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ABSTRACT

On the premise that there are certain practices that influence students' intrinsic motivation for academic engagement, this study examined the congruence between a teacher's goals and practice with regard to autonomy. Self-report data were collected on seven sixth-grade elementary school teachers concerning their goals for their math classes. Further data were collected through classroom observations over the course of an academic year. Discrepancies were found between the self-report data and the observational data. In particular there appeared to be a difference between the way teachers rated themselves along the dimension of autonomy and the way the observers rated the teachers along this same dimension using a theory-driven definition. However, some of these discrepancies may have been an artifact of the theoretical descriptions of the constructs and their implications for implementation. Analysis of classroom transcripts and notes supported the hypothesis that autonomy existed not only as student choice and decision making (task autonomy), but also as student ownership of ideas and student confidence and independence in thinking (cognitive autonomy). In addition, the data suggested that supporting, cognitive autonomy may be an essential catalyst that leads to a heightened master-orientation and deeper thinking. (Contains 19 references.) (JB)

Running head: MOTIVATIONAL PRACTICES

# The Relationship Between Teacher Perceptions and Observations of Motivational Practices In The Classroom

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*ABSTRACT*

There are certain practices that influence students' intrinsic motivation for academic engagement. According to the goal theoretic framework, an environment that encourages challenge-seeking, provides opportunities for collaborative work, supports student decision-making capacities and feelings of autonomy, and facilitates risk-taking in the face of potential error is thought to influence intrinsic motivation to learn (Ames, 1992; Blumenfeld, 1992). The congruence between a teacher's goals and his/her practice is the focus of this study. Self-report data were collected on seven sixth-grade elementary school teachers concerning their goals for their math classes. Further data were collected through classroom observations over the course of an academic year. Discrepancies were found between the self-report data and the observational data. However, it is believed that some of these discrepancies are an artifact of the theoretical descriptions of the constructs and their implications for implementation. Suggestions are provided for a reconceptualization of the constructs based on observations from classroom practices.

Our purpose in this research project was to examine classroom instruction to discover ways in which specific theoretical constructs are cultivated in practice. Through naturalistic observations of sixth grade math classes, we sought to discover the influence of instructional practices on intrinsic motivation and student engagement. Classroom observations guided by previous research findings provided an avenue for developing richer contextual constructs while validating theoretical definitions. Although motivational research provides us with sound theoretical models, Blumenfeld (1992) describes a need to investigate how teachers ground the theory to create stimulating and motivating atmospheres in their classrooms. Specifically, we focused on studying teachers as they implement autonomy support in classroom tasks. We chose autonomy because it is an essential ingredient in fostering intrinsic motivation and student engagement (Deci & Ryan, 1987).

## Theoretical background

Goal theory has contributed a framework for guiding recent motivational research (Dweck & Leggett, 1988; Ames, 1992; Blumenfeld, 1992). Ames (1992) describes two distinct types of goals for learning, mastery and performance. Though students with either mastery or performance goals do not differ in intelligence, their reasons for gaining competence can be quite dissimilar.

Students with mastery goals define their success as progress toward an overall goal of learning. These individuals place value on effort while tolerating the risk of uncertainty in the face of challenge. Further, mastery-oriented students view mistakes as an integral part of the learning process. As such, their self-efficacy is not diminished by error. Rather, students with mastery goals are likely to persist and sustain engagement because of their desire for self-improvement (Dweck & Leggett, 1988). This persistence often offers mastery-oriented students the opportunity to engage in deep cognitive processing (Nolen, 1988). According to Anderson (1993), deep processing is more likely than surface-level processing to lead to understanding and retention of material. Students who use deep-level strategies tend to search for assimilative information and relationships among abstract ideas. These students stop and think about their work as it relates to their intended goals. Deep processing resulting from mastery goals, in turn, enhances intrinsic motivation for learning and active engagement in the task (Pintrich & Schrauben, 1992).

In contrast, individuals with performance goals tend to rate their own performance relative to others. This emphasis on normative standards yields anxiety in ambiguous learning situations. Additionally, if they feel less able than their peers, performance-oriented students will act helpless in the wake of impending failure (Dweck & Leggett, 1988). Research suggests that the development of mastery-oriented behaviors would have a beneficial effect on students' engagement, self-efficacy, and enjoyment toward learning tasks (Maehr & Midgley, 1991).

Although students may bring to a situation an individual goal orientation, cues in the environment can increase the salience or value for particular goals (Ames, 1992). Specifically, Ames (1992) proposes that in a classroom the nature of the task, the locus of the decision making, and the evaluation procedures help to create an environment that can reinforce or alter an individual's learning goals. Studying such instructional strategies will provide useful feedback and insight about the learning outcomes they produce. In this study, we focused on teacher's support and encouragement of autonomy.

**The role of autonomy in promoting intrinsic motivation and cognitive engagement**

Authority structures that nurture feelings of self-determination in students often arouse intrinsic interest in learning activities (Deci & Ryan, 1987; deCharms, 1986). Theoretically, the central component of autonomy is affording opportunities for students to negotiate assignments regarding level of difficulty, interest, organization and procedure (Deci & Ryan, 1987). For our purposes, we have coined this type of structural control as "task" autonomy. According to theory, task autonomy is fundamental because it promotes a personal investment and responsibility for learning (Deci, Vallerand, Pelleiter, & Ryan, 1991).

However, our research led to the discovery of a different but equally cogent type of autonomy. This second type of autonomy is characterized by an ownership of ideas and decisiveness resulting in thoughtful justification of ideas and self-reliance. We have coined this type of autonomy "cognitive" autonomy and define it as a confidence in one's ability to think independently in ways that may or may not be consistent with one's classmates but nonetheless render the material meaningful in a personal fashion.

**Research scope and questions**

Through qualitative and quantitative analysis, this paper attempts to broaden the current conceptualization of autonomy. The findings presented here are part of a larger research project. The data are, in some respects, reflective of hypotheses that were generated during the course of the main project proper. Because we did not anticipate observing this particular kind of autonomy support, the ideas presented here should be considered in the early stages of their development. We propose that the current definition of autonomy with its focus on the choice of and ability to negotiate assignments, procedures, and methods of evaluation may be too confining and may lead to a superficial sense of autonomy for the student; that is, superficial in the sense that it does not necessarily lead to the type of motivation and cognitive engagement that produces the best learning outcomes. We will offer observational data in support of our contention that autonomy may actually be best viewed as comprised of two levels, a task autonomy which is synonymous with the traditional definition of autonomy and a cognitive autonomy which may be at least as important if not more so than the task component. We posed two questions for this study:

1. Can two levels of autonomy be identified?
2. What are the distinguishing features of task and cognitive autonomy?

**Method**

Seven sixth-grade school teachers provided self-report data about their instructional goals in their math classes. Of the seven classrooms included in this study, three were considered high ability math classrooms, one was average ability, two were low ability, and one was a mixed ability group. Each teacher completed the Teacher's Patterns of Adaptive Learning Survey (PALS) (Midgely, Maehr, & Urdan, 1991) in September prior to the beginning of formal observations. PALS consists of forty-five statements which reflect a teacher's goals for his/her students, pedagogical beliefs, efficacy beliefs, beliefs about the nature of school ability, goals expressed through instructional practices, and strategies used to motivate students. Teachers respond on a five point Likert scale with 1 reflecting "not at all true of me", 3 reflecting "somewhat true of me", and 5 reflecting "very true of me". Observational data were collected three times during the school year; with observational periods occurring in the fall, winter, and spring. A total of twelve observations were conducted with each teacher during this time. The observation periods were coordinated with the beginning and end of a unit of study. Of particular interest to the observers were instances of teaching practices that were judged to promote challenge-seeking, value for constructive error, collaboration, and autonomy. The lessons were audiotaped as well to provide detailed accounts of teachers' instructional and motivational strategies.

A classroom observation instrument was used to record instruction, particularly those parts of instruction that might later be missed by reliance on the audiotape alone. Included among the instructional elements recorded on the observation instrument at five minute intervals, were demonstrations at the board, use of materials, arrangement of the classroom, as well as striking instances of teacher statements or behaviors that are believed to reflect a promotion of a mastery orientation for learning. At the conclusion of each observation, each researcher rated his/her teacher on the dimensions of challenge-seeking, collaboration, value for constructive error, autonomy, and interest/involvement and meaningfulness according to a five point scale with one indicating low evidence of the dimension and five indicating high evidence.

The researchers were trained in the use of the classroom observation instrument prior to formal observations in an effort to establish the correct use of the instrument as well as familiarizing themselves with the types of behaviors that would constitute instances of the dimensions to be recorded. Training proceeded with the research team as a group viewing previously video-recorded math lessons from a prior study on the motivational practices of two teachers who were not included in the present study. It was essential that all of the researchers were comfortable with identifying instances of the behavioral manifestations of the dimensions under study in order to assume consistency of observations, or a common language, across teachers and researchers in the present investigation. Where discrepancies within the research team existed in the training sessions, discussions were held so as to ensure a common understanding of the dimensions within this study.

Three of the investigators observed two classrooms each for the three observational sessions; one investigator observed one classroom throughout the three observational sessions. Each teacher was observed for at least four math classes in each observational session by the researcher assigned to that teacher. As a reliability check on the primary observer, one of the observations included having two observers present in the classroom at the same time.

The audio-tapes of the observations were transcribed so as to obtain data concerning teacher statements that would be included as evidence of one or more of the dimensions of interest. Transcripts were done *verbatim* so as to not lose the unique quality of each teacher's style of communicating with the students in the classroom. Following transcription, the statements were coded as to which dimension, if any, they were thought to reflect. Transcripts were also shared (uncoded) with another researcher for comparison coding to ensure consistency of coding. In cases where discrepancies existed, discussions ensued which served to solidify the research teams' understanding of the dimensions under investigation as well as allowing the research team to question some of the underlying assumptions that guided the research.

**Data Analysis**

Items from the PALS that reveal aspects of valuing autonomy in the classroom were used to indicate a teacher's perception of his/her own instructional practices along this dimension. Two examples of such items include "I encourage students to suggest topics to study" and "I give my students lots of choices". Composite scores from self-ratings on autonomy and from observer ratings on autonomy were compared using a two sample dependent t-test.

The qualitative data analysis proceeded in three phases. First, field notes were compiled and coded for the dimensions of interest to the study. The audiotapes were transcribed and coded as well during this phase. Second, classroom summaries were written describing general instructional approaches and highlighting the most common codes used to describe those classrooms. Third, data displays were constructed from the field notes and transcripts to address the research questions (Miles & Huberman, 1994). In phase three, relationships among data were examined and conclusions were drawn or generalizations made through noting patterns and themes, counting, and comparing and contrasting. The intent with the main study was to identify ways in which teachers enacted the instructional variables that are believed to influence student motivation and was confirmatory in nature.

During the course of the research project, the team met periodically to review, discuss, and make logistical decisions. As the project matured, the team became concerned that there might be a problem with the definition of autonomy being used as there was little evidence of autonomy being fostered in the classrooms observed. However, it was felt, that despite the absence of the features of autonomy that were expected, there seemed to be a sense of student ownership and involvement in some of the classrooms. Furthermore, this ownership was of the type that would be expected under conditions that support and encourage autonomy. In fact, some of the teacher-centered classrooms were proving to be the classrooms where the most ownership and involvement were experienced. The team began to discuss the possibility of another aspect of autonomy that was not being tapped with our instrument developed on the current theories of autonomy. We began calling this phenomenon "cognitive autonomy". The decision was made to continue to code autonomy as we had originally defined it during the observations. However, once transcripts were made of the tapes, we added the second level of autonomy and coded for it as well.

**Results**

Results of the two sample t-test indicated a significant difference (p=0.0002) leading us to conclude that there is a difference between the way the teachers rated themselves along the dimension of autonomy and the way the observers rated the teachers along this same dimension using the theory-driven definition of autonomy. The mean teacher rating for autonomy was 4.389 on a scale of 5 with a standard deviation of 0.390; while the mean observer rating for autonomy was 2.625 on a scale of 5 with a standard deviation of 0.560. Therefore, our hypothesis that there was a difference between the teachers' perceptions of their autonomy support in the classroom and the researchers' ratings using the theory-driven definition of autonomy of the teachers' autonomy support was upheld.

To address the next hypothesis, that the reason the difference existed was due to an under-specified definition of autonomy, we turned to the qualitative data for support. Through the process of coding, categorizing, noting themes, counting, and comparing and contrasting, it was concluded that we were indeed able to differentiate between two distinct types of autonomy. Instances of task autonomy were relatively straight-forward to identify.

Identification of this dimension centered around teacher statements that indicated a sharing of decision-making responsibilities. For example, statements around issues of choosing with whom to work in group work scenarios, creative displays of products, or choice of when to turn in completed work were easily identified as belonging to the class of autonomy previously identified as task autonomy.

Identification of instances of cognitive autonomy required a careful analysis of teacher statements that created the conditions under which students were encouraged to become the masters of their own thoughtful reflections on the material at hand. For example, statements that required students to justify their strategy choice, statements that encouraged multiple approaches to a problem, or statements that showed an appreciation for unanticipated solution processes were seen as belonging to the second class of autonomy support in the classroom.

Creating two levels of autonomy allowed us to categorize instruction as low or high in task autonomy and low or high in cognitive autonomy. To provide some organization for our findings, we will describe four class periods that best characterize instruction that is (a) low in task and cognitive autonomy, (b) high in task and low in cognitive autonomy, (c) high in task and high in cognitive autonomy, and (d) low in task and high in cognitive autonomy.

**Low task/low cognitive autonomy**

An example of instruction low in both types of autonomy comes as Ms. S began a unit of measurement. She began by reviewing meter, centimeter, and millimeter conversions on the overhead projector. The students were to copy the overhead notes onto their worksheets entitled "Measurement Study Sheet".

> Ms. S: "What I need you to do is follow along as I read the information on page 172. We are studying information on equal measurement involving centimeters, meters, millimeters.... The "m" equals meter--boys and girls, please remember this, write it on your study sheet right now.... I apologize if this is review but I want to make sure that you have this on paper so that you know it for the quiz."

The students were given no opportunities for task autonomy. The teacher directed the lesson and made all the decisions about what to do and when to do it. Further, the instruction incorporated no explanations as to why moving the decimal place converts meters to centimeters to millimeters, but merely focused on how to do it.

> Ms. S: "Here is a perfect example of what I was trying to explain to you. If you're given centimeters and you want to find meters, all you have to do is move the decimal... write this on your paper... write this in your paper, this is simply memorizing this pattern."

This type of product-oriented instruction provided no opportunities nor tools for the students to think on their own.

To bring the lesson to a close, Ms. S assigned the students to measure five objects in the room using millimeters, then convert to centimeters and meters. The students had no choice in what to measure. All the dialogue in this lesson was teacher led. When the students did participate, it was a recitation of answers, not a discussion of the process and thinking involved.

**High task/low cognitive autonomy**

Ms. B's style of teaching provided many opportunities for the students in terms of task autonomy. For example, the students were permitted to hand in homework for a particular lesson anytime before the lesson test, putting the students in control of their own learning. Also, in terms of procedures, the class was characterized by a discussion between teacher and student. The teacher often asked, "What should we be doing...?" or "Should we do...?" The students also contributed ideas about process, "Can we do...?"

In this particular excerpt from a lesson, the teacher and students were working on a percentage project. The project required the students to predict the percentage of different flavors of candy in a bag, find the actual percentage of different flavors in the bag, and convert the percentages to decimals and fractions. There were also follow-up questions asking the students to find the difference between their predicted and actual values, to find the average difference value, and to add a new flavor to the chart without changing the actual total, reworking all the calculations. During the first part, the students worked in small groups on a chart model created by the teacher.

> Ms. B: "This is my sample for you. It is a model. You will be creating your own Personal Percentage Prediction Project."

In the second part of the lesson the students created their own project. They were to choose different objects (in part one, the teacher used gummi lifesavers), create their own charts, and create their own follow-up questions. Ms. B gave them a good deal of freedom and emphasized the creativity and fun of the project, but still maintained a mathematical focus.

> Ms B: "It needs to have neat, colorful decorations... Please, let's make this a little bit fun and creative. Require all different operations, including algebra, prediction and actual, but make it fun or even funny questions (in reference to the follow-up questions)."

In terms of task autonomy, it was quite clear that Ms. B struck a comfortable balance between teacher control and setting boundaries and student autonomy and allowing student decision-making. One interesting finding from the percentage project was that despite all the requests from the teacher for creativity and personal thinking on the follow-up questions, the students mostly imitated the five questions from her model project.

**Low task/high cognitive autonomy**

Ms. K's classroom was characterized by a high degree of teacher control over the routine of classroom activities. That is, she decided which activities were to be done that day; if group work was a part of the lesson plan, she decided the composition of the groups; or if there was a contextually-laden assignment for a class period, the materials and the procedure for how the work should flow from beginning to end were specified by this teacher. However, the one element that was left to vary was the actual thinking through of the assignment. The students were expected to use their own mathematical reasoning to complete the assignments. To support this independent thinking on the part of the students, Ms. K was observed to make statements that indicated an interest in the cognitive processes the students chose to tackle the task. For example, she routinely expressed admiration for the variety of solution processes that were attempted by the students with phrases such as "I just love that" or "That's really neat, do you all see what he/she did here?" or "Here's the really neat part." On occasion, she would encounter an unanticipated process. At these times, she was observed to take a learner role in the classroom, giving the impression that the teacher did not assume to be the sole authority on possible solution processes.

One lesson that expressly demonstrated cognitive autonomy in the absence of task autonomy required the students to fill in three different charts that were on the board. The charts were decimal to percent conversion, fraction to percent conversion, and percent to fraction conversion. In this lesson the students had little or no task autonomy. Ms. K began immediately with a push for thinking:

> Ms. K: "How do you deal with switching back and forth between decimals and percents? It is real easy just to say move the decimal point two spots. What does that mean? What is the significance of two spots?"

As they went over the answers as a class, Ms. K encouraged and valued different strategies for approaching these conversions. We saw this encouragement as promoting confidence in thinking.

> Ms. K: "Who can tell me-- here's another way; I don't know, maybe one of you approached it like this--how can I change this to a decimal and then transfer from decimal to percent? This might be the way I would approach it. Who can change this (5/8) to a decimal? How would you do it? Think about that for a minute. Because we can use these for our advantage. If we know how to do one, we can convert to another...There's many, many ways that you can get these conversions...as long as you're thinking through in a mathematical strategy that is correct, you're going to come up with the right answer."

Most importantly, unlike Ms. B's classroom where the students did not respond to the teacher's encouragement, the students in Ms. K's classroom bombarded her with different strategies or different ways of thinking. They had little control over what to do but a great deal of control over how to think about the task before them. The motivational benefits of this were apparent in the fact that the teacher often had difficulty moving on to other topics because the students wanted to hear and share ideas.

> Ms. K: "Ok, we've spent entirely too much time on this..." (The students sigh and Ms K takes two more strategies anyway.)

**High task/high cognitive autonomy**

Ms. A's style of teaching was unique in that it provided students with opportunities to make choices on a structural level in addition to fostering cognitive autonomy. On a task autonomy level, Ms. A encouraged students to make decisions about collaborating with peers. On any given day, some students selected partners while others worked independently. More importantly, however, was that the same students chose different options routinely. Similarly, the teacher prompted students to make decisions about the processes and products. For example, when a student asked, "Can we try a different number in that equation?" Ms. A gladly rendered control to the students and acted upon the request.

An outstanding feature of Ms. A's teaching was her ability to bridge task and cognitive autonomy. In terms of cognitive autonomy, Ms. A required careful decision making by allowing students plenty of time to think and justify their thoughts.

When presenting ideas, students were accountable for supporting thoughts with mathematical theory. Often, Ms. A would remark, "But, wait, here is my question then...how does that fit into your reasoning?" Furthermore, the teacher always emphasized that the students were expected to compare and contrast different ideas and choose the method that best suited the theory. To reinforce this self-reliant thinking, Ms. A enabled students to learn from their mistakes. She turned errors into learning opportunities by asking students to describe their cognitive processes aloud and reevaluate where their thinking fell short.

The following is a typical lesson that highlighted the use of task and cognitive autonomy. On this day, students were asked to formulate the number of different combinations that could be made given 8 flavors of ice cream with 2 and 3 scoops. Students needed to have sound theories and explanations to justify their approaches. On a task autonomy level, the teacher gave students options concerning the process and procedure:

> Ms. A: "You know it is pretty redundant to color in all of these scoops but if you would like to, you may. I have markers and colored pencils. Also, you may work with partners or alone. It is your choice. Again, if you truly want to color, that is fine, but can anyone give me a different way they might approach this problem?"

On a cognitive autonomy level, the teacher required the students to manipulate the information and develop a theory about the process. The teacher reminded students, "Remember, every hypothesis needs to be backed up by a surrounding system and justification."

In the next part of the lesson, students explained their process and product to their classmates using an overhead projector. In addition to demonstrating their many approaches in solving the problem (e.g., coloring, charts, algorithmic equations, diagrams), students were required to agree or disagree with their classmates' methods of approach. More importantly, they needed to know why one approach was better than another. Ms. A intermittently asked questions such as, "Why might this group choose this option instead of that one?" and "Who can find the repeating pattern in this group's system?"

Interestingly, most students found the solution to the problem. When the last group presented their mathematical system, they discovered an error. This group mistakenly computed 37 instead of 36 ice cream scoops. During their presentation, the class quickly realized the error; "majority rules" became the dominant belief. The teacher expressed surprise at the logic being used.

> Ms. A: "If you cannot find the extra pattern, it looks like these girls cleverly found an extra one that no one else found. The assumption is that the girls are right and the rest of us are wrong. You must prove you are right."

With that, Ms. A made copies of that group's overhead for students to take home and figure out what went wrong. It was evident that Ms. A valued all students' ideas. She enticed students to own their ideas and become confident, self-reliant mathematical thinkers.

## Discussion

Through our research efforts, we concluded that simply identifying incidences of autonomy based on task dimensions was inadequate. Therefore, we hypothesized two levels of autonomy: task autonomy and cognitive autonomy. Analysis of classroom transcripts and notes supported our contention that autonomy exists not only as student choice and decision-making, but also as student ownership of ideas and student confidence and independence in thinking.

This conceptualization is not unlike Mitchell's (1993) work on interest in the classroom. He suggested that interest had two components: catch and hold. Catch activities represented the "bells and whistles" of instruction used to attract attention. Hold activities represented instruction which meaningfully engaged the students in learning. Mitchell (1993) suggested that catch activities lead to a superficial level of motivation, whereas hold activities empower the students to achieve their learning goals.

Drawing on this analogy, we contend that task autonomy, focusing on choice of procedures and activities, represents a catch. Cognitive autonomy, focusing on empowering students to own ideas and develop self-reliance in thinking, represents a hold. Further, we believe that supporting the hold, cognitive autonomy, may be the essential catalyst that leads to a heightened mastery-orientation and deeper thinking.

For example, the tangible choices within Ms. B's percentage project piqued students' interest; but this interest centered around procedural decisions. When it came time to thinking independently about mathematical principles (e.g., create their own follow-up questions), the students copied the format that the teacher presented in her model, merely substituting words and numbers where necessary. These students were engaged throughout the entire lesson; however, the engagement was on a superficial rather than deep level.

In contrast, consider Ms. K's classroom where autonomy in the traditional sense was non-existent, yet the students showed tremendous autonomy in acquiring, applying, and sharing strategies for solving problems. They were responding to her support for being originators of ways to think about the mathematical principles. She pressed for making decisions about how to think, to make connections, and develop conceptual understanding.

Blumenfeld, Soloway, Marx, Krajcik, Guzdial, & Palincsar (1991) suggests that instruction must revolve around a "driving question". Our findings suggest that task autonomy may not be adequate to focus students on the "driving question" of instruction, but may inadvertently focus them instead on irrelevant issues. Cognitive autonomy appears more appropriate for addressing the instructional "driving question" by supporting student ownership of mathematical thinking. We contend that activities that promote structural autonomy may be necessary but insufficient to promote student engagement and intrinsic motivation. However, cognitive autonomy is an essential ingredient without which motivation and engagement will suffer.

**Implications**

Two different levels of autonomy may have developmental and practical importance as well as theoretical significance. Eccles, Buchanan, Flanagan, Midgely, and Yee (1991) speak to issues surrounding decisions on the appropriate amounts of control and autonomy that should be exercised as a function of developmental level. Though the Eccles et al. (1991) study focused on early adolescence, the cautions are germane in considerations of any developmental group. For younger students, allowing choice and decision making on too many issues may become intimidating or confusing, making this practice counter-productive to its original purpose. Further, in terms of simple practicality, teachers must balance task autonomy and responsibility as instructional leaders. This is not to suggest that teachers should be over-bearing and controlling, but that there might be limits to the amount of choice and freedom a teacher may be comfortable allowing.

A possible recommendation is to utilize task autonomy as a preliminary motivator (as a catch to draw the students in) but to press for cognitive autonomy as the ultimate goal. That is to say, it may be appropriate to initially motivate students with procedural choices and decision-making. However, to sustain intrinsic motivation, the classroom should ultimately be seen as supportive of cognitive autonomy.

A further implication of the distinction between task and cognitive autonomy centers around issues of possible unintended consequences. In attempts to implement current theory into practice, there may be a tendency to focus on the procedural aspects of the task in support of autonomy in light of the theoretical definition. As Blumenfeld (1991) warns with project-based learning, digressions from the "driving question", or the focal instructional intent of a task, may lead to distracting students from the more cognitive requirements of the task. When this happens, the true benefits of allowing choice may be over-ridden by unintended consequences, such as focusing on the procedural aspects of a task. Messick (1994) speaks to the necessity of evaluating and anticipating possible unintended consequences in terms of performance-based assessments, which are by design open-ended. The open-endedness of such assessments can be viewed from the motivational perspective, as Marzano (1994) asserts, by allowing for autonomous decision-making. However, a focus on the surface features of the task may prevent the student from engaging in the higher cognitive processes the tasks are designed to tap.

**Future research**

Triangulating student data with teacher self-report and classroom observations would serve to substantiate and validate the previous suggestions. Future investigations into student motivations and attitudes during lessons identified as supporting task, cognitive, or both types of autonomy will help clarify the existence of two levels of autonomy.

Understanding why the discrepancy between teacher self-report and researcher observations occurred would further our understanding of autonomy support in applied settings. One possibility for the discrepancy might be that the teachers had a broader sense of autonomy than what was represented by the questions on the inventory. This could have been reflected both by the relatively low incidence of what we have labeled task autonomy, the dimension along which the recordings were made, and by the emergence of the dimension of cognitive autonomy. Teacher interviews would help answer this question.

Additionally, research should focus on explicating the unintended consequences, if any, from motivational practices that ensue from autonomy defined in the traditional sense as outlined in this paper.

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