stronger effects on the subsequent engagement and performance of low-achieving children than of high-achieving children: Mothers' use of control was more detrimental and their use of autonomy support was more beneficial for low- than high-achieving children. These findings converge with a growing body of theory and research supporting Parent  $\times$  Child models of socialization in which the effects of parents' practices on children depend on children's attributes (e.g., Collins et al., 2000; Grusec, 2002; Kochanska, 1993), highlighting the importance of taking children's at-

tributes into account when considering the effects of parents' use of control and autonomy support on children. It appears that parents' use of control and autonomy support is most important to the subsequent development of low-achieving children, at least in terms of their subsequent engagement and achievement.

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## ENDNOTES

1. Mothers' responses to children's success were also assessed. However, the extent to which these responses were controlling and autonomy supportive was unclear. For example, much research has indicated that rewards are experienced as more controlling when they are expected than when they are not (Deci, Koestner, & Ryan, 1999). In the current research, although mothers indicated how frequently they use rewards in response to children's success, information as to whether children expected the rewards was not collected.

2. In addition to conducting these analyses, which collapsed across mothers' responses in the three areas (i.e., academic, social, and another), we also conducted analyses examining the effects of mothers' responses in each of the areas separately. Because of the reduced number of responses in these analyses, power was reduced. Thus, the Child Achievement  $\times$  Maternal Response interactions did not reach significance in all areas. However, the patterns were similar.

3. In addition to conducting these analyses, which collapsed across the three areas, we also conducted analyses for each area separately. Children's performance in one area was predicted from each of mothers' responses in that area. Because of the reduced number of events in these analyses, power was reduced. Thus, the Child Achievement  $\times$  Maternal Response interactions did not reach significance in all areas. However, the patterns were similar.

# Mothers' Affect in the Homework Context: The Importance of Staying Positive

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This research investigated mothers' affect in the context of children's homework. Mothers ( $N = 109$ ) of children 8 to 12 years old were interviewed daily about their affect while interacting with children, their assistance with children's homework, and children's behavior while completing homework. At this time and 6 months later, children's motivational and emotional functioning was assessed. Although mothers' negative affect was lower than their positive affect, it was elevated on days their assistance with homework was high. This was accounted for by mothers' perceptions of children as helpless on days they provided heightened assistance. Mothers' positive affect in the homework context buffered children's motivational and emotional functioning against mothers' negative affect as well as children's helplessness.

An important goal among many educational organizations is to help parents to become involved in children's school lives. This is a laudable goal, given that there is much evidence that when parents bridge the gap between home and school, children experience benefits in their psychological functioning as well as achievement (e.g., Grolnick, Kurowski, Dunlap, & Hevey, 2000; Gutman & Eccles, 1999; Steinberg, Lamborn, Dornbusch, & Darling, 1992). For example, parents' participation in school events, such as parent–teacher conferences and school open houses, foreshadows children's academic attainment (Izzo, Weissberg, Kaspro, & Fendrich, 1999). Although the merit of this form of parents' involvement, as well as of others, has been well documented, it is unclear whether parents' involvement in children's homework is beneficial for children (see Cooper, 1989). Some research suggests that such involvement enhances children's performance in school (e.g., Keith et al., 1993; Pomerantz & Eaton, 2001), but other research does not (e.g., Chen & Stevenson, 1989; Levin et al., 1997). This inconsistency has led to a consensus that the nature of parents' involvement in children's homework is important (see Cooper, Lindsay, & Nye, 2000; Epstein, 1983).

Unlike other forms of parents' involvement in children's school life, parents' involvement in children's homework may give rise to

negative affect on the part of both parents and children as they become frustrated over a variety of issues (see Levin et al., 1997; Xu & Corno, 1998). This possibility raises concern over whether it is wise to encourage parents to take part in children's homework (see Levin et al., 1997). Unfortunately, with the exception of case studies (e.g., Xu & Corno, 1998), there has been little examination of the affective nature of parents' involvement in children's homework. Thus, a central goal of the current research was to examine parents' affect while interacting with children in the homework context. Also of importance was elucidating the implications of such affect for children's motivational and emotional functioning.

## Parents' Negative Affect in the Homework Context

As Dix (1991) has emphasized, parenting is an inherently affective endeavor (see also Larson & Gillman, 1999). Parents' involvement in children's homework may be particularly affectively charged due in part to the reasons that parents become involved. Although there are multiple reasons parents assist with children's homework (see Eccles & Harold, 1996; Epstein & Van Voorhis, 2001; Hoover-Dempsey et al., 2001), parents may often do so because children are having difficulty (e.g., Chen & Stevenson, 1989; Cooper et al., 2000; Levin et al., 1997). Indeed, Pomerantz and Eaton (2001) showed that mothers were particularly likely to assist with homework when children did poorly in school the prior year. A key reason appeared to be children's uncertainty regarding how to do schoolwork. Such uncertainty may manifest itself in helplessness (e.g., frustration and giving up) in completing homework, which may foster irritation and annoyance in parents as they feel that children are not working constructively. Even high-achieving children may elicit such negative affect in parents, as parents may assist these children when they are showing signs of helplessness in completing homework. Indeed, regardless of their academic attainment, children can experience heightened negative affect while doing homework (Leone & Richards, 1989).

Parents' negative affect while assisting children with homework may be detrimental for two dimensions of children's functioning.

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First, it may undermine children's motivation (see Estrada, Arsenio, Hess, & Holloway, 1987; Hokoda & Fincham, 1995; Nolen-Hoeksema, Wolfson, Mumme, & Guskin, 1995). When parents become irritated and frustrated while providing assistance, they may convey to children that schoolwork and the challenges that accompany schoolwork are distressing. Children may come to view learning as a threatening process to be avoided (Nolen-Hoeksema et al., 1995). Consequently, parents' negative affect may undercut children's desire to master their schoolwork and their intrinsic interest in it. Second, in line with the idea that the academic arena may serve as an important context for the development of children's emotional functioning (Roeser, Eccles, & Sameroff, 1998; Roeser & Eccles, 2000; Rudolph, *in press*), parents' negative affect while interacting with children in the homework context may impair such functioning among children. Parents may directly transmit their negative affect to children. For example, Larson and Gillman (1999) found that mothers' anger and anxiety were predictive of such affect among children 2 hr later. When parents express negative affect, they may also convey that children are unworthy. Consistent with the proposal that parents' negative affect while providing assistance undermines children's motivational and emotional functioning, parenting characterized by negative affect is associated with impairments in such functioning among children (e.g., Denham et al., 2000; Hokoda & Fincham, 1995; Nolen-Hoeksema et al., 1995).

#### Parents' Positive Affect in the Homework Context

Despite the increase in parents' negative affect while assisting children with homework, there may not necessarily be a corresponding decrease in their positive affect. There is now consensus that negative and positive affect represent distinct, albeit related, experiences (e.g., Diener, Smith, & Fujita, 1995; Warr, Barter, & Brownbridge, 1983), with such a distinction evident in parents' affect while interacting with children (e.g., Denham et al., 2000; Kenney-Benson & Pomerantz, 2005). In the homework context, parents may become irritated and annoyed with children but also attempt to keep their interactions fun and loving. One of the reasons that parents may assist children with homework is to establish a sense of connectedness with them. Notwithstanding parents' negative affect, parents' involvement in children's homework may afford a structured context in which to spend time with children, gain knowledge about a significant area of their children's lives, and work together with children to overcome obstacles. Mothers who frequently assist children with homework report that it is a gratifying process that strengthens the bond between them and their children (Levin et al., 1997). Thus, parents' feelings of fun and love toward children may not be dampened in the context of their assistance.

When this is the case, parents' negative affect while assisting children with homework may not have undermining effects on children. In terms of children's motivational functioning, parents' positive affect may convey to children that although schoolwork can be frustrating, it is a positive endeavor that is not threatening. Such affect may also signal parents' support of children during times of difficulty, enabling children to confront challenges constructively (see Estrada et al., 1987; Nolen-Hoeksema et al., 1995). Thus, when parents maintain their positive affect while assisting,

their negative affect may not undercut children's desire to master schoolwork and children's intrinsic interest in it. In terms of children's emotional functioning, parents' positive affect while providing assistance may directly foster positive affect in children, countering the negative affect of children and parents in the homework context. Consistent with the notion of parents' positive affect as serving a buffering function, mothers' positive affect as it manifests itself in warmth and support toward children is associated with positive motivational and psychological functioning among children (e.g., Eisenberg et al., 2003; Hokoda & Fincham, 1995; Sheeber, Hops, Alpert, Davis, & Andrews, 1997), albeit with some exceptions (e.g., Galambos, Barker, & Almeida, 2003; Nolen-Hoeksema et al., 1995).

Parents' positive affect may also ameliorate the detrimental effects of children's helplessness on their subsequent functioning. When confronted with challenges, such as those of homework, chronically helpless children feel threatened, which leads them to respond negatively by viewing themselves as lacking competence, displaying negative affect, and giving up (Dweck & Leggett, 1988). As a consequence, they may be particularly likely to benefit from parents' positive affect in the homework context, because it conveys to children that although schoolwork can be frustrating, it is a nonthreatening endeavor in which parents support them. Moreover, it may directly foster positive affect in helpless children that counters their heightened negative affect in response to the challenges associated with homework. Although parents' positive affect while assisting with homework may benefit highly helpless children, it may be even more likely to do so when parents refrain from assisting. By maintaining positive affect when children are doing homework on their own, parents may be positively supporting their children's autonomy. This may be particularly valuable to helpless children, as it communicates to them that they are capable of solving challenges on their own. Suggestive of this possibility, mothers' provision of autonomy support appears to enhance the subsequent achievement of children having difficulty in school more than of children not having such difficulty (Ng, Kenney-Benson, & Pomerantz, 2004).

#### A Daily Interview Approach

To capture the affective nature of parents' interactions with children in the homework context, we adopted a daily interview approach. Such an approach has been used successfully in studying parents' involvement in children's school lives (e.g., Pomerantz & Eaton, 2001; Pomerantz & Ruble, 1998) and parents' affective experiences (e.g., Larson & Gillman, 1999; Larson, Richards, & Perry-Jenkins, 1994). The daily interview approach is well suited to the current research. First, it allows insight into whether parents' affect on days they assist children with homework has an influence on children unique from parents' affect in other contexts. Of most significance, it provided the opportunity to examine the unique effects of parents' affect in the homework context by comparing parents' affect on days parents assist, on days children have homework but parents do not assist, and on days children do not have homework. Second, although the daily interview approach uses self-report methods and thus is characterized by some of the same problems as traditional retrospective questionnaires, it does provide more reliable and valid assessments (Bolger, Davis, &

Rafaelli, 2003). This is important because parents who frequently assist children may be motivated to see their assistance in a positive light, thereby underreporting negative affect and overreporting positive affect. Third, the daily interview approach allows for assessment of parents' affect and assistance in the face of everyday concerns (e.g., getting dinner on the table and assisting siblings) that compete with parents' desire to support children in the homework context.

### Overview of the Current Research

We addressed two related questions with a daily interview in which mothers were interviewed every weekday over the course of 2 weeks. First, what is the affective nature of mothers' interactions with children in the homework context? Given the possibility that mothers' negative and positive affect may not be symmetrically related to their provision of assistance, we examined separately mothers' negative (i.e., irritation and annoyance) and positive (i.e., fun and love-caring) affect while interacting with children. We asked mothers about their affect in the general context of their interactions with children rather than in the specific context of their involvement in homework so as not to attune mothers to our hypotheses. We expected that mothers would experience elevated negative affect on days they assisted with homework but that their positive affect would not be dampened. Guided by prior research indicating that mothers provide assistance when children are having difficulty, we also investigated whether mothers' perceptions of children as helpless in completing homework underlie their negative affect while assisting. In addition, parents' assistance with homework may vary as a function of characteristics such as children's gender, parents' education, and household income (see Cooper et al., 2000; Eccles & Harold, 1996; Grolnick, Benjet, Kurowski, & Apostoleris, 1997). Thus, we explored whether mothers' affect in the homework context is moderated by such characteristics.

Second, what are the implications of mothers' affect in the homework context for children's motivational and emotional functioning? To address this question, we embedded the daily interview in a two-wave, 6-month study. At both waves, children completed questionnaires on their motivational and emotional functioning. It was anticipated that when mothers maintained their positive affect while providing assistance, they would offset the undermining effects of their negative affect on children's motivational and emotional functioning over time. Mothers' positive affect was expected to have a similar buffering effect against children's helplessness, but it was also expected to be even more likely to do so when mothers refrained from assisting because they may be positively supporting their children's autonomy. We examined the unique effects of mothers' affect on days mothers assisted with children's homework, days children had homework but mothers did not assist, and days children did not have homework.

## Method

### Participants

Participants were 109 children and their mothers (63 mother-daughter dyads; 46 mother-son dyads) taking part in the University of Illinois School Engagement Project.<sup>1</sup> Children ranged in age from 8 to 12 years

( $M = 10.22$ ,  $SD = 1.70$ ); mothers ranged in age from 24 to 53 years ( $M = 38.72$ ,  $SD = 5.98$ ). Twenty-eight percent of mothers had an advanced degree (e.g., MA or PhD), 29% had completed college, 42% had a high school diploma, and 1% had not completed high school. Most mothers (83%) worked outside the home at least part time. According to mothers, household incomes ranged from \$20,000 or below to \$160,000 or above, with a modal income range from \$40,000 to \$60,000. Children had from zero to six siblings ( $M = 1.71$ ,  $SD = 1.16$ ). Children were primarily European American (83%), with 5% African American, 2% Asian or Pacific Islanders, 1% Hispanic, and 9% mixed ethnicity or race.

### Procedure

Children and mothers took part in two waves of data collection 6 months apart. There was an attrition rate of 9%, with children not participating at the second wave having poorer emotional functioning,  $t(107) > 5.05$ ,  $p < .01$ , and marginally lower relative autonomy,  $t(107) = 1.69$ ,  $p = .09$ . During both waves, children and mothers completed a set of questionnaires. A trained researcher read each question to children, with children responding on their own. At the first wave, children and mothers subsequently took part in a daily interview over the course of 2 weeks. A trained researcher interviewed children and mothers separately on the phone at the end of each weekday after children had finished homework ( $M_s = 8.65$  and  $9.41$  days,  $SD_s = 0.73$  and  $1.00$  for children and mothers, respectively). If an interview was missed, every effort was made to have an additional interview. Children and mothers were given a total of \$70 as a token of appreciation for their participation. The University of Illinois at Urbana-Champaign Institutional Review Board approved the procedures.

### Measures

#### Daily Interview Measures

Information about children's and mothers' daily interactions was gathered from mothers at Wave 1 in the daily interview. Because the burden of repeated queries and responses places substantial demands on children and mothers, the daily interview was designed to be as short as possible (see Bolger et al., 2003). Although this was essential to keeping attrition low, it limited the number of items comprising each measure. For the measures obtained from the daily interviews, two major types of indexes were used. First, indexes taking the mean across days (e.g., for which mothers completed the daily interview or children had homework) were used in dyad-level analyses (e.g., see Table 1), including those examining validity and reliability (e.g., factor analyses and correlations between scale items) in which the mean of each item across days was used. Second, indexes for each day were used in daily-level analyses (e.g., see Table 2).

**Homework occurrence.** During each daily interview, mothers indicated whether children had any homework. On average, children had homework on 5.90 days ( $SD = 1.75$ ) over the course of the interviews, yielding a total of 677 instances of homework across dyads.

**Maternal homework assistance.** Mothers' assistance with homework was reflected in mothers' engagement in either of two practices: helping

<sup>1</sup> This is a subset of the children and their mothers participating in the project. To ensure that interactions around homework, rather than simply novel events, were being assessed, mothers had to report at least three instances of homework over the course of the daily interviews—that is, homework had to occur at least 30% of the time. This excluded 20 children and mothers completing the daily interview for at least 5 days. These children and mothers did not differ on any of the variables at Wave 1, with the exception that children had higher negative emotional functioning,  $t(127) = 2.18$ ,  $p < .05$ .

Table 1  
Associations Among Variables at Wave 1: Dyad-Level Analyses

| Variable   | 1     | 2     | 3     | 4     | 5     | 6    | 7     | 8     | 9      | 10     | 11 |
|--|-------|-------|-------|-------|-------|------|-------|-------|--------|--------|----|
| 1. Homework occurrence <sup>a</sup>                  | —     |       |       |       |       |      |       |       |        |        |    |
| 2. Maternal homework assistance <sup>b</sup>         | .00   | —     |       |       |       |      |       |       |        |        |    |
| 3. Maternal interaction negative affect <sup>a</sup> | -.03  | .14   | —     |       |       |      |       |       |        |        |    |
| 4. Maternal interaction positive affect <sup>a</sup> | -.19* | .19†  | -.03  | —     |       |      |       |       |        |        |    |
| 5. Child homework helplessness <sup>b,c</sup>        | -.03  | .35** | .46** | .08   | —     |      |       |       |        |        |    |
| 6. Child homework persistence <sup>b,c</sup>         | -.07  | .12   | -.20* | .26** | -.17  | —    |       |       |        |        |    |
| 7. Child academic helplessness                       | .14   | .29** | .28** | .08   | .72** | -.02 | —     |       |        |        |    |
| 8. Child mastery orientation                         | -.23* | -.24* | -.24* | .06   | -.20* | .08  | -.21* | —     |        |        |    |
| 9. Child relative autonomy                           | -.18† | -.21* | -.14  | -.06  | -.20* | .08  | -.22* | .62** | —      |        |    |
| 10. Child negative emotional functioning             | .08   | .17†  | .05   | .03   | .17   | .13  | .41** | -.12  | -.28** | —      |    |
| 11. Child positive emotional functioning             | -.15  | -.07  | -.15  | .25** | -.10  | .13  | -.17† | .31** | .45**  | -.51** | —  |

<sup>a</sup> The mean across days for which mothers completed the daily checklist (and provided information) was used. <sup>b</sup> The mean across days for which children had homework (and mothers provided information) was used. <sup>c</sup> Mothers' perceptions of children's behavior.

†  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .

children with homework and checking children's homework over for mistakes. For each day mothers reported children as having homework, mothers indicated their engagement in these practices. The two (across days children had homework) were associated with one another,  $r(107) = .42, p < .01$ . Thus, the mean of the two was used ( $M = 0.35, SD = 0.24$ ). Mothers' assistance from the first to second week of the daily interview was moderately stable,  $r(107) = .40, p < .01$ .

**Maternal interaction affect.** Mothers indicated their negative affect while interacting with children each day by rating how annoyed and irritated they were while with their children (1 = *not at all*; 5 = *very much*). Mothers indicated their positive affect by rating how much fun and love and affection they experienced while with their children. To ensure that mothers' negative and positive affect were distinct, we conducted a principal-components analysis (PCA) of the four items. Two factors with eigenvalues over 1 were yielded; the two negative affect items loaded on one factor, and the two positive affect items loaded on the other. The mean of the two negative affect items, which were associated,  $r(107) = .75, p < .01$ , was used as an indicator of mothers' negative affect ( $M = 1.62, SD = 0.41$ ) and was moderately stable from the first to the second week of the daily interviews,  $r(107) = .50, p < .01$ . The mean of the two positive affect items, which were also associated,  $r(107) = .47, p < .01$ , was used as an indicator of mothers' positive affect ( $M = 3.81, SD = 0.56$ ) and was highly stable over the 2 weeks of the daily interviews,  $r(107) = .77, p < .01$ .

**Maternal perceptions of child homework behavior.** Each day children had homework, mothers reported on children's helplessness with homework. To this end, mothers rated how quickly children gave up on homework and how frustrated children were with homework (1 = *not at all*; 5 = *very much*). Mothers also reported on children's persistence by rating how hard children worked on homework and how much they kept working on homework when things got difficult. Because pilot testing indicated that mothers sometimes did not have knowledge of children's behavior, mothers had the option of indicating that they did not know. Mothers used this option 20% of the time. A PCA of the four items yielded two factors with eigenvalues over 1. The two helplessness items loaded on one factor, and the two persistence items loaded on the other. The mean of the two helplessness items,  $r(108) = .57, p < .01$ , was used as an indicator of children's helplessness in completing homework ( $M = 1.50, SD = 0.51$ ); the mean of the two persistence items,  $r(108) = .47, p < .01$ , was used as an indicator of persistence ( $M = 3.72, SD = 0.66$ ). Both helplessness and persistence behaviors were moderately stable over the 2 weeks of the daily interviews,  $rs(107) = .34$  and  $.49, ps < .01$ , respectively.

Two additional measures of children's helplessness were obtained to ascertain the validity of mothers' reports. First, in the context of the daily

interview, each day children reported on how frustrated and uncertain they were in regards to their work at school (1 = *not at all*; 5 = *very much*). The mean of these two items,  $r(108) = .51, p < .01$ , was taken. Second, teachers completed Fincham, Hokoda, and Sanders's (1989) measure of helplessness in the academic arena for 94 of the 109 participating children.<sup>2</sup> In this 24-item measure, teachers rated the extent to which children demonstrated helpless and mastery behavior in the classroom (1 = *strongly disagree*; 7 = *strongly agree*; e.g., "Gives up when you correct her or find a mistake in her work" and "Does not respond with enthusiasm and pride when asked how she is doing on an academic task"). The mean of the 24 items ( $\alpha = .96$ ) was taken. Both children's and teachers' reports were associated with mothers' reports of children's helplessness ( $rs = .20$  and  $.34, ps < .05$ , respectively), but not with mothers' reports of children's persistence ( $rs = .05$  and  $.07, ns$ , respectively). Children's and teachers' reports were also associated with one another,  $r(92) = .36, p < .01$ . After standardizing the reports of mothers, children, and teachers, we took the mean ( $\alpha = .96$ ) as an index of academic helplessness ( $M = 0.00, SD = 0.74$ ).

### Questionnaire Measures

Information about children's motivational orientation and emotional functioning was gathered from children in the questionnaire session at Waves 1 and 2.

**Child motivational functioning.** Children's mastery orientation was assessed by having them rate how important it was to them to learn a lot (1 = *not at all*; 7 = *very much*) and how much they liked difficult work (1 = *not at all*; 7 = *very much*) in each of four school subjects (math, science, social studies, and language arts). The mean of these eight items ( $\alpha = .73$  for Waves 1 and 2) was taken ( $Ms = 5.30$  and  $5.34, SDs = 0.94$  and  $1.03$  for Waves 1 and 2, respectively). Across the two waves, children's mastery orientation was moderately stable,  $r(97) = .39, p < .01$ .

The relative autonomy of children's motivational orientation in meeting their academic goals was assessed with Ryan and Connell's (1989) Academic Self-Regulation Questionnaire. This questionnaire consists of four sets of statements reflecting four types of reasons children may have for working on school tasks: seven intrinsic reasons (e.g., "I do my homework because it is fun" and "I do my classwork because I enjoy it"), seven

<sup>2</sup> There were no differences on any of the variables between children for whom teachers completed the measure and children for whom teachers did not.

Table 2  
*Predicting Mothers' Affect During Interactions With Children: Daily-Level Analyses*

| Predictor  | Maternal negative affect |     |              | Maternal positive affect |     |              |
|--|--------------------------|-----|--------------|--------------------------|-----|--------------|
|  | $b_1$                    | SE  | 95% CI       | $b_1$                    | SE  | 95% CI       |
| Homework (0 = <i>no</i> ; 1 = <i>yes</i> )                     | .14**                    | .05 | .04 to .24   | -.03                     | .04 | -.11 to .05  |
| Maternal homework assistance                                   | .13*                     | .05 | .03 to .23   | .06                      | .04 | -.02 to .14  |
| Maternal negative affect                                       |                          |     |              | -.16**                   | .03 | -.22 to -.10 |
| Maternal positive affect                                       | -.22**                   | .04 | -.30 to -.14 |                          |     |              |
| Child homework helplessness <sup>a</sup>                       | .15**                    | .03 | .09 to .21   | -.02                     | .02 | -.06 to .02  |
| Child homework persistence <sup>a</sup>                        | -.04†                    | .02 | -.08 to .00  | .02*                     | .01 | .01 to .04   |
| Day of the week (0 = <i>Monday</i> ; 4 = <i>Friday</i> )       | .00                      | .02 | -.04 to .04  | -.01                     | .01 | -.03 to .01  |
| Day of interview (0 = <i>first day</i> ; 9 = <i>last day</i> ) | -.03**                   | .01 | -.05 to -.01 | .01                      | .01 | -.01 to .03  |

Note.  $b_1$  = the unstandardized coefficient; CI = confidence interval.

<sup>a</sup> Mothers' perceptions of children's behavior.

†  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .

identified reasons (e.g., "I do my homework because I want to understand the subject" and "I do my classwork because it is important to me"), eight introjected reasons (e.g., "I do my homework because I want the teacher to think I'm a good student" and "I do my classwork because I feel bad about myself if it does not get done"), and seven external reasons (e.g., "I do my homework because I'll get in trouble if I do not" and "I do my classwork because that is the rule"). Children rated how often they have each of these reasons (1 = *not at all*; 4 = *a lot*). The mean was taken for each set of items ( $\alpha$ s = .77 to .93 for Waves 1 and 2, respectively).

The four reasons children have represent different levels along a continuum of relative autonomy (Ryan & Connell, 1989). The intrinsic and identified reasons reflect a more or less internal perceived locus of causality and fall at the autonomous end of the continuum, with the intrinsic reasons being the most autonomous. The external and introjected reasons reflect a more or less external perceived locus of causality and fall at the controlled end of the continuum, with the external reasons being the most controlled. Following this conceptualization, as in prior research (e.g., Grolnick & Ryan, 1989; Ryan & Connell, 1989), the intrinsic and identified reasons were combined to form an autonomous motivation composite by taking the mean of the intrinsic scale weighted by two and the identified scale weighted by one; the introjected and external reasons were combined to form a controlled motivation composite by taking the mean of the extrinsic scale weighted by two and the introjected scale weighted by one. Residualized scores in which the controlled composite was partialled from the autonomous composite were used as an index of relative autonomy ( $M$ s = 0.00,  $SD$ s = 1.01 and 1.10 for Waves 1 and 2, respectively) with moderate stability across the two waves,  $r(97) = .54, p < .01$ .

**Child emotional functioning.** Children's negative emotional functioning was assessed with three measures. Negative emotions were measured with Diener et al.'s (1995) Unpleasant Emotions Scale, modified for use with children. Children indicated how often in the past week they experienced each of seven negative emotions (1 = *not at all*; 4 = *a lot*; e.g., down-depressed, disappointment, and nervousness). The mean was taken ( $\alpha$ s = .76 and .71 for Waves 1 and 2, respectively). Children's depressive symptoms were assessed with the Center for Epidemiological Studies Depression Inventory for Children (Weissman, Orvaschel, & Padian, 1980). For each of 20 items, children rated how often in the past week they experienced depressive symptoms (1 = *not at all*; 4 = *a lot*; e.g., "I was not able to feel happy, even when my family or friends tried to help me feel better" and "I felt like I was too tired to do things this past week"). The items were averaged to create an index of depressive symptoms ( $\alpha$ s = .90 and .88 for Waves 1 and 2, respectively). Children's anxiety symptoms were assessed with a modified version of the Revised Child Manifest Anxiety Scale (Reynolds & Richmond, 1978). Children rated how often

they experienced 25 anxiety symptoms (1 = *not at all*; 4 = *a lot*; e.g., "I get nervous when things do not go the right way" and "I am afraid of a lot of things"). The mean was taken ( $\alpha$ s = .90 and .92 for Waves 1 and 2, respectively).

Children's positive emotional functioning was also assessed with three measures. Diener and colleagues' (1995) Pleasant Emotions Scale was modified for use with children to assess positive emotions. Children indicated how often in the past week they experienced seven positive emotions (1 = *not at all*; 4 = *a lot*; e.g., joy, happiness, and love). The mean of the seven was taken ( $\alpha$ s = .64 and .76 for Waves 1 and 2, respectively). Children's life satisfaction was assessed with Terry and Huebner's (1995) Student's Life Satisfaction Scale. Children rated seven statements about life satisfaction (1 = *not at all true of me*; 4 = *very true of me*; e.g., "My life is better than most kids' lives" and "My life is going well"), which were averaged ( $\alpha$ s = .80 and .79 for Waves 1 and 2, respectively). Children's self-esteem was assessed with Rosenberg's (1965) and Rosenberg and Simmons's (1972) Self-Esteem Scale modified slightly to be appropriate for elementary school children. Children rated 12 statements about their self-worth (1 = *not at all true of me*; 4 = *very true of me*; e.g., "I feel that I'm as good as other kids" and "I feel that I am a valuable person"). The mean was used as an index of self-esteem ( $\alpha$ s = .90 and .85 for Waves 1 and 2, respectively).

To examine whether the six scales of emotional functioning reflected negative and positive dimensions, we conducted a PCA. At both waves, there were two factors with eigenvalues over 1. The three negative emotional functioning scales loaded on one, and the three positive emotional functioning scales loaded on the other. The mean of the three negative emotional functioning scales ( $\alpha$ s = .95 and .93 for Waves 1 and 2, respectively) was taken ( $M$ s = 1.97 and 1.80,  $SD$ s = 0.49 and 0.37 for Waves 1 and 2, respectively). The mean of the three positive emotional functioning scales ( $\alpha$ s = .91 for Wave 1 and .89 for Wave 2) was taken ( $M$ s = 3.15 and 3.22,  $SD$ s = 0.45 and 0.39 for Waves 1 and 2, respectively). Across the two waves, children's negative and positive emotional functioning were both moderately stable,  $r(97) = .58$  and  $.60, p < .01$ , respectively.

## Results

### Overview of Analytic Strategy

Three sets of analyses were conducted to examine the central hypotheses. In the first, we used an analysis of variance (ANOVA) and a mixed-model multivariate analysis of variance (MANOVA)

to provide a preliminary description of mean-level variation at the dyad level as a function of children's gender and grade in school as well as the wave of the study. We used hierarchical linear modeling (HLM; Bryk & Raudenbush, 1992) in the second set of analyses to examine the extent to which mothers' affect varies as a function of the homework context. In the third set of analyses, we investigated, in a series of multiple regression analyses, the implications of mothers' affect for children's motivational and emotional functioning.

### *Preliminary Dyad-Level Analyses*

The frequency with which children had homework did not vary with either their gender or grade in school. However, consistent with prior research (e.g., Cooper et al., 2000; Eccles & Harold, 1996), the Grade of Child  $\times$  Gender of Child ANOVA on the frequency of mothers' assistance yielded an effect of grade,  $F(3, 101) = 4.93, p < .05$ , with a linear trend analysis indicating that mothers' assistance decreased as children progressed through school ( $M_s = 0.45, 0.39, 0.30$ , and  $0.22$  for 3rd, 4th, 5th, and 6th graders, respectively),  $F(3, 105) = 14.77, p < .01$ .<sup>3</sup> A mixed-model Gender of Child  $\times$  Grade of Child  $\times$  Type of Maternal Affect MANOVA yielded only an effect of type of maternal affect,  $F(1, 101) = 895.94, p < .01$ . As in research using observational methods (e.g., Denham et al., 2000; Kenney-Benson & Pomerantz, 2005), mothers reported more positive than negative affect. There was a similar positive trend for mothers' perceptions of children's homework behavior, with mothers reporting children as more persistent than helpless,  $F(1, 101) = 574.79, p < .01$ . There were no other mean-level variations in the maternal variables at the dyad level.

A mixed-model MANOVA, with gender and grade of children as between-participants factors and wave of the study and type of motivational functioning as the within-participant factors, indicated that motivational functioning was more positive among girls than boys ( $M_s = 2.86$  and  $2.42$ , respectively),  $F(1, 91) = 6.72, p < .05$ .<sup>4</sup> This was dependent, albeit marginally, on the type of motivational functioning,  $F(1, 91) = 3.29, p = .07$ , as the gender difference reached significance only for relative autonomy,  $t(97) = 3.25, p < .01$ . A marginal Gender of Child  $\times$  Wave interaction,  $F(1, 91) = 3.71, p = .06$ , indicated that the gender difference in motivational functioning was significant only at Wave 2,  $t(98) = 3.44, p < .01$ . A mixed-model MANOVA on children's emotional functioning yielded a positive trend similar to that for mothers' affect: Children reported more positive than negative emotional functioning,  $F(1, 91) = 388.51, p < .01$ . A Wave  $\times$  Type of Emotional Functioning interaction,  $F(1, 91) = 6.00, p < .05$ , indicated that children's negative, but not positive, emotional functioning decreased from Wave 1 to 2,  $t(98) = 3.18, p < .01$ . There were no other mean-level variations in the child variables at the dyad level.

### *Mothers' Affect in the Homework Context: Daily-Level Analyses*

In investigating mothers' affect in the homework context, we conducted HLM analyses using HLM Version 5 (Bryk, Raudenbush, & Congdon, 2000). This multilevel data-analytic approach is

advantageous because it allows for the examination of daily-level associations without violating assumptions of independence. HLM is also unbiased in the presence of unequal numbers of events across mother-child dyads, which was important, given that mothers varied in the number of days not only for which they completed the daily interviews but also for which children had homework.

We conducted HLM analyses with the following type of equation: Maternal Affect<sub>*ij*</sub> =  $b_{0j} + b_{1j}(\text{Homework Characteristic}_i) + e_{ij}$ , where affect on a particular day (*i*) for an individual mother (*j*) was modeled as a function of the average affect the mother experienced over the daily interview period ( $b_{0j}$ ) and a characteristic of the homework context (i.e., occurrence of homework, assistance with homework, or perceptions of child's homework behavior) that day ( $b_{1j}$ ), with  $e_{ij}$  representing the error term. Similar equations were used to examine associations between mothers' assistance with homework and their perceptions of children's homework behavior. Effects of the day of the week and interview were also explored. All predictors were mean centered unless specified.

### *Does Mothers' Affect Vary as a Function of the Homework Context?*

There was significant day-to-day variation in children and mothers' homework interactions ( $M_s = 0.12$  to  $0.82$ , respectively;  $t_s > 7.80, p_s < .01$ ). We examined whether the variation in mothers' affect while interacting with children was related to characteristics of the homework context. On days children had homework ( $0 = \text{no homework}$ ;  $1 = \text{homework}$ ), mothers reported heightened negative affect while interacting with children (see Table 2),  $t(108) = 2.76, p < .01$ . However, the occurrence of homework was unrelated to mothers' reports of positive affect. To ensure that the effects of children's and mothers' interactions around homework were not simply due to children having homework, we included only days children had homework in the analyses examining such interactions. As anticipated, mothers' negative affect was heightened on days mothers provided heightened assistance,  $t(108) = 2.47, p < .05$ , but their positive affect was not any lower on these days. Mothers had more negative, although not less positive, affect while interacting with children on days they perceived children as highly helpless,  $t(108) = 5.44, p < .01$ . Conversely, mothers had more positive affect on days they perceived children as highly persistent,  $t(108) = 2.16, p < .05$ , and marginally less negative affect on such days,  $t(108) = 1.89, p = .06$ .

The data were consistent with the notion that mothers' heightened negative affect on days mothers assisted more with homework reflects their perceptions of children as particularly helpless in completing homework on those days. On days mothers provided assistance, mothers reported children as highly helpless ( $b_1 = .06, SE = .01$ ),  $t(108) > 4.05, p < .01$ . Moreover, when mothers' negative affect was predicted simultaneously from mothers' assis-

<sup>3</sup> The term *effect* is used throughout to denote statistical association rather than causation.

<sup>4</sup> There was also an effect of type of motivational functioning. However, this was due to the different scales used to assess the two types of functioning.

tance and perceptions of children's helplessness, the tendency for mothers to be more negative on days they provided more assistance was no longer evident ( $b_1 = .07$ ,  $SE = .05$ ),  $t(108) = 1.40$ , *ns*, but the tendency for mothers to be more negative on days they perceived children as highly helpless remained ( $b_2 = .14$ ,  $SE = .03$ ),  $t(108) = 5.06$ ,  $p < .01$ . In addition, mothers perceived children as highly persistent on days their assistance was high ( $b_1 = .03$ ,  $SE = .01$ ),  $t(108) > 3.05$ ,  $p < .01$ .

To ensure that the observed relations were not due to time of the week, we explored whether there were any effects of day of the week (0 = *Monday*; 4 = *Friday*), but no linear or curvilinear effects were evident. Because completing the daily interview may influence mothers' responses, we also examined the effect of the day of the daily interview (0 = *first day*; 9 = *last day*). Over the course of the daily interview period, mothers reported less homework ( $b_1 = -.01$ ,  $SE = .00$ ),  $t(108) = 2.79$ ,  $p < .01$ , and less negative affect,  $t(108) = 4.14$ ,  $p < .01$ . However, the tendency for mothers to experience more negative affect on days children had homework remained when day of the interview was taken into account ( $b_1 = .12$ ,  $SE = .05$ ),  $t(108) = 2.27$ ,  $p < .01$ . Otherwise, there were no effects of day of the interview.

### *Is Mothers' Affect in the Homework Context Moderated by Characteristics of Children or Mothers?*

To investigate whether mothers' heightened negative affect in the homework context differs as a function of characteristics of children and mothers, we predicted the slopes ( $b_j$ ) between mothers' affect and homework interactions from characteristics of children and mothers with the following type of equation:  $b_{1j} = b_{10} + b_{11}(\text{Child or Maternal Characteristic}_j) + u_{1j}$ , where the daily-level association ( $b_{1j}$ ) between an individual mother's affect and her homework interactions was modeled as a function of the average daily association across the sample ( $b_{10}$ ) and her child's or her own characteristic ( $b_{11}$ ), with  $u_{1j}$  representing the error term. Separate equations were used for each characteristic.

Neither children's gender nor their motivational or emotional functioning moderated mothers' affect in the homework context. Children's grade in school (0 = *3rd grade*; 3 = *6th grade*) marginally moderated the association between mothers' negative affect and assistance ( $b_{11} = -.08$ ,  $SE = .04$ , 95% confidence interval =  $-.16$  to  $.00$ ),  $t(107) = 1.87$ ,  $p = .06$ , such that the association became weaker as children progressed through school. There was no evidence that mothers' education, work status, household income, marital status, or number of children had a moderating effect.

### *Summary*

In sum, mothers reported heightened negative affect while interacting with children on days children had homework, with mothers' negative affect being further intensified on days mothers provided heightened assistance with homework. This was accounted for by mothers' perceptions of children as helpless. In contrast, mothers' positive affect while interacting with children did not vary as a function of whether children had homework or the extent of mothers' assistance. Indeed, mothers' positive affect was less variable from day to day than was mothers' negative

affect,  $t(108) = 4.92$ ,  $p < .01$ . There was little evidence that characteristics of children or mothers influenced the tendency for mothers' negative affect to be more intense in the homework context.

### *Effects Over Time on Children of Mothers' Affect in the Homework Context: Dyad-Level Analyses*

To investigate the implications for children's motivational and emotional functioning of mothers' affect, we conducted a series of multiple regression analyses. A key aim was to tease apart the effects of mothers' affect on days mothers assisted with homework, on days children had homework but mothers did not assist, and on days children did not have homework. To this end, the mean of mothers' affect across each type of day was taken, thereby creating three indexes for mothers' negative ( $M_s = 1.71$ , 1.64, and 1.55;  $SD_s = 0.64$ , 0.60, and 0.54 for homework-assistance days, homework-but-no-assistance days, and no-homework days, respectively) and positive ( $M_s = 3.87$ , 3.80, and 3.78;  $SD_s = 0.65$ , 0.62, and 0.62 for homework-assistance days, homework-but-no-assistance days, and no-homework days, respectively) affect. The associations between the two items comprising each index were similar to those for mothers' affect across the three types of days for negative affect ( $r_s = .71$  to  $.78$ ,  $p_s < .01$ ) and for positive affect ( $r_s = .39$  to  $.44$ ,  $p_s < .01$ ). Mothers' negative affect on the three types of days was associated ( $r_s = .25$  to  $.48$ ,  $p_s < .05$ ), but not as strongly as mothers' positive affect ( $r_s = .60$  to  $.67$ ,  $p_s < .01$ ). The degrees of freedom vary from one analysis to the next because some mothers ( $n = 10$ ) never provided assistance and thus did not have affect indexes for homework-assistance days, some mothers ( $n = 20$ ) always provided assistance and thus did not have affect indexes for homework-but-no-assistance days, and some children ( $n = 10$ ) had homework every day and thus mothers did not have affect indexes for no-homework days.

We investigated in three steps the hypothesis that mothers' positive affect in the homework context buffers the undermining effects of mothers' negative affect. First, each dimension of children's motivational and emotional functioning at Wave 2 was predicted simultaneously from mothers' negative and positive affect at Wave 1 (Step 1). In a second step, the interaction between the two types of affect was entered. Following Aiken and West (1991), we mean centered mothers' affect. Separate analyses were conducted for each type of day (i.e., homework-assistance days, homework-but-no-assistance days, and no-homework days). Second, to examine the unique effects of each type of day, we simultaneously entered the main effects of mothers' affect on the three different types of days and the corresponding interactions (e.g., Positive Affect  $\times$  Negative Affect on homework-assistance days, Positive Affect  $\times$  Negative Affect on homework-but-no-assistance days, and Positive Affect  $\times$  Negative Affect on no-homework days). Third, the interaction emerging from this analysis as driving the effects was decomposed with Aiken and West's methods: Multiple regression analyses centering mothers' positive affect at one standard deviation below the mean were conducted to examine the effects of their negative affect when their positive affect was low. Conversely, mothers' positive affect was centered at one standard deviation above the mean to examine the effects of mothers' negative affect when mothers' positive affect was high. A

similar three-step approach, substituting children's helplessness for mothers' negative affect, was taken to examine the hypothesis that mothers' positive affect in the homework context ameliorates the detrimental effects of children's helplessness. In these analyses, we used the composite of mothers', children's, and teachers' reports of helplessness, as it reflects children's helplessness across the academic arena from multiple perspectives.<sup>5</sup>

#### *Does Mothers' Positive Affect Moderate the Effects of Mothers' Negative Affect?*

The data were consistent with the notion that mothers' positive affect on days they assist with homework moderates the effects of mothers' negative affect on children's subsequent motivational functioning. Individually, neither mothers' negative nor positive affect on days mothers assisted predicted children's mastery orientation over time. However, there was an interaction between the two (see Table 3),  $t(86) = 2.73, p < .01$ , which remained,  $t(57) = 3.07, p < .01$ , when mothers' affect on days mothers did not assist was taken into account. Indeed, there was no interaction between mothers' negative and positive affect on days mothers did not assist. As shown in Figure 1, when mothers' positive affect was low (one standard deviation below the mean) on days mothers assisted, their negative affect on such days predicted dampened mastery orientation among children 6 months later ( $B = -.46, SE = .15, t(86) = 3.01, p < .01$ ). However, when mothers' positive affect was high (one standard deviation above the mean), there was no such effect of mothers' negative affect ( $B = .13, SE = .16, t(86) < 1, ns$ ).

A similar pattern emerged for children's relative autonomy. There were no independent effects of mothers' affect on days mothers assisted, but there was an interaction,  $t(86) = 2.51, p < .05$ . There was also a marginal interaction between mothers' negative and positive affect on days children had homework but mothers did not assist,  $t(79) = 1.72, p = .09$ . However, there was no such interaction on days children did not have homework. The interaction between mothers' negative and positive affect on days mothers assisted remained when the parallel interactions for days mothers did not assist were taken into account,  $t(57) = 2.38, p < .05$ . Similar to the pattern depicted in Figure 1, mothers' negative affect on days mothers assisted predicted dampened relative autonomy over time, albeit marginally, when mothers were low in positive affect on such days ( $B = -.31, SE = .16, t(86) = 1.91, p = .06$ , but not when mothers were high in positive affect ( $B = .27, SE = .17, t(86) = 1.59, ns$ ).

Surprisingly, neither mothers' negative nor positive affect nor their interaction predicted children's negative emotional functioning. However, for children's positive emotional functioning, there was an interaction between the two on days mothers assisted,  $t(86) = 2.43, p < .05$ , but not on days they did not assist. Although no such interaction was evident on days children did not have homework, a marginal one was evident on days children had homework but mothers did not assist,  $t(79) = 1.80, p = .08$ . Notably, the interaction for mothers' affect on days mothers assisted remained,  $t(57) = 2.13, p < .05$ , when the interactions for mothers' affect on days mothers did not assist were taken into account. In a pattern similar to that shown in Figure 1, mothers' negative affect on days mothers assisted was associated with poor

positive emotional functioning among children 6 months later when mothers' positive affect was low ( $B = -.13, SE = .06, t(86) = 2.24, p < .05$ , but not when it was high ( $B = .08, SE = .06, t(86) = 1.29, ns$ ).

#### *Does Mothers' Positive Affect Moderate the Effects of Children's Helplessness?*

Mothers' positive affect moderated the negative effects of children's helplessness in much the same way it moderated those of mothers' own negative affect. However, this was generally limited to mothers' positive affect on days children had homework but mothers did not assist. As shown in Table 4, the effect of children's helplessness on children's mastery orientation 6 months later ( $B = -.42, SE = .11, t(87) = 3.78, p < .01$ , was moderated by mothers' positive affect on days mothers assisted,  $t(86) = 2.36, p < .05$ . The parallel interaction on days children had homework but mothers did not assist was marginal,  $t(79) = 1.76, p = .08$ ; there was no interaction involving days children did not have homework. However, when the multiple interactions were included in a simultaneous regression, the interaction between mothers' positive and negative affect on days mothers assisted was no longer significant. Additional analyses suggested that mothers' affect on days children had homework regardless of whether mothers assisted contributed to children's mastery orientation. Indeed, mothers' positive affect on days children had homework (across days mothers assisted and days they did not) moderated the effects of children's helplessness ( $B = .28, SE = .11, t(95) = 2.64, p < .05$ , with this effect remaining, albeit marginally ( $B = .28, SE = .15, t(83) = 1.86, p = .07$ , when the moderating effect of mothers' positive affect on days children did not have homework was taken into account. As shown in Figure 2, children's helplessness was associated with children's low mastery orientation over time when mothers' positive affect was low on days children had homework ( $B = -.71, SE = .15, t(95) = 4.66, p < .01$ . However, this was not the case when mothers' positive affect was high on these days ( $B = -.15, SE = .14, t(95) = 1.01, ns$ ).

For children's relative autonomy, mothers' affect on days children had homework but mothers did not assist was most important. The effect of children's helplessness on children's relative autonomy 6 months later ( $B = -.30, SE = .12, t(87) = 2.45, p < .05$ ,

<sup>5</sup> Analyses examining the moderating effect of mothers' positive affect adjusting for the Wave 1 dimension of functioning being predicted at Wave 2 were also performed. These analyses need to be interpreted with caution, however, because they may be overly stringent, as they assume that change occurs over 6 months during the elementary school years when substantial socialization has already occurred. The Maternal Positive Affect  $\times$  Maternal Negative Affect interaction on days mothers assisted continued to predict children's mastery orientation and positive emotional functioning when these dimensions of functioning at Wave 1 were taken into account,  $t(85) > 2.45, ps < .05$ . However, this was not the case in predicting children's relative autonomy. The Maternal Positive Affect  $\times$  Child Helplessness interaction for days mothers assisted continued to predict children's mastery orientation, relative autonomy, and positive emotional functioning,  $t(85) > 2.35, ps < .05$ . The parallel interaction for days children had homework but mothers did not assist remained only for children's relative autonomy,  $t(78) = 3.91, p < .01$ .

Table 3  
*Maternal Positive Affect × Maternal Negative Affect Interactions Predicting Child Motivational and Emotional Functioning Over Time: Dyad-Level Analyses*

|                                 | Child motivational functioning |           |             |                   |           |             | Child emotional functioning |           |             |          |           |             |
|---------------------------------|--------------------------------|-----------|-------------|-------------------|-----------|-------------|-----------------------------|-----------|-------------|----------|-----------|-------------|
|                                 | Mastery orientation            |           |             | Relative autonomy |           |             | Positive                    |           |             | Negative |           |             |
| Mothers' affect day             | <i>B</i>                       | <i>SE</i> | 95% CI      | <i>B</i>          | <i>SE</i> | 95% CI      | <i>B</i>                    | <i>SE</i> | 95% CI      | <i>B</i> | <i>SE</i> | 95% CI      |
| Separate regressions            |                                |           |             |                   |           |             |                             |           |             |          |           |             |
| Homework-assistance days        | .29**                          | .11       | .08 to .51  | .26*              | .12       | .06 to .51  | .10*                        | .04       | .02 to .18  | .04      | .03       | -.02 to .11 |
| Homework-but-no-assistance days | .19                            | .12       | -.04 to .44 | .23†              | .13       | .04 to .49  | .08†                        | .05       | -.01 to .17 | .01      | .03       | -.06 to .08 |
| No-homework days                | -.03                           | .12       | -.27 to .28 | .11               | .13       | -.15 to .36 | .03                         | .04       | -.06 to .11 | -.01     | .04       | -.10 to .08 |
| Simultaneous regressions        |                                |           |             |                   |           |             |                             |           |             |          |           |             |
| Homework-assistance days        | .41**                          | .13       | .14 to .68  | .36*              | .15       | .06 to .66  | .10*                        | .05       | .01 to .19  | .02      | .05       | -.09 to .13 |
| Homework-but-no-assistance days | .13                            | .12       | -.11 to .37 | .09               | .14       | -.19 to .36 | .03                         | .04       | -.03 to .15 | .00      | .05       | -.10 to .10 |
| No-homework days                | .07                            | .14       | -.20 to .34 | .08               | .15       | -.23 to .38 | .04                         | .05       | -.05 to .14 | -.02     | .06       | -.13 to .09 |

Note. *B* = the unstandardized coefficient; CI = confidence interval.  
 † *p* < .10. \* *p* < .05. \*\* *p* < .01.

was moderated by mothers' positive affect regardless of type of day (*t*s > 2.00, *p*s < .05). When the three interactions were entered simultaneously, only that involving mothers' affect on days children had homework but mothers did not assist remained, *t*(59) = 2.32, *p* < .05. As shown in Figure 3, decomposition indicated that children's helplessness was associated with low relative autonomy among children 6 months later when mothers' positive affect was low on days children had homework but mothers did not assist (*B* = -.84, *SE* = .19), *t*(86) = 4.49, *p* < .01. However, this was not the case when mothers' positive affect was high (*B* = .25, *SE* = .18), *t*(86) = 1.40, *ns*.

The negative effect of children's helplessness on children's subsequent negative emotional functioning (*B* = .12, *SE* = .04), *t*(80) = 2.85, *p* < .01, was also moderated by mothers' positive

affect on days children had homework but mothers did not assist, *t*(79) = 2.26, *p* < .05. The interactions for other days were not evident, although when such interactions were taken into account, the one for days children had homework but mothers did not assist became marginal, *t*(59) = 1.77, *p* = .08. Similar to the pattern shown in Figure 3, children's helplessness predicted heightened negative emotional functioning among children 6 months later when mothers' positive affect was low on days children had homework but mothers did not assist (*B* = .22, *SE* = .06), *t*(86) = 3.64, *p* < .01, but not when mothers' positive affect was high (*B* = .03, *SE* = .06), *t*(86) < 1, *ns*.

Mothers' affect on days children had homework also moderated the effects of children's helplessness on children's positive emotional functioning over time (*t*s > 2.60, *p*s < .05). As was the case

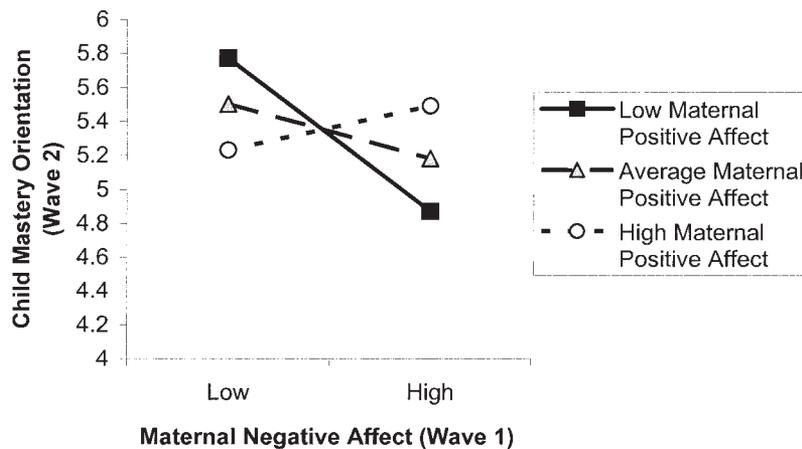


Figure 1. Children's mastery orientation (Wave 2) as a function of mothers' negative and positive affect on days mothers assisted with homework (Wave 1). Low levels are one standard deviation below the mean; high levels are one standard deviation above the mean. Slopes are estimated from the multiple regression equation.

Table 4

Maternal Positive Affect  $\times$  Child Helplessness Interactions Predicting Child Motivational and Emotional Functioning Over Time: Dyad-Level Analyses

| Mothers' affect day             | Child motivational functioning |           |             |                   |           |             | Child emotional functioning |           |              |          |           |              |
|---------------------------------|--------------------------------|-----------|-------------|-------------------|-----------|-------------|-----------------------------|-----------|--------------|----------|-----------|--------------|
|                                 | Mastery orientation            |           |             | Relative autonomy |           |             | Positive                    |           |              | Negative |           |              |
|                                 | <i>B</i>                       | <i>SE</i> | 95% CI      | <i>B</i>          | <i>SE</i> | 95% CI      | <i>B</i>                    | <i>SE</i> | 95% CI       | <i>B</i> | <i>SE</i> | 95% CI       |
| Separate regressions            |                                |           |             |                   |           |             |                             |           |              |          |           |              |
| Homework-assistance days        | .26*                           | .11       | .04 to .48  | .35**             | .12       | .11 to .59  | .13**                       | .04       | .04 to .21   | -.04     | .04       | -.06 to .10  |
| Homework-but-no-assistance days | .22†                           | .12       | .03 to .46  | .55**             | .13       | .28 to .81  | .12*                        | .05       | .03 to .21   | -.10*    | .04       | -.18 to -.01 |
| No-homework days                | .17                            | .11       | -.05 to .38 | .25*              | .12       | .00 to .49  | .04                         | .04       | -.05 to .12  | -.04     | .04       | -.12 to .04  |
| Simultaneous regressions        |                                |           |             |                   |           |             |                             |           |              |          |           |              |
| Homework-assistance days        | .14                            | .20       | -.26 to .55 | .05               | .22       | -.39 to .48 | .03                         | .07       | -.11 to .18  | .05      | .07       | -.10 to .20  |
| Homework-but-no-assistance days | .05                            | .18       | -.31 to .40 | .44*              | .19       | .06 to .82  | .13*                        | .06       | .01 to .26   | -.12†    | .06       | -.24 to .02  |
| No-homework days                | .16                            | .18       | -.21 to .52 | .03               | .20       | -.36 to .42 | -.02                        | .06       | -.16 to -.11 | -.03     | .06       | -.16 to .10  |

Note. *B* = the unstandardized coefficient; CI = confidence interval.

†  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .

for children's negative emotional functioning, when the interactions for all three types of days were entered simultaneously, only that involving mothers' affect on days children had homework but mothers did not assist remained,  $t(59) = 2.02$ ,  $p < .05$ . Similar to the pattern depicted in Figure 3, children's helplessness was associated with low relative autonomy among children 6 months later when mothers' positive affect was low on days children had homework but mothers did not assist ( $B = -.20$ ,  $SE = .07$ ),  $t(79) = 3.09$ ,  $p < .01$ . However, this was not the case when mothers' positive affect was high ( $B = .04$ ,  $SE = .06$ ),  $t(86) < 1$ , *ns*.

### Summary

In sum, mothers' positive affect on days mothers assisted with homework moderated the effects of mothers' negative affect on these days on children's subsequent motivational and positive emotional

functioning. Notably, this apparent buffering function of mothers' positive affect was limited to days mothers assisted, as it was not accounted for by their affect on days they did not assist. Mothers' positive affect also moderated the effects of children's helplessness on children's subsequent functioning. However, this was not limited to days mothers assisted. Mothers' positive affect on days children had homework, regardless of whether mothers assisted, moderated the effect over time of children's helplessness on children's mastery orientation. The moderating effects of mothers' positive affect in predicting children's relative autonomy and emotional functioning were specific to days children had homework but mothers did not assist.

### Discussion

The focus of the current research was on mothers' affect while interacting with children in the homework context. As anticipated,

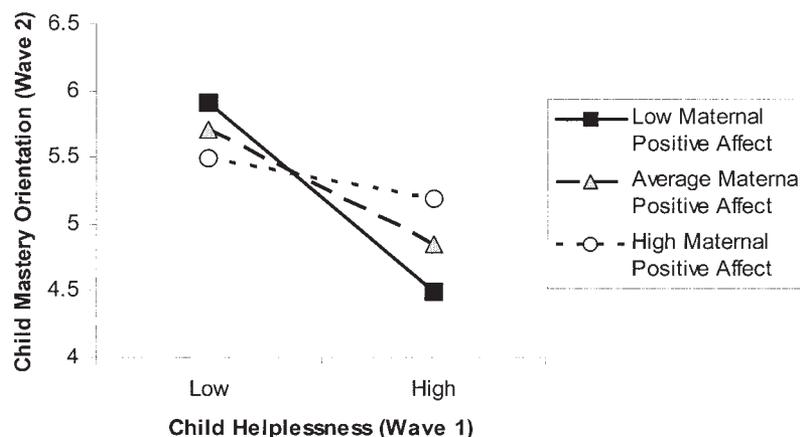


Figure 2. Children's mastery orientation (Wave 2) as a function of children's helplessness (Wave 1) and mothers' positive affect on days children had homework (Wave 1). Low levels are one standard deviation below the mean; high levels are one standard deviation above the mean. Slopes are estimated from the multiple regression equation.

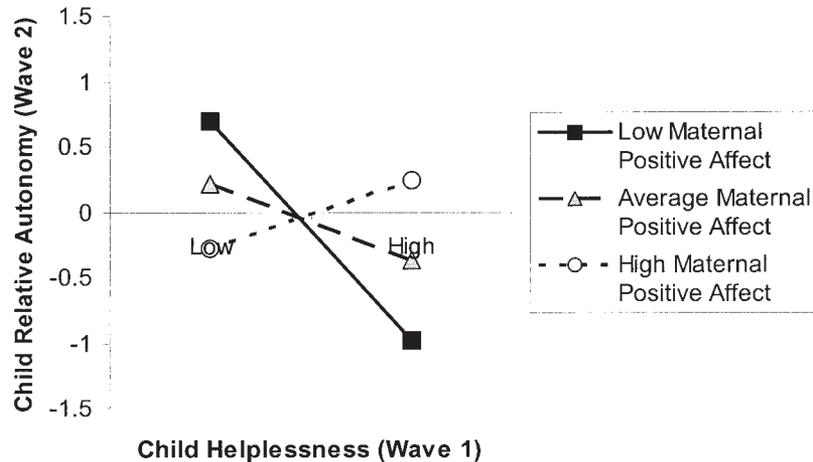


Figure 3. Children's relative autonomy (Wave 2) as a function of children's helplessness (Wave 1) and mothers' positive affect on days children had homework but mothers do not assist (Wave 1). Low levels are one standard deviation below the mean; high levels are one standard deviation above the mean. Slopes are estimated from the multiple regression equation.

mothers' negative affect, as manifested in mothers' experience of irritation and annoyance, increased on days mothers' assistance was particularly high. At first blush, mothers' heightened negative affect on days mothers provided heightened assistance may raise concern over whether it is wise to encourage parents to become involved in children's homework (see Levin et al., 1997). However, such concern is likely unwarranted for several reasons. First, mothers' high negative affect on days mothers provided high assistance must be interpreted in light of the fact that mothers reported twice as much positive (i.e., fun and love-caring) as negative affect while interacting with children. Moreover, mothers did not report dampened positive affect on days they elevated assistance. Second, mothers' negative affect appeared to reflect not so much mothers' provision of assistance itself but rather mothers' perceptions of children as helpless in completing homework. Third, undermining effects on children's motivational and emotional functioning of mothers' negative affect on days mothers assisted were not evident when mothers maintained their positive affect on these days. Mothers' positive affect on days children had homework but mothers did not necessarily provide assistance similarly buffered against children's helplessness.

#### *Mothers' Affect in the Homework Context*

In conjunction with prior research, the current research indicates that the homework process is an affective one. Research examining children's daily emotional experiences finds that children experience heightened negative affect when doing homework (Fulgini, Yip, & Tseng, 2002; Leone & Richards, 1989). The current research shows that mothers have a similar experience: Mothers reported increased negative but not decreased positive affect on days children had homework. Mothers' negative affect intensified even further on days mothers provided heightened assistance with children's homework. It is of note that although there was somewhat more variance between mothers in their positive than negative affect, there was more day-to-day variability in mothers'

negative than positive affect. It is quite possible that mothers' negative affect is easily influenced by the day-to-day events mothers encounter in their interactions with children, whereas mothers' positive affect represents a more stable aspect of mothers' general parenting style or personality. An important direction for future research will be to examine whether other forms of parents' involvement in children's homework (for a review, see Hoover-Dempsey et al., 2001) are characterized by affective patterns similar to those identified for assistance.

Mothers' high negative affect on days mothers' assistance with homework was high was accounted for by mothers' perceptions of children as particularly helpless in completing homework on such days. Prior research indicates that one precursor to mothers' assistance is children's difficulty with schoolwork (Pomerantz & Eaton, 2001), which may have been the case in the current research. There may be other reasons that parents assist, such as their anxiety over children's performance (Pomerantz & Eaton, 2001) and feelings of efficacy to assist (Eccles & Harold, 1996; Hoover-Dempsey et al., 2001). Teachers' practices may also play a role (Epstein & Van Voorhis, 2001). It is notable that on days mothers provided high levels of assistance, they reported high levels of helplessness and persistence among children. Given that some prior research suggests that mothers' assistance with homework is beneficial to children's grades (Keith et al., 1993; Pomerantz & Eaton, 2001), it may be that such persistence ensues from mothers' assistance. However, the design of this research did not actually provide information about the sequence of events. Moreover, although mothers' reports of children's helplessness were associated with those of children and teachers, such reports need to be interpreted with caution, as it may be that they are biased by mothers' affect and assistance.

There has been speculation that the homework process may be particularly problematic in families of low socioeconomic status (SES) due to limited resources such as parents' time and educational attainment (see Cooper et al., 2000). However, in the current

research, mothers' affect while interacting with children on days children had homework did not vary as a function of factors related to SES. This lack of moderation needs to be interpreted with caution. The families in the current study were of fairly diverse SES. Yet, given the substantial time demands of participation, those of low SES may not have been under as much stress as other families of similar SES. Moreover, there were no families of extremely low SES. Children's initial motivational and emotional functioning also did not moderate mothers' affect while interacting with children on days children had homework. Although there was a tendency for mothers to be less negative when interacting with children with positive motivational and emotional functioning, the tendency for mothers' negative affect to increase on days children have homework transcends such functioning, at least in this fairly well-functioning sample (see below).

### *Implications for Children's Motivational and Emotional Functioning*

Of major importance in studying parents' affect while interacting with children in the homework context is whether it contributes to children's development. The current research is consistent with the notion that parents' affect in the homework context plays a role in children's motivational and emotional functioning. When mothers failed to maintain their positive affect on days they assisted with homework, their heightened negative affect on such days was predictive of children's poor motivational and emotional functioning 6 months later. However, when mothers maintained their positive affect, their negative affect was not predictive. Thus, it appears that as long as mothers stay positive on days they provide assistance, their irritation and frustration will not be problematic for children. It will be important to identify how mothers' positive affect benefits children. For example, making the interaction fun may have positive effects only when there is a focus on children enjoying the process of doing homework. Moreover, it may often be difficult to make homework fun for children and sometimes may even be inappropriate. Thus, future research will need to examine which methods are successful in getting children to enjoy homework and the conditions under which such methods are appropriate. The overall level of mothers' negative affect while interacting with children was quite low; at higher levels, it may have detrimental effects for children, even in the face of mothers' positive affect. It is also possible that more extreme forms of negative affect, such as criticism and hostility, may prove problematic regardless of mothers' positive affect (see Nolen-Hoeksema et al., 1995).

Mothers' maintenance of positive affect in the homework context also appears to protect academically helpless children against future impairments in children's motivational and emotional functioning. When mothers were positive in their interactions with children on days children had homework, regardless of whether they assisted on such days, helpless children did not experience the deficits in their subsequent mastery orientation that they experienced when mothers were unable to maintain their positive affect. Mothers' positive affect also moderated the effects of children's helplessness on children's subsequent relative autonomy and emotional functioning. This, however, was mainly due to mothers' positive affect on days children had homework but mothers did not

assist. It is possible that for helpless children it is important for parents to build feelings of autonomy and positive emotions by positively supporting their children's autonomy when it comes to the challenges of homework. This is in line with prior research suggesting that mothers' heightened autonomy support is particularly likely to protect children having difficulty in school (Ng et al., 2004). However, future research is necessary to determine the types of interactions beyond assistance through which mothers transmit their affect to helpless children when they have homework.

Examination of the affective nature of mothers' interactions with children on days children have homework is significant for understanding why the findings of prior research on parents' involvement with homework are ambiguous. The current research is consistent with that of Cooper and colleagues (2000), indicating that one reason for such ambiguity is that how parents become involved matters (see also Steinberg et al., 1992). The current research suggests that mothers' assistance undermines children's motivational and emotional functioning when mothers' negative affect is relatively high and mothers' positive affect is relatively low. However, if mothers maintain their positive affect while assisting, even when their negative affect is high, children may not suffer. Moreover, it appears that the effects of mothers' involvement depend on characteristics of children. Mothers' positive affect in the homework context, particularly when mothers do not assist, is likely to benefit the motivational and emotional functioning of children with high levels of helplessness but not necessarily children with low levels.

### *Limitations of the Current Research*

There are several limitations of the current research that warrant caution in drawing conclusions. For one, although the daily interview approach provides more reliable and valid assessments than do traditional retrospective self-report methods, it is characterized by some of the same problems as these methods (Bolger et al., 2003). Hence, the tendency for mothers to report experiencing more than twice as much positive as negative affect in their interactions with children could be due to a social desirability bias in mothers' reporting. However, it is of note that this positive tendency is found in research using observational methods (e.g., Denham et al., 2000; Kenney-Benson & Pomerantz, 2005). Still, it would be useful for future research to use observers, children, and spouses as reporters. Another limitation is that although the current research provides information about mothers' affect on days mothers assisted with homework, it does not actually provide information about their affect while assisting. Thus, the timing of mothers' affect is unclear. For example, it could be that mothers' negative affect precedes mothers' assistance. In regards to the issue of timing, it is also unclear as to how mothers maintain positive affect in the face of negative affect: Do they simultaneously experience negative and positive affect? Does one precede the other? Or do mothers swing back and forth between the two? Future research using observational microanalytic or experience sampling methods is necessary.

The representativeness of the sample is restricted along several dimensions. For one, the majority was European American. Although there are some similarities in parents' involvement in

children's schooling across race and ethnicity, there are also differences (e.g., García Coll et al., 2003; Gutman & Eccles, 1999; Hill & Craft, 2003), which may influence parents' affect. Within the mainly European American sample, there may also have been an overrepresentation of positively functioning children and mothers. Children returning for the second wave of the study tended to have better emotional functioning than those failing to do so. As a consequence, participating mothers may have been particularly able to maintain their positive affect while interacting with children in the homework context. Moreover, because children reported by mothers as rarely bringing schoolwork home (less than 30% of the time) were excluded, the affective nature of mothers' interactions around homework when it is relatively rare is unclear. The exclusion of fathers is an issue as well. Fathers may often be involved in children's homework, and their affect may not function in the same way as that of mothers.

### Conclusions

Despite these limitations, the current research takes a significant step toward understanding the affective nature of parents' interactions with children in the homework context. The findings indicate that on days children have homework, mothers' negative affect is elevated but mothers' positive affect is not dampened. Mothers' negative affect is further intensified on days mothers provide assistance. Mothers' maintenance of positive affect in the homework context appears to offset the undermining effects of mothers' negative affect as well as of children's helplessness. Thus, if parents are to get involved in children's homework, a key goal is to keep the interaction fun and loving, despite the irritation and annoyance parents may experience. It may be important for interventions aimed at increasing parents' involvement in children's schooling to aid parents in keeping their interactions with their children fun and loving.

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# Clarifying Achievement Goals and Their Impact

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The study of achievement goals has illuminated basic motivational processes, though controversy surrounds their nature and impact. In 5 studies, including a longitudinal study in a difficult premed course, the authors show that the impact of learning and performance goals depends on how they are operationalized. Active *learning goals* predicted active coping, sustained motivation, and higher achievement in the face of challenge. Among performance goals, *ability-linked goals* predicted withdrawal and poorer performance in the face of challenge (but provided a “boost” to performance when students met with success); *normative goals* did not predict decrements in motivation or performance; and *outcome goals* (wanting a good grade) were in fact equally related to learning goals and ability goals. Ways in which the findings address discrepancies in the literature are discussed.

Considerable evidence suggests that much of achievement motivation (e.g., intrinsic interest, strategy use, and persistence) can be understood in terms of the different goals individuals bring to the achievement context (see Ames, 1992; Ames & Archer, 1988; Butler, 1987, 1993; Dweck & Elliott, 1983; Dweck & Leggett, 1988; Elliott & Dweck, 1988; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Kaplan & Maehr, 1999; Middleton & Midgely, 1997; Nicholls, 1984; Pintrich, 2000a; Rawsthorne & Elliot, 1999; Utman, 1997). However, there are some disagreements and some conflicting findings on the nature of these relations. Specifically, researchers disagree on how to best define and operationalize the major classes of goals, and on the precise impact of these goals on motivation and achievement.

In the original goal models, two classes of goals were identified—*performance goals*, where the purpose is to validate one’s ability or avoid demonstrating a lack of ability, and *learning goals*, where the aim is to acquire new knowledge or skills (i.e., to increase one’s ability; see Dweck & Elliott, 1983). Different researchers have used different labels for these two classes of goals—performance goals have also been called *ego-involved goals* (e.g., Nicholls, 1984) or *ability goals* (e.g., Ames, 1992), and learning goals have also been called *mastery goals* (e.g., Ames,

1992; Butler, 1993; Elliot & Harackiewicz, 1996; Meece & Holt, 1993) or *task goals* (e.g., Middleton & Midgely, 1997; Nicholls, 1984).

These two classes of goals were then linked to motivation and performance in achievement situations. Performance goals, with their emphasis on outcomes as measures of ability, were shown to produce a vulnerability to helplessness and debilitation after a setback or negative feedback, particularly in cases where current perceptions of ability were low (Ames & Archer, 1988; Butler, 1993; Elliott & Dweck, 1988; Jagacinski & Nicholls, 1987; Meece, Blumenfeld, & Hoyle, 1988). That is, when the goal is to validate ability and individuals do not believe they can accomplish this, motivation and performance tend to suffer. Learning goals, with their emphasis on understanding and growth, were shown to facilitate persistence and mastery-oriented behaviors in the face of obstacles, even when perceptions of current ability might be low (Ames & Archer, 1988; Butler, 1993; Elliott & Dweck, 1988; Jagacinski & Nicholls, 1987; Utman, 1997).

Performance and learning goals have also been shown to predict real-world performance, including exam grades, course grades, and achievement test scores, controlling for past performance (Dweck & Sorich, 1999; Greene & Miller, 1996; Kaplan & Maehr, 1999; Meece & Holt, 1993; Midgely & Urdan, 1995; Roeser, Midgely, & Urdan, 1996). In addition, goal effects obtain both when the goals have been experimentally manipulated (Butler, 1987; Elliott & Dweck, 1988; Graham & Golen, 1991), and when students’ naturally existing goals have been assessed (Ames & Archer, 1988; Bouffard, Boisvert, Verzeau, & Larouche, 1995; Midgely, Anderman, & Hicks, 1995; Miller, Behrens, Greene, & Newman, 1993; Pintrich & DeGroot, 1990; Pintrich & Garcia, 1991). The fact that induced goals have been found to have strong impact is important for two reasons. First, it means that goals can have a causal role in producing achievement patterns. Second, it means that learning environments can be constructed in ways that enhance achievement (Ames, 1992; Maehr & Midgely, 1991; Roeser et al., 1996).

Despite early agreement regarding the effects of performance and learning goals on motivation and performance, recent research has revealed a more complicated picture. Some researchers have questioned whether learning goals affect performance at all, sug-

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gesting that they chiefly influence intrinsic motivation (e.g., Barron & Harackiewicz, 2001; Elliot & Church, 1997; Harackiewicz et al., 1997; Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000). Some have argued that performance goals predict higher, not lower, grades, and do not affect intrinsic motivation (e.g., Barron & Harackiewicz, 2001; Elliot & Church, 1997; cf. Rawsthorne & Elliot, 1999).

We propose that looking at the ways in which performance and learning goals have been defined or operationalized can help account for the discrepant findings that have been obtained by different researchers. To test this proposal, items were created to measure the different forms of goals that have been prominently represented in existing research. Five studies explore the relationships among these goals, their ability to predict intrinsic motivation and performance under highly challenging or difficult circumstances, and the mechanisms through which they may bring about those effects. We begin by describing the important dimensions along which the operationalizations of performance and learning goals vary in current achievement goal research, and describing how each of these dimensions is represented in the following studies.

### What Is a Performance Goal and What Is Its Effect?

Achievement goal researchers have already made one important distinction among performance goals—namely, the distinction between performance *approach* goals (where the focus is on attaining success) and performance *avoidance* goals (where the focus is on the avoidance of failure; Elliot, 1999; Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Middleton & Midgely, 1997; Pintrich, 2000a). In general, this program of research has suggested that it is the avoidance form of performance goals that predict lower intrinsic motivation and performance, with approach goals often relating positively to performance.

However, as discussed below, the positive and negative effects of performance approach goals have typically been found when performance goals are operationalized in particular ways, and the positive and negative effects of different types of performance approach goals have not been systematically explored. Thus our purpose in this article is to distinguish among approach forms of performance goals, and we propose that they take at least three distinct forms: (a) goals that are linked to validating an aspect of self (e.g., one's ability), (b) goals that are explicitly normative in nature, and (c) goals that are simply focused on obtaining positive outcomes (i.e., doing well). It is the first form that was linked to impairment in the earlier models, but it has tended to be the second two forms that have been linked to more positive outcomes in recent work. Let us take a closer look at these different forms of approach goals.

For some researchers, the essence of a performance goal is seeking to validate one's ability (operationalized either by suggesting to participants that their performance on a task measures the extent to which they possess a valued ability, or by assessing the extent to which they generally strive to validate their ability). Debilitation occurs when outcomes indicate a lack of ability, but performance maintenance or enhancement can occur when success is expected (Ames, 1992; Elliott & Dweck, 1988; see Dweck & Leggett, 1988). It should be noted that debilitation here requires the presence of challenges, setbacks, or failure—an easy task or

course is not expected to produce debilitation, even in the presence of strong performance goals. To represent this view, we developed *ability* goal items (e.g., "It is important to me to validate that I am smart.").

For others, the essence of a performance goal is a normative comparison (i.e., wanting to perform better than others), and a goal that is nonnormative (e.g., using an absolute standard such as a perfect score, or tying absolute performance to self-worth) is not considered to be a performance goal (Elliot, 1999; Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Maehr & Midgely, 1991; Pintrich, 2000b). Here, performance goals are often operationalized by informing participants that their performance on a task will be evaluated normatively, or by measuring their agreement with statements such as "It is important to me to do well compared to others in this class" (Elliot & Church, 1997).

The issue of whether normative performance goals are empirically distinct from performance goals that do not contain a normative standard has not been systematically addressed in the achievement goal literature. Yet it is an important question, because to some theorists, as noted, the presence of normative comparison is the essence of a performance goal (Elliot & Harackiewicz, 1996; see Rawsthorne & Elliot, 1999), and to others, a potentially interesting but nonessential aspect of a performance goal (Elliott & Dweck, 1988). It would be interesting to find that normative and nonnormative performance goals do indeed differ, particularly if these differences could illuminate discrepancies in the reported effects of performance goals on motivation and performance. The following studies contain both normative and nonnormative versions of performance goals. An example of an explicitly normative goal would be the following: "One of my major goals in school is to feel that I am more intelligent than other students." In contrast, the goal item, "It is important to me to validate that I am intelligent," is not explicitly normative.

Sometimes goal items used to measure performance-goal orientation simply ask the participant about wanting to do well on a task, such as wanting to earn a high grade in a course. For people who are focused on doing well, negative outcomes do not necessarily indicate a lack of ability (i.e., holding this type of goal does imply a particular causal attribution for success or failure). We refer to the goal of wanting to do well on a particular task as an *outcome* goal, and it, too, is represented in our studies (e.g., "It is important to me to get good grades in my classes."). A closely related construct is "competence valuation," or the degree to which a task is perceived to be important (Elliot & McGregor, 2001), which has been found to relate positively to intrinsic motivation and performance (Barron & Harackiewicz, 2001). We find this type of goal particularly interesting, because "wanting to do well" can also be an important part of a learning goal framework. In other words, a person with a learning goal may care very much about doing well on a task, but perhaps for different reasons (i.e., in order to maximize learning, as an indicator of successful learning, or for instrumental reasons). Later, we address the question of whether outcome goals are best understood as performance goals.

### What Is a Learning Goal? When Is It Helpful?

There is generally less controversy and more agreement with respect to the nature of learning goals. As noted learning goals, task goals, and mastery goals have often been regarded as concep-

tually equivalent (Ames, 1992; Linnenbrink & Pintrich, 2000). Yet, potentially important differences among operationalizations do exist. For some (Ames, 1992; Elliot & Church, 1997; Elliott & Dweck, 1988; Harackiewicz et al., 1997; Middleton & Midgley, 1997), a learning goal is an active striving toward development and growth of competence, and is operationalized by emphasizing the importance and benefits of learning some new knowledge or skill to the participant, or by asking participants to indicate the extent to which learning and developing new skills are major academic goals. However, the terms “task goals” and “mastery goals” do not put an explicit emphasis on learning; thus, we thought it important to test the extent to which the desire to learn may be similar or different from the desire to master challenges. As a result, we included items measuring two forms of learning goals. An example of a learning goal without an explicit challenge-mastery component is “I strive to constantly learn and improve in my courses.” An example of an explicit challenge-mastery item is “It is very important to me to feel that my coursework offers me real challenges.”

It should be reiterated that, despite the substantial agreement among researchers with respect to the concept of a learning goal, the data with respect to the influence of learning goals on motivation and performance are not without inconsistencies. Typically, those who adopt learning goals are found to engage in deeper, more self-regulated learning strategies, have higher intrinsic motivation, and perform better, particularly in the face of challenge or setbacks (Ames, 1992; Dweck & Leggett, 1988; Kaplan & Midgley, 1997; Pintrich, 2000a; Pintrich & Garcia, 1991; Utman, 1997; see also Barron & Harackiewicz, 2000). However, recently, several studies have failed to find enhanced performance outcomes resulting from learning goals (although enhanced intrinsic motivation was found; Elliot & Church, 1997; Elliot, McGregor, & Gable, 1999).

### Conditions Under Which Goal Effects Are Tested

The effects of learning and performance goals on motivation and achievement have been tested under a wide variety of circumstances—with students working on interesting “NINA” puzzles (Elliot & Harackiewicz, 1996), performing a concept-formation task (Elliott & Dweck, 1988), solving math problems (designed to be highly challenging in one condition; Barron & Harackiewicz, 2001; cf. Middleton & Midgley, 1997), or taking an intermediate-level psychology course (Elliot & Church, 1997). Importantly, these tasks may have varied with respect to the degree of difficulty or challenge encountered by the participant, and the degree to which performance on the task had importance or meaning to the participant. We feel that conditions where the degree of difficulty is substantial for a large number of participants and the outcome is highly important are more likely to reveal goal effects on motivation, coping, and achievement, and have tried to use such conditions in the studies reported here.

In summary, there have been major differences in the ways goals have been operationalized, and it is not surprising that the data are inconsistent with respect to how and when performance and learning goals affect motivation and achievement. In the following studies, we attempted to illuminate these issues. In three studies, we developed and tested a set of items to tap different forms of learning and performance goals. In the fourth study, to

gain an initial sense of the patterns associated with each goal type, we presented students with scenarios depicting important academic setbacks and examined how the different goals predicted intrinsic motivation and coping. In the fifth study, the different goals were used to predict intrinsic motivation, study strategies, and performance in an important and challenging course.

### Study 1

Given the number of goals we hoped to measure and compare (e.g., ability goals, outcome goals, normative outcome goals, normative ability goals, learning goals, and challenge-mastery goals), we wanted to use the fewest possible items to measure each type of goal while still maintaining high reliability. It was felt that using relatively few items would minimize the frustration and confusion participants might experience when required to answer many similarly worded items. Thus, 10 items for each of type of goal were created and carefully tested with 560 participants, and the most reliable three items were selected for each goal. In three preliminary studies (Studies 1–3) reported below, the items used to measure each type of goal achieved good reliability and validity, as demonstrated by the relatively high alphas for each group of items, the high correlation of each group of items with scales assessing conceptually similar variables, and the high test–retest correlations (the Appendix contains the complete list of items). For each goal item, participants were asked to rate their agreement on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

### Method

#### Participants

A total of 451 participants (218 men and 233 women) recruited from the Columbia University student population were paid \$5 for their participation. Fifty-seven percent of participants were Caucasian, 9% African American, 19% Asian, 8% Latino, and 7% were “other” or unidentified.

#### Procedure

Participants were asked to complete a goal inventory containing the three items for each of the types of goals along with several unrelated measures. The goal items were presented in random order. Participants in this initial study (and all subsequently reported studies) read and signed consent forms that informed them about the procedure, the information that would be asked of them, and their rights as research participants. They were reminded that they were free to leave the study at any time without penalty.

### Results

#### Exploratory Factor Analysis

Principal-components analysis, using varimax rotation and eigenvalues greater than 1, yielded four factors (accounting for 24%, 20%, 16%, and 12% of the total variance, respectively). Factor 1 contains all normative items (both normative ability and normative outcome). Factor 2 contains both the learning and challenge-mastery items. Factor 3 contains all of the nonnormative outcome goal items. Factor 4 contains all nonnormative ability goal items.

This analysis was repeated using oblimin rotation, which yielded nearly identical results (see Table 1).

These analyses revealed that, consistent with our expectations, learning goals (Factor 2), outcome goals (Factor 3), and ability goals (Factor 4) are distinct constructs. As we will see, learning and ability goals are the major classes of predictive goals in subsequent studies. In addition, participants clearly distinguished between normative and nonnormative forms of performance goals, suggesting that this distinction is a meaningful and potentially important one. Normative goals loaded together (Factor 1), suggesting that participants who endorsed them did not distinguish strongly between normative outcome and normative ability goals. Similarly, challenge-mastery goals did not distinguish themselves reliably from learning goals. Thus, four groups or classes of goals emerged in this study, and we focus on these groups throughout the remainder of the article: learning (comprised of both learning and challenge-mastery items), outcome, ability, and normative (comprised of both normative outcome and normative ability items).

### Internal Consistency

Although Cronbach's alpha is dependent on the length of the measure (i.e., number of items in a scale), our goal measures nonetheless achieve substantial alphas. The alphas for each of the four subsets of the goal items (ranging from .81 to .92) had an average of .86, consistent with unidimensionality for each set of items.

### Confirmatory Factor Analysis (CFA)

CFA was conducted on the achievement goal items using EQS 5.7 (Bentler & Wu, 1995). Solutions were generated on the basis of maximum-likelihood estimation. Seven models were tested. For each model, we calculated multiple indices of fit: chi-square, comparative fit index (CFI), normed fit index (NFI),

nonnormed fit index (NNFI), root-mean-square error of approximation (RMSEA), and Akaike Information Criterion (AIC), a comparison statistic for nonhierarchical models. The results from these analyses indicated that two models provided a good fit to the data: Model A,  $\chi^2(123, N = 451) = 490.23$ , CFI = .93, NFI = .91, NNFI = .92, RMSEA = .08, AIC = 244; Model B,  $\chi^2(120, N = 451) = 395.76$ , CFI = .95, NFI = .93; NNFI = .94, RMSEA = .07, AIC = 155). Although Model B (a six-factor model) does provide a slightly better fit, Model A—a hierarchical model with four primary factors (i.e., an ability goal factor, an outcome goal factor, a normative factor comprised of normative ability and normative outcome factors, and a learning factor comprised of learning and challenge-mastery factors)—is consistent with the results from the two principal-components analyses, as well as with the pattern of item intercorrelations and scale alphas. Thus, a four-factor goal model, consisting of learning goals, outcome goals, ability performance goals, and normative performance goals, received the most consistent support and provided the best overall fit to the data.

### Correlations Among Classes of Goals

All four goal indices were positively correlated. Outcome goals (wanting to do well) appear to accompany the valuing of any achievement goals, whether those goals pertain to learning ( $r = .37, p < .001$ ), to validating one's ability ( $r = .53, p < .001$ ), or to outperforming others ( $r = .34, p < .001$ ). Learning goals were positively related to outcome goals, as noted, as well as ability goals ( $r = .41, p < .001$ ) and normative goals ( $r = .17, p < .001$ ). Finally, ability goals and normative goals were strongly correlated ( $r = .52, p < .001$ ). Although it appears that individuals who value achievement may value many aspects of it, we will see that clearly distinct and unique patterns are associated with each type of goal.

Table 1  
Principal-Component Factor Analysis With Item Loadings

| Goal item type    | Item no. | Varimax rotation |           |            |            |
|-------------------|----------|------------------|-----------|------------|------------|
|                   |          | 1                | 2         | 3          | 4          |
| Learning          | 1        |                  | .72 (.74) |            |            |
|                   | 2        |                  | .70 (.68) |            |            |
|                   | 3        |                  | .66 (.62) | .51 (-.44) |            |
| Challenge-mastery | 1        |                  | .84 (.87) |            |            |
|                   | 2        |                  | .80 (.82) |            |            |
|                   | 3        |                  | .74 (.75) |            |            |
| Outcome           | 1        |                  |           | .81 (-.79) |            |
|                   | 2        |                  |           | .74 (-.71) |            |
|                   | 3        |                  |           | .87 (-.86) |            |
| Ability           | 1        |                  |           |            | .50 (-.46) |
|                   | 2        |                  |           |            | .79 (-.80) |
|                   | 3        |                  |           |            | .81 (-.83) |
| Normative outcome | 1        | .81 (.85)        |           |            |            |
|                   | 2        | .81 (.86)        |           |            |            |
|                   | 3        | .83 (.86)        |           |            |            |
| Normative ability | 1        | .82 (.78)        |           |            |            |
|                   | 2        | .81 (.77)        |           |            |            |
|                   | 3        | .85 (.82)        |           |            |            |

Note. All loadings above .40 are shown. Oblimin rotation values are shown in parentheses.

### *Analysis by Gender*

Tests for mean difference in goal ratings by gender revealed several significant differences, though the pattern of differences varied across studies. Because these differences did not replicate across studies, there is little reason to believe that any were representative of the general population. It is important to note that there were no interactive effects of goal and gender in any of the studies. In other words, performance and learning goals exerted the same effects on both men and women in each study. Therefore, in the interest of brevity, gender differences will not be discussed for each study.

## Study 2

### *Method*

#### *Participants*

A total of 54 participants (23 men, 31 women) recruited from the Columbia University student population were paid \$10 for their participation.

#### *Procedure*

Participants completed the goal items as part of a battery of measures, and then completed the items again in another battery of measures exactly 2 weeks later.

### *Results*

Correlations between Time 1 and Time 2 ratings were calculated for each goal. The correlations ranged from .69 to .88, and the average test-retest correlation was .79. Thus, participants' scores were substantially consistent over time.

## Study 3

Study 3 was designed to obtain construct validity for the goal items by relating them to other goal measures. Two commonly used measures of achievement goal orientation were chosen (i.e., Button, Mathieu, & Zajac, 1996, and Elliot & Church, 1997). In particular, it was important to show that (a) our measure of learning goals mapped onto other operationalizations of learning goals, (b) that our measure of normative performance goals was an accurate representation of how these goals have been measured in the literature, and (c) that our outcome goals were equally related to learning and performance goals in other measures, as they had been in ours. Neither measure taps ability goals as we have defined them.

### *Method*

#### *Measures*

*Learning and Performance Orientation Scales* (Button et al., 1996). Button et al.'s (1996) inventory is composed of two scales (Learning and Performance), each containing eight items. In general, Button et al.'s learning goal items capture the conceptualization proposed by Dweck and Elliott (1983)—an emphasis on challenge-seeking, use of effort and strategies, and desire to develop and grow. Button et al.'s performance items

emphasize wanting to do well and not make mistakes, though there are two items that involve social comparison and the opinions of others.

*Elliot and Church's (1997) Achievement Goal Scale.* The goal orientation scale used by Elliot and his colleagues in their classroom studies (Elliot & Church, 1997; Elliot et al., 1999) consists of three subscales with six items each, of which we focused on two: Mastery and Performance Approach (the third subscale is Performance Avoidance). The Mastery items emphasize wanting to learn as much as possible and thoroughly master new material. Performance Approach items emphasize wanting to do better than others (i.e., normative items).

### *Participants*

A total of 87 participants (37 men, 50 women) were recruited from the Columbia University student community and paid \$5 for their participation. Sixty percent of participants were Caucasian, 22% African American, 13% Asian, and 5% were "other" or unidentified.

### *Procedure*

Participants completed our goal items, along with the Learning and Performance Orientation Scales (Button et al., 1996), and the Achievement Goals Scale used by Elliot and his colleagues (Elliot & Church, 1997). The three measures were presented in three different orders across participants. There were no discernable effects of order.

### *Results*

As expected, the learning goal items were highly positively correlated with Button et al.'s (1996) Learning scale ( $r = .72, p < .001$ ) and Elliot and Church's (1997) Mastery scale ( $r = .76, p < .001$ ). This suggests that the items are valid indices of a learning orientation.

In Study 1, outcome goal items, with their focus on the value of doing well, were compatible with learning goals, ability goals, and normative goals. They were also positively correlated with both Button et al.'s (1996) Learning ( $r = .37, p < .01$ ) and Performance ( $r = .45, p < .001$ ) Scales, as well as with Elliot and Church's (1997) Mastery ( $r = .41, p < .001$ ) and Performance Approach ( $r = .30, p < .01$ ) scales. This is further evidence of the hybrid nature of outcome goals.

Ability goal items were positively correlated with Button et al.'s (1996) Performance Scale ( $r = .45, p < .001$ ) and Elliot and Church's (1997) Performance Approach scale ( $r = .46, p < .001$ ), but only moderately, because neither of those scales focus on ability validation.

As predicted, normative goal items were highly correlated with Elliot and Church's (1997; normative) Performance Approach scale ( $r = .83$ ). Ability and outcome goal items were significantly less correlated with this scale (outcome  $r = .30$  vs. normative  $r = .83, t[85] = 4.01, p < .001$ ; Ability  $r = .46$  vs. Normative  $r = .83, t[85] = 1.98, p < .05$ ).

In summary, a comparison of these three measures yielded evidence for the construct validity of our goal items. High correlations with conceptually similar subscales in the Button et al. (1996) and Elliot and Church (1997) measures can be taken as evidence that the items are tapping into the right goal constructs.

## Study 4

We believe that it is important to look at goal effects when individuals experience major setbacks or failure on highly valued

tasks, because it is under these conditions that we would expect goal effects on motivation, coping, and achievement to be maximal. Studies 4 and 5 were designed to look at how each of the different goals we identified predicts indices of intrinsic motivation, mastery-oriented coping, and performance, after a significant or sustained difficulty or setback, by means of hypothetical failure scenarios (Study 4), reports of habitual coping style (Study 4), and a very challenging premed college course (Study 5).

We also included measurements of some of the affective and cognitive variables that comprise the psychological processes that accompany goal pursuit. Much recent achievement goal work pays little attention to the psychological concomitants of goals: attributions, beliefs, and contingency of self-worth (Molden & Dweck, 2000). By including these measures, we hoped to capture a richer motivational picture of performance and learning goal processes.

In Study 4, two scenarios were generated in which the participant encounters failure in an important achievement setting (adapted from Zhao & Dweck, 1997). The use of hypothetical scenarios was used here as a first step in relating the different goals to the variety of cognitive, affective, and behavioral variables involved in coping with difficulty in achievement situations.

Participants in Study 4 also completed a measure of chronic coping style (COPE; Carver, Scheier, & Weintraub, 1989), so that we might look at the relationship between goal orientation and participants' own personal history of coping with setbacks. Thus, the first part of Study 4 asks participants to indicate how they would respond to a situation if it occurred, and the second part of Study 4 asks them to reflect on past situations that have actually occurred.

## Method

### Participants

A total of 92 participants (40 men, 52 women) were recruited for pay from the Columbia University community. Sixty-one percent of participants were Caucasian, 21% African American, 12% Asian, and 6% were "other" or unidentified. They received \$5 for their participation.

### Procedure

Participants completed the goal items, and then, after a 5-min word-completion filler task, they received one of two randomly assigned scenarios, shown in previous work to elicit motivational differences (see Zhao & Dweck, 1997). The scenario asked them to read about a failure experience in a college classroom (either getting a bad grade on an important essay in a key course or doing poorly on the Graduate Record Examination when they strongly wished to go to graduate school), and to imagine it happening to them. These two scenarios were vividly written and were selected to represent situations that they could easily personally relate to (i.e., doing poorly on an essay in a course in your major, and doing poorly on a test in science class). Here is an example:

Imagine that during your second semester at Columbia, you take an important course in your major, in which students are required to read their essays out loud to the entire class. This happens several times throughout the semester. The time comes for the first readings. By the time it's your turn, most of the students have already presented their essays. All of them did pretty well, and you know that their essays got good grades from the professor. But when you read your essay to the class, the professor and the other students don't seem to like your

presentation very much, and later you find out that the grade he gave you was a C-.

Participants were then asked to indicate what they would think, how they would feel, and how they would behave after the failure by rating their degree of agreement with a series of statements. These statements include items assessing *loss of intrinsic motivation* (e.g., "I'd probably feel less interested in the subject"), *help-seeking* (e.g., "I would seek help from my professor or my classmates"), *planning* (e.g., "I'd start planning how to do better on the next presentation"), and *time and energy withdrawal* (e.g., "I would devote less time and energy to the class"), as well as *attributions* for the failure (e.g., "I would feel like I wasn't smart enough"), *loss of self-worth* (e.g., "I would feel like a loser"), and *ruminating* (e.g., "I would dwell on my failure"). Responses were made by circling a number on a 7-point scale ranging from 1 (*not at all true of me*) to 7 (*very true of me*).

After a second 5-min word-completion filler task, participants were asked to complete the Ways of Coping Scale (COPE; Carver et al., 1989). This scale measures the ways in which individuals have coped with difficulties when they have arisen. Subscales include Active Coping, Planning, Positive Reinterpretation, Denial, and Behavioral Disengagement.

## Results

For each of the analyses conducted, scenario version (1 or 2) was entered as a predictor, and no effect for scenario version was found. Therefore, all analyses reported were conducted collapsing across scenario version. Each of the four goal types (learning, outcome, ability, and normative) was entered as a predictor in a series of simultaneous regressions that included all two-way interactions. There were no significant two-way interactions, so these terms were dropped in subsequent analyses. Thus, the effects of each goal on the variables of interest control for any effects of the other three classes of goals. In this way, we could determine what, if any, were the unique effects of each class of goal on our achievement variables.

### Intrinsic Motivation

Table 2 depicts the unique relationship between each type of goal and an index of loss of intrinsic motivation, created by adding together responses from the following three items ( $\alpha = .89$ ): "I'd probably feel less interested in the subject," "I probably wouldn't enjoy the course as much as before," and "I wouldn't really be excited about the course anymore."

As can be seen, learning goals were negatively related to decreases in intrinsic motivation, whereas outcome and ability goals were significantly correlated with decreases in intrinsic motivation. Of interest, normative goals did not predict loss of intrinsic motivation. This finding is worth noting, in that the program of research that has most consistently found that approach forms of performance goals do not negatively influence intrinsic motivation has used a normative definition of performance goal (e.g., Elliot & Church, 1997). Also, Epstein and Harackiewicz (1992) have found that students high in achievement motivation who were assigned competitive goals (which are inherently normative) experienced increased interest in a task when they were given a failure expectancy. This finding suggests that competitive strivings may buffer individuals when they experience difficulty or failure, in ways that ability-focused strivings do not.

Table 2  
Goals and Responses to Failure

| Goal      | Loss of intrinsic motivation | Withdrawal of time and effort | Help-seeking | Planning |
|-----------|------------------------------|-------------------------------|--------------|----------|
| Learning  | -.39***                      | -.40***                       | .17          | .57***   |
| Outcome   | .29**                        | .00                           | .36**        | .03      |
| Ability   | .40***                       | .32**                         | -.02         | -.02     |
| Normative | -.11                         | -.02                          | -.16         | -.16     |

Note. Values are standardized regression coefficients.  
\*\*  $p < .01$ . \*\*\*  $p < .001$ .

### Behavioral Coping

Endorsement of several possible behavioral responses by goal type is also displayed in Table 2. Consistent with the maintenance of intrinsic motivation, learning goals predicted planning (one item: "I'd start planning how to do better on the next presentation"), and negatively predicted withdrawal of time and energy (one item: "I would devote less time and energy to the class"). Ability goals, in contrast, positively predicted withdrawal of time and energy.

Outcome goals were the only goals that were positively related to help-seeking (one item: "I would seek help from my professor or my classmates"). Help-seeking may be perceived as a good way to obtain the good grades that those who endorse outcome goals clearly value.

### Attributions

Turning to the psychological processes that accompany goal pursuit, learning goals ( $\beta = .56, p < .001$ ) were predictive of effort-based attributions for failure (one item: "I think that if I work harder, I can do better"), whereas ability goals ( $\beta = .22, p < .05$ ) and outcome goals ( $\beta = .36, p < .01$ ), in contrast, were predictive of ability-based attributions (one item: "I feel like I'm just not good at this subject"). Learning goals were negatively related to making ability attributions for poor performance ( $\beta = -.37, p < .01$ ).

These results are consistent with prior research, which found attributions to low ability to be associated with drops in intrinsic motivation and helplessness, whereas attributions to effort were associated with intrinsic motivation maintenance and mastery-oriented coping (e.g., Mueller & Dweck, 1998).

Again, normative goals were not reliable predictors of negative ability attributions. Taken together with the finding that these goals do not reliably predict loss of intrinsic motivation, the data begin to suggest that normative performance goals may be a harder form of performance goal (i.e., one that does not tend to lead to "helpless" forms of coping and behavior). This is again consistent with Elliot and colleagues' findings (see Elliot & Church, 1997; Elliot et al., 1999) that (normative) performance approach goals do not lead to lower motivation and performance.

### Loss of Self-Worth

Loss of self-worth is akin to a negative ability attribution, but it is more global. It, too, can often accompany helpless motivational and behavioral responses to a setback (e.g., Covington, 1992;

Crocker & Wolfe, 2001). A composite index of self-worth loss was created by adding together responses from the following three items: "I would feel like a loser," "I would feel like a failure," and "I'd think less of myself as a person" ( $\alpha = .84$ ). Consistent with results thus far, ability ( $\beta = .56, p < .001$ ) goals were positively correlated with loss of self-worth.

### Rumination

The tendency to ruminate on one's setbacks has been associated with helplessness. A composite index of ruminating and dwelling on the failure was created by adding together responses from the following two items: "I would dwell on how poorly I did" and "I would replay it all over and over again in my mind" ( $\alpha = .92$ ). Rumination was fairly strongly related to ability goals ( $\beta = .47, p < .001$ ). Thus, those goals that tend to lead to ability attributions and negative self-evaluation also predict dwelling on the negative outcome and its meaning.

The results from the hypothetical failure scenarios revealed a consistent pattern among the motivational and coping variables. Learning goals predicted active, engaged responding, whereas ability goals predicted self-denigration and withdrawal. Outcome goals were associated with a hybrid response pattern (i.e., low ability attributions and decreased intrinsic motivation as well as help-seeking). Finally, normative goals were not reliable predictors of mastery-oriented or helpless responding.

### Chronic Coping Style

We now turn to the question of whether different goals predict different reported histories of coping with setbacks in past achievement situations. Different styles of chronic coping were measured by the Ways of Coping Scale (Carver et al., 1989), which asks participants to indicate the extent to which they have typically engaged in various coping strategies.

Consistent with the responses to the failure scenarios, learning goals predicted *active coping* ( $\beta = .38, p < .01$ ) and *planning* ( $\beta = .33, p < .01$ ). They were also predictive of *positive reinterpretation* of a setback ( $\beta = .30, p < .05$ ) and negatively related to *denial* ( $\beta = -.36, p < .01$ ), *behavioral disengagement* ( $\beta = -.35, p < .01$ ), and *mental disengagement* ( $\beta = -.28, p < .05$ ).

Ability goals negatively predicted positive reinterpretation of a setback ( $\beta = -.30, p < .05$ ). Of interest, normative goals were significant predictors of denial after a setback ( $\beta = .25, p < .05$ ) and behavioral disengagement ( $\beta = .28, p < .01$ ). The finding for denial perhaps suggests that competitive striving might keep indi-

viduals from recognizing a poor performance when they produce one. This may provide some explanation for the consistent finding that normative goals did not predict negative cognitive, affective, and behavioral responding to a hypothetical setback (e.g., loss of intrinsic motivation, low ability attributions, loss of self-worth, rumination) as strongly or consistently as nonnormative ability goals.

In summary, learning goals were associated with active coping, and a wide range of positive, mastery-oriented indicators. Learning goals appear to be a powerful predictor of behaviors that will preserve intrinsic motivation and performance in the face of difficulty. In contrast, ability goals were associated with a loss of motivation and common indices of helplessness. Outcome goals (which are related to both learning goals and ability goals) also predicted a loss of motivation and low ability attributions for failure, but predicted proactive behaviors as well (e.g., help-seeking). Taken together, these results suggest that valuing doing well is not in itself a good predictor of responses to failure—rather, the goals that accompany valuing doing well (learning or validating ability) seem responsible for much of the “action.” Normative goals were not among the performance goals that related strongly or consistently to the variables measured, suggesting that under some circumstances, competitive performance goal items may not predict maladaptive cognitions, affect, or coping when other types of performance goals (i.e., ability goals) do.

### Study 5

Study 5 differed from Study 4 in several ways. First, the goal items were used to predict motivation and performance in a “real-world” setting, specifically for freshman and sophomore undergraduates taking an important and often career-defining course. Study 5 also differed from many past course-taking studies in the level of sustained challenge or difficulty encountered by participants (and, as explained below, in our special attention to students who encountered successive setbacks over the course of the semester). For this reason, we would expect to see more facilitative effects of learning goals on motivation and performance, as well as the debilitating effects of performance goals.

Aside from being a real-world study, Study 5 differed from Study 4 in another important way. Study 4 presented students with a *fait accompli*—a defined failure—and therefore, perhaps did not allow us to see the potentially beneficial effects of performance goals for people experiencing challenge but not failure. Study 5 allowed us to monitor students throughout the semester, by looking in on students as they began this new, important, and challenging course. Here we might find that for students who are doing well, ability goals will provide a boost over time, whereas for students who are encountering difficulty, ability goals will predict further impairment. In other words, Study 5 allowed us to see goal effects as they played out over time—both their facilitative effects and their detrimental effects.

Most potential premed, engineering, and science majors at Columbia University enroll in General Chemistry in the Fall of their freshman year. The permission and support of the Columbia University Provost, Deans of the College of Arts and Sciences, and General Chemistry instructors were granted to conduct an intensive study of these students throughout the semester. Surveys tracked students’ intrinsic motivation and performance at several

points throughout the semester, and grades were obtained from the Chemistry Department with permission of the students.

### Method

#### Participants

Participants were 85% freshmen, 50% female and 50% male. The number of participants in each wave of the study varied between 78 and 128, depending on class/recitation attendance. In the largest sample, participants were 59% Caucasian, 7% African American, 26% Asian, and 8% Latino. The average grade on any exam in this course was a C+, suggesting that this was a course in which many participants experienced difficulty or setbacks. For the smaller samples, we tested to ensure that the participants were entirely representative of the larger sample and that no systematic attrition had occurred. Thus, although attendance (and hence participation in the study) varied over the waves of the study, no significant differences among samples at the different time points were found in terms of gender, ethnicity, goal endorsement, or grades.

#### Procedure

General Chemistry is a lecture course that is structured around three midterms and a final exam. Data were collected from participants at four points during the semester: twice 2–3 weeks before the first midterm, once immediately after the first midterm, and again 2 weeks before the final exam. Data were collected in the last 15–20 min of class or recitation. The measures were presented (along with other measures in a packet of questionnaires) in the following sequence:

Session 1 (2–3 weeks before first midterm): goal items, demographic information

Session 2 (1 week after Session 1): intrinsic motivation, perception of chemistry ability

Session 3 (after first midterm): general study strategies (from Elliot et al., 1999)

Session 4 (before final exam): intrinsic motivation

Consistent with the results of Study 4, we predicted that learning goals would be positively related to intrinsic motivation and grades (despite the lack of the influence of learning goals on performance found in previous studies in what may have been less academically strenuous or personally relevant contexts). We expected ability goals to be associated with lower performance after multiple setbacks, as suggested by Dweck and Leggett (1988), but not necessarily with lower performance overall. In fact, we expected that students who were doing well in the course might experience a “boost” from holding strong ability goals.

### Results

#### Perceived Ability

If different types of goals are systematically related to different levels of perceived ability, then it is possible that the effects of goals obtained in this study are simply due to this confounding factor. To rule out this explanation, perceived level of ability in chemistry was measured at the beginning of the course (one item: “Compared to other students in this course, please rate your ability in chemistry” on a 10-point scale ranging from *top 10%* to *lower 10%*). Perception of ability in chemistry was related to overall course grade ( $r = .27, p < .01$ ). It was also related to intrinsic

motivation at the beginning ( $r = .26, p < .01$ ) and at the end ( $r = .31, p < .05$ ) of the course.

Correlations between perceived ability in chemistry and goal type revealed that normative goals were significantly positively related to perceived ability ( $r = .38, p < .001$ ). In other words, people with normative goals tended to believe that their ability was high relative to others. This could help account for the resilience (or, better put, lack of negative consequences) associated with normative goals in Study 4. Outcome goals were also positively related to perceived ability ( $r = .21, p < .05$ ), whereas learning and ability goals were unrelated to perceptions of chemistry ability.

### *Intrinsic Motivation*

In a set of linear regressions, we looked at the relationship between goal type and intrinsic motivation, measured by enjoyment of and interest in the course (two items,  $\alpha = .88$ ). These data were collected at the beginning of the course and again before the final exam. The regressions controlled for perceived ability (though an essentially identical pattern emerged when perceived ability was not included in the analysis) and for the effects of each of the other three goal indices. We also included gender in our initial analyses, but gender did not predict intrinsic motivation and was dropped from subsequent analyses predicting intrinsic motivation.

In this highly difficult course, learning goals predicted higher intrinsic motivation at the beginning ( $\beta = .23, t(128) = 2.34, p < .05$ , and at the end ( $\beta = .22, t(78) = 2.02, p < .05$ , of the course. This is consistent with the findings of Elliot, Harackiewicz, and their colleagues (Elliot & Church, 1997; Elliot & McGregor, 1998; Harackiewicz & Elliot, 1998) that learning goals positively predict intrinsic motivation. There were no other significant predictors of intrinsic motivation.

### *Grades*

We looked at the relationship between each goal type and students' total grades, controlling for Scholastic Aptitude Test (SAT) score, perceived ability in chemistry, number of prior courses in chemistry, and gender, as well as the effects of other goal indices. Gender predicted total grade ( $\beta = -.19, t(126) = -3.03, p < .01$ , such that men tended to have higher grades than women. In addition, we looked at the extent to which each goal type predicted improvement from Exam 1 to the final exam, controlling for performance on Exam 1 (the interaction of each goal with performance on Exam 1 was also included as a predictor).

### *Total Course Grade*

Consistent with the pattern of effort attribution and mastery-oriented coping associated with learning goals in Study 4, learning goals positively predicted course grade ( $\beta = .20, t(120) = 2.42, p < .05$ ). No other goals were significant predictors of course grade. The fact that learning goals emerged as a significant predictor of performance supplements the findings of Elliot, Harackiewicz, and their colleagues (e.g., Elliot & Church, 1997; Harackiewicz et al., 1997), who have suggested that performance

goals, and not learning goals, predict course performance. This result could imply that when a course involves sustained challenge, learning goals do positively affect course performance.

### *Improvement in Grade From Exam 1 to Final Exam*

Learning goals also significantly predicted grade improvement ( $\beta = .25, t(122) = 2.94, p < .01$ , and were the only goals to do so.

### *Final Exam Grade*

Earlier, we had predicted that ability goals would have a negative effect on performance for those students who had experienced prolonged setbacks. To address this question, we looked at how goals predicted performance on the final exam for those students who had performed poorly throughout the semester. We simultaneously regressed each goal type, the average of students' Exam 1, 2, and 3 grades (our index of past performance), and the interaction of goal type with average exam grades, onto final exam grades. We predicted a significant interaction for ability goals, such that students who had done poorly throughout the semester (i.e., those with low average exam grades) would suffer for holding strong ability goals, whereas those who had done well throughout the semester might receive a boost on the final.

As predicted, there was a significant interaction between ability goals and average grade on Exams 1, 2, and 3 ( $\beta = .52, t(71) = 2.23, p < .05$ ). Figure 1 illustrates this effect. We have plotted data for participants who were either one standard deviation above or below the mean endorsement of ability goals (see Jaccard, Turrisi, & Wan, 1990). Participants were further separated into high- and low-course performance groups (based on a median split of performance on exams prior to final). As shown, participants with low prefinal grades score lower on the final exam if they are high rather than low in ability goals. In contrast, participants with higher prefinal grades earn better scores on the final

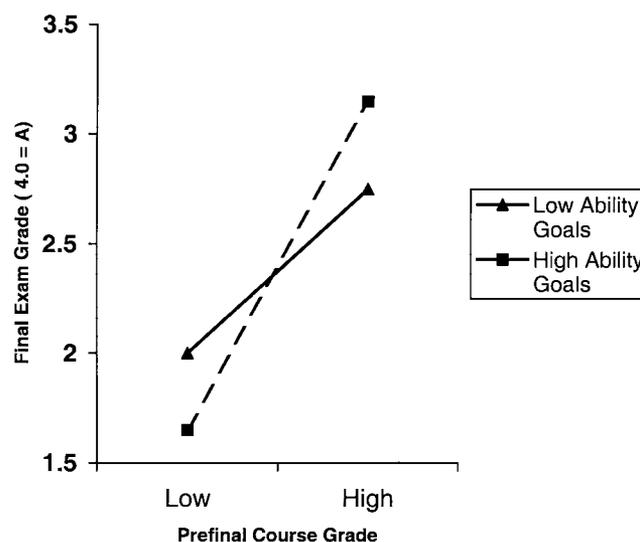


Figure 1. Final exam grade predicted by past performance and ability goals.

exam if they are high rather than low in ability goals. This finding suggests that when setbacks are repeated, ability goals predict poor performance, but may indeed provide a boost when an individual is doing well (see Elliott & Dweck, 1988).

### Study Strategies

To further understand the differences we found in performance, we looked at three study strategies (deep processing, surface processing, and disorganized processing) that were adapted from a scale used by Elliot et al. (1999), and were assessed immediately after students took the first exam. The tendency to engage in deep processing was significantly correlated with grade in the course ( $r = .29, p < .01$ ). Disorganized processing was negatively related to course grade ( $r = -.36, p < .001$ ). Surface processing was unrelated to course grade ( $r = .08, ns$ ).

Outcome goals predicted surface processing of course material ( $r = .29, p < .01$ ), and learning goals predicted deeper processing of course material ( $r = .31, p < .01$ ). In contrast, normative goals were negatively related to deep processing ( $r = -.21, p < .05$ ), suggesting that one drawback associated with a competitive goal might be the absence of deep analysis of issues or material.

### Mediational Analyses for Learning Goal Effects on Course Grade

The significant correlation between learning goals and deep processing ( $r = .31$ ), as well as the correlation between deep processing and course grade ( $r = .29$ ), suggested processing style as a possible mediator of the effect of learning goals on course grade. Consistent with this hypothesis, the relationship between learning goals and course grade (controlling as we had earlier for SAT score, perceived ability in chemistry, past chemistry course experience, and gender), when controlling for extent of deep processing, is not significant ( $\beta = -.06, ns$ ), whereas deep processing remains a significant predictor of course grade ( $\beta = .43, p < .05$ ; see Table 3 and Figure 2).

### General Discussion

Items measuring different types of performance and learning goals were created and used in five studies to help to shed light on several important, unresolved issues in current achievement goal research. Studies 1–3 yielded evidence for four types of goals: learning goals, outcome goals (wanting to do well), ability-linked

performance goals, and normative performance goals. Individuals' responses in these three preliminary studies and two more comprehensive studies suggested answers to a number of the fundamental questions posed in the literature.

First, are there different types of learning goals? What is the relationship of learning goals to intrinsic motivation and performance? We looked at two types of learning goals: striving to learn and develop versus seeking to master challenges. These two goals were highly correlated and loaded together in two principal-components analyses, so the items were combined into a single learning goal measure. Although we did not find evidence in our studies for separating these two types of learning goals, they may still differ importantly from the "task goals" found in past research that are often operationalized in ways that contain neither striving to learn nor challenge-seeking.

Studies 4 and 5 provided evidence for the positive effects of learning goals on both intrinsic motivation and performance, consistent with the early research on achievement goals (see, e.g., Ames, 1992; Ames & Archer, 1988; Butler, 1987; Dweck & Leggett, 1988; Elliott & Dweck, 1988; Meece et al., 1988; Nicholls, 1984). Individuals who endorse learning goals should be more likely to see negative outcomes as information about ways to improve the learning process, rather than as indicators of stable low ability. As expected, in response to a major hypothetical failure (Study 4), learning goals predicted a wide range of positive, mastery-oriented indicators—including sustained intrinsic motivation, planning, and persistence. Participants with strong learning goals also reported a history of having used more mastery-oriented coping methods (e.g., active coping, planning) in response to past setbacks.

In Study 5, in an important and difficult college course, learning goals predicted better processing of course material, higher intrinsic motivation, higher grades, and greater improvement over time. Further analysis suggested that the relationship between learning goals and course grades was mediated by the tendency to engage in deeper processing of course material. The impact of learning goals on performance may be seen chiefly when a high degree of challenge is present, when a task is personally important, or when the processing of complex, difficult material is necessary. A potentially important topic for future research is the role that these factors play in the presence or absence of learning-goal effects on performance.

Turning to other questions posed earlier, is wanting to do well different from wanting to prove your ability? When might perfor-

Table 3  
Summary of Learning and Ability Goal Effects From Studies 4 and 5

| Goal     | Study 4   | Study 5   |
|----------|---|---|
| Learning | No decrease in intrinsic motivation<br>Less time and effort withdrawal<br>Effort attributions<br>Planning<br>Seeking positive reinterpretation and growth | Higher intrinsic motivation at beginning <i>and</i><br>end of course<br>Higher grades<br>Greater improvement over time<br>Deeper processing |
| Ability  | Lower intrinsic motivation<br>Loss of self-worth<br>Low ability attributions<br>Time and effort withdrawal<br>Rumination                                  | Lower grades after repeated poor performance<br>Higher grades after repeated good performance   |

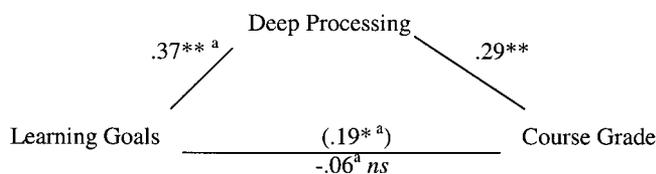


Figure 2. Processing style mediates the effects of learning goals on course grade. Values are standardized regression coefficients. <sup>a</sup>Standardized regression coefficient controlling for Scholastic Aptitude Test, perceived chemistry ability, past chemistry course experience, and gender. \* $p < .05$ . \*\* $p < .01$ .

mance goals predict vulnerability, and when might they prove beneficial to intrinsic motivation and/or performance? Individuals who endorse ability goals (i.e., seek to validate their ability) should be more likely to see negative outcomes as indicative of a lack of ability. Consistent with this prediction, ability goals were associated with common indices of helplessness after a significant hypothetical failure in Study 4. These goals predicted attributions to low ability, loss of self-worth, rumination about the setback, and loss of intrinsic motivation. In Study 5, consistent with the results of Study 4, after multiple setbacks, ability goals predicted lower grades. Thus, ability goals tend to predict a pattern of negative affect and cognition, as well as poorer subsequent performance, after a significant setback or a series of setbacks. These findings are also consistent with the early work on achievement goals (Ames & Archer, 1988; Butler, 1993; Elliott & Dweck, 1988; Jagacinski & Nicholls, 1987; Meece et al., 1988; see also Midgley, Kaplan, & Middleton, 2001). However, ability goals do not appear to have negative effects on performance when one is still “in the running” (i.e., when success is still possible), or when one is doing well, and may in these cases sometimes even boost performance because so much is on the line.

Why do the negative effects of ability goals occur? Dweck and Leggett (1988) suggested several potential cognitive and affective mechanisms of debilitation for individuals who hold ability goals in the face of difficulty. These include the loss of belief in the efficacy of effort (i.e., “My ability is so low, no amount of effort could help me”), defensive withdrawal of effort (either as a form of self-handicapping or as a response to the belief that the need to put in effort confirms that one has low ability), and interference of negative affect with concentration or test performance. Another possibility is that students with ability goals may withdraw effort strategically when they are doing poorly to redirect the resources to courses where they have a better chance at getting a good grade. Although these data do not test specifically for this possibility, the pattern of negative attributions, rumination, and loss of self-worth associated with ability goals suggest that withdrawal is not a solely cool-headed strategic process.

Outcome goals had surprisingly few effects. Although correlated with many key outcomes, these effects were almost always due to the association of outcome goals with either learning goals (e.g., for active coping and effort attributions) or ability goals (e.g., for loss of self worth and rumination). These effects did not survive simultaneous regression analyses that controlled for the influence of learning, ability, and normative goals. Taken together, these results suggest that those researchers interested in studying the unique effects of performance goals would do better not to

operationalize them this way, as outcome goals (wanting to do well) can clearly be as much a part of a learning framework as a performance framework. In fact, doing well can be a means of assessing the acquisition and mastery of new skills and knowledge or of demonstrating ability.

Finally, *do* normative and nonnormative performance goals produce different effects? Unlike (nonnormative) ability goals, normative performance goals did not predict any of the affective, cognitive, or behavioral variables measured in Study 4, with the exception of the tendency on the COPE scale (Carver et al., 1989) to report engaging in denial and behavioral disengagement after experiencing an academic setback. In other words, wanting to outperform others might lead you to be reluctant to perceive your performance as a failure. In Study 5, normative goals, unlike ability goals, did not predict vulnerable performance, and in fact, were associated with higher levels of perceived ability. As mentioned earlier, the absence of a relationship between competitive goals and helplessness is worth noting, in that those researchers who have most consistently found that performance goals do not negatively influence intrinsic motivation and performance have used a normative definition of performance goal (e.g., Elliot & Church, 1997). Further research is warranted to explore the roles that perceived ability and denial may play in this protective function. Moreover, it is striking that although deep processing mediates the beneficial effects of learning goals on grades, the negative relationship between normative goals and deep processing did not seem to predict poorer grades. If the lower level of deep processing was not a hindrance in this setting, it is very likely that competitive zeal could have positive effects in the many settings in which deep processing is not required (Kanfer & Ackerman, 2000).

Because ability performance goals and normative performance goals appear to behave so differently, it would seem important for researchers to include both types of performance goals in future studies. In this way, we could continue to gain knowledge about when, why, and for whom each has costs and benefits.

It should be noted that there are several differences between these studies and many past studies of goal effects. First, the present studies used a measure of general goal orientation (i.e., the extent to which students typically felt oriented toward particular goals in their courses), whereas many past studies have used goal inventories that were specific to the task at hand, or to the course the student was currently taking. Although it is not certain how this difference might have affected our results and their interpretation, the field of achievement motivation might benefit from research that addressed differences in general versus specific goal measurement. Next, our participants, attending a highly selective university, may have differed somewhat from the typical student in ways that could increase or decrease the impact of particular goals. Also, somewhat larger sample sizes in some other studies may have yielded significant effects for certain performance goals that were not significant in our studies. Finally, as noted above, the course that our participants were enrolled in (Study 5) appeared to require deep processing in order to do well, and it is possible that this factor heightened the impact of learning goals. Nonetheless, our findings make sense both in view of much previous research and in view of the different meanings that various goals have for the individual.

Indeed, in this article we have taken great care to consider the meaning that particular goals may have for the individual and to

consider goal effects in that light. For example, in addressing the effects of ability-linked goals on behavior or performance, we pointed to the inferences that students with ability-linked goals draw from setbacks. In addressing the effects of outcome goals, we noted that wanting to do well, far from being a pure performance goal, may be equally linked to learning and performance goals. In thinking about learning goals, we stressed the element of active striving rather than a simple focus on the task or the absence of performance goal concerns. Thus, for each goal type, we tried to spell out the impact it might have in the face of achievement outcomes and why. We hope that our findings have shown the importance of conceptualizing the psychological processes that accompany different types of goals, and of matching operationalizations to these conceptions. When thought of in this way, it becomes clearer when and why different goals—even ones that have typically been classified under the same name—will have different effects.

In conclusion, we have found evidence to suggest that a careful examination of different types of performance and learning goals can indeed begin to clarify current controversies in the field. These studies have shown that learning goals do exert a positive influence on both intrinsic motivation and performance when individuals encounter prolonged challenge or setbacks. In addition, although performance goals that are focused on validating ability can have beneficial effects on performance when individuals are meeting with success, these same goals can predict impaired motivation and performance after setbacks.

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## Appendix

### Achievement Goal Inventory Items

#### Outcome Goal Items ( $\alpha = .85$ )

It is very important to me to do well in my courses.  
I really want to get good grades in my classes.  
A major goal I have in my courses is to perform really well.

#### Ability Goal Items ( $\alpha = .81$ )

It is important to me to confirm my intelligence through my schoolwork.  
In school I am focused on demonstrating my intellectual ability.  
One of my important goals is to validate my intelligence through my schoolwork.

#### Normative Goal Items ( $\alpha = .92$ )

##### Normative Outcome

It is very important to me to do well in my courses compared to others.  
I try to do better in my classes than other students.  
A major goal I have in my courses is to get higher grades than the other students.

##### Normative Ability

It is very important to me to confirm that I am more intelligent than other students.

When I take a course in school, it is very important for me to validate that I am smarter than other students.

In school I am focused on demonstrating that I am smarter than other students.

#### Learning Goal Items ( $\alpha = .86$ )

##### Learning

I strive to constantly learn and improve in my courses.  
In school I am always seeking opportunities to develop new skills and acquire new knowledge.  
In my classes I focus on developing my abilities and acquiring new ones.

##### Challenge-Mastery

I seek out courses that I will find challenging.  
I really enjoy facing challenges, and I seek out opportunities to do so in my courses.  
It is very important to me to feel that my coursework offers me real challenges.

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An Analysis of Learned Helplessness: Continuous Changes  
in Performance, Strategy, and Achievement  
Cognitions Following Failure

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Helpless children show marked performance decrements under failure, whereas mastery-oriented children often show enhanced performance. Current theories emphasize differences in the nature of the attributions following failure as determinants of response to failure. The present studies explored helpless versus mastery-oriented differences in the nature, timing, and relative frequency of a variety of achievement-related cognitions by continuously monitoring verbalizations following failure. The results revealed that helpless children made the expected attributions for failure to lack of ability; mastery-oriented children made surprisingly few attributions but instead engaged in self-monitoring and self-instructions. That is, helpless children focused on the cause of failure, whereas the mastery-oriented children focused on remedies for failure. These differences were accompanied by striking differences in strategy change under failure. The results suggest that in addition to the nature of the attribution one makes, the timing or even occurrence of attributions may be a critical individual difference.

Past research has linked deterioration in performance following failure to learned helplessness—the perceived inability to surmount failure (Dweck, 1975; Dweck & Bush, 1976;

Dweck & Reppucci, 1973; cf. also Seligman, Maier, & Geer, 1968). This perception is associated with attributions of failure to uncontrollable, invariant factors such as lack of ability, rather than to controllable factors such as effort. Despite equivalent performance prior to failure, children who attribute failure to lack of ability display marked performance decrements when they experience failure. Children who attribute their failure to lack of effort do not show deterioration in performance and often show improvement. Indeed, helpless children who are trained to make attributions that stress motivation

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rather than ability as determinants of failure show striking improvement in their response to failure (Dweck, 1975).

While past research gives clear indications of individual differences in attributional patterns, there may well be important differences in other achievement-related beliefs and behaviors (e.g., expectancy of success, self-instructions), in the relative importance of particular achievement-related cognitions, and in the time at which particular cognitions come into play. The two studies reported here were designed to explore differences between helpless and mastery-oriented (nonhelpless) children in their performance following failure and its cognitive-motivational concomitants.

In order to examine performance change under failure and the accompanying cognitive components, children were trained on a discrimination learning task that allowed monitoring of their hypothesis-testing strategies and classification of the sophistication of the strategies before and after failure (cf. Weisz, 1975). In one study, the children were requested to verbalize "what they were thinking about" while performing the task. In contrast to the usual procedure of soliciting statements of particular achievement cognitions at prespecified times, the continuous verbalization procedure permitted children to report what cognitions were salient to them as they became salient. Thus, it was possible to analyze differences in the nature, relative frequency, and timing of achievement-related cognitions reported by helpless and mastery-oriented children.

This study, then, addressed the cognitive-motivational differences between helpless and mastery-oriented children by examining whether their verbalizations differ in a systematic fashion. For example, do both groups of children make attributions following the same amount of failure feedback, or do helpless children perceive failure and make attributions sooner? Do the mastery-oriented children maintain a less "personal" view of failure feedback, use the feedback more constructively, and provide themselves with cues for improving their performance? Do the helpless children instead dwell on the negative affect associated with failure and per-

haps withdraw from the situation by making task-irrelevant verbalizations?

In view of the possibility that the verbalization procedure would change the nature of the situation and affect performance in unforeseen ways (see Dweck & Gilliard, 1975), another study was conducted in which changes in hypothesis-testing strategy were monitored without verbalizations. In addition to providing a check on the obtrusiveness of the verbalization procedure, this study enabled us to examine the precise nature of the performance decrement following failure and addressed the following questions: Does the helpless child try alternative, sophisticated strategies but abandon them sooner than the mastery-oriented child? Do helpless children simply revert to somewhat more immature (i.e., easier, but less efficient) strategies when they begin to fail and thus show performance deterioration; or do they begin to use feedback less effectively, perseverating on responses that are incorrect? Does the helpless child cease to search actively for a solution and begin to respond randomly? Does the deterioration in performance during a series of failures generally occur in a gradual fashion or does it tend to occur immediately?

In summary, past research had documented differences in the attributions and in the general performance of helpless and mastery-oriented children following failure. The present research was aimed at (a) determining the nature and timing of a variety of cognitive-motivational variables by continuously monitoring verbalizations during failure and (b) specifying the precise nature of the performance change by examining the course of hypothesis-testing strategies during failure.

## Method

### *Overview*

Children, classified as either helpless or mastery-oriented, worked on a discrimination task, and the level of their hypothesis-testing strategy was monitored. After eight training trials, a failure procedure was instituted, and changes in hypothesis-testing strategy were assessed. In a second study, the same procedure was followed but, in addition, children were asked to verbalize what they were thinking about while performing the task.

### Participants

In Study 1, the participants were 70 fifth graders (35 males and 35 females) from a semirural community. One male and one female were excluded for not meeting the training criterion, and the data from one additional female were eliminated because of procedural error. In Study 2, the participants were 30 male and 30 female fifth graders, also from a semirural community. None of the children had participated in the first study.

### Measure of Helplessness

Since past research (Dweck, 1975; Dweck & Repucci, 1973; Floor & Rosen, 1975) has indicated that a major difference between helpless and mastery-oriented subjects lies in their respective tendency to neglect or emphasize the role of effort in determining their failures, this relative emphasis was used as the criterion for dividing children into helpless and mastery-oriented groups. The Intellectual Achievement Responsibility (IAR) Scale (Crandall, Katkovsky, & Crandall, 1965), a questionnaire consisting of 34 forced-choice attributions, was used. Each item on the scale describes either a positive or negative achievement experience that occurs frequently in the daily lives of children. This is then followed by two alternatives, one attributing the cause of the event to someone else in the child's environment (external responsibility) and the other to his or her own behavior (internal responsibility). A subset (10 items) of the questions on the IAR specifically taps the child's attributions of failure to lack of effort.

Subjects were divided at the median (which was the same for both studies) into two groups: Those scoring 7 and below on the effort items were placed in the helpless group, and subjects scoring 8 and above were designated as mastery-oriented. The mean effort-attribution scores of the children in the two studies were very similar (Study 1: helpless children = 5.20, mastery-oriented children = 8.80; Study 2: helpless children = 5.35, mastery-oriented children = 8.70). The IAR was administered in written form to all subjects at least 2 weeks prior to the experimental session.

### Task and Materials

The task consisted of a three-dimension, two-choice discrimination problem in which the child searched for the one solution that was correct. Each child was presented with eight training problems and four test problems. A problem consisted of a set of stimulus cards (see Figure 1) with each card containing two figures that varied on three dimensions: color (e.g., red or blue), form (e.g., square or triangle), and a symbol in the center of the form (e.g., dot or star).

The stimuli were varied in a systematic fashion so that the child's hypothesis about the correct solu-

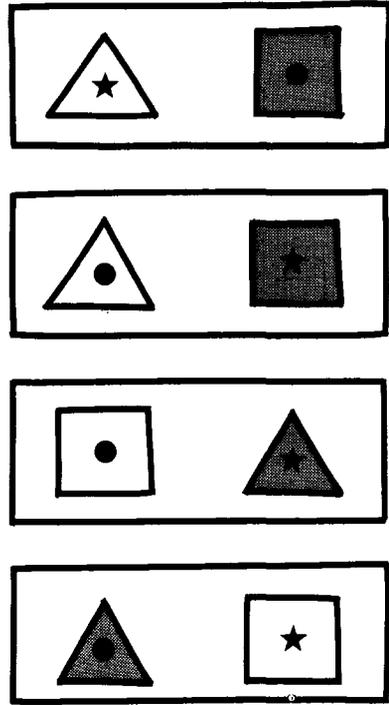


Figure 1. Example of four consecutive stimulus cards that allow the tracking of a hypothesis over the no-feedback trials.

tion could be inferred unambiguously from his or her choices. For example, a child who is testing the hypothesis, "triangle," would choose cards in the sequence of left, left, right, left, as can be seen in Figure 1. In order to monitor hypothesis-testing, a "blank trial" procedure was used in which the children did not receive feedback about the correctness of their responses on the first three of every four trials (Levine, 1966). A hypothesis was defined as the consistent selection of a particular stimulus property, such as the color red, over four trials prior to feedback. The instructions explicitly pointed out that when the experimenter gave no responses this meant neither right nor wrong. It has been demonstrated that when subjects receive no feedback, they maintain the same response for the next trial (Frankel, Levine, & Karpf, 1970; Gumer & Levine, 1971; Levine, 1966, 1969; Levine, Miller, & Steinmeyer, 1967).

Previous research (Fellows, 1968; White, 1965; Zeeman & House, 1963) has shown that children frequently display response sets such as position alternation and position perseveration. To eliminate the possibility that one of these response sets could be mistaken for a solution-relevant hypothesis, the stimuli were ordered within a single block of four trials such that all useful hypotheses could be separated from position responses. The instructions also

explicitly stated that the only possible solution was one of the colors, shapes, or interior symbols.

### *Procedure*

*Training problems.* Since the goal of the study was to examine the effects of failure feedback on problem-solving strategies during testing, rather than to test sophistication of hypothesis use per se, each child was given extensive training prior to the test problems. Hypothesis use during training was monitored, and measures of ease of training were taken across all problems. During training, the child was gradually introduced to the no-feedback trials and told that he or she was to try to be correct on every response. At the beginning of each new deck of cards, all stimulus dimensions (color, form, and interior symbol) were reiterated, all stimulus values were named by the experimenter, and the child was told there was only one correct answer for the entire deck of cards.

On the first training problem, veridical feedback ("right" or "wrong") was given after every response. Upon completion of a deck of 16 cards, the child was asked to verbalize the correct solution. If the child was correct, he or she was told, "Very good," and was given the second training problem. If the child was wrong, the same problem was repeated with a hint provided by the experimenter: "The correct answer is one of the two shapes, either the triangle or the square. See if you can figure out the right answer. The same answer is right for this whole deck of cards. Try to be right every time." For those children who were still unable to reach the criterion of six successive correct responses, the deck was again repeated along with the hint. All subjects were able to reach criterion after the third repetition. The second training problem was presented in the same manner as the first.

On the third training problem, the child was introduced to the no-feedback procedure, that is, trials on which no information about correctness was given following the child's response. The child was told, "I have been saying 'right' or 'wrong' each time you pointed to one of the cards. From now on I will not always tell you if you are right or wrong. After some cards I will say nothing. Don't let this bother you. Keep trying to be right all of the time. Remember, you are still trying to figure out which of the colors, shapes, or little symbols in the middle is the correct answer for this whole deck of cards." During the third and fourth problems, feedback was given after every second response. If the child was unable to arrive at the correct answer after going through the deck once, a hint was provided, and the same deck was repeated.

On the fifth and sixth training problems the child was given feedback after every third response. Hints were provided as needed if the child was unable to arrive at the correct solution after going through the deck twice. On the seventh and eighth training problems, feedback was given after every fourth re-

sponse. Each child demonstrated the consistent use of strategies in the seventh and eighth training problems before the test problems were begun.

*Test problems.* The four test problems were similar to the seventh and eighth training problems (i.e., the child received feedback after every fourth response) except that the deck contained 20 cards and was gone through only once. This change allowed the children sufficient opportunity to search for the solution but ensured that, given their strategy level, they would not have tested all possible solutions. The feedback always consisted of "wrong," thus permitting the monitoring of strategy change following continued failure feedback.

In Study 1, after the last problem in the test series, each child was asked for an attribution for his/her performance: "Why do you think you had trouble with these problems?" The responses generated by the child were later categorized by two independent raters who were blind to the particular group to which the child belonged.

In order to ensure that all children left feeling proud of their performance, they were told, "This was a very difficult task, and you caught on so quickly that I gave you four harder decks that were intended for older children, just to see how you would do. You did very well on the decks intended for your age group." After being asked not to talk to his/her classmates about the tasks until the other children had had their turn, the child was thanked and returned to the classroom.

*Study 2.* In Study 2, one procedural modification was made. Prior to the seventh training problem, the children were asked to begin "thinking out loud." They were told that we were interested in what kinds of things children their age think about while doing tasks of this nature. In order to dispel inhibitions about making task-irrelevant statements, it was stressed that children think about many different kinds of things, such as lunch, what they are doing after school, solving the problem, and that the child should feel free to say out loud anything he/she was thinking. All verbalizations were noted verbatim. While some children were hesitant to verbalize on the first problem following the introduction of the procedure, all children made some type of verbalization. By the second problem, the children seemed at ease with the procedure. The four test problems were administered in the same fashion as in the first study, with feedback always consisting of "wrong." The child was reminded at the beginning of each problem "to think out loud." Verbalizations were monitored on both training and test problems so that changes following failure could be assessed.

*Training measures.* To ensure that deterioration following failure was not simply a function of lack of proficiency at the task, training measures were taken. In addition to monitoring feedback utilization and sophistication and extent of hypothesis use during training, the number of hints required during training was recorded. The hints were given when the child was unable to solve the training problems within the specified number of trials. Three training

measures were derived for each child from these hints: the total number of hints needed for all eight training problems; the number of hints needed on Training Problems 7 and 8 on which feedback was given every fourth trial as in testing; and the number of times more than one set of hints was required to solve a given problem.

### Scoring Procedures

*Classification of hypotheses: Strategies versus stereotypes.* Useful strategies are sequences of hypotheses that, when followed perfectly, will eventually lead to problem solution. Stereotypes (ineffectual strategies) are sequences of hypotheses that can never lead to problem solution because they involve the repeated use of a disconfirmed hypothesis or the failure to use an allowable hypothesis.

In order to assess the child's use of strategies and stereotypes, the scoring system used by Gholson, Levine, & Phillips (1972) was adapted. In the Gholson et al. study, designed to investigate hypothesis-testing behavior of children at various ages, subjects were given 25 blocks of trials per problem, and the criterion of 3 consecutive blocks of trials was used to identify strategy and stereotype use. Since the present study was designed to examine performance decrements following consistent failure, there were only 5 blocks of trials per problem, and the scoring criterion was the use of a given strategy or stereotype on 3 of the 5 blocks.

*Useful strategies.* The useful strategies were classified into two types—dimension checking and hypothesis checking. (Gholson et al., 1972, discuss a third strategy, focusing, in which the child processes information perfectly and eliminates all dimensions that have been logically disconfirmed on each feedback trial. It was not included in this analysis because only a few children showed evidence of using it.) In dimension checking, the child proceeds through all three dimensions (color, form, interior symbol) in a systematic fashion. When the child tests one member of a dimension, he or she chooses the one that was consistent with the feedback on the previous trial. For example, suppose the child tested the shape dimension on the previous trial by choosing a yellow circle and was told "wrong." If the child is now testing the color dimension, he or she will choose red. In hypothesis checking, the child eliminates only one possible solution per feedback. For example, suppose the child tested the shape dimension by choosing a yellow circle and received "wrong" feedback; if the child then decided to test the color dimension, he or she would still try both yellow and red.

*Stereotypes.* Stereotypes—ineffectual task strategies—are response sets that can never lead to the solution of the problem. The three stereotypes are stimulus preference, position alternation, and position perseveration. Stimulus preference refers to the selection of a single stimulus characteristic (for example, the color red) independent of feedback. Position alterna-

tion occurs when the child alternately chooses the left and then the right stimulus regardless of what they are, and position perseveration occurs when the child chooses the stimulus in the same position each time. These ineffectual task strategies can be ordered on the basis of the ages of children who most frequently use them, with stimulus preference being used by older children and position perseveration by the youngest children.

### Verbalization Categories

*Categories.*<sup>1</sup> At least 10 children had to make statements classified in a given category by independent raters for it to be included, since the chi-square analysis requires that there be an expected frequency of at least 5 per cell. The categories meeting this requirement are described below.

1. *Statements of useful-task strategy.* These were statements of a plan or system that under normal conditions would eventually lead to a solution. These statements corresponded to strategies.

2. *Statements of ineffectual approach to task.* These were statements that ignored the experimenter's feedback and would not lead to problem solution under normal conditions. These statements corresponded to stereotypes rather than strategies.

3. *Attributions.* Only one attributional category received at least 10 statements—attribution made to a lack of ability (e.g., not having a good memory) or loss of ability (e.g., confusion or inability to think). No other attributional category received more than 5 statements.

4. *Self-instructions.* These statements referred to instructions the child gave to him/herself that, if followed, would improve performance, such as a direction to slow down or to concentrate more.

5. *Self-monitoring.* Verbalizations in this category were statements that described the child's solution-oriented behavior other than the child's task strategy, such as monitoring his or her own effort expenditure or concentration.

6. *Statements of positive affect.* These were statements indicating that the task was enjoyable or a challenge and statements indicating that the child wished to continue doing the problems.

7. *Statements of negative affect.* This category included statements that indicated boredom, anxiety, or a desire to terminate the task or to escape from the situation.

8. *Positive prognostic statements.* These were statements expressing a child's high expectancy of success or indicating a belief that he or she would solve the problem if given sufficient opportunity.

9. *Solution-irrelevant statements.* Statements in this category were completely irrelevant to solution attainment and were often, although not necessarily, irrelevant to the task.

<sup>1</sup> The category system was derived from the data by the authors, who were blind to the group membership of the children making the verbalizations.

*Raters.* At the conclusion of the study, all verbalizations were categorized by two independent raters. These raters were trained in the use of the categories but were blind to the nature of the study and to the particular group to which each child belonged. Interrater reliabilities were computed using the conservative method of evaluating percentage agreements for each category separately. The mean interrater agreement for the nine categories was 89%, with a range from 79% to 100%. Only verbalizations on which there was agreement were used in the analyses. Accordingly, 11% of the verbalizations were discarded. Of these, only 2% were in the opposite direction from the reported findings, and 9% were in line with the obtained differences.

## Results

### *Self-Generated Attributions (Study 1)*

The categorization of the children as helpless or mastery-oriented on the basis of their IAR scores was corroborated by the children's responses to the question that followed the failure problems in Study 1: "Why do you think you had trouble with these problems?" (Interrater reliability for categorizing the attributions was 91%.) As shown in Table 1, over 50% of the helpless children responded that they were unable to do the problems because they were not smart enough. In contrast, none of the mastery-oriented children gave this response. The mastery-oriented children divided their explanations for their failure among lack of effort, bad luck, the fairness of the experimenter, and the increased difficulty of the task. Thus, helpless children blamed their abilities for failure, even though both the helpless and mastery-oriented

Table 1  
*Percentage of Helpless and Mastery-Oriented Children Generating Attributions in Each Category, Study 1*

| Attributional category | Group    |                  |
|------------------------|----------|------------------|
|                        | Helpless | Mastery-oriented |
| Ability                | 52       | 0                |
| Effort                 | 3.4      | 23.7             |
| Luck                   | 3.4      | 21.05            |
| Experimenter not fair  | 6.8      | 23.7             |
| Task harder            | 27.6     | 21.05            |
| No reason              | 6.8      | 10.5             |

children had learned the task equally well, had equal degrees of success during training, and had received equal amounts of failure feedback.

### *Training Measures: Performance Prior to Failure*

None of the measures of difficulty in training—total number of hints needed on all eight training problems; number of hints on Training Problems 7 and 8; number of times more than one set of hints was needed to solve the problem; or total number of training trials required—pointed to any differences between the groups in ease of training. Both the helpless and mastery-oriented groups utilized feedback appropriately during the training procedure, retaining their hypothesis following the feedback "correct" and changing hypotheses following the feedback "wrong." Chi-square analyses on the number of times children used dimension checking versus hypothesis checking during training also yielded no significant differences between groups. Helpless children used dimension checking 47% of the time and hypothesis checking 53% of the time as compared with the mastery-oriented children, who used dimension checking 43% of the time and hypothesis checking 57% of the time in Study 1. Sophistication of strategy during training in Study 2 was consistent with the results of the first study. Helpless children used dimension checking 44% of the time and hypothesis checking 56% of the time, while mastery-oriented children used dimension checking 40% of the time and hypothesis checking 60% of the time.

### *Testing Measures: Strategy Change Following Failure*

In order to provide a general picture of change in performance following failure feedback, a  $2 \times 2$  (Helpless vs. Mastery-Oriented  $\times$  Male vs. Female) analysis of variance was performed on the number of times that each child used ineffectual and disconfirmed hypotheses on the test problems. There were no significant differences between the

males and females in the analysis of variance, so data from males and females were combined. (When there were differences in the performances of males and females, as were found on the specific pattern of deterioration, these differences are noted.) The results of Study 1 show that helpless children used ineffectual hypotheses significantly more often than mastery-oriented children ( $M_s = 8.97$  and  $6.08$ , respectively),  $F(1, 63) = 11.7$ ,  $p < .001$ . This general finding is further supported by the significant negative correlation between the use of ineffectual hypotheses and the effort attribution scores, ( $r = -.326$ ,  $p < .01$ , two-tailed). That is, helpless children, who do not attribute their failure to lack of effort, use ineffectual hypotheses to a significantly greater extent than mastery-oriented children, who do attribute their failure to lack of effort. A similar pattern of results was obtained in Study 2, in which helpless children, following failure, used illegitimate and disconfirmed hypotheses significantly more than mastery-oriented children ( $M_s = 7.03$  and  $2.00$ , respectively),  $F(1, 56) = 70.06$ ,  $p < .001$ . The significant negative correlation between the effort attribution scores and use of ineffectual hypotheses found in Study 1 was again obtained ( $r = -.427$ ,  $p < .005$ , two-tailed).

Of greater interest, however, is the change in strategy use across failure trials. Table 2 shows the number of children in each group whose strategies deteriorated, remained the same, or increased in sophistication over test problems. A chi-square analysis of the data shown in Table 2 (combining the Same and Improved categories) yielded a highly significant difference between helpless and mastery-oriented groups,  $\chi^2(1) = 27.37$ ,  $p < .001$ , for Study 1;  $\chi^2(1) = 19.89$ ,  $p < .001$ , for Study 2.

The analysis of variance, the correlation, and the chi-square analysis have all shown large and significant differences in the performance of helpless and mastery-oriented children following failure. However, to appreciate the specific pattern of performance following failure, one must examine the problem-by-problem change. Table 3 shows the percent of helpless and mastery-oriented chil-

Table 2  
*Number of Helpless and Mastery-Oriented Children Whose Hypothesis-Testing Strategy Improved, Remained the Same, or Deteriorated Following Failure*

| Group            | Improved |    | Same  |    | Deteriorated |    |
|------------------|----------|----|-------|----|--------------|----|
|                  | Study    |    | Study |    | Study        |    |
|                  | 1        | 2  | 1     | 2  | 1            | 2  |
| Helpless         | 0        | 0  | 5     | 9  | 24           | 21 |
| Mastery-oriented | 10       | 11 | 21    | 15 | 7            | 4  |

dren exhibiting each type of strategy or stereotype on each of the four test problems. As can be seen from Table 3, helpless subjects in both studies showed a progressive decrease in the use of legitimate strategies with an attendant increase in ineffectual responses. On the first test problem in Study 1, most helpless subjects were showing strategy use, but by the fourth test problem less than one third of the subjects were able to maintain strategy use. In fact, by the end of the second test problem, 37.9% of the helpless children had abandoned useful strategies. While some helpless females lapsed into stereotypic responses quite early, most helpless children showed a progressive decline in performance across the four test problems, suggesting that the effects of failure are cumulative in nature. None of them showed an increase in strategy sophistication.

In contrast, most mastery-oriented subjects did not show a permanent decline in use of strategies over test problems. In fact, some mastery-oriented subjects showed a clear tendency to become *more* sophisticated in their strategy use as they received failure feedback—a change that may have been prompted by the procedural change to only one exposure per deck during the test problems. As can be seen in Table 3, the strategy changes in Study 1 were essentially replicated in Study 2 despite the verbalization-monitoring procedure. The one difference was that in the second study *all* mastery-oriented children exhibited consistent use of strategies across all four test problems. Thus, the strat-

Table 3  
*Percentage of Helpless and Mastery-Oriented Children Exhibiting Each Type of Strategy on the Four Failure Problems*

| Group                   | Study 1 |      |      |      | Study 2 |      |      |      |
|-------------------------|---------|------|------|------|---------|------|------|------|
|                         | Problem |      |      |      | Problem |      |      |      |
|                         | 1       | 2    | 3    | 4    | 1       | 2    | 3    | 4    |
| <b>Helpless</b>         |         |      |      |      |         |      |      |      |
| Useful strategies       |         |      |      |      |         |      |      |      |
| Dimension checking      | 20.7    | 17.3 | 3.4  | 3.4  | 30.0    | 20.0 | 3.3  | 0    |
| Hypothesis checking     | 72.4    | 44.8 | 48.3 | 27.6 | 70.0    | 53.3 | 60.0 | 36.7 |
| Ineffectual strategies  |         |      |      |      |         |      |      |      |
| Stimulus preference     | 6.9     | 31.0 | 34.5 | 44.8 | 0       | 23.3 | 26.7 | 30.0 |
| Position alternation    | 0       | 6.9  | 10.4 | 24.1 | 0       | 3.3  | 3.3  | 26.7 |
| Position perseveration  | 0       | 0    | 3.4  | 0    | 0       | 0    | 6.7  | 6.7  |
| <b>Mastery-oriented</b> |         |      |      |      |         |      |      |      |
| Useful strategies       |         |      |      |      |         |      |      |      |
| Dimension checking      | 13.2    | 18.4 | 7.9  | 39.5 | 26.7    | 36.7 | 26.7 | 50.0 |
| Hypothesis checking     | 78.9    | 55.3 | 60.5 | 44.7 | 73.3    | 63.3 | 73.3 | 50.0 |
| Ineffectual strategies  |         |      |      |      |         |      |      |      |
| Stimulus preference     | 7.9     | 26.3 | 28.9 | 10.5 | 0       | 0    | 0    | 0    |
| Position alternation    | 0       | 0    | 2.6  | 5.3  | 0       | 0    | 0    | 0    |
| Position perseveration  | 0       | 0    | 0    | 0    | 0       | 0    | 0    | 0    |

egy-change data demonstrated that behavior following failure is dramatically different for helpless and mastery-oriented children. However, the full extent of these differences is clear only when the cognitive concomitants of the performance changes are also examined.

#### *Verbalizations (Study 2)*

*Training.* Since verbalizations were monitored on Training Trials 7 and 8, comparisons between training and testing could be made. During training, the only category to which at least 10 children contributed was the useful-task-strategy category: 33 helpless children and 32 mastery-oriented children made statements of this type. Therefore, the two groups were quite similar in both performance and verbalizations prior to the failure experience.

*Testing.* A chi-square analysis was performed on the  $2 \times 9$  (Helpless vs. Mastery-Oriented  $\times$  Verbalization categories) contingency table containing the number of children in each group who made verbalizations in each category during the test problems. The analysis revealed a significant difference in

the use of the verbalizations by the helpless and mastery-oriented children,  $\chi^2(8) = 120.5$ ,  $p < .001$ . Individual chi squares were then computed for each category separately and are summarized in Table 4. To maintain a conservative experimentwise significance level (since nine analyses were performed), .01 was adopted as the alpha level necessary for significance. Seven of the nine categories showed dramatic and significant differences.

As can be seen in Table 4, there is very little overlap in the types of statements made by the two groups of children except for the useful-task-strategy statements. Although equal numbers of helpless and mastery-oriented children made useful-task-strategy statements, almost all of these statements were made on the first failure problem. However, as soon as the children began to experience failure, differences in their verbalizations began to appear. As early as the second test problem, the helpless children began to make ineffectual task-strategy statements and attributions for their failure. These attributional statements reflected a perceived lack or loss of ability, such as "I'm getting confused" and "I never did have a good memory." In contrast, none

of the mastery-oriented children responded in this fashion. In fact, the mastery-oriented children made surprisingly few attributions, and these were scattered among several categories.

Instead of searching for a cause for their failure and making attributions, mastery-oriented children seemed to search for a remedy by engaging in self-instructions and self-monitoring. As Table 4 shows, almost half of the mastery-oriented children made self-instructional statements that could improve their performance. For example, they made statements such as "I should slow down and try to figure this out" and "The harder it gets the harder I need to try." About 84% of the mastery-oriented children engaged in active self-monitoring. These statements reflected attention to the degree of effort or concentration they were exerting and appeared to provide the mastery-oriented children with a check on their task-related behavior.

The attitudes of the two groups of children toward the task following failure were also quite different, particularly by the last two failure problems. A third of the mastery-oriented children continued to express positive affect, whereas two thirds of the helpless children voiced a good deal of negative affect. For example, mastery-oriented children made statements like "I love a challenge," whereas helpless children made statements such as "This isn't fun anymore." In addition, almost two thirds of the mastery-oriented children made statements that reflected a posi-

tive prognosis such as "I've almost got it now." Although negative prognostic statements were not sufficiently numerous to constitute a category, five helpless children did offer statements like "I give up."

Marked differences are also evident in the solution-irrelevant category as shown in Table 4. A typical example of statements in this category is the following commentary made by a helpless female as she chose stimuli: "There is a talent show this weekend, and I am going to be Shirley Temple." It might be noted that this child's stimulus choices showed a position alternation. In fact, virtually all the solution-irrelevant verbalizations corresponded to stereotypic rather than strategic hypothesis testing. For example, despite the experimenter's consistent feedback of "wrong," one helpless male repeatedly chose the brown color, saying "chocolate cake." Although this was one of the most frequent types of statements made by helpless children (22 children), none of the mastery-oriented children made statements that fell into this category.

In summary, Study 2 revealed important quantitative and qualitative differences in the verbalizations of helpless and mastery-oriented children as failure occurred. The statements of helpless children were characterized by attributions for their failure, by a large number of solution-irrelevant statements, and by statements of negative affect. In contrast, mastery-oriented children were less concerned about the cause of their failures than they were with a remedy for the failure.

Table 4

*Number of Helpless and Mastery-Oriented Children with Verbalizations in Each Category, Study 2*

| Category of verbalizations      | Group    |                  | $\chi^2$ ( $df = 1$ ) | $p$  |
|---------------------------------|----------|------------------|-----------------------|------|
|                                 | Helpless | Mastery-oriented |                       |      |
| Useful task strategy            | 26       | 26               | 0                     | —    |
| Ineffectual task strategy       | 14       | 2                | 12.27                 | .001 |
| Attributions to loss of ability | 11       | 0                | 13.46                 | .001 |
| Self-instructions               | 0        | 12               | 15.0                  | .001 |
| Self-monitoring                 | 0        | 25               | 42.86                 | .001 |
| Statements of positive affect   | 2        | 10               | 6.0                   | .025 |
| Statements of negative affect   | 20       | 1                | 26.46                 | .001 |
| Positive prognosis statements   | 0        | 19               | 27.8                  | .001 |
| Solution-irrelevant statements  | 22       | 0                | 34.74                 | .001 |

Their statements revealed a marked absence of attributions and the presence of self-monitoring and self-instructions. Moreover, following failure, the mastery-oriented children maintained their positive affect towards the task and a positive prognosis about the eventual outcome.

### Discussion

The results revealed striking differences both in the pattern of performance and in the nature of the verbalizations made by helpless and mastery-oriented children following failure. It was particularly noteworthy that while the helpless children made the expected attributions to uncontrollable factors, the mastery-oriented children did not offer explanations for their failures. Instead the mastery-oriented children engaged in solution-directed behavior such as self-instructions and self-monitoring. While most current attribution theories emphasize individual differences in the *nature* of the attributions, the present findings suggest that when or whether attributions occur spontaneously may of itself be a critical difference.

Although the mastery-oriented children did not tend to make explicit attributions, one might argue that attributions to effort were implicit in the self-instructions and self-monitoring, since these verbalizations emphasized effort. Several factors make this possibility unlikely. First, the few attributions that the mastery-oriented children did make were scattered among categories. Second, attributions may be considered irrelevant to the mastery-oriented child on this task, because the remedy would be the same regardless of the cause of failure. Whether the cause is thought to be greater task difficulty, insufficient effort, bad luck, or lower ability than originally suspected, the remedy would still consist of sustained concentration and the use of sophisticated strategies. Third, it did not appear that the mastery-oriented children perceived themselves as having failed. The positive affective and positive prognostic statements suggest that the mastery-oriented children responded to the "wrong" feedback chiefly as information leading to problem

solution, not as a failure or as a prediction of future failure.

If mastery-oriented children do not tend to perceive themselves as having failed and therefore do not make attributions, then the question arises as to why the IAR, an attribution scale, is a good predictor of their behavior and why one finds differences in attributions generated by helpless and mastery-oriented children as in Study 1. The answer may lie in the usual procedure for eliciting attributions: The failure is defined for the child and he/she is then asked to explain its cause. This external definition of failure would probably be premature for mastery-oriented children and would occur when they still viewed increased effort expenditure as the means of achieving success. They would thus tend to cite insufficient effort as the cause of failure. In addition, although mastery-oriented children did not tend to make attributions in the present study, it is likely that had the failure continued, attributions would have begun to appear. Thus, the helpless versus mastery-oriented difference may be one of timing rather than the presence or absence of attributions.

In short, then, there appears to be a striking difference between the helpless and mastery-oriented groups in their emphasis on the cause of, versus remedy for, failure. Helpless children ruminate about the cause of their failure and, given their attributions to uncontrollable factors, spend little time searching for ways to overcome failure. Mastery-oriented children, on the other hand, seem to be directed towards the attainment of a solution. They are less concerned with explaining past errors and more concerned with producing future successes. Consequently, their verbalizations tend to be ones that will enable them to improve their performance, such as self-monitoring and self-instructions. These findings imply that in addition to attribution retraining (Dweck, 1975), helpless children might benefit from being trained to control task-irrelevant cognitions and to focus on self-instructions and self-monitoring as do the mastery-oriented children. Such procedures have proved highly effective in treating impulsivity and hyperactivity in children as

well as anxiety and intense fear in adults (Meichenbaum, 1975).

The continued task involvement of the mastery-oriented children clearly appears to be more adaptive than the withdrawal of the helpless children—there was no alternative to the task and no real cost for continuing to try. Had a solution been possible, the mastery-oriented children would have been far more likely to find it (Dweck & Reppucci, 1973). However, as Bulman and Brickman (Note 1) suggest, persistence can be maladaptive as well. For example, it is possible that among the persisters there exists a subgroup of children who are similar to helpless children in that they view failure as a condemnation of their abilities. They would differ from helpless children in that, instead of withdrawing, they may persist in order to forestall the admission of failure. However, they might persist despite prolonged lack of success and despite the availability of potentially more fruitful alternatives. This possibility, that a subgroup of the mastery-oriented children may be similar to helpless children in their perception of failure, warrants further investigation. It is also possible that there are mastery-oriented children who, not unlike impulsive children, are overly action oriented. That is, they will seek immediate, premature remedies and will not engage in systematic consideration of alternative causes even on those tasks for which diagnosis of cause may be necessary to formulate a remedy. Thus, we might ask whether mastery-oriented children will make earlier attributions for failure when identification of the cause is necessary for achieving the solution.

In summary, past research has involved the implicit assumption that individuals tend to employ the same classes of cognitive mediators and that they bring them into play at similar times. For example, following a discrete event such as evaluative feedback, one is assumed to formulate an attribution. Individuals have been considered to differ only in the *particular* attribution they make. The present research, however, suggests that the timing or the very occurrence of attributions may be a critical individual difference.

## Reference Note

1. Bulman, R. J., & Brickman, P. *When not all problems are soluble, does it still help to expect success?* Unpublished manuscript, Northwestern University, 1976.

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#### Erratum to Rodin and Langer

In the article "Long-Term Effects of a Control-Relevant Intervention With the Institutionalized Aged," by Judith Rodin and Ellen J. Langer (*Journal of Personality and Social Psychology*, 1977, Vol. 35, No. 12, pp. 897-902), the  $z$  score reported on page 900 should be changed from  $z = 3.14$ ,  $p < .01$ , to  $z = 1.73$ ,  $p < .10$  (two-tailed). The outcome is therefore only marginally significant, and a more cautious interpretation of the mortality findings than originally given is necessary. The authors and the journal's editors are grateful to an observant reader for detecting the error in the statistic originally reported.