INTENTIONAL LEARNING ENVIRONMENTS AND EXTRINSIC INCENTIVES TO ENHANCE STUDENTS' ENGAGEMENT IN ASSESSMENT-RELATED DISCOURSE:

CONSEQUENCES ON MOTIVATIONAL TRAITS AND STATES

by

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(Under the Direction of Daniel T. Hickey)

ABSTRACT

This study examined the effects of incentives on student engagement in formative feedback to explore unresolved issues regarding extrinsic rewards. Ninth-graders (N=95) in six classrooms completed two sets of self-report motivation surveys during an innovative assessment-intensive curriculum. Following formative feedback sessions, students in three of the classes volunteered to have their self-assessed proficiency displayed prominently (*public recognition*). Trait-oriented surveys assessed general motivational orientation before and after instruction. Public recognition was associated with significantly increased value for the domain of genetics, and no significant negative consequences were detected. State-oriented surveys assessed task-specific motivational orientations early and late in the curriculum. Public recognition was associated with a significant increase in perceived competence, and no significant negative consequences were detected. These results provide initial support for the argument that the "intentional" learning environments minimize the potential negative consequences of extrinsic incentives for students.

INDEX WORDS: Intentional Learning Environments, Extrinsic Incentives, Intrinsic Motivation, Self-Determination Theory, Expectancy × Value, Formative Assessment

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DEDICATION

To Christodoulos, my family and friends for their unlimited and invaluable support to my efforts throughout the last two years.

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CHAPTER 1

INTRODUCTION

Extrinsic incentives are controversial but common in education. Different types and variations of rewards ranging from privileges, free time, stars, recognition, and grades to the more extreme and explicit competition for scores are related and often closely intertwined with schooling and educators' everyday classroom practices. Controversial commentaries about the consequences of extrinsic incentives appearing with titles such as "The rewards for learning" (Chance, 1992) and "Learning versus rewards" (Kohn, 1993) can be confusing to educators and often irrelevant to their day-to-day concerns. Educators learned that rewards should be avoided because of their negative consequences on students' motivation but, for the minute to minute decisions they need to make in dealing with the complexity of everyday classrooms, any considerations about the long term consequences of their practices, especially to something *abstract* such as their students' "intrinsic motivation," might seem particularly remote.

Influential curricular commentators (e.g. Kohn, 1999) cite a substantial body of research findings that demonstrate the negative consequences of extrinsic incentives on intrinsic motivation (e.g. Deci, Koestner, & Ryan, 1999a; 1999b). Behaviorists, on the other hand, contend that extrinsic rewards are useful to initiate and maintain engagement in otherwise uninteresting tasks, arguing that the negative effects can easily be avoided. Behaviorists therefore approach and interpret relevant research differently than cognitive motivation researchers, or choose to focus their attention on studies that help them

support their arguments (Cameron, 2001; Cameron & Pierce, 1996). Researchers from each of the perspectives have conducted multiple meta-analyses using the same pool of empirical studies, yet reached different conclusions that provided support of their initial arguments (e.g. Deci et al. 2001, Cameron, 2001).

Meanwhile, most of the studies reviewed in the meta-analyses were conducted in artificial non-classroom contexts (e.g. research laboratories) or in classroom contexts that support outdated "transmission-reception" models of teaching and learning. Consequently, their relevance to more contemporary, innovative learning environments is limited. Sociocultural learning theorists presume that the theoretical distinction between intrinsic and extrinsic motivation is too crude to be of any service to the study of learning and motivation in innovative, intentional learning environments (e.g. Bereiter & Scardamalia, 1989; Hickey, 1997).

This unresolved issue leaves educators uncertain about the consequences of their practices. Moreover, it has led to major policy changes, such as the *No Child Left Behind Initiative* (Public Law 107-110) that ignored the enormous body of cognitive motivation research that suggests detrimental consequences of explicit, extrinsic incentives on motivation.

This study investigates extrinsic rewards in a classroom context consistent with newer approaches to teaching and learning in order to inform classroom practice directly. This effort is aligned with current efforts in education that seek to bridge research and practice and study learning in the complex social systems of classrooms where they occur. The influential theorist Allan Collins attributed the ineffectiveness of educational

research to systematically inform practice, to research methods that have been indiscriminately adopted from psychology:

> There has always been a great divide between education research and practice. Most practitioners regard education research irrelevant to their day-to-day concerns, and so they pay little attention to what researchers recommend. This partly derives from the origins of research about practice in the field of psychology. The methods employed, based on laboratory studies, led to a body of findings that has a problematic relation to the questions of practice. Learning in the real world occurs in complex social situations, and laboratory methods of studying learning so fundamentally alter the conditions of learning, that it is not clear what to conclude from any such study. (1999, p.289)

More specifically to the present study, Jere Brophy (1999) argued that research on motivation in education needs to focus on educational questions and more work is needed that investigates whether and how motivation principles derived from non-school based psychological research apply in educational contexts. Brophy suggests a transition from "motivation in psychology" to "motivation in education" where "disciplinary psychologists studying motivation in education will need to make a transition from being psychologists who happen to be working in classrooms to being educational researchers addressing educational questions" (Brophy, 1999, p. 30). Stressing the importance of the applicability of research findings to teachers' practices, Brophy goes on to say that the derived principles should be aligned with the constraints within which most teachers have to work. This later commentary is associated with my goal in this paper. I focus on the consequences of extrinsic incentives on students' motivation, considering specifically

public recognition, a type of reward that is routinely used by teachers. An overwhelming body of findings on the issue falls largely within what Brophy (1999) called research in "motivation in psychology" that consistently fails to inform classroom practice. Previous studies have been criticized for unrealistic research settings, "exotic procedures" and reward contingencies that have little resemblance to those employed in everyday classroom practices (Lepper, Henderlong, & Gingras, 1999). I revisit the issue by addressing factors that can potentially contribute to a more direct translation of findings in educators' practices. I start with an overview of the relevant research.

Intrinsic Motivation, Rewards and Related Theories

The Overjustification Effect

The prevailing behaviorist tradition in the early 70's regarded extrinsic rewards as an important device for learning. This was consistent with their assumption that organisms learned by constructing numerous small internal associations of the many such associations in the environment. The value of extrinsic rewards was fundamentally challenged by the ground breaking findings that emerged early in the "cognitive revolution". The most influential of these findings is known as the "overjustification effect". The name attached to this finding nicely captures the nature of the phenomenon. Edward Deci (1971) showed that paying college students for performing well in an inherently interesting activity (puzzle solving) resulted in decreased intrinsic motivation (engagement in an eight minute "free choice" period), relative to subjects who received no pay. This finding was then replicated in a field experiment conducted in a college newspaper, where staff members received payment for each headline they wrote, and then again in a third laboratory experiment (Deci, 1972). Lepper, Greene and Nisbett

(1973) promised randomly selected preschool children “Good Player Awards” for drawing pictures with some new type of magic markers and later observed those children and measured their interest in the activity several weeks later. When children were later observed in a room where the markers were again available, the children who had received the award demonstrated significantly lower interest in using them, compared to their non-rewarded classmates. These studies provided evidence of the overjustification effect: subjects who were already interested in the rewarded activities and regarded interest and enjoyment as the only reason for engaging in them lost that initial interest after being rewarded. Researchers theorized that the reward overjustified engagement, supplanting their interest in an activity that was otherwise interesting.

In their initial reports on overjustification, the researchers (e.g. Deci, 1972; Lepper, Greene, & Nisbett, 1973) suggested that negative effects were less likely when rewards were non-contingent, unexpected and verbal, or when the task was of little initial interest. These findings were summarized in Cognitive Evaluation Theory (CET) that specifically allows for specific predictions on the effects of rewards on intrinsic motivation under specific contingencies. CET arises from Self Determination Theory, an integrative theory that seeks to explain the development and integration of self and account for social environmental factors that seem to influence those efforts for self-unification/integration. In SDT, autonomy is a pivotal component of motivated behavior. As this assumption serves as the building block for the different mini-theories advanced within SDT, especially CET, it is essential for better understanding of how CET can contribute to studying the effects of rewards on motivation.

Self-Determination theory (SDT). SDT is an overarching theory of personality that seeks to provide an account for the human need for active engagement and development and psychological growth on the one hand and the fragmented and conditioned responses in interactions with the social world on the other. In particular, it provides for individuals' psychological growth and mental health. In their latest account, Ryan and Deci (2002) distinguish between autonomy (tending toward inner organization and holistic self-regulation) and homonomy (tending toward integration of oneself with others). In earlier characterizations (Deci, Vallerand, Pelletier, & Ryan, 1991) homonomy was implied through references to the need of relatedness. Relatedness, along with autonomy and competence, represent the core psychological needs in SDT. Autonomy is a pivotal construct in this theory and synonymous with the notion of self-determination. Individuals experience autonomy when the reason for undertaking an action lies within his or her self. This is contrasted with the experience of control, which is experienced when undertaking particular actions is compelled by factors arising from outside the individual.

SDT distinguishes between self-determined and controlled types of intentional regulation (intentional regulation is used to mean motivated activity). Motivated actions can be self-determined or controlled, depending on the level at which the action was endorsed solely by the individual, or compelled by interpersonal or intrapsychic agents/forces (e.g. Deci, Vallerand, Pelletier, & Ryan, 1991). Choice is of central importance to SDT theory: "When a behavior is self-determined, the regulatory process is choice, but when it is controlled, the regulatory process is compliance (or in some cases defiance) (Deci et al., 1991, p. 327).

The distinction between self-determined and controlled types of behavior is not equivocal to the distinction between intrinsic and extrinsic motivation. Intrinsic motivation is defined as the inherent pleasure and satisfaction experienced when the particular types of behavior are performed, while extrinsic motivation involves the performance of an action not out of interest but because of its instrumentality in the achievement of particular outcomes (Deci, Koestner, & Ryan, 2001). While intrinsically motivated behaviors are always self-determined, the extent to which extrinsically motivated behaviors might become self-determined depends on specific qualities of the activity. Organismic Integration Theory, a sub-theory within SDT, presumes that each extrinsically motivated activity involves some degree of internalization, depending on how much the activity converges with one's sense of self: external regulation, introjected regulation, regulation through identification and last integrated regulation. This last type of internalization is the basis for the most autonomous form of extrinsically motivated activity (Ryan & Deci, 2002).

To further elaborate on the underlying assumptions of CET, it is important to note that the SDT theorists do not focus on the distinction between motivated or "amotivated" actions but between self-determined and controlled: "The important point in this distinction is that both self-determined and controlled behaviors are motivated or intentional but their regulatory processes are very different …. The qualities of their experiential and behavioral components are accordingly different" (Deci, Vallerand, Pelletier, & Ryan, 1991, p. 327). These regulatory processes are the focus of CET where they are described and discussed in relation to rewards.

Cognitive Evaluation Theory (CET). CET assumes that competence and self-determination are innate psychological needs underlying intrinsic motivation. The effect of rewards and other motivational inputs such as deadlines, competition, general climate of classrooms, interpersonal settings, the delivery of evaluations, etc. on intrinsic motivation, is determined by their influence on a person's perceptions of competence and self-determination (Deci, Koestner & Ryan, 2001). The effect of such "external events" on both perceived self-determination and perceived competence needs to be examined in order to define their effect on intrinsic motivation.

Deci and Ryan (2002) suggested that there are two cognitive processes through which contextual factors affect intrinsic motivation: change in perceived locus of causality and change in perceived competence. The change in perceived locus of causality relates to the need for autonomy and provides specifically for associations between perceived causality and intrinsic motivation. If an event causes a change in perceived locus of causality, which is experienced as internal, then intrinsic motivation will be enhanced. If the event prompts an external locus, then intrinsic motivation will be undermined. The change in perceived competence relates to individuals' need for competence. Its relation to intrinsic motivation is direct, in that intrinsic motivation is enhanced when events provide information that enhances perceived competence, but it is undermined when events diminish perceived competence. Together, these cognitive processes explain how events that take place in the social context impact intrinsic motivation. However, it seems that the need for autonomy (or self-determination) is more central; if autonomy is not enhanced then intrinsic motivation will not be either,

regardless of whether or not information is conveyed with respect to perceived competence (Ryan & Deci, 2002).

An important issue is the nature of the rewards. The meta-analysis by Deci, Koestner, and Ryan (1999) (summarized in Deci, Koestner, & Ryan, 2001) was conducted in part to distinguish between verbal and tangible rewards and their differential effects on intrinsic motivation (on self-report and free choice measures). Their analysis discriminated between the effects of task-noncontingent rewards (given for simply participating in the experiment), task-contingent rewards (given for completing an activity) which are further distinguished between completion-contingent (require completing the task) and engagement-contingent (require engagement but not necessarily completion of the target activity) and finally performance-contingent rewards (given after a successful completion of an activity; meeting a standard of excellence; surpassing a criterion). The meta-analysis presents a strong case against every sort of expected tangible reward on both self–report and free choice measures. Only unexpected rewards (where subjects were not informed of the reward in advance) and task-noncontingent rewards failed to diminish intrinsic motivation. While verbal rewards in the form of positive feedback seemed to enhance free-choice intrinsic motivation for college students, it still diminished intrinsic motivation for children, and for children and adults when administered in a controlling manner or context.

Performance contingent rewards. Performance-contingent rewards are an interesting contingency, partly because of their "double sided sword" function. The majority of rewards employed in schools are administered upon meeting specific standards or criteria of excellence. Investigating this particular reward should therefore

advance our understanding of how common reward types play out in real classroom settings. Recognizing students for their successful performance in different learning activities, a commonly used practice, is a characteristic example of a performance-contingent reward. Prior studies of performance-contingent rewards don't directly inform classroom practice because they involved college students and experimental settings. Additionally the rewards administered in the studies were often peculiar. In real life not all students are simultaneously rewarded for surpassing a criterion of excellence. Administering such a reward on a selective basis can be quite problematic in authentic educational research settings, because of issues of experimental control and the ethics of administering selective rewards. In studies where performance-contingent rewards were examined, all participants received rewards as if they had all done well. These particular experimental manipulations are very removed from what is actually happening in real classrooms. Therefore, Deci, Koestner, and Ryan (2001) argue that these studies actually underestimate the negative effects of performance-contingent rewards. However, finding ways to overcome the difficulties of investigating them could be a valuable process, mainly because they represent a very common type of reward that has not been systematically investigated yet.

One of the two "edges" of performance-contingent rewards is the considerable competence enhancing information that they can convey. The other edge is their competence suppressing function, because of the competence-related information that it is potentially communicated to those students who do not meet the specified standards. In that regard, educational researchers need to uncover ways of minimizing those negative effects. The study described here builds on the suggestion by Hickey (1997) that the

learning environments that follow from newer sociocultural learning theories might help minimize the negative consequences of performance contingent rewards and maximize the positive ones.

In the center of CET and of particular importance for the present study, is the assumption that each reward (or any other contextual event or climate) entails both an informational and a controlling aspect. It is the salience of each that determines the effect of the reward on intrinsic motivation (e.g. Ryan, & Deci, 2002; Deci, Koestner, & Ryan, 2001). Informational rewards or events convey positive information regarding competence and support self-determination, whereas controlling rewards or events are more likely to invoke an external locus of causality and undermine competence. Furthermore CET emphasizes the importance of the interpersonal context or climate in the perception or experience of external events as either informational or controlling. Because this argument is central in the current discussion I will further elaborate on it later. I will now review the broader debate on extrinsic rewards, which is documented in a number of meta-analytic studies which draw consistently controversial conclusions.

The Debate Over Rewards

Four meta-analytic studies conducted within five years did not resolve the debate over the effects of extrinsic rewards on learning. The meta-analyses of over 80 studies on the issue conducted by behaviorists Cameron and Pierce (e.g. Cameron & Pierce, 1994; 2001) consistently show lack of evidence of the *detrimental effects* of tangible rewards; the analyses of this same pool of studies conducted by Deci, Koestner and Ryan (Deci, Koestner & Ryan, 1999a; 2001) reveal substantially undermining effects of tangible rewards and positive effects of verbal rewards when administered in non-evaluative

contexts. While the pool of studies is well established, the divergent findings resulted from differing criteria for including and categorizing studies for inclusion or exclusion in the competing analyses. Each team attributes some of the discrepancies to methodological flaws committed by the other. Deci and colleagues rely particularly strongly on methodological flaws in their rebuttal (see Deci, Koestner, & Ryan, 2001; Deci, Koestner, & Ryan, 1999b, Lepper, Keavney, & Drake, 1996, Kohn, 1996). Cameron (2001) argued that rewards are not inherently harmful and pointed insistently to the evidence that negative effects occur under specific and easily avoidable set of circumstances. Both groups concede that that the negative consequences are primarily observed when there is initially a high interest in the task for which participants are being rewarded. Reflecting a fundamentally behaviorist view of learning, Cameron & Pierce (2001) challenge the meaningfulness and value of this finding for classroom practice. From a practical point of view, teachers use rewards when there is a need to "instill interest in tasks that hold little initial appeal" (p. 32). With this, Cameron and Pierce point to the inadequacy of the Cognitive Evaluation Theory as a meaningful framework for worthwhile educational research (see also Eisenberger, Pierce, & Cameron, 1999).

The second round of meta-analyses was conducted in light of the particular criticisms developed by the opposite camps for the purpose of addressing the specific methodological concerns expressed in commentaries on the results. Nevertheless, those adjustments did little to bridge the methodological differences. The fact that the studies used in the meta-analyses were generally the same (in particular the latest two where criticisms and recommendations expressed by other researchers were taken into account and addressed) indicates that one should read the results of these studies with

considerable caution, bearing in mind that those results might be more or less biased by the authors' particular theoretical or epistemological considerations.

In their commentary on the controversial results of the meta-analyses, Lepper, Henderlong, & Gingras (1999) argued about the idiosyncratic nature of the literature and the often unusual experimental conditions that researchers developed to address the issue of positive or nonexistent effects of rewards. Commenting particularly on disconnects between many of these studies and the real world, they stated: "To produce the most theoretically telling comparisons, many important experiments employed exotic procedures or deceptive methods without counterparts in real life outside the laboratory" (p. 671). They nevertheless found the meta-analyses conducted by Deci and his associates (Deci, Koestner, & Ryan, 1999a) to be methodologically the most sound.

The major findings summarized by Deci, Koestner, and Ryan (1999a) are that tangible, expected rewards substantially undermine intrinsic motivation and to a greater degree for children than for college students. This undermining effect occurs when the task is of initial interest to the participants, but not in the case of dull or uninteresting tasks. Commonsensically, this conclusion is of limited value for practice because teachers generally do not offer rewards for interesting activities. It would be reasonable to say therefore that this controversy is not anywhere close to reconciliation and therefore does little to inform classroom practice. Most importantly, the weakness of this body of literature is exacerbated by the unrealistic settings in which studies were conducted. Given that the issue at hand is of considerable significance for educational practice, it seems that it could be reexamined within more realistic classroom contexts and should use the incentive practices that teachers more commonly employ. To broaden the

consideration of rewards in relation to more general motivational attitudes, it also may be useful to consider additional motivational constructs related to achievement motivation, such as goal orientation and other constructs consistent with the Expectancy × Value model.

Expectancy × Value and Related Theories

Expectancy × Value Model

While CET is one theory that has influenced some of the current generation of educational researchers, others have been influenced by the expectancy x value model. The model presumes that achievement motivation can be predicted by the multiplicative relationship between *expectancy* for success and *value* for the task. Expectancy has been differentially defined over the years (as elaborated in Eccles & Wigfield, 1995); it usually refers however to beliefs about future expectations for success on a particular task or an upcoming event. Although its future orientation theoretically differentiates it from self-perceptions of competence (see Pintrich & Schunk, 1996), confirmatory factor analyses revealed that students do not differentiate among these constructs in self-report contexts. Specifically, ability, expectancy and competence beliefs all loaded on a single factor concerning adolescents' perceptions of how well they think they will do at a task (Eccles and Wigfield, 1995). Expectancy is often measured by domain specific ability perceptions, such as self-efficacy beliefs (e.g. Bandura, 1997), perceptions of competence (e.g. Harter, 1982) and self-concept of ability (e.g. Covington, 1984).

Similarly, value has been discussed from different angles. Eccles and colleagues defined value in terms of attainment, intrinsic value (or interest), utility, and cost (Eccles and Wigfield, 1995). The first three constructs summarize the different reasons/motives

for task engagement, are positively correlated, and have been shown to be sufficiently distinct components (Eccles & Wigfield, 1995). This justifies a "practical" distinction (since participants in studies can differentiate among them) on top of the theoretical distinction. Attainment value concerns the perceived importance of doing well at certain tasks in terms of one's identity and life values. Utility value concerns the extent to which people engage in a task for its usefulness or instrumentality in terms of their future goals. Intrinsic value or interest is what makes people engage in a task for the mere enjoyment or pleasure they experience when engaging in it (similar to interest/enjoyment of SDT). Cost, however, is negatively related to these constructs as it represents the negative consequences of task engagement (e.g. time, anxiety, or other reasons why one should avoid engaging in a task). Cost may prohibit engagement, diminishing thus the overall value of the task.

Expectancy perceptions and task value are positively related. People will engage in tasks for which they maintain positive competence perceptions. The Expectancy × Value model is generally used to predict motivation and future achievement within particular domains (e.g. Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). With respect to the present study, this model will be used to examine how a moderate extrinsic incentive might affect students' motivation to study genetics by means of affecting their subjective competence and value.

Goal Orientation

Goal orientation in research has been driven by dichotomous characterizations such as the distinction between *learning* and *performance orientation*. Traditionally (see e.g. Nicholls, 1989, Dweck, 1986) learning (or mastery) and performance (or ego) goal

orientations were regarded as the end point of a single continuum. More recently recent theoretical considerations maintain that learning and performance orientations represent distinct continuums and that the relationship between them is not antagonistic (a student could be high on both). The latter represents the multiple goal perspective (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002), a cornerstone of which is the demarcation between performance-approach and performance-avoidance goals. This study builds on the concerns raised by Hickey (1997) that performance orientation might not necessarily be considered negative and counterproductive to learning. In other words, the distinction between learning orientation and performance orientation may be in part an artifact of learning environments that follow from a conventional view of learning based on the acquisition of knowledge by individuals. In learning environments based on newer participatory views of learning, learning orientation and performance orientation become less and less distinct. This is because these newer environments are designed to attach value to the act of engaging in intentional learning.

Whereas SDT is employed to examine the effect of rewards on students' subjective experience as they engage in certain tasks (motivational states), goal orientation constructs have been considered for the effects on more enduring attitudes (motivational traits). Moreover, *personal interest* (e.g. Schiefele & Rheinberg, 1997, Ainley, Hidi, & Berndorff, 2002) and value (e.g. Eccles & Wigfield, 1995) and finally *subjective competence or self-efficacy* (e.g. Bandura, 1997) were also considered as constructs that reflect motivational traits. Following the Expectancy × Value model, subjective competence and value will be considered here in combination.

The Issue of Context

In their initial reports on the overjustification effect, investigators maintained that the focus of future research should not be whether rewards have positive or negative effects, but rather when and why those differences might occur (Lepper, Henderlong, & Gingras, 1999). The contention here is that researchers should not be overly concerned with providing evidence of positive or negative effects, but rather should focus their efforts on understanding why such effects occur. This "piece of advice" could be taken in many different directions, but unfortunately according to Lepper et al. (1999) subsequent researchers' interpretations did not appear to contribute to further understanding of the effects or the circumstances under which they occur. Instead, a generation of researchers fabricated sophisticated experimental settings and reward contingencies that sharpened narrow theoretical arguments while clouding practical interpretations. The suggestion could still be timely in discussions of how negative effects might be mediated by characteristics of the learning environment in real classroom settings.

In the introductory chapter in their latest handbook of self-determination theory, Deci and Ryan (2002) restate that the interpersonal context or climate within which rewards are administered can influence their effects, namely their functional significance (e.g., the average or expected effect of different rewards). For example, extrinsic rewards are generally presumed to be controlling, while positive feedback is generally informational. Yet, positive feedback could in fact be perceived as controlling if delivered in a pressuring manner (i.e. a classroom where the idea that students *should* do well is prevalent). Ryan, Mims & Koestner (as cited in Ryan & Deci 2002) showed that despite the average controlling tendency of extrinsic rewards, they tend *not* to be

undermining when administered in a non-evaluative context that supports autonomy. Reeve & Deci (1996) provided evidence that elements of competitive situations can support intrinsic motivation; competitors not pressured to win were significantly more intrinsically motivated than competitors pressured to win. Thus according to this finding, competition might not be that detrimental if it takes place in a more relaxed context.

An ostensibly similar statement was articulated by Hickey (1997) who argued that the negative effects of competitive or reward structures might be due to conventional "transmission-reception" instructional models and could possibly be mediated in learning environments consistent with emerging sociocultural views. SDT is rooted in cognitive/rationalist views on learning and motivation where the focus is on enduring individual differences and the generalization of those across tasks and situations (see Greeno, Collins, & Resnick, 1996; Case, 1996; Hickey & McCaslin, 2001). Despite the invaluable contribution of SDT to achievement motivation, its development was substantially stimulated by the need of a comprehensive theory on individuals' healthy psychological and mental development. Although CET provides specifically for the effects of the social context, their definition of context falls within a rationalist tradition, where the focus is the individual mind. However, the definition of context from a sociocultural/sociohistoric view stands in a sharp contrast with this; sociocultural theorists are concerned with the study of the learning context, that involves decidedly non-individual factors such as task structure, social climate, culture, etc. (Hickey & McCaslin, 2001) and where the focus is on scaffolding students' increasingly meaningful participation in the practices of a community of learners that values the advancement of learning (e.g. Brown, 1994; Brown & Campione, 1996). In these communities learning is

considered a problematic situation and untangling this problem represents a central value and prioritized concern for the practices of the community. The kind of learning that ideally occurs in these communities is captured by Bereiter and Scardamalia's (1989) notion of intentional learning.

Intentional Learning Environments and Rewards

The level and quality of students' engagement with learning tasks has been described in numerous ways. Bereiter and Scardamalia (1989) assume that all experience can have learning as an incidental outcome, and therefore use the notion of "intentional learning" to refer to the cognitive processes that have learning as a goal rather than an incidental outcome" (p. 363). This notion of a meaningful and purposeful engagement is captured by Jimenez-Aleixandre, Rodriguez and Duschl's (2000) distinction between "doing the lesson" vs. "doing the science". When students are "doing the lesson" they demonstrate their ability to navigate the different procedures that are associated with their roles as students (answering questions, reading directions, taking exams, etc). This lower anchor of the continuum is also described by Bloom, Puro, & Theodorou (1989) with the term "procedural display":

> a.the display by teacher and students, to each other, of a set of academic and interactional procedures that themselves count as the accomplishment of a lesson, and
>
> b. the enactment of a lesson is not necessarily related to the acquisition of intended academic or nonacademic content or skills but is related to the set of cultural meanings and values held by the local community for classroom education (p. 272).

Bereiter and Scardamalia (1989) differentiated further between *learning through problem solving* and *learning as problem solving*. Solving a mathematical problem might result in

some kind of learning (most likely incidental). Further efforts to master the concepts embodied in the particular problem could be evidence of intentional learning. The distinction between these two different approaches in learning is to some extent reflected in the dichotomy between intrinsic and extrinsic motivation, which according to Scardamalia & Bereiter (1989) is "too crude to be of much service in studying the intentional aspects of learning" (p.366).

Building learning environments around this concept of intentionality might mean abandoning superficial characterizations of motivation (intrinsic vs. extrinsic) and focusing rather on orchestrating all the different aspects of classroom instruction around the development of intentional learning. Students will need useful opportunities to improve their knowledge and substantial amounts of meaningful feedback to enact curricular intentions in this respect, especially given that students are not used to this approach of learning. Intentional learning environments would therefore be defined as the combined outcome of orchestrating curriculum, instruction and assessment towards the development of intentional learning.

The Present Study

Brophy's argument for the examination of if and how psychological research operates in educational settings seems particularly relevant at this point. SDT, Goal Theory and Expectancy × Value Theory are employed to facilitate the understanding of the effects of rewards on students' motivation as those occur in a real classroom environment. The present study was designed to examine the effects of voluntary public recognition for self-assessed proficiency, considered here to be a moderate extrinsic incentive, in the context of an intentional learning environment.

This study was completed in the context of *The GenScope Assessment Project*, a three-year NSF funded project that focused on examining different views of motivation and learning in the context of formative assessment (Hickey, 2001; Hickey; Kindfield, Horwitz, & Christie, in press). The GenScope Assessment Project represents a "design experiment" (Brown, 1992; Collins, 1999; Kelly, 2003, The Design-Based Research Collective, 2003) initiated in 2000 to study materials and methods to enhance student participation in formative classroom assessment. A recent NRC report (2001) on the subject described formative assessment as "all those activities undertaken by teachers and their students [that] provide information to be used as feedback to modify the teaching and learning activities in which they are engaged" (p. 12). The model of formative feedback in this study is particularly relevant to motivation because it emphasized the direct advancement of student knowledge, and included a very detailed analysis of the knowledge individual students acquired. Thus, students who were more motivated to engage in using the formative feedback materials would end up learning more, and this learning could be detected in substantial detail.

One of the main goals of the broader effort concerned the reconciliation of competing views on learning and motivation. For that reason, three teams of researchers studied learning and motivation in the same learning environment, each holding different assumptions about learning and motivation, consistent with the broader perspectives they represented: the behaviorist/empiricist, the cognitive/rationalist and the situated/sociohistoric (for an extended discussion see Greeno, Collins, & Resnick et al, 1996, and Case, 1996). Thus, while the learning environment was designed to be consistent with modern sociocultural perspectives, the data reported here are consistent

with the cognitive/ rationalist perspective that underlies the modern theories of motivation outlined above.

The majority of studies reviewed in the meta-analyses involved the use of particular manipulations that took place in strict experimental settings. Although a number of those accounted for climate or interpersonal variables, the role of the learning was seen as rather irrelevant. This study took place in a month long implementation of a standards-based curriculum in public school classrooms serving average and below-average students. Public recognition as it was manipulated in the present study was part of a broader classroom practice and as such needed to be aligned with curriculum and curricular intentions and conform to ethical considerations associated to human subject research.

In the main, the GenScope Assessment Project tried to help students improve their knowledge of introductory genetics by providing meaningful feedback following the completion of classroom performance assessments. The project attempted a number of strategies, including extrinsic incentices, to motivate students to intentionally develop a deeper understanding of the particular target concepts of each unit. This focus on directly advancing students' understanding reflects to a large extent the notion of intentional learning as originally proposed by Bereiter & Scardamalia (1989). Most importantly, this practice aimed to motivate students to intentionally develop a deeper understanding, rather than motivating them to master a specific problem that would be expected to incidentally lead them to learn valued knowledge.

Assuming all the different contingencies related to extrinsic rewards, public recognition demonstrates the closest resemblance to performance-contingent rewards.

Deci, Koestner, and Ryan (2001) presume that among the different contingencies related to extrinsic rewards, the performance-contingent rewards (given after a successful completion of an activity; meeting a standard of excellence; surpassing a criterion) could potentially have the most detrimental effects on intrinsic motivation. However, when performance contingent rewards are tied to excellent or exemplary performance they can convey substantial competence information and thus compensate for some of the negative effects of their controlling aspect (Deci et al., 2001). As stated previously, the way performance contingent rewards have been examined in previous studies has been somewhat problematic since all the participants received a reward, which is quite unrealistic considering how such a reward actually is used in real life (Deci et al., 2001) and therefore underestimate the negative effects of it. Moreover, the interpersonal context is one other factor that is importantly involved in the delivery of a performance contingent reward (the degree of control).

According to CET, although performance-contingent rewards are expected to have the most pronounced negative effects on intrinsic motivation, they nevertheless convey important competence enhancing information and in that regard should support intrinsic motivation. The type of reward employed in this study represents the most natural form of a performance-contingent reward, because not all students get recognized indiscriminately. What is most important however is that the students assume a considerable amount of responsibility on whether they deserve it or not. Importantly, in intentional learning environments, students who compete for recognition might in fact be engaging in a worthwhile process of advancing their understanding and that might offset some of the potentially negative effects.

In order to investigate how performance-contingent rewards influence motivation in intentional learning environments, this study examined the consequences of public recognition, a reward commonly used in everyday classrooms, on students' motivation to learn genetics. Here are the questions specifically asked:

a. What are the consequences of public recognition on students' reported motivational traits?
b. What are the consequences of public recognition on students' reported motivational states?

A set of measures related to Expectancy × Value and Goal Theory were employed to investigate the first question and a set of measures related to SDT were used in relation to the second question.

CHAPTER 2

METHOD

The broader project was designed to explore a wide range of issues, including the one being focused on here. Three teams of researchers attempted to study engagement and learning in a single learning environment, each using a very different set of assumptions about learning and engagement. Specifically, the study was designed to explore the consequences of a common motivational practice for which the contradictory findings reviewed above leave educators uncertain. The specific extrinsic reward practice, voluntary public recognition of self-assessed proficiency, was used because it was the most salient extrinsic reward that the participating school districts would allow researchers to manipulate experimentally in an actual classroom setting.

Participants

Two teachers from two different schools implemented the GenScope curriculum in their 9th grade life science classrooms for 5 weeks. Teacher A taught four periods (N=85) and teacher B two periods (N=61). School A is a lower SES suburban school where 99.5% of the students were African American and over 30% of the students qualified for the federal lunch subsidy. The school typically posted mean achievement scores that were somewhat below national averages. School B is a middle class SES suburban school, where roughly 40% of the students were African American and some of those students were continuing as participants in a court-ordered desegregation plan that had been terminated several years earlier.

Curriculum

The curriculum consisted of three units of computer-based and conventional activities. The *GenScope* introductory genetics software (Horwitz & Christie, 2000) was used for the computer-based activities. The teachers were provided with an LCD panel and roughly half of the computer-based activities were completed as whole-class activities. After each unit, students individually completed a challenging formative performance assessment that targeted the core topics of that unit. Unit tests were not graded or scored, and the genetics grade was entirely based on a final consisting of items based on the unit tests. The completed assessments were returned to students, along with "Answer Explanation" rubrics that explained how to solve the problems without directly giving the answer. Students assembled in triads and reviewed their assessments using the Answer Explanations. They were also expected to judge their understanding of targeted concepts using a "Judge Your Understanding" rubric. A detailed breakdown of the content was anchored to specific problems on the assessment. Students were then asked to self-assess their understanding as *developing, proficient, accomplished,* and *exemplary*. Significantly, students were repeatedly told to judge their understanding after engaging in formative feedback, and to *not* consider their understanding when they took the test the first time. This was intended to focus their attention on the intentional learning that presumably occurred during the formative feedback activity.

Independent Variable

The experimental manipulation was introduced in three out of the six classes that participated in the study, following students' private proficiency assessment. At the conclusion of that routine, students participated in a whole class activity using their

private evaluations of their understanding. First, the teacher invited students who thought their understanding was *accomplished* or *exemplary* to raise their hands and have their names posted on a chart that outlined the three units and the target concepts of each. This particular activity entailed a considerable amount of accountability on the part of the students; the teacher encouraged and gave them the opportunity to challenge each other and request evidence of their "accomplished" or "exemplary" understanding. The students' names were posted on the "Exemplary Geneticists" chart and remained posted throughout the implementation. These experimental classrooms will be referred from this point on as PR[1] (Public Recognition) classrooms. In the three classes that did not feature public recognition, the classroom period concluded with the private proficiency assessment routine. In turn, these comparison classrooms will be referred to as NPR[2] (Non-Public Recognition) classrooms.

This Public Recognition (PR) event took place at the end of each of the three units and it was not introduced to the students until the end of unit one. Therefore students did not expect PR the first time this activity was practiced. What this means is that for one third of the implementation students were not expecting it. From that point on though, for the remaining two thirds of the instructional time, students were very well aware of its existence and therefore it could be presumed that overall PR was an expected incentive.

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[1] In this condition three different classes were collapsed: two of them also featured video feedback a manipulation of the broader study and one of them did not. There were not significant differences between them ($F<1$).

[2] Three classes were collapsed here as well: two of them featured video feedback and one of them only public recognition. No significant differences were detected ($F<1$) among them and therefore they were collapsed.

Dependent Variables

Trait Measure. Before the start and at the end of the implementation students completed a Trait Motivation Questionnaire titled "How do you feel about genetics?" adapted from Hickey, Moore, & Pellegrino (2001) (Appendix A). This questionnaire consists of five scales that assess trait-like motivation constructs about biology and genetics. Students responded using a Likert scale from 1 (strongly disagree) to 5 (strongly agree). The scales, along with example items and Cronbach's alpha indices, are presented in Table 1.

State Measure. On the 4th day and again on the 16th day of the implementation immediately after particular classroom activities, the students completed a State Motivation Questionnaire titled "How do you feel about class today?" (Appendix B). The five scales of this questionnaire were selected from the Intrinsic Motivation Inventory (Deci, & Ryan, 2000) and were slightly modified to the needs of the particular study. The scales measure students' motivational states at the conclusion of particular classroom activities. Description of the scales along with example items and other details of the questionnaire follow in Table 2. The included items as well as those included in the trait questionnaire were selected from a larger pool of items piloted in a smaller sample of students from the same population a semester prior to the implementation.

Procedure

Two or three weeks before the start of the implementation, the researchers, two at each school, administered the Trait Motivation Questionnaire. They explained to the students the purpose of it and informed them of the confidentiality of their responses; students were told that the survey served research purposes, that only researchers would

be using them, and that their teacher would not have access to their responses. The researchers allowed students 10 minutes to complete the surveys and were available for further questions or clarifications. Similarly, a day after the end of the implementation the students completed the same motivation questionnaire.

The State Motivation Questionnaire was administered twice during the course of the implementation, on the 4th and the 16th day. The curriculum consisted of three units on introductory genetics. In each unit the students participated in a variety of group and whole class activities. This questionnaire was administered to students at the end of particular classroom activities in unit one and unit three. The early administration took place a while before the experimental manipulation was introduced in the public recognition classrooms. The late administration took place five days after the public recognition routine was enacted for the second time. The conditions of the administration were the same as those of the Trait Motivation Questionnaire.

Table 1

Scales on Trait Motivation Questionnaire

Scale	No. of items	α[a] TA[c] Pre	TA[c] Post	TB[d] Pre	TB[d] Post	Example Item[b]
Learning Orientation	5	.79	.75	.70	.81	What I learn makes me want to find more
Performance Orientation	5	.87	.79	.76	.72	When I get higher scores than my classmates.
Work Avoidance	3	.70	.66	.59	.41	When I don't have to work hard.
Subjective Competence	4	.54	.77	.63	.71	I am confident in my ability to do well in genetics.
Personal Interest	5	.77	.89	.71	.76	Genetics is an interesting topic.
Value	3	.69	.87	.72	.77	Learning about genetics is useful to me.

[a]Internal consistency (Cronbach's alpha).

[b]For the first three scales (Learning Orientation, Performance Orientation and Work Avoidance, items were preceded by the question *How do you feel about Biology?* and the stem *I feel pleased in biology class when…*For the next three scales Subjective Competence, Personal Interest and Value, items were preceded by the question *How do you feel about genetics?*

Scores could range from 1 to 5 (Strongly Disagree, Disagree, Both Agree and Disagree, Agree, Strongly Agree).

[c]Teacher A.

[d]Teacher B.

Table 2

Scales on State Motivation Questionnaire

Scale	No of items	α[a] TA[c] Early	TA[c] Late	TB[d] Early	TB[d] Late	Example Item[b]
Interest/Enjoyment	5	.84	.87	.84	.69	I enjoyed doing them.
Perceived Competence	5	.74	.81	.79	.71	I am satisfied with my performance at these activities.
Pressure/Tension	4	.65	.58	.67	.28	I felt very tense while doing them.
Perceived Choice	4	.43	.59	.52	.35	I did them because I wanted to.
Value	4	.69	.81	.77	.66	I think these are important activities

[a]Internal Consistency (Cronbach's alpha).

[b]All items were preceded by the stem *How do you feel about the activities in class today?*

Scores could range from 1 to 5 (Strongly Disagree, Disagree, Both Agree and Disagree, Agree, Strongly Agree).

[c]Teacher A.

[d]Teacher B.

CHAPTER 3

RESULTS

For each subscale of the trait and state measures, a Repeated Measures ANOVA was performed to compare the two conditions (NPR, PR). To account for possible variation between teachers, *Teacher* was introduced as a second variable in the design. Negatively stated items were reverse coded. There was evidence that a small number of students did not complete the surveys thoughtfully. To exclude from the analysis those cases, all surveys were coded for "thoughtful completion" using dummy coding (1,0) which represents a method for coding categorical variables; "1" is assigned for membership in a category and "0" for non-membership (Pedhazur, 1997). This variable was not incorporated as an integral part of the design; it was only used to easily exclude from the analyses cases for which there was evidence of careless completion. I present descriptive statistics of the six scales for both teachers and subsequently ANOVA results and figures, starting with the results on motivational traits.

Consequences for Motivational Traits

Tables 3 and 4 present the descriptive statistics for the Trait Motivation Questionnaire on the pre and post administrations for both teachers in the Non Public Recognition (NPR) and Public Recognition (PR) classrooms respectively. Scores could range from one to five. The observed scores in all classrooms, both at the pre and post administrations ranged from two to four. The mean scores of the six constructs fluctuated somewhat differently between the two teachers. The only unanimous change in the NPR

classrooms was observed in value, which decreased for both teachers. In the PR classrooms, the across time differences in these six trait constructs were more similar between the two teachers than in the NPR classrooms. Interestingly, value appeared to increase for both teachers. This increase in value in the PR classrooms, taken together with the decrease on the same construct in the NPR classrooms, constituted an interesting observation.

A Repeated Measures ANOVA was performed for each motivational trait to systematically compare differences across time for the six constructs and between the two conditions of the study. Tables 5-7 present the ANOVA results for Learning Orientation, Performance Orientation and Work Avoidance each followed by their associated figures (Figures 1-3). As shown in Table 5 changes in Learning Orientation across time were not significantly different between the two conditions $F(1,91)=.48$ $p=.488$. As depicted in Figure 1, Learning Orientation remained unchanged overall for the NPR condition of Teacher B, but it decreased slightly for all PR classrooms and the NPR classrooms of Teacher A. This difference between the two teachers in the NPR classrooms was trivial as suggested by the non-significant second order interaction, $F(1,91)=.10$, $p=.748$.

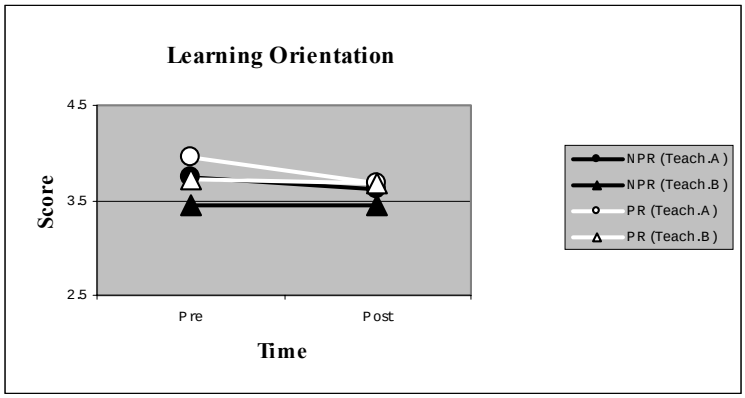

Figure 1. Changes in Learning Orientation by condition and teacher.

The changes in Performance Orientation were similar overall to the across time changes in Learning Orientation. As shown in Figure 2, Performance Orientation remained almost unchanged in both conditions although there was a slight decrease in the PR classrooms of Teacher A. The self-report Performance Orientation of students in the two conditions was almost identical as suggested by the F value, $F(1,91)=.00$, $p=.995$. The results are summarized in Table 6.

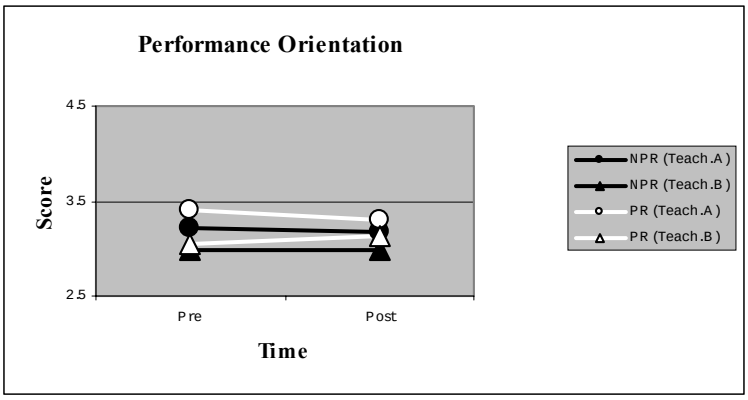

Figure 2. Changes in Performance Orientation by condition and teacher.

As shown in Table 7 the across time changes in the two conditions in Work Avoidance were not significant, $F(1,91)=.12$, $p=.488$. In particular, Work Avoidance increased for all PR classrooms. It also increased in the NPR classrooms of Teacher A and slightly decreased in the NPR classrooms of Teacher B. This difference between teachers was again trivial as suggested by the non significant second order interaction $F(1,91)=.65$, $p=.422$.

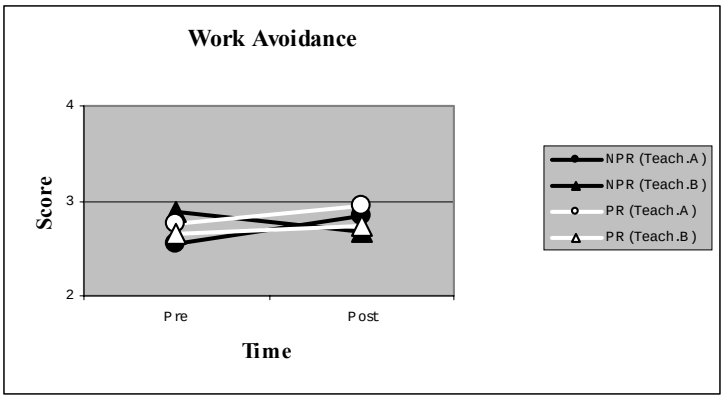

Figure 3. Changes in Work Avoidance by condition and teacher.

Overall the changes in goal orientation between the two conditions as represented by the three motivational traits reviewed so far are negligible. As suggested by the results reviewed so far, the voluntary public recognition of students' self-assessed proficiency did not have any significant consequences on their self-report goal orientation over the course of the five weeks of the innovative curriculum. Results for the three remaining motivational traits are now presented starting with Subjective Competence.

The *Teacher* variable here seems to have played a more decisive role than the actual experimental condition. The statistically significant Teacher × Time interaction in Table 8, $F(1,91)=6.92$, $p=.01$, suggests that students reported substantially different Subjective Competence according to their teacher. For Teacher A it relatively increased for both NPR and PR conditions, while for Teacher B it remained unchanged in the PR condition and decreased in the NPR. This finding along with the non-significant PR × Time interaction, $F(1,91)=.75$, $p=.488$ indicates that the variation in this construct can be attributed to a large extent to the teacher and not to the experimental manipulation.

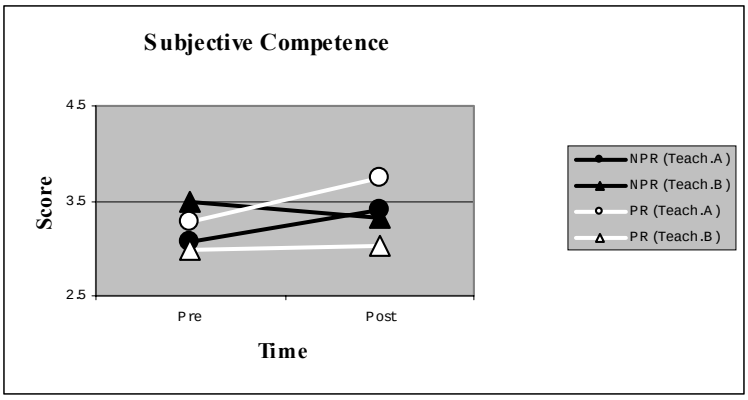

Figure 4. Changes in Subjective Competence by condition and teacher.

Personal Interest increased in the PR classrooms identically for both teachers and it remained overall unchanged for the NPR classrooms. This interaction was not significant, F(1,91)=1.02, p=.315 (see Table 9).

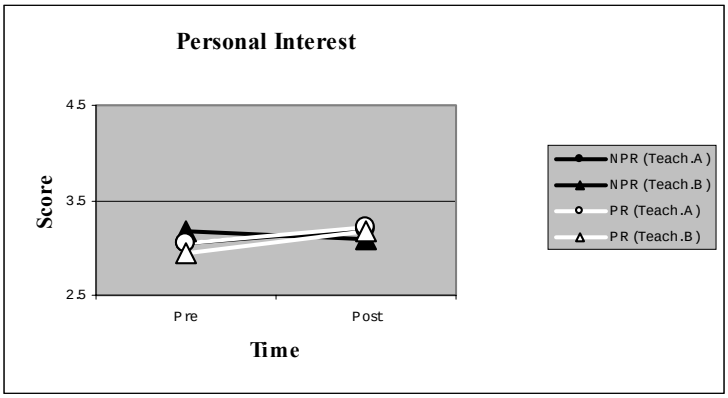

Figure 5. Changes in Personal Interest by condition and teacher.

The consequences of public recognition were most prevalent in students' self-reported value for the domain of genetics. Students in the PR classrooms increased their reported Value in genetics compared to the students in the NPR classrooms. Figure 6

presents the across time increase in Value for the students in the experimental condition and the decrease for the students in the rest of the classrooms. As shown in Table 10, this condition by time interaction reached marginal statistical significance F(1,90)=.043. Importantly, this finding was not confounded by any variation between teachers, as suggested by the non-significant PR × Teacher × Time interaction, F(1,90)=.24, p=.624, enabling a clearer interpretation of this finding.

The three items used for measuring Value (see Appendix A) reflected a usefulness and importance in studying genetics (in accordance with the utility task value suggested in the Expectancy × Value model) and it can be therefore assumed that students who were participants in the classrooms where voluntary public recognition was provided as a modest reward for exemplary understanding, came to value genetics as an important field of study more than their peers in the comparison classrooms.

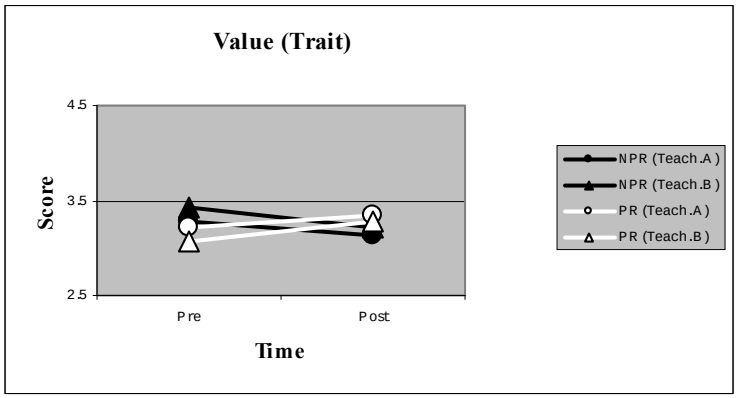

Figure 6. Changes in Value by condition and teacher.

Summary of Results for Trait Measures

Trait motivation constructs reflect general and usually more stable motivational attitudes of individuals. The motivational intervention used in this study over the course of the six weeks of implementing an innovative curriculum had several outcomes on students' self-report motivational attitudes. The students in the experimental classrooms reported significantly increased importance and usefulness in the study of genetics, compared to the students in the comparison classrooms [$F(1,90)= 4.21$, $p=.043$]. Moreover, the students of Teacher A, regardless of experimental condition felt more competent in genetics by the end of the implementation, compared to the students of Teacher B [$F(1,91)= 6.92$, $p=.010$]. The motivational intervention did not result in any significant across time changes in students' goal orientation and personal interest.

Consequences for Motivational States

Tables 11-12 summarize the descriptive statistics for the State Measure on both the early and late administrations for both teachers, in the Public Recognition and Non-Public Recognition classrooms. Similar to the trait measures scores could range from one to five and the observed scores ranged from two to four. Changes in mean scores across time were overall similar between the two teachers for the Non- Public Recognition classrooms but there was some variation between teachers in the Public Recognition classrooms in Interest/Enjoyment, Perceived Competence and Perceived Choice. Comparisons of the observed means between the experimental and the control conditions across time were conducted using a Repeated Measures ANOVA analysis on each motivational state construct. Results follow starting with Interest/Enjoyment.

The differences between the experimental and the comparison classrooms were not significant. As shown in Table 13 the condition by time interaction was not significant F(1,96)=.18, p=671. However, the Teacher × Time interaction was statistically significant, F(1,96)= 6.06, p=.016 suggesting again a teacher effect on the across time changes of students' self report interest. Interestingly the second order interaction PR × Teacher × Time approached significance, F(1,96)=2.82, p=.097 suggesting to some extent that the students of Teacher A in the experimental classrooms reported higher Interest/Enjoyment than the students of the same teacher in the comparison classrooms and all the students of Teacher B. As shown in Figure 7 Interest/Enjoyment decreased for both teachers in the NPR classrooms. It also decreased in the PR classroom of Teacher B, whereas it only increased for the experimental classrooms of Teacher A.

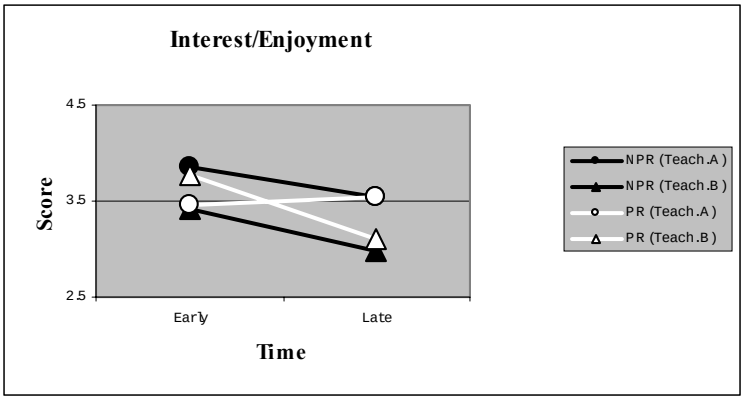

Figure 7. Changes in Interest/Enjoyment by condition and teacher.

Changes in Perceived Competence are quite similar to those observed in Interest/Enjoyment. As shown in Figure 8 it decreased for both teachers in the NPR classrooms and also for Teacher B in the PR classrooms, whereas it increased for teacher

A in the PR classrooms. Interestingly though and contrary to Interest/Enjoyment the PR × Time interaction was significant, F(1,96)=4.78, p=.031 (see Table 14). This means that students in the experimental classrooms felt more competent in dealing with the different classrooms activities related to genetics compared to the students in the comparison classrooms. The second order PR × Teacher × Time interaction approached significance F(1,96)=3.41 p=.068 suggesting as in Interest/Enjoyment that the finding might be more prevalent in the experimental classrooms of Teacher A than those of Teacher B.

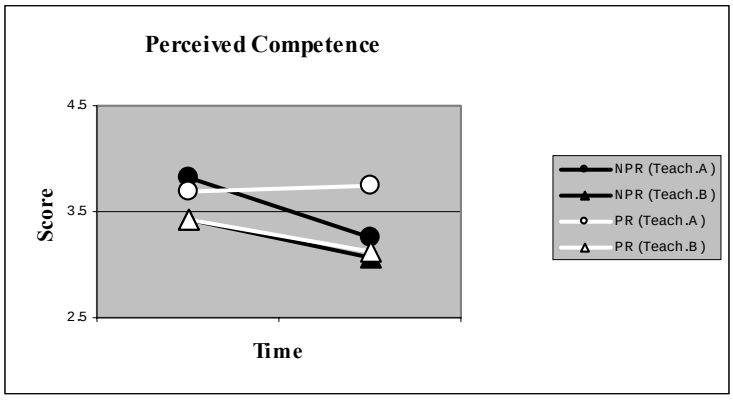

Figure 8. Changes in Perceived Competence by condition and teacher.

The results for the two self-determination measures, Pressure/Tension and Perceived Choice are presented here. As depicted in Figure 9 Pressure/Tension increased for all classrooms in both conditions and no interactions were present F(1,96)=.14, p=.712 (Table 15).

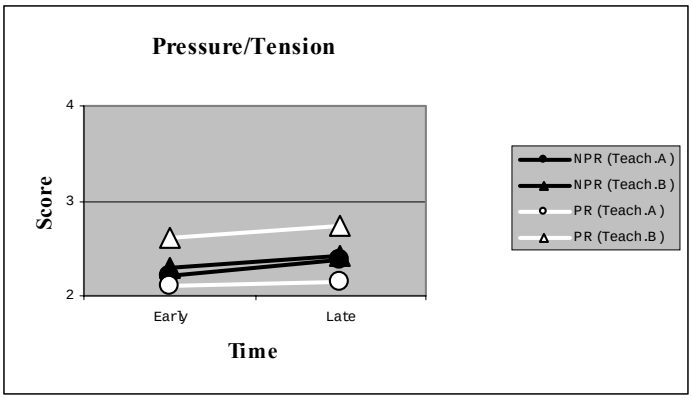

Figure 9. Changes in Pressure/Tension by condition and teacher.

Perceived Choice followed an interesting pattern. As Figure 9 shows it was overall the same between teachers regardless the condition. It identically decreased for both conditions of Teacher B and remained overall the same for Teacher A. There were no significant interactions $F(1,96)=.03$, $p=.855$ (see Table 16). However, the Teacher × Time interaction, $F(1,96)=2.82$, $p=.096$ approached significance suggesting that the students of Teacher A might had felt more freedom in their choices as opposed to the students of teacher B. However, particular low internal consistency measures for these two motivational states (pressure/tension, perceived choice), limits the value and interpretability of the related findings.

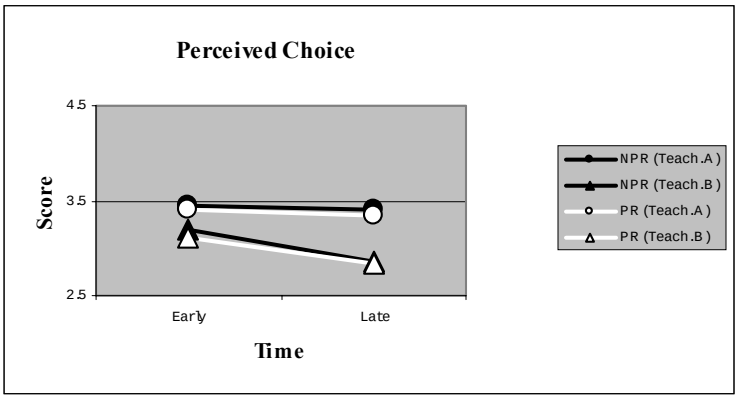

Figure 10. Changes in Perceived Choice by condition and teacher.

There were not any interesting changes in the Value construct of the state measure. The across time changes between the experimental and the comparison classrooms were almost identical as indicated by the zero F value in the PR × Time interaction, F(1,96)= .00 (Table 17). As shown in Figure 11 Value appeared decreased for both the experimental and the comparison classrooms.

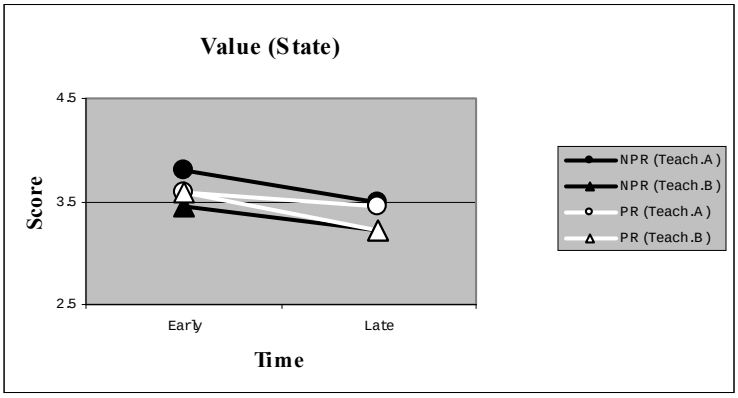

Figure 11. Changes in Value by condition and teacher.

Summary of Results for State Measures

The state measures are on-line evaluations of individuals' different motivational experiences while completing different learning tasks. Compared to the motivational trait measures, these measures are substantially different because they represent individuals' evaluations of their different motivational experiences at particular states of their engagement in different activities and they are therefore much more bound to the context of the particular learning tasks.

The students of Teacher A appeared more interested in the classroom learning activities compared to the students of Teacher B as the Teacher × Time interaction

F(1,91)=6.06, p=.016 suggests. However, a second-order interaction in the same construct that approached significance indicates that students of Teacher A in the experimental classrooms reported higher interest than students in all other classrooms. In addition, Perceived competence of students in the experimental classrooms was significantly increased compared to their peers' perceived competence in the non-experimental classrooms, F(1,91)= 4.78, p=.031. Again, this interaction was accompanied by a second-order interaction that approached significance. A similar consequence was observed in Perceived Choice, but that finding is particularly inconclusive because of the particularly low internal consistency measures (see Table 2).

Overall findings

Over the course of the five weeks of the innovative curriculum, students in the experimental classrooms attributed higher importance and usefulness for the study of genetics and felt more competent in dealing with classroom activities related to genetics. Statistical significant Teacher × Time interactions in Subjective Competence and in Interest/Enjoyment both accompanied by PR × Teacher × Time interactions that approached significance may suggest that positive outcomes of the reward condition were more prevalent in the experimental classrooms of Teacher A. This finding provides initial evidence of an interpersonal context effect, which suggests that the effects of rewards depend on the way they are administered (informationally vs. controllingly) (Ryan and Deci, 2002). It also provides support of the argument of this study that the essence of an intentional learning environment might mediate and lessen the negative effects of rewards on motivation. Video data collected for the broader purposes of the larger study provide support for the interpersonal context effect, as Teacher A's enactment of the

curriculum was more aligned with the curricular intentions that were largely driven by sociocultural perspectives on learning and motivation.

Table 3

Descriptive Statistics of students' reported motivational traits

Non-Public Recognition Classrooms

	Pre		Post	
Scales	M	SD	M	SD
Teacher A (n=26)				
Learning Orientation	3.74	.62	3.61	.53
Performance Orientation	3.22	.85	3.17	.69
Work Avoidance	2.55	1.02	2.85	.71
Subjective Competence	3.06	.59	3.41	.89
Personal Interest	3.05	.78	3.19	.93
Value	3.28	.64	3.14	.83
Teacher B (n=24)				
Learning Orientation	3.44	.66	3.45	.72
Performance Orientation	2.98	.85	2.99	.65
Work Avoidance	2.88	.95	2.68	.79
Subjective Competence	3.48	.60	3.32	.70
Personal Interest	3.17	.66	3.09	.72
Value	3.43	.77	3.22	.87

Note: Scores could range from 1 to 5.

Table 4

Descriptive Statistics of students' reported motivational traits

Public Recognition Classrooms

	Pre		Post	
Scales	M	SD	M	SD
Teacher A (n=33-34)				
Learning Orientation	3.95	.53	3.68	.64
Performance Orientation	3.42	.74	3.31	.61
Work Avoidance	2.77	.84	2.95	.75
Subjective Competence	3.28	.61	3.74	.59
Personal Interest	3.06	.66	3.19	.93
Value	3.21	.54	3.33	.77
Teacher B (n=11)				
Learning Orientation	3.73	.60	3.69	.65
Performance Orientation	3.06	.41	3.13	.79
Work Avoidance	2.65	.57	2.73	.57
Subjective Competence	2.98	.93	3.02	.88
Personal Interest	2.95	.88	3.17	.92
Value	3.06	.85	3.27	.99

Note: Scores could range from 1 to 5.

Table 5

Analysis of Variance for Learning Orientation

Source	df	F	p
	Between subjects		
Public Recognition (PR)	1	2.79	.098
Teacher	1	1.92	.169
PR × Teacher	1	.26	.613
Within-cells error	91	(.57)	
	Within Subjects		
Time	1	2.47	.119
PR × Time	1	.48	.488
Teacher × Time	1	1.82	.180
PR × Teacher × Time	1	.10	.748
Within-cells error	91	(.19)	

Note. Values enclosed in parentheses represent mean square errors.

Table 6

Analysis of Variance for Performance Orientation

Source	df	F	p
	Between subjects		
Public Recognition (PR)	1	1.00	.320
Teacher	1	2.96	.089
PR × Teacher	1	.05	.828
Within-cells error	91	(.76)	
	Within Subjects		
Time	1	.04	.848
PR × Time	1	.00	.995
Teacher × Time	1	.52	.472
PR × Teacher × Time	1	.14	.708
Within-cells error	91	(.29)	

Note. Values enclosed in parentheses represent mean square errors.

Table 7

Analysis of Variance for Work Avoidance

Source	df	F	p
	Between subjects		
Public Recognition (PR)	1	.06	.803
Teacher	1	.10	.752
PR × Teacher	1	.77	.383
Within-cells error	91	(.79)	
	Within Subjects		
Time	1	.60	.119
PR × Time	1	.12	.488
Teacher × Time	1	1.63	.180
PR × Teacher × Time	1	.65	.422
Within-cells error	91	(.55)	

Note. Values enclosed in parentheses represent mean square errors.

Table 8

Analysis of Variance for Subjective Competence

Source	df	F	p
	Between subjects		
Public Recognition (PR)	1	.25	.621
Teacher	1	1.78	.185
PR × Teacher	1	6.80	.011
Within-cells error	91	(.66)	
	Within Subjects		
Time	1	3.93	.051
PR × Time	1	.75	.488
Teacher × Time	1	6.92*	.010
PR × Teacher × Time	1	.09	.766
Within-cells error	91	(.31)	

Note. Values enclosed in parentheses represent mean square errors.

**p<.05*

Table 9

Analysis of Variance for Personal Interest

Source	df	F	p
	Between subjects		
Public Recognition (PR)	1	.03	.868
Teacher	1	.05	.830
PR × Teacher	1	.09	.761
Within-cells error	91	(.94)	
	Within Subjects		
Time	1	1.99	.162
PR × Time	1	1.02	.315
Teacher × Time	1	.23	.632
PR × Teacher × Time	1	.75	.390
Within-cells error	91	(.25)	

Note. Values enclosed in parentheses represent mean square errors.

Table 10

Analysis of Variance for Value (Trait)

Source	df	F	p
	Between subjects		
Public Recognition (PR)	1	.10	.621
Teacher	1	.00	.986
PR × Teacher	1	.54	.466
Within-cells error	90	(.87)	
	Within Subjects		
Time	1	.00	.946
PR × Time	1	4.21*	.043
Teacher × Time	1	.00	.961
PR × Teacher × Time	1	.24	.624
Within-cells error	90	(.28)	

Note. Values enclosed in parentheses represent mean square errors.

* $p<.05$

Table 11

Descriptive statistics of students' reported motivational states

Non-Public Recognition Classrooms

	Early		Late	
Scales	M	SD	M	SD
Teacher A (n=24)				
Interest/Enjoyment	3.85	.76	3.55	.81
Perceived Competence	3.82	.74	3.25	.79
Pressure/Tension	2.22	.66	2.39	.76
Perceived Choice	3.45	.53	3.41	.62
Value	3.79	.60	3.50	.61
Teacher B (n=25)				
Interest/Enjoyment	3.41	.86	2.97	.87
Perceived Competence	3.42	.72	3.06	.73
Pressure/Tension	2.29	.61	2.42	.67
Perceived Choice	3.19	.72	2.86	.92
Value	3.46	.72	3.22	.65

NOTE: Scores could range from 1 to 5.

Table 12

Descriptive statistics of students' reported motivational states

Public Recognition Classrooms

	Early		Late	
Scales	M	SD	M	SD
Teacher A (n=38)				
Interest/Enjoyment	3.47	.88	3.54	.78
Perceived Competence	3.69	.63	3.74	.64
Pressure/Tension	2.10	.65	2.14	.49
Perceived Choice	3.40	.64	3.34	.71
Value	3.59	.79	3.45	.88
Teacher B (n=13)				
Interest/Enjoyment	3.76	.72	3.10	.62
Perceived Competence	3.43	.53	3.12	.65
Pressure/Tension	2.62	.98	2.73	.52
Perceived Choice	3.12	.67	2.83	.43
Value	3.60	1.15	3.21	.97

NOTE: Scores could range from 1 to 5.

Table 13

Analysis of Variance for Interest/Enjoyment

Source	df	F	p
	Between subjects		
Public Recognition (PR)	1	.02	.888
Teacher	1	3.75	.056
PR × Teacher	1	2.12	.149
Within-cells error	96	(.96)	
	Within Subjects		
Time	1	13.77	.000
PR × Time	1	.18	.671
Teacher × Time	1	6.06*	.016
PR × Teacher × Time	1	2.82	.097
Within-cells error	96	(.35)	

Note. Values enclosed in parentheses represent mean square errors.

*$p<.05$

Table 14

Analysis of Variance for Perceived Competence

Source	df	F	p
	Between subjects		
Public Recognition (PR)	1	.70	.406
Teacher	1	8.31	.005
PR × Teacher	1	.33	.567
Within-cells error	96	(.69)	
	Within Subjects		
Time	1	15.13	.000
PR × Time	1	4.78*	.031
Teacher × Time	1	.22	.640
PR × Teacher × Time	1	3.41	.068
Within-cells error	96	(.25)	

Note. Values enclosed in parentheses represent mean square errors.

* $p<.05$

Table 15

Analysis of Variance for Pressure/Tension

Source	df	F	p
	Between subjects		
Public Recognition (PR)	1	.33	.566
Teacher	1	6.85	.010
PR × Teacher	1	4.61	.034
Within-cells error	96	(.58)	
	Within Subjects		
Time	1	1.96	.165
PR × Time	1	.20	.660
Teacher × Time	1	.01	.905
PR × Teacher × Time	1	.14	.712
Within-cells error	96	(.27)	

Note. Values enclosed in parentheses represent mean square errors.

* $p<.05$

Table 16

Analysis of Variance for Perceived Choice

Source	df	F	p
	Between subjects		
Public Recognition (PR)	1	.21	.645
Teacher	1	10.32	.005
PR × Teacher	1	.00	.978
Within-cells error	96	(.67)	
	Within Subjects		
Time	1	5.37	.023
PR × Time	1	.01	.933
Teacher × Time	1	2.82	.096
PR × Teacher × Time	1	.03	.855
Within-cells error	96	(.25)	

Note. Values enclosed in parentheses represent mean square errors.

* $p<.05$

Table 17

Analysis of Variance for Value (State)

Source	df	F	p
	Between subjects		
Public Recognition (PR)	1	.05	.831
Teacher	1	2.10	.151
PR × Teacher	1	.43	.516
Within-cells error	96	(.92)	
	Within Subjects		
Time	1	9.76	.002
PR × Time	1	.00	.995
Teacher × Time	1	.31	.581
PR × Teacher × Time	1	.74	.393
Within-cells error	96	(.31)	

Note. Values enclosed in parentheses represent mean square errors.

CHAPTER 4

DISCUSSION

This study explored the consequences of public recognition, a modest extrinsic incentive, on students' reported motivational traits and states in an intentional learning environment. It was initiated in an attempt to examine the unresolved issue regarding extrinsic rewards and motivation by addressing factors that necessarily limited the applicability of previous findings and their potential to illuminate practice. No "artificial" rewards were given to students and no "exotic" experimental settings were created. The issue was investigated in a realistic classroom and a realistic teacher administered the reward. Moreover the reward was provided after evidence of exemplary understanding of challenging genetics concepts and not for engaging in "fun problem solving activities". Pointing to the mismatch of research on intrinsic motivation and the reality of classroom practice, Brophy (1999) criticized previous studies for their focus on "fun" tasks:

> Intrinsic motivation research tends to be done in situations in which people are freely engaging in work or learning activities. If learning is involved, it usually takes the form of leisurely exploration to satisfy curiosity rather than sustained efforts to accomplish knowledge-or skill-development goals for which one will be held accountable. (p.6)

This relates specifically to the broader point of this study. In learning environments where students are induced into directly advancing their understanding and learning and where ample opportunities for feedback and improvement are provided, students who are

working towards the reward might in fact be engaged in a worthwhile endeavor. To investigate the issue, dominant motivation theories were reviewed and will be used here to interpret the results. I start by interpreting the main findings on the "state-oriented" and "trait-oriented" measures and next, I draw initial implications of this study for educational practice and future motivation research.

Consequences for Motivational States

Motivational states are assessed while students are engaged in different tasks and serve as online measures of different motivation qualities. They are therefore particularly bound to the context of the related learning tasks. The utility of this method in combination with the more conventional pre-post self-report trait measures has been discussed elsewhere as a useful and promising tool towards a more rigorous study of motivation in relation to the learning environments with which it is essentially related (for an extended discussion see Hickey, 1997).

In the present study the online measures where adapted from the Intrinsic Motivation Inventory advanced within SDT and CET. This "state-oriented" survey practically assesses intrinsic motivation and other constructs that mediate it. Perceived competence and autonomy measures (pressure/tension and perceived choice) are according to CET critical mediators of intrinsic motivation. In this study perceived competence was the only motivational state that varied significantly across time; students in the Public Recognition classrooms reported higher perceived competence than their peers in the comparison classrooms.

According to CET, the evaluation of rewards as either informational or controlling is accomplished through the examination of effects on autonomy and perceived

competence. Autonomy is the determining factor. Even if perceived competence might appear to have increased, it cannot support intrinsic motivation unless autonomy is also enhanced or overall unchanged. Pressure/tension and perceived choice represented indices of autonomy. However, findings on these two measures were particularly inconclusive; no consequences were detected and the associated alphas (indexes of internal consistency) were particularly low. This means that only a small, negligible proportion of variance associated with these constructs, can be attributed to the experimental manipulation and therefore, it cannot be accurately interpreted.

Interest/enjoyment is the intrinsic motivation measure in the State Motivation Questionnaire, (Deci, & Ryan, 2002). The reward condition did not seem to significantly influence it, although students in the Public Recognition condition reported relatively higher, non-significant interest/enjoyment. In this same construct there was a significant teacher effect that might suggest that the teacher and all the different elements of a learning environment associated with the teacher played more of a role than the reward per se. This argument could be further reinforced by the second order interaction that approached significance. According to CET, the interpersonal context within which a reward is administered can influence its functional significance (the way particular types of rewards are usually interpreted as either informational or controlling) (Ryan, & Deci, 2002). Specifically, the interpersonal context relates to the way a reward is administered (in a pressuring manner or context vs. in a relaxed, non-evaluative manner or context). Observations on video data collected for the purposes of the broader study may support this argument: Teacher A enacted the Public Recognition activity in a very relaxed and non-evaluative manner, which very well matched the prevalent “culture” in his

classrooms. Whether students chose to have their names posted on the board was to a large extent a matter of volition and self-evaluation. To keep students somewhat accountable, teachers invited other students to challenge those who considered their understanding exemplary or accomplished. Teacher A invited challenges from other students but he definitely did not do so in a pressing manner. Teacher B however, enacted the PR activity in a completely different manner; she actively encouraged students to come up with challenges for their classmates who wanted to have their names posted and strongly encouraged students who did not meet the challenges to reconsider the evaluation of their self-assessed proficiency.

Public Recognition as used in this study was idiosyncratic in nature; it was developed in such a way as to inform classroom practice as opposed to contribute to the extension of a theory. It cannot be characterized strictly as either a verbal or a tangible reward although it is to a large degree consistent with performance contingent rewards. As it has already been discussed here, performance-contingent rewards can have the most detrimental effects on intrinsic motivation because they are usually expected (and therefore it is assumed that students are working towards the rewards). In addition, the expected detrimental outcomes are attributed to the competence-related information that is communicated to students. In this study, students were rewarded based on their self-assessed proficiency and therefore it can be argued that they were to some extent in control of the competence related information that it was conveyed.

It could be therefore reasonably expected that PR would support students' self-determination. It was also expected to enhance students' perceived competence because students were recognized for their understanding of the underlying concepts of each unit.

It was repetitive and therefore provided students with multiple opportunities to participate; if students were not as successful the first time, they had the opportunity to focus their efforts on the subsequent units and advance their understanding. In a sense, for those students PR could also be competence enhancing through vicarious learning (see Bandura, 1997). Most importantly, the broader scope of this motivational intervention was aligned with the curricular intentions of promoting and advancing intentional learning via meaningful participation in assessment related discourse. It was expected that this "culture" of intentional learning would stir students to more meaningful engagement in discourse within their groups, that would subsequently facilitate the advancement of their learning and increase their value and interest in the domain of genetics. For this reason, the study was not particularly concerned with comparisons in reported motivation among students who were nominated and those who were not over the five weeks of the curriculum.

This same argument holds for the interpretation of consequences on motivational states. The "early" administration of the State Motivation Questionnaire took place before the motivational intervention was introduced to students, while the "late" took place a few days after Public Recognition was already enacted twice. A reasonable criticism could therefore be that the state measure, both because of its task specificity and the asynchrony of its administration with Public Recognition, would not be a very "sensitive" measure. The answer to this concern is similar to the one developed previously. Public Recognition was used in an effort to create a culture of intentional learning and therefore the consequences of its use should be present in the culture of the classrooms and to some

extent be reflected in student's motivational experiences while engaged in different classroom activities of the curriculum.

There were not any prevalent negative consequences on any of the state measures. Interest/enjoyment was non-significantly changed and perceived competence, which is an important mediator of intrinsic motivation, was significantly higher for the students in the experimental condition. When asked in a personal communication about the extent to which the intervention might be considered informational, Richard Ryan (April 6, 2002) stated: "I actually thought it was novel, and interesting, and I suspect it was largely informational for two reasons: first, it supports a sense of competence, and second it is based largely on self-evaluation and volition". The results presented here appear to reaffirm Ryan's sense about public recognition. Perceived competence was indeed enhanced and presumably self-evaluation and volition offset any possible negative effects that might otherwise be expected because of the reward contingency.

These findings however, relate to a state measure, which is considerably bound to context, as opposed to consequences on trait measures that are considered more stable motivational attitudes. Therefore the magnitude of the implications of this finding should not be overstated. The significant findings were modest overall; in part due to IRB limitations. That might also explain why no significant consequences were detected in other constructs, such as in the goal orientation constructs.

Consequences for Motivational Traits

Students in the experimental condition reported higher value for genetics than their peers in the non-experimental classrooms. Similarly, perceived competence of students in

the experimental condition was enhanced compared with that of their counterparts. The implications of these findings are discussed in detail below.

The value measure intended to capture students' reported utility and usefulness in studying genetics. It maps well on the utility task-value construct of the Expectancy × Value model that represents the extent to which people engage in a task for its usefulness or instrumentality in terms of their future goals. Value represents a more enduring motivational attitude and that reinforces the related finding of increased value in genetics for students who were members of the public recognition classrooms. The significance is highlighted when value is combined with the expectancy construct, which in this study was measured with subjective competence. Although this construct did not significantly vary across time, students in the experimental condition reported relatively higher subjective competence. Using the multiplicative relationship of the model to infer motivation, with one quantity increased and the non-significantly enhanced, students' motivation in the public recognition classrooms appears increased.

Personal interest was non-significantly enhanced, while consequences on goal orientation were less prevalent. The two experimental conditions practically did not differ on the three goal orientation measures (learning orientation, performance orientation and work avoidance). Personal interest is a more context or task specific measure and therefore more sensitive to experimental manipulations than goal orientation measures that reflect more general motivational qualities. It is important to note here as a caveat that the moderate internal consistency indices of these measures (see Table 1) ranged from .41 to .89 and therefore diminish the degree of assertiveness with which these non-findings or absence of consequences can be discussed.

Implications

My primary goal in this paper has been to revisit the issue on extrinsic incentives and intrinsic motivation in light of the characteristics of the learning environment and do so in an informative manner for educational practice. Negative consequences were not detected and there was evidence of some moderate positive ones. The reward contingency employed in the study was in many aspects consistent with performance-contingent rewards that according to theory can potentially cause the most detrimental effects. However, public recognition of self-assessed proficiency did not result in any prevalent negative effects. The findings support only initial evidence of the argument presented here and therefore the question of whether the effects of rewards are mediated by the characteristics of the learning environment is still open to discussion. The findings are not compelling enough to enable direct translation for practice. This might be a limitation of the study but at the same time it might suggest a limitation of the method employed.

Research methods stem from epistemological perspectives. In this study, surveys were used as the main data collection instrument. The assumption behind this method is that motivation is related to individuals' intrinsic sense making processes and therefore it is bound to internal affective qualities. This approach is consistent with a cognitive/ rationalist view of knowledge and learning that extends also to motivation (Greeno, et al., 1996; Case, 1996). One way to study motivation then according to this view, is to directly ask individuals to describe their motivational experiences, either in written (respond to surveys) or orally (participate in interviews).

The method employed here provided one way of looking and studying students' motivation. It enabled students to portray their motivation at particular instances of their

participation in the classroom activities, curriculum, culture and therefore the results derived from those portraits might be representative only of those particular moments. The broader study in which the current was initiated aimed to study learning and motivation from different perspectives, in an attempt to investigate to what extent the three different perspectives (behaviorist, rationalist, sociocultural) can be reconciled to advance our understanding of learning and motivation in the classroom.

Assuming that the sociocultural approach is the most conclusive of all three, it can potentially be particularly informing to examine the argument advanced in this study with methods and tools derived from this perspective and moreover examine to what extend the findings from the two different perspectives (rationalist and sociocultural) might complement, or even conflict each other. The fact that the argument about the relation of rewards and intentional learning environments implies the importance of the "context" as that translates to features of the learning environment makes the importance of employing sociocultural methods in the investigation of the question even more appropriate.

Therefore, such alternative methods might be used to complement the method used here and provide a broader picture of students' participation in the different learning activities and in the classroom culture. To that end, such methods should examine to what extent students' engagement and its multiple manifestations can be attributed to the reward structure that was an important element of the classrooms' cultures.

How this study would speak to the two sides of the debate (behaviorists and cognitive motivation researchers), is not very clear. To some extent, it supports arguments advanced by both sides. On the one hand, the extrinsic incentive did not result in any negative consequences, consistent with the arguments advanced by behaviorists. On the

other hand, relative positive consequences were more prevalent in the experimental classrooms of one of the two teachers, who administered the reward in a non-evaluative manner, supporting the importance of the interpersonal context effect, suggested by cognitive motivation researchers. It seems therefore that the alternative "voice" supported in this study, which points to the role of context and specifically to the role of learning environments as an important mediator, provides evidence that neither side is necessarily right or wrong, and that this alternative approach is both viable and promising. More studies should therefore be undertaken to support and further the present findings.

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APPENDIX A

TRAIT MOTIVATION QUESTIONNAIRE

Different students feel differently about biology topics. We want to know what best describes how you feel about biology and genetics in general. Think about each statement. Fill in the one number that best indicates how much you agree or disagree with each statement. Fill in only one number for each statement. Please note: **YOUR ANSWERS ARE CONFIDENTIAL. YOUR TEACHER WILL NOT SEE YOUR RESPONSES**.

"I feel best in Biology class when…"

Learning Orientation

What I learn makes sense

I learn something interesting

I get a new idea about something

What I learn makes me want to find out more

A lesson makes me think about things

Performance Orientation

I show my classmates that I can handle this subject

I get higher scores than my classmates

I show people I am smart

I do better than other students

I am the only one who can answer a question

Work Avoidance

I don't have to work hard

The work is easy

The teacher doesn't ask hard questions

“How do you feel about genetics?”

Subjective Competence

I am not very good at this topic

I can get good grades in genetics

I can handle other topics okay, but not genetics

I am confident in my ability to do well studying genetics

Personal Interest

Other topics are more interesting than genetics

Genetics is an enjoyable subject to learn about

I want to learn more about genetics

Genetics is an interesting topic

I would rather do anything else than study genetics

Value

Learning about genetics is useful to me

Genetics is an important topic to me

Learning about genetics is beneficial to me

APPENDIX B

STATE MOTIVATION QUESTIONNAIRE

Different students feel differently about what they do in class. We want to know what best describes how you felt about the activities in class today. Think about each statement. Fill in the one number that best indicates how much you agree or disagree with each statement. Fill in only one number for each statement. Please note: **YOUR ANSWERS ARE CONFIDENTIAL. YOUR TEACHER WILL NOT SEE YOUR RESPONSES.**

"How do you feel about the activities in class today?"

Interest Enjoyment

I enjoyed doing them

They were fun to do

They were fun to do

They didn't hold my attention at all

I thought these activities were boring

I thought they were quite enjoyable

Perceived Competence

I think I am pretty good at them

I am satisfied with my performance at these activities

These were activities I couldn't do well

After working at these activities for a while, I felt pretty competent

I was pretty skilled at them

Pressure/Tension

I didn't feel nervous at all while doing them

I was very relaxed while doing them

I felt pressured while doing them

I felt tense while doing them

Perceived Choice

I felt like it was my own choice to do them

I felt like I had to do them

I did these activities because I had no choice

I did these activities because I had no choice

I did them because I wanted to

Value

I would be willing to do them again because they had some value to me

I don't think they are useful

I think these are important activities

I believe they could be of some value to me