



Research Report of the Month
OCTOBER 2004

Xiang, P., Bruene, A., & McBride, R.E. (2004).

Using achievement goal theory to assess an elementary physical education running program.

Journal of School Health, 74, 220-225.

INTRODUCTION

This study is what my Australian friends would call a "little beauty." With the data gathered from a single elementary school and at a single level (the fourth grade) the investigation certainly qualifies as "little," and given that both design and results track perfectly with simple, intuitive logic, the whole undertaking truly does possess a "beautiful" symmetry.

Modest scope, however, does not preclude some impressive features. Because the total number of participants was substantial at 116, and the physical education (PE) program variable had been applied to those participants for the remarkable span of nearly five years, this was anything but a trivial investigation. If the program was going to exert any detectable influence on outcome measures, it surely would have a chance to do so with such a robust arrangement.

Finally, although the study report allows us to enjoy the structure and findings of a nicely ordered investigation, the topic in play here is not without controversy. By the end of this brief annotation, I hope you will have acquired some sense of the arguments and what might be at stake.

THEORETICAL FRAMEWORK

The working framework used here is called "Achievement Goal Theory" (AGT) and deals with the creation in PE classes of either a mastery-focused climate (sometimes called a task-orientation) for children, or a class climate that is predominantly performance-focused (sometimes called an ego-orientation). These ideas were introduced and illustrated in the Research Study of the Month section of UnlockResearch for December, 2003 (which can be retrieved by using the "Archive" button on the main page). Below, however, is a brief summary for readers who have not yet had access to this interesting new approach to teaching.

In a class for which the teacher promotes a mastery focus for students, the definition of achievement (for example, in acquiring a motor skill or developing some component of fitness) is made in terms of what the individual learns or accomplishes, with little or no emphasis on comparison to the performances of other children. Among the tactics teachers employ is engaging students in a variety of learning activities, in each case attempting to make the tasks interesting by putting emphasis on the meaningfulness of what is learned. Students are encouraged to take some responsibility for their own learning, and primary emphasis is always on individual effort and improvement rather than level of performance produced.

Evaluation in such a pedagogical regimen is based on individual growth toward task mastery and the development of personal capacities, rather than on the display of skills that are mostly the

product innate physical ability. Class learning activities often are structured to require cooperation rather than competition, students often work in mixed ability-level groups, and, finally, individual (private) feedback is used whenever possible in preference to the kinds of public feedback that allow performance comparisons among students.

In a performance-oriented class, teachers encourage the opposite set of values and employ very different teaching strategies. There is little attention to what particular skills or physical activities might mean outside the gym, pupils often are grouped by ability, and there is a premium placed on performance outcomes rather than on effort and improvement. Public feedback and evaluation of achievement are frequent events, and there is a pervasive use of competition as a motivational device.

If you wish to locate resource material that describes plans for mastery goal teaching in some detail, I suggest retrieving the published version of the study reviewed in UnlockResearch's December, 2003 Research Report of the Month. If you wish to probe further, the list of references there will lead you to publications that offer more substantial guidance. I also have placed several citations to useful AGT articles at the close of the present annotation.

PREVIOUS AGT RESEARCH

In the past decade, a considerable volume of research on AGT has been published, much of which shows at least some degree of superiority for teaching that induces a mastery climate in the academic classroom. This has been true whether the outcome measured has been a learning activity, a student disposition, or level of achievement. For example, mastery-focused class climates have been associated with students' positive attitudes toward subject matter, use of more effective learning strategies, belief that effort is the route to success (rather than just native ability), and a preference for challenging tasks.

In the case of PE, however, the conclusions from studies have been much less clear-cut and include findings of no significant impact on any outcome measure, results with mixed (and confusing) patterns of influence, and examples of pervasive but relatively weak positive associations. This has been particularly so when studies have employed actual learning as the criterion measure. Accordingly, a line of argument has emerged which suggests that critical differences between academic and PE classes (particularly with regard to the clarity of goals) may always be expected to undercut any effort to employ AGT as the basis for improving student learning. If you would like to know more about the issues involved in this conversation, a good place to begin would be with the review of "Goals, Interests, and Learning in Physical Education," by Ang Chen and Catherine Ennis in the July/August, 2004 issue of the *Journal of Educational Research*.

WHAT WE DO KNOW ABOUT AGT

In the midst of conflicting evidence and differing conclusions, however, some things can be asserted with confidence. Notably, we can say that applications of AGT have not yet been adequately tested (a) in the early elementary grades, (b) with periods of application that are truly substantial, or (c) with goals for achievement in a motivation-loaded activity such as running. The focus for inquiry to date has been on older students, treatments measured in only weeks or months, and skill-loaded activities such as tennis, juggling, fencing, and volleyball. All of those deficits are addressed in the study now before us.

We also can anticipate that the results from any study of student motivation will vary according to the outcome measure employed and, of equal importance, the ability of teachers to create and sustain a mastery climate across time. As most readers would guess, the last named variable is critical because there is some reason to believe that the traditional format for public school PE has always included at least some elements that have a distinct emphasis on performance rather than mastery. Teachers who want to create a mastery climate in their classes may find themselves swimming upstream against a considerable current of habit, prior training, and personal disposition.

THE STUDY

The present study breaks some new ground in goal theory research by combining four measures: (1) the students' perception of class climate (Do they perceive it as oriented toward mastery or performance?), (2) the actual kind of achievement goal adopted by students (Is it their expressed goal to master the task, or to be better than their classmates?), (3) the outcome measures of persistence (practice effort), and (4) the final performance (level of achievement on a criterion task).

The program examined in the study was a running module called Roadrunners. It was imbedded as a component part of an elementary school PE curriculum. The specific research questions were: (1) What kind of achievement goals do the children adopt and endorse in the Roadrunners program? (2) What motivational (achievement) climate do students perceive as their teachers' intention within the Roadrunners unit? and, (3) What relationships exist among students' achievement goals, perceived climate, persistence/effort in Roadrunners, and performance on a mile run?

THE PROGRAM

The Roadrunner program had been in place for the children at the study site since their kindergarten year. As all data were collected toward the end of the fourth-grade year, the participants had been exposed to nearly five years of mastery emphasis within the running component of their PE curriculum. (Of 125 fourth graders at the study site, data were obtained from all but 9.)

Children participated daily in 30-minute PE classes and were required to run/walk on a measured course (one third of a mile) once each week. In each of the five years they could elect to work toward achievement of four possible goal levels during the school year: 100, 125, 150, or 175 laps. Instruction was provided by physical education specialists who attempted each year to maintain a mastery climate for the roadrunners program. With age-appropriate adjustments, the key aspects in their teaching included the basic elements of AGT described above.

MEASURES

Each student's personal achievement goal orientation was measured through use of a carefully adapted 12-item questionnaire (read aloud). Perceived climate in Roadrunners was assessed with a questionnaire consisting of 11 mastery-focused and 13 performance-focused statements about the class. (Again, each item was read aloud and questions were solicited for any difficulty concerning instructions.) Full copies of both of the paper and pencil measures are included in the report.

Persistence/effort was measured in terms of the number of laps the children ran or walked in Roadrunners during the school year. Completed laps were recorded by instructors on each of the days devoted to Roadrunner participation. Finally, running performance was measured in an individually timed one-mile run. Children performed the test (as a class) over the same course used for practice, and were encouraged to complete the mile as fast as they could.

RESULTS

As you might expect, in purely descriptive terms, the students showed a strong orientation toward a mastery definition when questioned about their goals for Roadrunners. Furthermore, they were likely to perceive the class climate as mastery-focused. Put simply, most fourth-grade students were quite aware of what was emphasized in class concerning achievement and were much inclined to adopt that same sort of goal-orientation for themselves.

The primary form of analysis used to examine the data, however, was not descriptive but correlational. That is, it focused on the relationships among the four research variables by

establishing correlation coefficients between each possible pair. Finally, a step-wise multiple regression analysis (the details of which are not discussed in this annotation) also allowed detection of how well each measure predicted performance on the mile run.

Boiled down to the essentials, students' scores on persistence/effort produced a large (.74) and statistically significant ($<.01$) correlation with time for the mile run (a result for which all teachers and coaches will heave a sigh of relief). More importantly for the present study, however, higher student scores on mastery were significantly related ($<.01$) to both practice persistence/effort (.37) and final achievement on the mile run (.32). Students with higher levels of performance-orientation displayed neither of those positive associations.

To complete the near perfect symmetry observed in the data, students who had adopted a performance goal orientation tended to see the class as having been performance oriented, and significantly so ($<.01$). Further, the only variable that served as a significant predictor of persistence in practice during the year was having a mastery goal orientation. Finally, relative to all other possible combinations, it was the students with both high mastery goals and high perception of mastery-focused class climate who performed best on the mile run.

It is important to note that while persistence/effort accounted for about half of the variability in students' mile run scores; all of the other predictors (including a mastery goal-orientation) explained relatively little about performance on that test. In other words (with apologies to the statistical purists among you), there probably were many other factors at work in determining how fast a student would run, not the least of them being such mundane goals as pleasing the teacher, gaining peer approval, or living up to parental expectations. At best, goal orientation was just one motivational factor among many others, and not a particularly dominant one, at that.

DISCUSSION

So, what do we know now that was not reasonably apparent before the advent of Roadrunners and investigation by Xiang, Bruene, & McBride? To take the most conservative view, we don't "know" anything more until there have been replications and systematic variations on the present study. Nevertheless, we certainly have cause now to suspect some things that could only have been the topic of speculation a year ago.

First, it is likely that we can reject any assertion that it is impossible or improbable that fourth-grade students who have a strong mastery-orientation will show no advantage in running, either for persistence at practice or for final tested achievement, over students who hold a performance orientation. Placed head to head, I know which horse would draw my money. We even might suspect that any activity that has a similarly clear and uncomplicated index of performance (laps completed, or time for a measured distance) would produce the same pattern of results.

Further, we now have cause to suspect that a regression analysis of data will show that, under similar conditions, young students who have both a mastery orientation and a strong perception that mastery is the prevalent emphasis in the social/psychological climate of the class, will exert more effort in practice and achieve at a higher level (in running) than will students who have some alternative mixture of those factors. In other words, although it is not the only thing, a mastery orientation can play at least a small part in how children behave (practice effort) and what they achieve (learn) in a PE class.

THE UNLOCKRESEARCH CONCLUSION

Does any of this matter? I think the answer is, "Absolutely yes!" At this point it is prudent to recall Yogi Berra's (reputed) maxim: "The ballgame ain't over until it's over." What we have yet to learn about the influence of age, task, parental expectations, teaching tactics, length and intensity of treatment, pupil skill level, and factor interactions may yet alter presently pessimistic predictions about the efficacy of any pedagogy that makes use of AGT in the gym. Or, at the very

least, it might be prudent to sound a cautionary note. "Watch out, there may be a baby somewhere in that bathwater!"

Additional resources for learning about teaching for mastery goal-orientation.

Xiang, P., McBride, R.E., & Solmon, M.A. (2003). Motivational climates in ten teachers' elementary physical education classes: An achievement goal theory approach. The Elementary School Journal, 104, 71-92.

Ames, C. (1996). Achievement goals, motivational climate, and motivational processes. In G. Roberts (Ed.), Motivation in sport and exercise (pp.161-176). Champaign, IL: Human Kinetics.

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