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Content Specificity of Expectancy Beliefs and Task Values in Elementary Physical Education

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Abstract

The curriculum may superimpose a content-specific context that mediates motivation (Bong, 2001). This study examined content specificity of the expectancy-value motivation in elementary school physical education. Students' expectancy beliefs and perceived task values from a cardiorespiratory fitness unit, a muscular fitness unit, and a traditional skill/game unit were analyzed using constant comparison coding procedures, multivariate analysis of variance, χ^2, and correlation analyses. There was no difference in the intrinsic interest value among the three content conditions. Expectancy belief, attainment, and utility values were significantly higher for the cardiorespiratory fitness curriculum. Correlations differentiated among the expectancy-value components of the content conditions, providing further evidence of content specificity in the expectancy-value motivation process. The findings suggest that expectancy beliefs and task values should be incorporated in the theoretical platform for curriculum development based on the learning outcomes that can be specified with enhanced motivation effect.

Keywords

curriculum; fitness education; motivation

Enhanced motivation leads to effective learning. The content to be learned, however, may superimpose a context that has strong motivation implications. Bong (2001) suggested learners' motivation may result from their responses to the content. In other words, the learner's motivation may depend on the content being taught and how it is taught. Content specificity of motivation has strong theoretical significance with which educational

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researchers can link motivation constructs and mechanisms to the curriculum to enhance learning.

The purpose of this study was to examine the content specificity of expectancy-value motivation in elementary school physical education, particularly the hypotheses that (a) different expectancy beliefs and task values would be observed among learners in physical education and (b) the relationship of expectancy-value components would vary based on content differences. The hypotheses were examined in a large-scale, randomized, controlled curriculum intervention research context, in search of the optimal motivation process (Chen & Ennis, 2004; Sansone & Harackiewicz, 2000). We hope this study may provide useful information enabling us to theoretically articulate the possibility of developing a holistic, coherent platform in which curriculum and motivation theories can be incorporated to address the “fun content, but low value” phenomenon (Goodlad, 1984). In addition, we hoped the study would offer solutions to the “high need, low demand” dilemma (Ennis, 2001), in which the physical education curriculum is continuously marginalized in schools while the public is increasingly aware of the health benefits associated with physical activity.

Expectancy-Task Value Construct

Motivated behavior is characterized by voluntary choices, persistent effort, and achievement, which are directly associated with students’ expectancy for success and perceived value in specific activities (Jacobs & Eccles, 2000; Wigfield & Eccles, 1992). Wigfield (1994) argued that students’ expectancies for success and their perceived values in the content motivate them to learn different tasks. Empirical examinations of the expectancy-value construct over more man two decades have yielded strong classroom-based evidence supporting the argument. According to Wigfield and Eccles (1992), *expectancy for success* is defined as students’ beliefs about how well they will do on upcoming activities.

The perceived task values represent students’ perceptions of the attractiveness of a particular task or content. Based on abundant empirical evidence accumulated since 1983, Eccles and her colleagues (e.g., Eccles & Wigfield, 1992, 1995; Jacobs & Eccles, 2000; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Wigfield, 1994) identified three common values in various content domains to determine learners’ motivation: (a) attainment value refers to personal importance of success in an activity, (b) intrinsic value is the enjoyment the individual gains from the activity, and (c) utility value is the perception of the activity’s worth in relation to current and future goals. A critical component in this construct is *cost*, which refers to the negative aspects of engaging in a task, such as fear of failure or lost opportunities from choosing one task over the other (Wigfield, 1994).

In an analysis of a decade-long longitudinal data set, Jacobs et al. (2002) found that children develop a self-concept system with many beliefs about self and the activities in which they participate. This system leads to changes in expectancy beliefs and task values over time and, in turn, the changes in expectancy beliefs and perceived values in content domains result in motivation changes in learning. With physiological and psychological development, children are able to stabilize the self-concept system to inform an activity-specific expectancy for success and determine task values in a specific task or content domain (e.g., English, mathematics, sport, physical education). The expectancy beliefs and perceived task values in any given domain are developed simultaneously. Learners constantly assess their competence, possibility of success in learning, and the content values. By attaching or detaching the values (i.e., attainment, intrinsic, utility, and cost), the learner can determine the content meaning and make decisions on whether and/or to what extent to put forth effort.

Expectancy Belief and Task Values

Expectancy and task values are content domain specific and are often perceived as benefits of and difficulties in learning. From an early age, learners distinguish between their expectancies and perceived values in terms of the content they are studying (Eccles, Wigfield, Harold, & Blumenfeld, 1993). Jacobs et al. (2002) found drastically different changes in expectancy for success and appreciation for task values in content domains. For example, learners' expectancy beliefs in language arts, math, and sport decline steadily from elementary to high school, whereas task values in language arts and sports receive accelerated appreciation among boys and girls who believe in success in these domains (Jacobs et al., 2002). Bong (2001) revealed that among several motivation constructs (e.g., achievement goal orientations, self-efficacy, task values), task values were sensitive across different content domains. For instance, middle school students in Korea assigned higher task values to quantitative content in mathematics than in science. In the same study, high school students rated mathematics and science higher in task value than Korean (Bong, 2001). Although content specificity of motivation constructs has not received much research attention, the limited findings indicate motivation constructs are sensitive to the content. In addition, the observed variability across content areas may suggest that task values are an effective motivator at the domain-specific level, while others (achievement goal orientations, self-efficacy) may function at a more global level. Bong (2001) and others (Jacobs & Eccles, 2000) argued that expectancy beliefs and task values may have a more direct impact on learning behavior and achievement than other motivation constructs.

In addition to the cross-domain differences, children can identify and form distinct expectancy beliefs and task values *within* a content domain. For example, Eccles et al. (1993) studied 865 elementary school children and found that even first-grade students (n = 284) could identify and differentiate expectancy for success and task values within and between reading, math, music, and sports. Based on a 3-year longitudinal study of 615 elementary school children, Wigfield et al. (1997) reported that the within-domain distinction changes in expectancy beliefs and task values were content specific, especially for the intrinsic value. From first to third grade, students' intrinsic values in reading and instrumental music declined, while values in sports increased. These findings indicated that from an early age children's expectations of success and/or the values they see *could* motivate them. In a follow-up study using a confirmatory factor analysis, Eccles and Wigfield (1995) confirmed that children could distinguish expectancy beliefs and task values in mathematics.

It has been reported that expectancy beliefs motivate students to engage in a particular task at a given moment. Perceptions of task values, on the other hand, determine students' long-term motivation to continue their study (Wigfield & Eccles, 1992). According to Eccles and Wigfield (1995), children's expectancy beliefs and task values together enable them to distinguish and evaluate personal competencies and activity values. Once children are able to distinguish what they are good at and what they value, they are more likely to use value information in making their motivation decisions. Although the expectancy beliefs play a critical role in motivating children and adolescents to engage in an activity, perceived task values may have a stronger and longer influence on their motivation to continue an activity or commit to a new activity. Using regression analyses, Xiang, McBride, and Bruene (2004) found that expectancy belief is the sole motivator for performance, whereas the attainment and intrinsic values are predictors for motivation to continue participation.

Unfortunately, a common characteristic across content domains is the decline of expectancy-task value induced motivation. The 10-year longitudinal data on children's and adolescents' motivations for different school subjects (Jacobs et al., 2002) revealed that children's perceived competence and task values declined steadily from elementary to high school. The decline of perceived physical competence and values in sports is characterized by a curvilinear pattern, with acceleration occurring during the same years (grades 6–9, Jacobs et al., 2002) with the sharpest decline in physical activity for both boys and girls (Caspersen, Pereira, & Curran, 2000). Cross-sectional data (Xiang, McBride, Guan, & Solmon, 2003) also showed a similar decline in motivation to learn in physical education.

Definition of Content Domain

A cascading structure may define content domains. Although it is often defined by knowledge of disciplinary boundaries, such as mathematics, reading, or physical education, it can also be defined in reference to distinct study units, within a discipline, such as Algebra I or Algebra II in mathematics, or a net-and-wall game or invasion game in physical education. This concept of a content domain is often used in research. For instance, Dodds, Griffin, and Placek (2001) separated fitness and soccer as two domains in their research on learner domain-specific knowledge. In this study, we used a similar concept in studying the extent to which elementary school learners' expectancy beliefs and task values differed when studying in a 10-lesson cardiorespiratory fitness unit, a 10-lesson muscular capacity fitness unit, and a 10-lesson traditional skill-and-game unit in physical education. We hypothesized that we would observe different responses in expectancy beliefs and task values between the two science-based units and the multiactivity unit. We also hypothesized that the interrelationship of the expectancy-value dimensions would differ from unit to unit.

Method

Research Design

This study was part of a large-scale 5-year science-based physical education intervention research project involving 30 randomly selected elementary schools. In designing the study, we closely followed the guidelines for a randomized, controlled, clinical trial for producing trustworthy evidence in school-based research recommended by the U.S. Department of

Education (2003). During sampling, over 150 schools in a large urban/suburban area were matched on the percentage of students in the federal Free and Reduced Meal program (FARM%) and current year's state standardized science test scores. All matched schools were placed in 15 sampling brackets by FARM% and test score rankings. Then a stratified random selection was performed in each quartile within each bracket. Once the 15 pairs of schools were determined, one in each pair was randomly assigned to either the experimental or comparison condition. The participating schools served over 6,700 third-, fourth-, and fifth-grade students.

The Experimental Curriculum—The *Be Active Kids!*© Curriculum (Ennis & Lindsay, in press) consists of nine science-based physical education curriculum units, three each for the third-, fourth-, and fifth-grade students. The units include "Dr. Love's Healthy Heart" (DHH), "Mickey's Mighty Muscles" (MMM), and "Flex Cool Body" (FLEX) that teach students about cardiorespiratory health, skeletal muscular fitness, and the importance of flexibility and exercise principles, respectively. Each unit consists of ten 30-min lessons mat use a scientific inquiry approach as the learning tool. The lessons emphasized unifying concepts and processes appropriate for an integrated or cross-disciplinary application of science content in physical activity. Each unit in the curriculum is spirally sequenced. The content for a higher grade includes more difficult concepts, learning tasks, and problems-to-be-solved than for a lower grade. Thus, students at a higher grade level will learn more advanced knowledge and skills for a deeper understanding of health science-based physical activities, principles, and benefits.

Instruction is centered on a constructivist approach that uses a 5-E scientific inquiry mechanism: engagement, exploration, explanation, elaboration, and evaluation. In each lesson, students actively engage in moderate to vigorous physical activities designed and sequenced in terms of the 5-E for health-related learning. The curriculum also provides opportunities in each lesson to engage students in highly cognitive learning processes. Students experiment with different activities, predict possible physiological or other outcomes, come to a conclusion about the activity, and document the outcome and conclusion in a workbook. The curriculum provides both cognitive and physical demands to enhance student learning.

The Comparison Curriculum—The school board had approved the comparison curriculum for elementary school physical education. The content includes a variety of physical activities centered on sports, games, basic locomotor movement patterns, and educational dance. The curriculum goal is to provide opportunities for elementary school students to experience different forms of physical activity and movement and expose them to various sports and games as part of their social-cultural experiences. Individual teachers determine the instruction. Some use a direct teaching style, while others use guided inquiry or problem-solving approaches. Student learning assessment is based primarily on daily participation, skill tests, and written tests.

Curriculum Implementation—Given the distinctive nature of the content taught in these curriculum units, we operationalized them to represent different content domains within physical education (Dodds et al., 2001). Data used for this study were from the comparison curriculum and the DHH and MMM units. In the DHH unit, major concepts regarding cardiorespiratory fitness were the focus. For example, students in third grade were to learn many ways (including using some devices) to "feel" their heart in physical activity and how the "feeling" and other physiological responses of the body were related to exercise intensity. The fifth-grade students were asked to identify efficient ways to exercise the cardiorespiratory system using the concept of Target Heart Rate Zone. In the MMM unit, the focus was on learning concepts about muscular fitness. For example, they learned the concept of body adaptation through observing and feeling muscle changes in shape and tension in toner-band resistance exercises. Students learned that exercises lead the body muscles to positive adaptations, and physical inactivity leads to negative ones.

Assurance for Observation Independence—We randomly assigned 15 schools to the experimental curriculum and their matched counterparts to the comparison curriculum to ensure treatment independence. Students in the experimental content condition were expected to experience the different curriculum units at different times during a 3-year period in the larger research project. To minimize possible confounding effects, expectancy beliefs and task value measures were taken at different times when the two units were taught and in different classes. As described in Figure 1, the data were collected during two different but consecutive semesters encompassing two school years with a summer in between. The DHH was taught from late fall 2003 to spring 2004 (Project Year 1), while MMM was taught in fall 2004 (Project Year 2). Because students moved to a higher grade in fall 2004 (the new school year) and received a different content unit, treatment independence was maintained. Observation independence was also maintained, because the participants responded to the content unit they currently experienced. Data were collected prior to the end of each unit. The data from the comparison condition were collected parallel to data collection in the experimental condition. To control for pretest sensitization (Bracht & Glass 1968; Willson & Putman 1982), no pretests on the expectancy value measures were conducted. Data from 26 classes were collected during spring 2004, and the data from the other 22 classes were collected in fall 2004. We believe that in this school-based field research, the block design effectively minimized possible confounding and maintained observation independence.

As an intervention strategy of the larger project, the teachers in both experimental schools (n = 15) and comparison schools (n = 15) received equal amounts of inservice training each year. In-semester workshops and follow-up inservices were also provided for all the teachers. The teachers from the experimental schools received training on teaching DHH and MMM prior to teaching these units. During the same periods, the teachers from the comparison curriculum received placebo trainings on the best teaching practice focused on effectively managing the class and conducting games.

Participants

Students in the study (N = 298, 49% boys and 51% girls) were randomly selected from 48 intact classes (approximately 5–7 students from each) that were studying DHH (16 classes), MMM (15 classes), or the comparison curriculum (17 classes). The participants were predominantly African American (72%) and from low to middle socioeconomic status families. Table 1 reports their gender and grade distributions by the content conditions. Parental consent forms were received from all students.

In all content conditions, students had a 30-min physical education lesson every other day. The classes were all taught by certified physical education teachers who received the same hours of inservice training. For this study, data were collected from experimental curriculum classes taught by eight teachers and from the comparison curriculum classes taught by six teachers. Their selection was random and their demographic characteristics are reported in Table 2. In the DHH and MMM groups (n = 8), teaching experience ranged from 1 to 32 years with a mean of 9.38 years (SD = 10.17), while those teaching the comparison curriculum had experience ranging from 1 year to 34 years, with a mean of 12.33 years (SD = 14.62).

Variables and Instruments

Expectancy and task values were measured using a 13-item modified Self- and Task-Perception Questionnaire originally developed in mathematics (Eccles, Adler, & Meece, 1984). Xiang et al. (2003) modified and validated the questionnaire and determined its ability to generate valid and reliable data in physical education. To maintain its content validity, we only changed the wording to frame the responses in physical education as Xiang et al. (2003) demonstrated. The scale included five items for expectancy belief, two for attainment, two for intrinsic interest, two for utility values, and two open-ended items for cost. Each item, except the cost items, was attached to a 5-point scale anchored by a descriptor appropriate for the item. The items and descriptors are included in Appendix A.

Data Collection

For the experimental group, the questionnaire was administered to the students in the last lesson of each unit. For the comparison group, it was administered during the same week as for the experimental group. The data collection was done in classrooms. The students sat apart from each other and completed the questionnaire independently. They were told there were no right or wrong answers and to respond with their true feelings about the content they had experienced in the previous 2 weeks. In addition, they told their responses would not affect their grades in any subject and no one would see their responses except the researchers. They were assured anonymity and confidentiality. A researcher read the questions aloud, answered questions about wording, and explained the 1–5 scale. The researcher also explained the concept of cost. Data collection took about 15–20 min.

A group of trained observers involved in the larger research projects monitored implementation fidelity for the experimental curriculum. They visited experimental schools frequently, often unannounced. They conducted nonparticipant lesson observation and took field notes about the lessons. The field notes were compared with the verbally scripted lesson plans provided to teachers. Agreement and discrepancies between actual instructions and lesson plans were identified and addressed in follow-up teacher workshops. Data analyses showed that more than 70% of the lessons were taught consistently with the lesson plans (Ennis, Chen, & Sun, 2005).

Data Analysis

A student's scores on items in a particular expectancy-value dimension were aggregated and averaged by the number of items in the dimension. That score was then used to represent the student's response. Internal consistence reliability coefficients α (Cronbach, 1951) for the scales of Expectancy Belief (Item 1–5), Attainment Value (Items 6, 7), Intrinsic/Interest Value (Items 8, 9), and Utility Value (Items 10, 11) were calculated for each content condition. In the meantime, intraclass correlation coefficients ρ (Scariano, & Davenport, 1987) were computed to examine the degree of autocorrelation among the students' responses for violations of independence of scores. In the subsequent inferential statistical analysis, the class means were used to control for possible autocorrelation within a class. Because the expectancy-task value dimensions are correlated, we used multivariate analysis of variance (MANOVA) to determine differences in perceptions of expectancy beliefs and task values by content conditions. We used Pearson-product moment and Spearman's nonparametric correlation analyses to explore the relationship between expectancy-value dimensions in each condition.

Students' responses to the open-ended cost questions were analyzed using the constant comparison with open, axial, and selective coding procedures. During this process, we identified major categories that delineated possible cost. The categories were assigned codes to quantify students' responses. Sample student responses and codes are included in Appendixes B and C. The quantified responses were statistically analyzed using χ^2 to determine differences by the content conditions. Spearman's nonparametric correlation analysis was used to examine the relationship between perception of cost and expectancy beliefs and task values.

Results

As shown in Table 3, data reliability was at the acceptable level, which is consistent with the range of .63 to .87 reported by Xiang et al. (2003, p. 30). According to Huitema, McKean, and McKnight (1999), $\rho = .10$ should be the threshold to judge if the independence assumption is violated for inferential statistical analyses. It appears the independence assumption was violated in the attainment and utility value dimensions in the comparison group, suggesting the students responded to the expectancy-value inventory based on influence of the curriculum or their teachers. Given that there were three groups of *n* ranging from 15 to 17 each, the critical value of α (usually $p = .05$) for MANOVA is likely to be inflated by 10 times ($p = .05$ is actually .49; see Scariano & Davenport, 1987). However, as seen in Table 3, the violation appeared in only two isolated cases. By the research design, we already intended to use class means to address their impact (Silverman & Solmon, 1998). Nevertheless, we took an additional precaution by adjusting the critical value of α 10 times lower in the MANOVA; thus, the *p* value was set at .005 for statistical decision about the significance of observed differences between the groups (Chen & Zhu, 2001).

Differences in Expectancy Beliefs and Task Values

Table 4 shows descriptive statistics for the expectancy belief and task values by content conditions. The Box*M* test showed a violation of the variance homogeneity assumption

(Box*M* = 55.00, p = .001). Therefore, we used Pillai's Trace in MANOVA, which indicated statistically significant differences (p = .001) on content conditions. Given that the variance homogeneity assumption was not violated for the post hoc comparisons (Levene's test, p values all greater than. 11), we used the Bonferroni approach for its adequate statistical power to detect differences in small sample sizes (n ranging from 15 to 17).

The MANOVA revealed statistically significant differences (F_8 = 5.34, p = .001, η^2 =.10) among the three content conditions. Results of the post hoc test (Tukey's HSD), reported in Table 5, showed further statistically significant differences between DHH and comparison of expectancy belief, attainment value, and utility value, as well as between MMM and comparison of attainment value and utility value. No statistically significant differences were found in any dimensions between DHH and MMM or in the highest rated intrinsic/interest value across the content conditions.

Relationship of Expectancy Values by Content Conditions

As seen in Table 6, the correlation analyses yielded coefficients (r) ranging from .37 to .75 among the expectancy-task value dimensions, which is consistent with many findings across various disciplines (Jacob & Eccles, 2000; Xiang et al., 2003). We further conducted Z tests (Fisher, 1958) to compare the differences among the correlation coefficients by the content conditions. Z values reported in Table 7 show that the correlations in the DHH (r= .47–.75) are generally stronger than those in comparison (r= .22–.50, p< .05), and the correlation coefficients of expectancy-attainment, expectancy-intrinsic/interest, and intrinsic/interest-utility values in DHH are stronger with statistical significance (p< .05, p< .01) than those in comparison. Because most correlation coefficients in MMM are not statistically significant (see Table 6), the comparison of MMM with other content conditions was deemed of little meaning.

Cost

Not all students identified a cost in responding to the open-ended questions. About 69% thought something could cost their motivation in physical education. They wrote down cost statements and reasons in their responses to Questions 12 and 13 of the expectancy-value inventory. Constant comparisons were performed on all written statements and subsequently coded for statistical analyses. Sample responses and codes on cost (Question 12) and choice (Question 13) are included in Appendixes B and C. When broken down by content, as reported in Table 8, students in the MMM (50%) and the comparison curriculum (48%) were more likely than those in DHH (28%) to identify a cost (χ^2 = 8.66, df= 2, p = .013). Results reported in Table 9 show four sources of costs: content (68%), peer behavior (14%), physical discomfort (12%), and teacher behavior (6%), differing in statistical significance (χ^2 = 18.18, df= 2, p = .006). Because our focus was content specificity, we performed a post hoc analysis on the students' perceptions of cost in terms of content conditions. The results showed that students in the comparison curriculum (49%) were more likely than those in the DHH (33%) and MMM (18%) to name content as a source of demotivation (see Table 9). However, an analysis on choosing or avoiding physical education based on perceived cost showed no statistically significant difference among the content conditions. Almost all students in DHH (100%), MMM (97%), and the comparison curriculum (98%) indicated they would *choose* to come to physical education. The most cited reason was that physical education provided “fun” experiences in the school.

Spearman’s nonparametric correlation analysis was conducted to identify any possible association between perception of cost and expectancy beliefs and task values. The results in Table 10 show weak and negative correlations of cost with the intrinsic interest ($r = -.19$, $p < .05$) and utility values ($r = -.16$, $p < .05$) in DHH. No meaningful correlation was found in MMM and comparison.

Discussion

In this study, we examined content specificity of expectancy beliefs and perceived task values in elementary school physical education. We intended to investigate the extent to which (a) students’ expectancy beliefs and perceived task values differed in different content domains in physical education and (b) the relationship of expectancy-value dimensions, especially between expectancy belief and the task values, varied based on content differences. In general, the results supported both research questions, suggesting a strong content-centered differentiation of the expectancy-task motivation construct in physical education.

Content-Specific Task Values

The MANOVA results indicated that students’ expectancy beliefs and perceptions were characterized by content specificity, suggesting the expectancy-value is as effective as the content allows. Students in the different content conditions demonstrated expectancy beliefs in accordance with the achievement goals the content required and perceived content values in light of what they experienced. Our data further suggest that the task values may have different sensitivity levels for content. For example, although the students in different conditions responded differently to the attainment and utility values, they rated the intrinsic interest value equally high (means over 4.5 on a 5-point scale) in all three content conditions. The findings support the fact that physical education, as a global content domain, has a highly general interest-based attraction for elementary school children (Chen, Ennis, Martin, & Sun, 2006). Curriculum designers and teachers need to decide how to use that attraction to motivate children to learn.

As Bong (2001) pointed out, motivation to learn can be differentiated by the content. In education settings, it is likely that different motivation constructs may function dynamically within and across content domains, and the content might mediate student motivation through changing dynamics of the interaction. The data from this study support the possibility that students can view content as having different embedded values. The findings further indicate that content specificity is also likely to function at a within-discipline level (i.e., physical education) as well as at the between-discipline level as Bong (2001) and others (Jacobs et al., 2002) observed.

The content-differentiated expectancy beliefs and perceived task values raise an interesting question for physical educators. Like all school subjects, physical education helps students learn specific knowledge and skills. From the students’ perspective, what are the most worthwhile knowledge and skills in physical education? Our data show that the students valued the cardiorespiratory and muscular fitness units higher in importance and utility than content in the comparison curriculum.

These findings are particularly meaningful when viewed in relation to communicating the value of active, healthy lifestyles to students through carefully designed physical education curricula (Ennis, 1999). It has been argued that motivation constructs should be studied within the context of a curriculum (Bong, 2001; Burke, 1995; Chen & Ennis, 2004) to provide strong evidence for curriculum design. In this regard, the data show that the *Be Active Kids!*© curriculum provided students with a meaningful learning context that helped them relate the content learned in physical education with their life experiences. Students in the *Be Active Kids!*© curriculum considered their learning experiences as intrinsically interesting as their counterparts in traditional physical education.

The findings have advanced our understanding of the *Be Active Kids!*© curriculum. We know from previous findings that the curriculum can help students learn the benefits of and knowledge about healthy and physically active lifestyles more efficiently than the traditional curriculum (Chen et al., 2006). We also know that despite large quantities of cognitive tasks, students in the *Be Active Kids!*© are as physically active as those in the conventional curriculum (Chen, Martin, Sun, & Ennis, 2007). The findings from this study demonstrate that *Be Active Kids!*© is likely to provide learning experiences that nurture stronger positive task values than the traditional curriculum. Chen et al. (2006) reported that although a part of motivation to learn in the *Be Active Kids!*© curriculum could be accounted for by situational interest in the learning tasks, a major portion of motivation remained unaccounted for. This finding helps explain that the unaccounted motivation sources may be based on students' expectancy beliefs and perceptions of task values in the *Be Active Kids!*© curriculum.

Role of Expectancy Beliefs and Its Relationship With Task Values

Students' expectancy beliefs are considered to have a direct impact on their success in learning (Eccles, et al., 1983; Wigfield, 1994). Students with strong beliefs in success are more likely to demonstrate motivated learning behavior and better performance. Similar to the task values, students' expectancy beliefs in this study were positively associated with their motivation to learn (Xiang et al., 2003). The findings suggest a content specificity of expectancy beliefs, indicating the content that dictates students' perceived chances of success may mediate their motivation to learn. The students in the *Be Active Kids!*© curriculum demonstrated stronger expectancy beliefs than those in the comparison curriculum, suggesting that expectancy beliefs, to a degree, may rely on what content students are learning.

It might be that the *Be Active Kids!*© curriculum has clearer, specifically defined learning goals and step-by-step procedures that help students achieve their goals (e.g., students working on journal entries, data, on a daily basis). The students can make a clear connection between what they are doing in class and what they will eventually be able to achieve. Thus, their expectancy for success is strengthened.

The relationship among the expectancy-value components has been considered an indication of the expectancy-value construct coherence. There is disagreement about the nature of the relationship. Atkinson (1957) asserted that individuals tend to value tasks that are difficult to master. Thus, a negative correlation, presumably, should be observed. Research findings, however, have repeatedly shown a positive correlation in children in school work (Battle, 1966; Eccles & Wigfield, 1995) and physical education (Xiang et al., 2003). According to these researchers (e.g., Eccles & Wigfield, 1995), children tend to value what they are good at rather than something at which they don't expect to succeed. It is postulated that a positive, coherent relationship between expectancy beliefs and task values optimizes students' motivation to learn (Eccles & Wigfield, 1995, Jacobs et al., 2002).

Our finding, however, has shown theory-predicted coherent, positive relationships (Eccles & Wigfield, 1995) only in the DHH and the comparison curriculum, Where we observed that content specificity characterizes the relationship between expectancy beliefs and task values. When students were learning the benefits and exercises of muscular fitness in MMM, the relationship was nonexistent (see Table 2). In this unit, the students were expected to learn names of major muscle groups, identify muscles involved in exercises, and apply the principle of specificity to exercising muscle groups. The absence of the expected relationship may be because the students perceived the content value but did not believe they could successfully learn it, or they did not perceive the value but somehow believed they were successful. Is this disintegration of the positive, coherent relationship due to the students' realization that they were not good at the muscular fitness learning tasks or that the content did not convey meaningful substances for learning? Or, as an independent curriculum unit, was the content developmentally inappropriate for elementary school students in helping them value the content? Further research is necessary to address these important questions.

The Role of Cost

Cost has been a missing topic in most studies of expectancy beliefs and task values. Although it has been included in the theoretical articulation in many studies (see Wigfield, 1994; Xiang et al., 2003), it is rarely measured in physical education. The lack of evidence about its role in the motivation process hinders our understanding of the full function of expectancy beliefs and perceived task values. From the data in the current study, we were able to identify the four possible costs students perceived in physical education. Consistent with our findings on task values, content specificity also characterizes perceived cost Our data showed that a perception of cost was more likely (68%) to be related to the content rather than the teacher (6%), peer behavior (14%), or physical discomfort (12%). This structure of perceived cost is strikingly similar to a group of Chinese college students who attributed as much as 45% perceived cost to the physical education curriculum (Chen & Liu, 2008).

Despite perceived cost, the students' motivation to participate in physical education remained high. All students, both in *Be Active Kids!*© and the comparison curriculum, indicated a desire to have physical education! Written responses to the open-ended cost questions indicated "fun" in physical education as the primary reason for their decision. The highest mean of the intrinsic/interest value seems to support this observation, suggesting that situational interest (Hidi, 1990) is the basis for young children's decisions rather than the attainment or utility values observed in the college student sample (Chen & Liu, 2008).

A limitation of our finding is that the role of cost is still ambiguous. Although we have identified four possible sources, their role in the motivation process remains unknown. A number of studies documented a steep decline in expectancy beliefs and task values over the elementary and secondary school years (e.g., Eccles et al., 1989; Jacobs et al., 2002; Wigfield et al., 1997). Rarely have research studies on expectancy beliefs and perceived task values explored cost in classroom learning and physical education. It is unclear whether students' perception of cost plays a role in the decline.

The results from Spearman's nonparametric correlation analysis provide limited but perhaps useful evidence showing no or little association between cost and other expectancy-task value dimensions. It may be hypothesized that the strong impact of expectancy beliefs and task values can override the detrimental effect of cost on motivation. To advance our understanding of cost and its role in motivation, additional research is needed to (a) clarify the mediating function of cost, if any, within specific content domains, and (b) examine the hypothesis that strong expectancy beliefs and task values override the impact of cost on motivation.

Curriculum Implications

Elementary school children have a strong attraction to physical education as manifested in high intrinsic interest ratings found in this study and similar research on situational interest (Chen et al, 2006; Shen, Chen, Tolley, & Scrabis, 2003). Students' motivation to engage in learning tasks can be based solely on situational interest in the activities offered, or students can transform their interest-based motivation into value-based motivation. In a curriculum with specified goals and objectives, students will appreciate the content and develop a value-based motive to learn, as predicted by educational psychologists (Eccles et al., 1983).

Our findings suggest that student motivation issue should be viewed as a curriculum issue. Physical education is experiencing a "high need, low demand" challenge (Ennis, 2001). While the health benefits of physical activity are increasingly acknowledged by the general public, physical education is facing increasing resistance in schools and struggling to remain in the school curriculum. This phenomenon clearly indicates the traditional curriculum has failed to address students' motivational needs that are vital in learning the necessary knowledge and skills to develop and sustain a healthy and physically active lifestyle.

Content specificity of the expectancy-task value construct revealed in this study calls for researchers and curriculum designers to search for a theoretical platform in which the curriculum design has built-in motivational mechanisms. In other words, motivation and content are no longer separate entities in the gymnasium. Our results specifically suggest that an expectancy-task value platform may be useful for curriculum design. A curriculum should emphasize attainment and utility values through teaching well defined competence-based goals and objectives, such as those defined in *Be Active Kids!*©. In the meantime, the curriculum should maintain students' general attraction to physical activity and physical education by enhancing the intrinsic interest value in learning tasks students experience daily. In this context, students should be able to develop positive expectancy beliefs and achieve the learning goals.

This expectancy-task curriculum platform will place a strong focus on communicating the value of active, healthy lifestyles by enhancing opportunities for success and meaningful learning (Ennis, 1999). In addition, the platform will help conceptualize curriculum goals into competence- and noncompetence-based goals. This conceptualization might help clarify what Corbin (2002) referred to as a curriculum misconception in physical education (i.e., “We can be all things to all people,” p. 138), in which the curriculum includes too many goals, and physical educators are overburdened and fail to accomplish any. A curriculum well balanced between competence- and noncompetence-based goals may provide challenging learning tasks with enjoyable experiences through which students can effectively learn the knowledge, skill, and values needed for a healthy, physically active lifestyle.

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References

Atkinson JW. Motivational determinants of risk taking behavior. Psychological Review. 1957; 64:359–372. [PubMed: 13505972]

Battle E. Motivational determinants of academic competence. Journal of Personality and Social Psychology. 1966; 4:534–642.

Bong M. Between- and within-domain relations of academic motivation among middle and high school students: self-efficacy, task-value, and achievement goals. Journal of Educational Psychology. 2001; 93:23–34.

Bracht GG, Glass GV. The external validity of experiments. American Educational Research Journal. 1968; 5:437–474.

Burke DJ. Connecting content and motivation: Education’s missing link. Peabody Journal of Education. 1995; 70:66–81.

Caspersen CJ, Pereira MA, Curran KM. Changes in physical activity patterns in the United States, by sex and cross-sectional age. Medicine & Science in Sports & Exercise. 2000; 32:1601–1609. [PubMed: 10994912]

Chen A, Ennis CD. Searching for optimal motivators: Goals, interests, and learning in physical education. The Journal of Educational Research. 2004; 97:329–338.

Chen, A.; Ennis, CD.; Martin, R.; Sun, H. Situational interest—A curriculum component enhancing motivation to learn. In: Hogan, SN., editor. New developments in learning research. Hauppauge, NY: Nova Science Publishers, Inc; 2006. p. 235-261.

Chen A, Liu X. Value-based motivation in Chinese college physical education and physical activity. Journal of Physical Activity and Health. 2008; 5:262–274. [PubMed: 18382035]

Chen A, Martin R, Sun H, Ennis CD. Is in-class physical activity at risk in constructivist physical education? Research Quarterly for Exercise and Sport. 2007; 78:500–509. [PubMed: 18274221]

Chen A, Zhu W. Re-visiting the assumptions for inferential statistical analysis: A conceptual guide for pedagogy research in physical education. Quest. 2001; 53:418–439.

Corbin CB. Physical activity for everyone: What every physical educator should know about promoting lifelong physical activity. Journal of Teaching in Physical Education. 2002; 21:128–144.

Cronbach LJ. Coefficient alpha and the internal structure of tests. Psychometrika. 1951; 16:297–334.

Dodds P, Griffin LL, Placek JH. Chapter 2: Selected review of the literature on development of learners' domain-specific knowledge [Monograph]. Journal of Teaching in Physical Education. 2001; 20:301–313.

Eccles, JS.; Adler, TF.; Futterman, R.; Goff, SB.; Kaczala, CM.; Meece, J., et al. Expectancies, values and academic behaviors. In: Spence, JT., editor. Achievement and achievement motives. San Francisco: Freemand; 1983. p. 75-146.

Eccles JS, Adler TF, Meece JL. Sex differences in achievement: A test of alternative theories. Journal of Personality and Social Psychology. 1984; 46:26–43.

Eccles JS, Wigfield A. In the mind of the actor: The structure of adolescents' achievement task values and expectancy-related beliefs. Personality and Social Psychology Bulletin. 1995; 21:215–225.

Eccles JS, Wigfield A, Flanagan C, Miller C, Reuman D, Yee D. Self-concepts, domain values, and self-esteem: Relations and changes at early adolescence. Journal of Personality. 1989; 57:283–310. [PubMed: 2769558]

Eccles JS, Wigfield A, Harold R, Blumenfeld PB. Age and gender differences in children's self- and task-perceptions during elementary school. Child Development. 1993; 64:830–847. [PubMed: 8339698]

Ennis CD. Communicating the value of active, healthy lifestyles to urban students. Quest. 1999; 51:164–169.

Ennis, CD. Addressing the "high need, low demand" status of physical education. In: Ward, P.; Doutis, P., editors. Physical education in the 21st century. Lincoln, NE: University of Nebraska Press; 2001. p. 199-213.

Ennis, CD.; Chen, A.; Sun, H. Curriculum fidelity: Teacher implementation of externally designed curriculum. Paper presented at the annual meeting of American Educational Research Association; Montreal, Canada. 2005 Apr.

Ennis, CD.; Lindsay, EL. The Be Active Kids! Science-enriched physical education curriculum. Champaign, IL: Human Kinetics; in press

Fisher, RA. Statistical methods for research workers. 13. New York: Hafner; 1958.

Goodlad, JI. A place called school. New York: McGraw-Hill; 1984.

Hidi S. Interest and its contribution as a mental resource for learning. Review of Educational Research. 1990; 60:549–571.

Huitema BE, McKean JW, McKnight S. Autocorrelation effects on least-squares intervention analysis of short time series. Educational and Psychological Measurement. 1999; 59:767–786.

Jacobs, JE.; Eccles, JS. Parents, task values, and real-life achievement-related choices. In: Sansone, C.; Harackiewicz, JM., editors. Intrinsic and extrinsic motivation: The search for optimal motivation and performance. San Diego, CA: Academic Press; 2000. p. 408-443.

Jacobs JE, Lanza S, Osgood EW, Eccles JS, Wigfield A. Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. Child Development. 2002; 73:509–527. [PubMed: 11949906]

Sansone, C.; Harackiewicz, JM., editors. Intrinsic and extrinsic motivation: The search for optimal motivation and performance. San Diego, CA: Academic Press; 2000.

Scariano S, Davenport J. The effects of violations of independence assumptions in the one-way ANOVA. The American Statistician. 1987; 41:123–129.

Shen B, Chen A, Tolley H, Scrabis KA. Gender and interest-based motivation in learning dance. Journal of Teaching in Physical Education. 2003; 22:396–409.

Silverman S, Solmon M. The unit of analysis in field research: Issues and approaches to design and data analysis. Journal of Teaching in Physical Education. 1998; 17:270–284.

U.S. Department of Education. Identifying and implementing educational practices supported by rigorous evidence: A user friendly guide. Washington, DC: Author; 2003.

Wigfield A. Expectancy-value theory of achievement motivation: A developmental perspective. Educational Psychology Review. 1994; 6:49–78.

Wigfield A, Eccles JS. The development of achievement task values: A theoretical analysis. Developmental Review. 1992; 12:265–310.

Wigfield A, Eccles JS, Yoon KS, Harold RD, Arbreton AJA, Blumenfeld PC. Changes in children's competence beliefs and subjective task values across the elementary school years: A three-year study. Journal of Educational Psychology. 1997; 89:451–469.

Willson VL, Putman RR. A meta-analysis of pre-test sensitization effects in experimental design. American Educational Research Journal. 1982; 19:249–258.

Xiang P, McBride RE, Bruene A. Fourth graders' motivation in an elementary physical education running program. The Elementary School Journal. 2004; 104:253–266.

Xiang P, McBride R, Guan J, Solmon M. Children's motivation in elementary physical education: An expectancy-value model of achievement choice. Research Quarterly for Exercise and Sport. 2003; 74:25–35. [PubMed: 12659473]

Appendix A. Expectancy-value inventory (adopted from Xiang et al., 2003)

1. How good are you in physical education?						
Very good	5	4	3	2	1	Not good
2. If you give 5 to the best student in PE and 1 to the worst, what would you give to yourself?						
Best	5	4	3	2	1	Worst
3. Some kids are better in one subject than in another. For example, you might be better in math than in reading. Compared to most of your other school subjects, how are you doing in PE?						
A lot better	5	4	3	2	1	A lot worse
4. How well do you think you are doing in learning in PE?						
Very well	5	4	3	2	1	Very poorly
5. How well are you keeping yourself physically active in PE?						
Very well	5	4	3	2	1	Very poorly
6. How important do you think PE is for you?						
Not very important	1	2	3	4	5	Very important
7. Compare to math, reading, and science, how important is it for you to learn PE content?						
Not very important	1	2	3	4	5	Very important
8. In general, how fun do you think your PE classes are?						
Very boring	1	2	3	4	5	Very fun
9. How much do you like your PE classes?						
Don't like it at all	1	2	3	4	5	Like it very much
10. Some things that you learn in school help you do things better outside of school. We call this being useful. For example, learning about plants at school might help you grow a garden at home. How useful do you think the concepts you learned in PE are?						
Not useful at all	1	2	3	4	5	Very useful
11. Compared to your other school subjects, how useful are the skills learned in PE?						
Not useful at all	1	2	3	4	5	Very useful
12. (Open-ended) If there is anything that you don't like in PE, what would that be? Why?						
13. (Open-ended) If you had a choice, would you rather not come to PE? Why?						

Appendix B. Sample cost statements and codes

Question 12: If there is anything that you don't like in PE, what would that be? Why?		
Cost code: 1 = No cost, 2 = there is a cost		
Source code: 1 = content, 2 = teacher, 3 = peer, 4 = physical discomfort		
Sample student responses	**Cost**	**Source**
No cost		
I like it because it is fun to me	1.00	N/A
I like it very much and I like it because you can be yourself	1.00	N/A
I like everything because it's all fun and you get energy	1.00	N/A
Cost—content		
I don't like the journals because it sometimes is not fun	2.00	1.00
I don't like the sit-ups and push-ups	2.00	1.00
I don't running laps because everybody is too fast	2.00	1.00
Cost—teacher		
When he (the teacher) yell at all of us	2.00	2.00
I don't like when Mr. XXXXX yells	2.00	2.00
I don't like the way my teacher rewards kids	2.00	2.00
Cost—peer		
I don't like when people talk a lot and waste time	2.00	3.00
I don't like when the other class is late and takes up our time	2.00	3.00
I don't like PE because people trip me up and it is not fun	2.00	3.00
Cost—physical discomfort		
I don' like running cause it makes me lose my breath	2.00	4.00
I do not like doing (running) laps, it makes me tired	2.00	4.00
I don't like pushups because it hurts to do it	2.00	4.00

Appendix C. Sample choice statements and codes

Question 13: If you had a choice, would you rather not come to PE? Why?	
Sample student responses	**Code**
Yes	
I will come because I like to run, PE is science and we still have fun	1.00
I would (come) because we are doing fun games sooner or later	1.00
I would (come) because PE is important and it helps your body	1.00
I go to PE because I do not want to stay in the classroom	1.00
I would go cause it gives us muscles and more exercise	1.00
I would come to PE it is a way to get in shape and have fun	1.00
I like to go to PE to do fun thing and play lots of games	1.00
Come to PE because we learn to take care of our heart	1.00
I rather come because I like learning about my body	1.00
I would come to PE because I really like it better than music, it is fun	1.00
Come! Because it helps me learn more about exercise and how healthy it is in fitness zone	1.00

Question 13: If you had a choice, would you rather not come to PE? Why?	
Sample student responses	**Code**
No	
I would not come sometimes because PE is sometimes boring	2.00
If it is the Be Active Kids project, no, because it's dull,	2.00
I would not come to PE if I knew we were going to run laps	2.00

	Spring 2004	Summer	Fall 2004
Experimental DHH	• Data collection in 16 grade 3, 4, 5 classes	Teacher training (MMM)	• No data collection • Received MMM • New grade 3, 4, 5
MMM	• No data collection • Received DHH	Teacher training (MMM)	• Data collection in 15 grade 3, 4, 5 classes
Comparison	• Data collection in 10 grade 3, 4, 5 classes	Teacher training (placebo)	• Data collection in 7 grade 3 4, 5 classes

Figure 1.

Content conditions and block design of the study for data collection.

Table 1

Student gender and grade distributions by content conditions

	DHH	MMM	Comp.	Total
Boys				
Third grade	18	16	15	49
Fourth grade	13	17	18	48
Fifth grade	17	16	16	49
Subtotal	48	49	49	146 (49%)
Girls				
Third grade	14	18	19	51
Fourth grade	22	15	14	51
Fifth grade	15	18	17	50
Subtotal	51	51	50	152 (51%)
Total	99 (33%)	100 (34%)	99 (33%)	298 (100%)

Note. DHH = Dr. Love's Healthy Heart; MMM = Mickey's Mighty Muscles; Comp. = comparison.

Table 2

Demographic Information for the participating teachers

	DHH	MMM	Comp.	Total
Boys (n = 7)				
African American	1	1	1	3
Caucasian	0	1	2	3
Other	0	0	1	1
Girls (n = 7)				
African American	0	0	1	1
Caucasian	3	2	1	6
Other	0	0	0	0
Total	4	4	6	14

Note. DHH = Dr. Love's Healthy Heart; MMM = Mickey's Mighty Muscles; Comp. = comparison.

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Table 3

Internal consistence reliability (α) and intraclass correlation (ρ) coefficients for expectancy-value scales by content conditions

	DHH α/ρ	**MMM** α/ρ	**Comp.** α/ρ
Expectancy beliefs	.70/.03	.60/.08	.77/.04
Attainment value	.63/.04	.63/.09	.71/.14*
Intrinsic/interest value	.62/.04	.75/.02	.92/.09
Utility value	.84/.06	.76/.04	.62/.18*

Note. DHH = Dr. Love's Healthy Heart; MMM = Mickey's Mighty Muscles; Comp. = comparison.

* p =.001 (H_0: $\rho = 0$ for F test).

Table 4

Descriptive statistics of expectancy belief and task values by content (*N* = 48 classes)

	Expectancy belief		Attainment		Intrinsic/interest		Utility	
	M	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
DHH	3.68	.57	4.51	.70	4.72	.65	4.41	.82
MMM	3.44	.36	4.21	.86	4.56	.65	4.03	.93
Comparison	3.37	.47	3.38	.47	4.66	.70	3.68	.80

Note. *M*= mean; *SD* = standard deviation; DHH = Dr. Love's Healthy Heart; MMM = Mickey's Mighty Muscles.

Table 5

Results of multiple comparisons (Tukey's HSD)

	Unit (I)	Unit (J)	Mean difference (I–J)	*SE*	*p*
Expectancy beliefs	DHH	MMM	.2381	.10349	.058
		Comparison	.3031	.07554	.000
	MMM	Comparison	.0650	.09966	.791
Attainment value	DHH	MMM	.2932	.17210	.206
		Comparison	.5567	.12562	.000
	MMM	Comparison	.2636	.07554	.000
Intrinsic value	DHH	MMM	.1555	.14067	.512
		Comparison	.0721	.10268	.762
	MMM	Comparison	−.0834	.13546	.812
Utility value	DHH	MMM	.3833	.17261	.070
		Comparison	.7348	.12600	.000
	MMM	Comparison	.3514	.12310	.000

Note. DHH = Dr. Love's Healthy Heart; MMM = Mickey's Mighty Muscles; *SE*= standard error.

Table 6

Correlation coefficients of expectancy belief with task values by content conditions

	Attainment			Intrinsic/interest			Utility		
	DHH	**MMM**	**Comp.**	**DHH**	**MMM**	**Comp.**	**DHH**	**MMM**	**Comp.**
Expectancy beliefs	.50**	.016	.48**	.75**	.37*	.44**	.61**	.06	.50**
Attainment value				.49**	.25	.31**	.59**	.21	.42**
Intrinsic value							.56**	.27	.22*

Note. DHH = Dr. Love’s Healthy Heart; MMM = Mickey’s Mighty Muscles; Comp. = comparison.

* $p < .05$.

** $p < .01$.

Table 7

Z values from correlation coefficient statistical comparison

	Content conditions compared		
Correlated variables	**DHH–Comp.**	**DHH–MMM**	**MMM–Comp.**
Expectancy belief & attainment	1.975*	3.708**	3.527**
Expectancy belief & intrinsic	3.479**	4.063**	.583
Expectancy belief & utility	1.111	4.507**	3.396**
Attainment & intrinsic	1.493	2.132*	.639
Attainment & utility	1.597	3.229**	1.630
Intrinsic & utility	2.840**	2.472*	.368

Note. DHH = Dr. Love's Healthy Heart; MMM = Mickey's Mighty Muscles; Comp. = comparison.

* $p < .05$ when $Z_{r1-r2} \geq 1.96$.

** $p < .01$ when $Z_{r1-r2} \geq 2.58$.

Table 8

Frequencies of cost and no-cost responses by content

	No cost	Cost	Total[a]
DHH			
Frequency	55	21	76
Expected frequency	44.9	31.1	
% within unit	72.4%	27.6%[b]	100.0%
MMM			
Frequency	18	18	36
Expected frequency	21.3	14.7	
% within unit	50.0%	50.0%[b]	100.0%
Comparison			
Frequency	46	42	88
Expected frequency	51.9	36.1	
% within unit	52.4%	47.6%[b]	100.0%

Note. DHH = Dr. Love’s Healthy Heart; MMM = Mickey’s Mighty Muscles.

[a]Only students who responded to the cost item are included.

[b]Follow-up post hoc comparison: $p < .001$ ($Z = -5.414$) DHH vs. MMM and comparison; $p = .05$ ($Z = -.2.005$) MMM vs. comparison.

Table 9

Frequencies of cost sources

	Sources of cost				
	Content[a]	Teacher	Peer	Discomfort	Total
DHH					
Frequency	18	3	0	0	21
Exp. freq.	14.1	1.2	2.9	2.9	21.0
% within cost	32.7%	60.0%	.0%	.0%	25.9%
MMM					
Frequency	10	0	2	6	18
Exp. freq.	12.1	1.0	2.5	2.5	18.0
% within cost	18.2%	.0%	16.7%	50.0%	22.2%
Comparison					
Frequency	27	2	9	4	42
Exp. freq.	28.2	2.4	5.7	5.7	42.0
% within cost	49.1%	40.0%	83.3%	50.0%	55.1%
Total					
Frequency	55	5	11	10	81
Exp. freq.	53.0	5.0	12.0	11.0	81.0
% within cost	67.9%	6.2%	13.6%	12.3%	100.0%

Note. DHH = Dr. Love's Healthy Heart; MMM = Mickey's Mighty Muscles; Exp. freq. = expected frequency.

[a] Follow-up post hoc comparison on content: $p < .001$ ($Z= -3.902$) DHH vs. MMM; $p= .001$ ($Z= -.3.229$) DHH vs. comparison; $p < .001$ ($Z= -3.612$) MMM vs. comparison.

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Table 10

Correlation coefficients (Spearman's ρ) of cost with expectancy-value dimensions

	Exp.	Attain.	Intrinsic	Utility
DHH cost	−.152	.009	−.190*	−.157*
MMM cost	−.003	−.090	−.087	−.107
Comparison cost	.101	−.097	.037	−.002

Note. Exp. = expectancy; Attain. = attainment; DHH = Dr. Love's Healthy Heart; MMM = Mickey's Mighty Muscles.

* p<.05(2-tailed).