

Changes in dance teachers' beliefs about critical-thinking activities

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Abstract

Experienced, early career, and prospective dance teachers and non-teacher controls ($N = 167$) participated in a study examining the development of beliefs about use of critical-thinking (CT) activities with different learner populations. Dance teachers' self-selection of careers was associated with support for high-CT for high-advantage learners. Preservice education was associated with more absolute beliefs in both the inherent advantages of high functioning learners and the use of high-CT activities for all learners. Teaching experience was associated with a moderation of support for high-CT instruction for all learners – with clear preferences for high-advantage students – and reduced support for low-CT instruction for high-advantage learners. For teacher educators who advocate strongly for use of CT in dance and physical education, the results suggest a need for research and development of preservice practices that promote optimal use of CT activities for all learners.

Introduction

The Confucian Analects tell us, "Learning without thought is labor lost; thought without learning is perilous." This ancient wisdom underscores the importance of *critical thinking*: purposeful and goal-directed cognitive skills or strategies that increase the likelihood of a desired outcome (Browne & Keeley, 2001; R. Ennis, 1987; Halpern, 2002). Not coincidentally, educators have placed a premium on critical thinking (CT) skills over the past several decades, focusing on approaches to "becoming a critical thinker," "teaching for thinking," and "teaching higher-order thinking skills" (O'Tuel & Bullard, 1993; Perkins, Jay, & Tishman, 1993; Pogrow, 1990, 1994; Raths, Wasserman, Jonas, & Rothstein, 1986; Tishman, Perkins, & Jay, 1995). A growing body of research points to the educational effectiveness of CT-enriched instruction (Levine, 1993; Pogrow, 1990; White & Frederiksen, 2000). Today, modern schooling increasingly requires students to develop CT skills for optimal performance on tasks such as writing essays, calculating likelihoods, evaluating creative works, understanding nutritional guidelines, and planning physical training regimes (Ericsson, 1996; Henderson, 2001; Resnick, 1987; Yeh, 2002).

More recently, researchers investigating the role of CT in learning have concentrated on the influence of teacher beliefs about CT activities for different populations of learners. As far back as Rosenthal and Jacobson's (Rosenthal & Jacobson, 1968) seminal study of teacher expectations, educational psychologists and teacher educators have investigated the nature and impact of teachers' beliefs about learning and teaching on student achievement (Calderhead, 1996; Fang, 1996; Fenstermacher, 1994; Nespor, 1987; Pajares, 1992; Richardson, 1994, 1996; Smylie, 1988). Teachers' beliefs have been shown to influence how they structure tasks and interact with learners (Anning, 1988; Pissanos & Allison, 1993; Richardson, 2002; Wilson, 1996). One of several strands of this research focuses on teachers' beliefs about the educational effectiveness of CT-enriched instruction (Brown & Campione, 1990; Henderson, 2001; Pogrow, 1990, 1994; Raths et al., 1986; Resnick, 1987). In particular, researchers have studied the relationship between teachers' beliefs about CT and factors that influence their decision-making concerning its use in the classroom. These factors include teachers' beliefs about

the relative effectiveness of activities that are high-CT (e.g., discussion) versus low-CT (e.g., drill-and-skill).

Theory and research on teachers' beliefs about high-CT and low-CT activities has also focused on, among other things, the relationship between such beliefs and teachers' perceptions of learners as "high-advantage" or "low-advantage" (i.e., differing in academic track, level of achievement, or SES) (Oakes, 1990; Page, 1990; Pogrow, 1990, 1994). According to a frequently cited assertion about teachers' beliefs, low-advantage learners often receive limited access to high-CT activities in schools because teachers purportedly believe that low-CT activities are more appropriate than high-CT ones for low-advantage learners (Radenbush, Rowan, & Cheong, 1993; Zohar, Degani, & Vaakin, 2001; Zohar & Dori, 2003). Such an "advantage effect" may result in a self-fulfilling prophecy, according to this line of reasoning: high-advantage learners receive high-CT instruction that results in high-level academic performance that in turn makes still more high-CT lessons likely; but low-advantage learners receive few high-CT lessons, making them less likely to develop sufficiently strong academic skills to warrant high-CT instruction in subsequent lessons.

Despite the growing body of theory and research on CT, relatively little investigation has been conducted to validate the construct "teachers' beliefs about CT." Advantage-effect research cited above includes examinations of the reliability of the assessments employed, but little exploration of the validity of these assessments or the construct on which they are based. For example, without discriminant validity of the CT-demand, it would remain unclear the extent to which the reported advantage effect is an artifact of hidden factors. Three such factors can be identified. The first is *CT ability* (R. Ennis, 1987; Facione, Facione, & Giancarlo, 2000; Kuhn, 1999); it follows that teachers who are better critical thinkers may use more CT in the classroom. The second factor is *CT disposition* (Caccioppo & Petty, 1982; Perkins et al., 1993); it stands to reason that teachers who favor intellectual challenges may evince higher classroom CT-demand. The third factor is *social desirability* (Crowne & Marlow, 1964); teachers with a strong need for social approval may tend to ascribe to social norms favoring lively CT-rich activities over humdrum CT-lean ones (Putnam & Borko, 1997; Woolfolk Hoy & Murphy, 2001). The predictive validity of the CT-demand construct also remains unexplored, so it is unknown the extent to which the reported advantage effect is manifested in teachers' classroom practices as well as their espoused beliefs (Fang, 1996; Wilcox-Herzog, 2002).

This need was addressed in a sequence of five studies validating the theoretical and practical utility of the *CT-related beliefs* construct and a four-factor scale – *Critical Thinking Belief Appraisal* (CTBA) instrument – measuring teachers' beliefs about high-CT and low-CT activities for high-advantage and low-advantage learners (Torff & Warburton, 2005). The three "advantage characteristics" employed by the CTBA are *ability* (learners' capacity for intellectual or skill achievement when dealing with the specific topic the class is studying); *prior knowledge* (how much learners know about the specific topic the class is studying before they participate in additional lessons); and *motivation* (how much interest and attention learners show when dealing with the specific topic the class is studying). Correlations and factor-analytic results yielded in validation research strongly support these three advantage characteristics as effective indicators of teachers' perception of learner advantages, but not as independent factors themselves (Torff & Warburton, 2005).

Based on a four-factor model, the CTBA assesses teachers' beliefs concerning the effectiveness of (a) high-CT activities for high-advantage learners (HH), (b) high-CT activities for low-advantage learners (HL), (c) low-CT activities for high-advantage learners (LH), and (d) low-CT activities for low-advantage learners (LL). The four factors yielded by the CTBA scale served as dependent variables, with high scores reflecting favorable beliefs about HH, HL, LH, and LL conditions. The scale was accompanied by a

set of demographic items for use as independent variables (age and gender) and grouping (educational level, teacher certification, number of years teaching). (The measurement instrument is described further in the Methods section.)

A study involving practicing secondary teachers ($N = 145$) who completed the CTBA replicated earlier findings of an *advantage effect*, with teachers rating high-CT activities as significantly more effective for high-advantage learners than for low-advantage ones (Warburton & Torff, 2005). Interestingly, the results also pointed to *pedagogical-preference effects* in teachers' beliefs. For high-advantage learners, teachers judged high-CT activities to be more effective overall than low-CT ones. This result is consistent with previous advantage-effect research. However, teachers also produced a pedagogical-preference effect for low-advantage learners as well. Teachers preferred high-CT activities to low-CT ones when teaching low-advantage learners, demonstrating an apparent pedagogical preference for high-CT activities for low-advantage learners as well as high-advantage ones.

A subset of teacher beliefs research has focused on those who primarily teach movement-based subjects, specifically dance educators. This is an important group for study not only because dance is an understudied area of education, but also because folk beliefs about physical activity as a somehow non-cognitive experience remain intact (Warburton, 2003). Some experts in movement education contend that many dancers and dance teachers alike tend to view learning as memorization of externally provided input, where the passive act of knowledge reception and skill acquisition precedes thinking (Smith-Autard, 1994). This view is thought to yield an impoverished "transmission" approach to teaching (Berliner, 1992; Brookhart & Freeman, 1992; Hollingsworth, 1989). In dance, one finds so-called traditional teaching in those who believe that "talent will out" as long as key dance concepts remain implicit and physically embedded in movement, with understanding and ability emerging spontaneously through training and a pedagogy devoted to drill and skill (Gardner, 1991; Warburton, 2002).

Despite the traditionalist tendency, some dance and physical education practitioners and scholars, especially those who champion "movement approaches" based on Rudolf Laban's ideas (Barrett, 1997; Laban, 1948), champion CT as a key element of constructivist learning theory and instructional practices (C. D. Ennis, 1991; C. D. Ennis, Mueller, & Hooper, 1990; C. D. Ennis, Mueller, & Zhu, 1991; Green Gilbert, 1992; Lavender, 1996; Rovegno, 1997, 1998; Sebran, 1995; Smith-Autard, 1994). Accordingly, movement experts have been shown to use methods and materials that help learners generate critical thinking elements and achieve more (Chen & Cone, 2003; Hutchinson Guest, 1995; Warburton, 2000). In contrast, novice teachers have been found to be less likely than experts to facilitate students' use of CT (Chen, 2002; Chen & Rovegno, 2000).

A recent study employed the CTBA to examine the connection between dance teacher beliefs and CT use. This study hypothesized that practicing dance teachers ($N = 56$) would manifest the *advantage effect* favoring more talented students, but not the *pedagogical-preference effect*, which would suggest widespread support for CT activities for all learners (Warburton, 2004). The results were mixed. On the one hand, the investigation found a *pedagogical-preference effect* for lessons that are high in CT-demand: ones in which dancers think for themselves and take responsibility for knowing what it takes to become skilled, expressive and creative movers. On the other hand, the study also revealed an *absolute advantage effect*: practicing dance educators evinced widely held beliefs that activities high in CT – and all other activities including those low in CT – are most effective with high advantage learners.

The results suggested that talented and motivated dance students receive *explicit* instruction – and *implicit* support – that results in high-level performance, which in turn makes still more enriched lessons likely. Conversely, low-advantage dance students

receive few enriched lessons, making it unlikely that they will develop sufficiently strong skills to warrant enriched instruction and support in subsequent lessons (Oakes, 1990; Page, 1990). A self-fulfilling *absolute advantage effect* emerges that keeps the "in" group in and the "out" group out, resulting in unequal access to CT-rich movement instruction and future opportunities.

This article follows up on previous research by investigating the origins and development of the *pedagogical-preference* and *absolute advantage* effects in dance teachers. The study explores the extent to which beliefs about CT-use change as dance teachers accrue training and experience. Only one other study has examined the development of teachers' beliefs about classroom use of high-CT and low-CT activities for different populations of learners. In a study of secondary teachers ($N = 408$) in art, business, English, health, foreign language, mathematics, music, science, and social studies, Torff (2005) uncovered evidence that advantage-related beliefs change with education and experience, but differentiation of instruction based on learners' advantage status remains robust. Interestingly, prospective teachers produced the highest ratings for CT-use, and all group differences associated with preservice education or the combination of inservice education and teacher experience entailed lower ratings, not higher ones. According to Torff, the bottom line for educational psychologists and teacher educators who advocate use of CT activities in schools appears to be "one of countering the apparent reduction of existing support for high-CT activities, not facilitating an increase in support for these activities" (2005). Neither dance nor movement/physical education teachers were included in the sample.

Method

The basic issue centers on the pattern of changes in dance teachers' beliefs over time and due to training and experience. Three questions focus on the nature of this change. First, how do prospective teachers at the beginning of a preservice teacher-education program compare to similar-age individuals who have not selected a career in teaching? This question explores whether advantage effect-related beliefs are unique to teachers as a self-selected group or such beliefs are shared with individuals who select a career in performance.

Second, how do prospective dance teachers compare to teachers in early career, fresh from a dance teacher-certification program? At issue is the impact of teacher-education on teachers' beliefs about CT for high-advantage and low-advantage learners. Considering the checkered history of research on teacher change (Richardson & Placier, 2002), it seems advisable to address the issue of the effect of preservice training on CT beliefs.

Finally, how do early career teachers less than one year out from a teacher certification program compare to experienced teachers with at least five years of teaching experience? This question examines the effect of classroom experience and inservice training on the effect of perceived learner advantages on teachers' CT-demand beliefs.

Participants

The 167 participants in the study comprised four groups: controls, prospective teachers, early-career teachers, and experienced teachers. Within-group samples were randomly selected and were not stratified by age, gender, content area, or other variables. The control group consisted of 48 undergraduate students in dance programs with an average age of 21 years ($SD = .71$ years). These students had never taken a teacher-education course and had indicated a lack of intention to do so. They were enrolled at postsecondary institutions in the New York metropolitan area. The prospective teacher group comprised 43 graduate students with an average age of 26 years ($SD = 4.0$ years).

This group had enrolled in graduate dance education programs in the New York metropolitan area and had declared an interest in dance teacher certification but had yet to begin coursework. The early-career teacher group consisted of 44 graduates of K-12 dance teacher-certification programs in the New York metropolitan area (Age $M = 32$ years, $SD = 9.1$ years) They had completed an average of .75 years ($SD = .25$ years) of service. The experienced teacher group comprised 32 practicing teachers with an average age of 48 years ($SD = 7.8$ years). This group had an average of 18.2 years ($SD = 9.8$) of full-time employment as certified dance teachers in private and public K-12 schools in the New York City metropolitan area.

Procedure

Participants completed the CTBA (Warburton & Torff, 2005). Data were collected for the control and prospective groups by administering the scale during undergraduate and graduate classes. Early career and experienced teachers were contacted individually at their place of employment and were asked to participate in an opinion survey of teacher beliefs. Upon agreeing to participate, teachers were mailed the CTBA and asked to return the survey in a postage-paid return envelope. The response rate was about 70 percent. All participants were instructed that the survey had no correct answers and responses were confidential.

The CTBA has a total of 12 lesson vignettes (i.e., prompts) describing classroom activities in English, mathematics, science, and social studies (Warburton & Torff, 2005). Below are examples of each.

High CT. A social studies class is studying the Treaty of Versailles signed at the end of World War I. The teacher assigns learners to write letters from the future to President Wilson arguing why the United States should or should not support the treaty.

Low CT. A social studies class is studying the industrial revolution. The teacher provides learners with a list of inventions, explains the impact of these inventions during this period, and describes how they continue to influence the modern world.

To account for disciplinary knowledge, additional prompts in dance were included; these prompts were judged to have strong face validity by a panel of expert performing arts educators. For example, the following prompt was judged to be low in critical thinking demand: "A dance composition class is studying the use of ABA form in choreography. The teacher explains how to use ABA form, demonstrates a sample composition, and then gives an in-class assignment in which students practice similar compositions." Using 6-point Likert-type scales, each of the 12 prompts is followed by three assessment items – either a high-advantage or low-advantage item for each advantage characteristic. For example, Prompt 1 is followed by a low-ability item, a low prior-knowledge item, and a high-motivation item.

The 36-item scale is balanced as follows: it has a total of 12 prompts, six high-CT and six low-CT; it presents 18 items for high-advantage learners and 18 for low-advantage ones; and it includes 12 of each of the three advantage characteristics (six for high-advantage learners and six for low-advantage ones). The design of the CTBA allows teachers' beliefs to be assessed specifically for high-advantage and low-advantage learners. To avoid response bias caused by leading questions, the contextualized assessment scheme included characteristics that teachers typically take into consideration as they judge learners to be high-advantage or low-advantage (Archer & McCarthy, 1988; Dweck, 1986; Givvin, Stipek, Salmon, & MacGyvers, 2001; Madon et al., 1998; Nolen & Nicholls, 1994; Pintrich & Schunk, 1996; Tollefson, 2000).

Results

Means and standard deviations for the dependent variables are presented in Table 1. A series of multivariate analysis of covariance (MANCOVA) and analysis of covariance (ANCOVA) procedures were conducted to control for potential covariate measures (age, gender) while examining between participants and within-participants differences in the dependent variables (see Table 2 for a correlation matrix). Interactions among the covariates were insignificant. Evaluation of assumptions of normality of sampling distributions, linearity, homogeneity of variance, homogeneity of regression, and reliability of covariates was satisfactory. No univariate within-cell outliers were obtained at $\alpha=.001$. (Note: Throughout this article, the term *significant* refers to statistical significance.)

Table 1
Means and Standard Deviations for Dependent Variables by Group

Variable	Group							
	Control		Prospective		Early Career		Experienced	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
HH	4.76	0.75	5.15	0.50	5.14	0.57	5.34	0.71
HL	3.01	0.77	3.18	1.00	3.55	1.11	2.99	1.05
LH	4.40	0.90	4.79	0.85	4.27	1.22	4.51	1.02
LL	3.56	0.71	3.58	0.84	3.14	0.96	3.21	0.77

Note. All variables were assessed on a 6-point scale (1 = *low*, 6 = *high*). CT = critical thinking; HH = high-CT activities for high-advantage learners; HL = high-CT activities for low-advantage learners; LH = low-CT activities for high-advantage learners; LL = low-CT activities for low-advantage learners.

Between-Participants Comparisons

A between-participants MANCOVA produced significant group differences for the combined dependent variables, $F(3,161) = 10.23, p < .0001 (\eta^2 = .26)$. (See Table 3, page 8 for a summary of between-participants findings.) In ratings of high-CT/high-advantage, significant differences were obtained between the four groups, $F(3,161) = 2.66, p < .05 (\eta^2 = .04)$. Post hoc pairwise comparisons revealed that controls scored significantly lower than prospective ($\eta^2 = .09$), early career ($\eta^2 = .08$), and experienced teachers ($\eta^2 = .14$). Other pairwise differences were insignificant. (All post hoc pairwise comparisons reported in this article used least significant differences tests.) This between-group comparison showed that prospective, early career and experienced teachers produced higher ratings of high-CT activities for high-advantage learners than controls, revealing some similarities between individuals who choose a teaching career.

In ratings of high-CT/low-advantage, there were significant differences between the four groups, $F(3,161) = 3.24, p < .05 (\eta^2 = .06)$. Post hoc pairwise comparisons showed that early career teachers scored significantly higher than controls ($\eta^2 = .08$) and experienced teachers ($\eta^2 = .06$). Other pairwise differences were insignificant. These results showed that early career teachers produced higher ratings of high-CT activities for low-advantage learners than controls, that ratings were lower among experienced teachers than early career ones, and that prospective teachers were similar to experienced teachers. This comparison provided some evidence of an association between preservice teacher education and pedagogical preference for high-CT activities for all learners among early career dance teachers.

Table 2
Pooled Within-Cell Correlations of Dependent and Independent Variables

Variable	1	2	3	4	5	6
1. Age	—	.04	.24**	-.05	.12	-.10
2. Gender		—	-.24**	-.00	-.04	.04
3. HH			—	.21**	.37**	.14
4. HL				—	-.06	.36**
5. LH					—	.15
6. LL						—

Note. CT = critical thinking; HH = high-CT activities for high-advantage learners; HL = high-CT activities for low-advantage learners; LH = low-CT activities for high-advantage learners; LL = low-CT activities for low-advantage learners.

* $p < .05$, two tailed. ** $p < .01$, two tailed.

In ratings of low-CT/high-advantage, significant differences were found between the four groups, $F(3,161) = 4.75$, $p < .01$ ($\eta^2 = .08$). In post hoc pairwise comparisons, prospective teachers scored significantly higher than controls ($\eta^2 = .05$) and early career teachers ($\eta^2 = .06$). No other significant between group differences were found. With respect to low-CT activities for high-advantage learners, prospective teachers produced higher ratings than both controls and early career teachers. Control, early career and experienced teachers produced similar ratings. This comparison suggested a nascent belief among prospective dance teachers in the inherent ability of high functioning learners to perform well regardless of pedagogical approach.

In ratings of low-CT/low-advantage, there were significant differences between the four groups, $F(3,161) = 2.99$, $p < .05$ ($\eta^2 = .05$). Post hoc pairwise comparisons revealed that controls and prospective teachers scored significantly higher than both early career ($\eta^2 = .06$), and experienced teachers ($\eta^2 = .05$). No other significant differences were obtained. These results showed that early career and experienced teachers produced lower ratings of low-CT activities for low-advantage learners than controls and prospective teachers, which produced similarly high ratings. This result provided additional evidence for an association between preservice teacher education and pedagogical preference for high-CT activities.

Within-Participants Comparisons

Table 4 displays a summary of a series of with-in participants ANCOVA analyses. One key comparison points to the effect of perceived learner advantages. Ratings were significantly higher for high-CT/high-advantage than for high-CT/low-advantage learners in prospective $F(1,42) = 3.78$, $p < .05$ ($\eta^2 = .08$) and experienced $F(1,31) = 4.28$, $p < .05$ ($\eta^2 = .12$) teacher groups. These results demonstrated a present, though inconsistent pattern across the groups, with prospective and experienced teachers producing an *advantage effect* for high-CT activities, rating them more effective for high-advantage than low-advantage learners. The absence of a significant advantage effect in the early career group was explained somewhat by the significantly higher ratings of low-CT/high-advantage to low-CT/low-advantage produced by the early career teacher group $F(1,43) = 4.14$, $p < .05$ ($\eta^2 = .09$) This result was reminiscent of the *absolute advantage effect* for high-advantage learners found in the earlier study of practicing dance teachers: where any type of pedagogy – even low-CT activities – is rated more effective for high-advantage learners than low-advantaged ones (Warburton, 2004).

Table 3
Summary of Results of Between-Participants Comparisons

Groups	Variable			
	HH	HL	LH	LL
Combined	$F(3,161) = 2.66, p < .05, \eta^2 = .04$	$F(3,161) = 3.24, p < .05, \eta^2 = .06$	$F(3,161) = 4.75, p < .01, \eta^2 = .08$	$F(3,161) = 2.99, p < .05, \eta^2 = .05$
Cont-Pros	Cont < Pros $p < .01, \eta^2 = .09$	<i>ns</i>	Cont < Pros $p < .05, \eta^2 = .05$	<i>ns</i>
Cont-Erly	Cont < Erly $p < .01, \eta^2 = .08$	Cont < Erly $p < .01, \eta^2 = .08$	<i>ns</i>	Cont < Erly $p < .05, \eta^2 = .06$
Cont-Exp	Cont < Exp $p < .001, \eta^2 = .14$	<i>ns</i>	<i>ns</i>	Cont < Exp $p < .05, \eta^2 = .05$
Pros-Erly	<i>ns</i>	<i>ns</i>	Pros < Erly $p < .05, \eta^2 = .06$	Pros < Erly $p < .05, \eta^2 = .06$
Pros-Exp	<i>ns</i>	<i>ns</i>	<i>ns</i>	Pros < Exp $p < .05, \eta^2 = .05$
Erly-Exp	<i>ns</i>	Erly > Exp $p < .05, \eta^2 = .06$	<i>ns</i>	<i>ns</i>

Note. Cont = control group; Pros = prospective teacher group; Erly = early career teacher group; Exp = experienced teacher group; CT = critical thinking; HH = high-CT activities for high-advantage learners; HL = high-CT activities for low-advantage learners; LH = low-CT activities for high-advantage learners; LL = low-CT activities for low-advantage learners.

Table 4
Summary of Results of Within-Participants Comparisons by Group

Variables	Group			
	Control	Prospective	Early Career	Experienced
HH-HL	<i>ns</i>	HH > HL $F(1,42) = 3.78^*, \eta^2 = .08$	<i>ns</i>	HH > HL $F(1,31) = 4.28^*, \eta^2 = .12$
LH-LL	<i>ns</i>	<i>ns</i>	LH > LL $F(1,43) = 4.14^*, \eta^2 = .09$	<i>ns</i>
HH-LH	HH > LH $F(1,47) = 36.41^{***}, \eta^2 = .32$	<i>ns</i>	HH > LH $F(1,43) = 3.84^*, \eta^2 = .08$	HH > LH $F(1,31) = 6.36^*, \eta^2 = .17$
HL-LL	<i>ns</i>	<i>ns</i>	HL > LL $F(1,43) = 46.40^{***}, \eta^2 = .50$	<i>ns</i>

Note. CT = critical thinking; HH = high-CT activities for high-advantage learners; HL = high-CT activities for low-advantage learners; LH = low-CT activities for high-advantage learners; LL = low-CT activities for low-advantage learners.
* $p < .05$. ** $p < .01$. *** $p < .001$

A second important comparison points to the effect of pedagogical preferences. The difference between ratings of high-CT/high-advantage and low-CT/high-advantage were significantly higher in three of four groups: controls $F(1,47) = 36.41, p < .0001 (\eta^2 = .32)$; early career teachers $F(1,43) = 3.84, p < .05 (\eta^2 = .08)$; and experienced teachers $F(1,31) = 6.36, p < .05 (\eta^2 = .17)$. There were no differences between ratings of high-CT/high-advantage and low-CT/high-advantage in the prospective group. With the exception of the prospective group, these groups produced a *pedagogical-preference effect* in which high-CT activities were favored over low-CT ones. Once again, the early career teachers in this sample produced an intensification of this finding, with the largest effect size in the study. The early career group rated high-CT activities as more effective for low-advantage learners than low-CT activities $F(1,43) = 46.40, p < .0001 (\eta^2 = .50)$. This result suggested an *absolute pedagogical-preference effect* for high-CT activities resulting from preservice teacher training.

Discussion

Cross-sectional comparison of non-teacher dance controls and prospective, early career and experienced dance teachers confirmed earlier findings of *advantage* and *pedagogical-preference* effects, but also revealed unique patterns of beliefs about CT use associated with self-selection into dance teaching, preservice dance education, and the accumulation of dance teaching experience.

Self-Selection into Dance Education

In comparing similarities and differences between individuals who had chosen a dance teaching career and those that did not, some evidence was found to support the notion that advantage effect beliefs are unique to dance teachers as a self-selected group. In between-group comparisons, non-teacher controls produced lower ratings of high-CT activities for high-advantage learners than prospective, early career and experienced teachers (with effect sizes of .09, .08, and .14 respectively). Straightforward self-selection distinctions were tempered somewhat by no significant differences between prospective teachers' and controls' ratings for hi-CT activities for low-advantage learners, suggesting a lack of a global pedagogical-preference effect associated with self-selection into a teaching career. The lack of a strong pedagogical-preference effect distinguishing controls from prospective teachers contradicted earlier findings in the general population (Torff, 2005).

Further investigation of prospective teachers and controls, however, revealed the strength of the advantage effect on self-selection into dance teaching. Prospective dance teachers seemed particularly sensitive to the effect of perceived learner advantages, with ratings that were significantly higher for high-CT/high-advantage than for high-CT/low-advantage learners (effect size of .08). Prospective teachers also scored significantly higher than both controls (with effect size of .05) and early career teachers (effect size of .06) on ratings of the effectiveness of low-CT activities for high-advantage learners. These findings suggest that prospective dance teachers in this sample held a nascent belief in the inherent ability of high functioning learners to perform well in physical activities regardless of pedagogical approach.

Dance Teacher Education and Early Career

As prospective dance teachers moved through preservice teacher education and into the first year of teaching, beliefs about CT use and perceived learner advantages appeared to undergo profound changes. The impact of teacher-education on teachers' beliefs about high- and low-CT activities for high- and low-advantage learners was particularly notable in the intensification of the advantage effect. In particular, early career teachers

evinced beliefs in *absolute* advantages for high-advantage learners, with any type of pedagogy – even low-CT activities – considered to be more effective for high-advantage than low-advantaged learners (effect size = .09).

In stark contrast to prospective teachers who have limited experience with educational theory and practice, preservice teacher education also appeared to impress new dance teachers with a value for, and global belief in, CT activities. Early career teachers in this sample evinced a strong pedagogical preference for high-CT activities for all learners. The results showed that early career teachers produced higher ratings of high-CT activities for low-advantage learners than controls (effect size = .08), and lower ratings of low-CT activities for low-advantage learners than controls and prospective teachers (effect sizes = .06). Moreover, the absence of a pedagogical preference in the prospective group served to highlight the largest effect (and effect size) in this study, which showed the early career group rating high-CT activities as more effective than low-CT ones for low-advantage learners (effect size = .50). This finding suggested an *absolute* pedagogical preference for high-CT activities resulting from preservice teacher education.

Dance Teaching Experience

While teacher education seemed to intensify dance teachers beliefs in early career, the accumulation of studio classroom experience and inservice training appeared to moderate the beliefs of experienced dance teachers. In short, dance teachers' beliefs in absolute differences in pedagogical approach and learner advantages, first acquired in preservice and then carried into early career, appeared to diminish with time and experience. But the core advantage and pedagogical-preference effects remained.

In pedagogical terms, experienced dance teachers appeared to retain a preference for high-CT activities and an aversion to low-CT ones. They produced significant differences in ratings for classroom activities for high-advantage students, showing preference for high-CT over low-CT activities (effect size = .17). Experience teachers also showed less support for low-CT activities for low-advantage learners than either controls or prospective teachers (effect sizes = .05). But they did not produce significant differences in ratings of high- versus low-CT classroom activities for low-advantage students. This suggested that, for experienced teachers, pedagogical approach might not matter as much for low performing students as it does for high performing ones. In the moderation of absolutist beliefs, then, experienced teachers in this sample appeared to retain a robust belief in inherent learner advantages. This conclusion was supported by the analysis of experienced teachers' ratings of high-CT activities as more effective for high-advantage learners than low-advantage ones (effect size = .12).

Changes in Dance Teachers' Beliefs

In sum, dance teachers' self-selection of their careers was associated with support for high-CT for high-advantage learners. Preservice education was associated with very strong support for any type of instruction (i.e., high- and low-CT activities) for high-advantage learners plus a very high level of support for high-CT activities for low-advantage learners. The combination of inservice education and teacher education was associated with a moderation of support for high-CT instruction for all learners – with clear preferences for high-advantage students – and only slightly reduced support for low-CT instruction for high-advantage learners.

The most profound differences among the teachers in this study (prospective, early career, and experienced) were associated with preservice training. Essential as preservice training is in the development of teaching skill, the early career teachers seemed to enter the workforce with more absolutist beliefs than other groups about the

use of CT and the power of learner advantages. With experience and inservice education, teachers' beliefs (perhaps predictably) moderated, but the influence of preservice education on beliefs about CT activities remained robust. That is, experienced dance teachers continued to believe in CT for high functioning learners, but they also continued to hold strong beliefs in high functioning learners' inherent advantages: a belief that "talent will out" regardless of instructional approach.

For teacher educators who advocate strongly for use of CT in dance and "movement approaches" in physical education (Barrett, 1997; Chen, 2002; Chen & Cone, 2003; Chen & Rovegno, 2000; Green Gilbert, 1992; Lavender, 1996; Rovegno, 1997, 1998; Sebran, 1995; Smith-Autard, 1994), the task appears to be development of educational practices that comprise the appropriate blend of high-CT and low-CT activities given different populations of learners and instructional objectives. Preservice education would seem to be a good time for interventions that promote optimal use of CT activities in the classroom.

One way to address this concern is emphasize dance teacher training that examines how deficiencies in the skills needed to teach dance (i.e., pedagogical knowledge) can pose a bigger threat to effective instruction than familiarity with the subject being taught (i.e., content knowledge). The process of learning to teach not only elucidates the basics of sound pedagogy, such as the use of CT in the dance studio classroom, but also reveals key ideas and personal beliefs about dance that engenders better teaching and learning.

But perhaps the most crucial shift needs to be in attitude. It is quite possible that beliefs and practices will change when dancers begin to view teaching, like choreography, as their work and not a second choice to creative practice. This "pedagogy as choreography" stance suggests that one of the most important tasks in higher education is to help dance students recognize that scholarly research, like choreography, is *their* work. Researching is akin to choreographing: gathering content and generating raw materials, beginning initial drafts and searching for the right (not formulaic) form and structure, making decisions about what works and why, putting the work into action (on page or onstage), with many revisions and re-envisioning throughout the process. This approach brings research to students, rather than the other way around. Perhaps if we bring the art and science of teaching to dance in this way, pedagogy as choreography, we might engender new kinds of dance, dances, dancing, and dance education.

Limitations and Future Research

Limitations are inherent in the use of cross-sectional methods and a three-factor approach to measuring learner advantages. Cross-sectional research designs do not permit the type of causal determinations one finds in longitudinal research involving a single group of participants examined over time. There are also substantial limitations in the combining of three advantage-related factors (ability, prior knowledge, and motivation) that individually may vary in influence on teachers' beliefs about CT activities. The further bifurcation of these variables (into high and low advantage) also limits the kind of analysis possible if the data were otherwise treated as continuous. Both longer-term studies and examination of the range of factors that teachers take into account in rendering judgments about CT are important goals for future research.

There may also be differences within content area and between regions. Educators who teach dance may share some characteristics with those that use a Laban movement approach to physical education, but there are important differences in teacher training and disciplinary knowledge. For example, physical education teachers learn about a vast array of physical activities, and not just dance. Teacher education for physical educators may also be required to cover some issues in more depth, such as health and nutrition, training protocols and injury prevention. It is possible that this training sensitizes physical

educators to differences in learners' abilities. There are also important differences within the discipline of dance between those that teach ballet, modern and jazz dance. This study also does not present any data of student learning outcomes with different teachers. Finally, this study was conducted exclusively in the New York metropolitan area. Replication studies in other geographical areas may produce different results.

Future research might assess how CT-demand varies between expert dance teachers – for example, those who employ one of the 4 conceptual-based models – and “experienced” ones who are similar in training and classroom experience but are not nominated as experts. Prior research indicates that experts exert higher CT-demand relative to experienced teachers; however, it remains unclear how experts compare to experienced dance teachers in differentiation of classroom CT-demand based on perceived learner advantages. Future research might well examine the extent to which experts and experienced teachers compare in manifesting the advantage effect. It is also crucial to investigate the extent to which this effect manifests itself at different levels of education, in training versus educational contexts, and in different states and countries around the world.

Despite these limitations and future research areas, studies of teachers' beliefs about CT provide useful information for teacher educators of all stripes, especially given prior research that shows experienced teachers judge high-CT activities to be more appropriate for high-advantage learners than for low-advantage ones (Radenbush et al., 1993; Torff, 2005; Warburton, 2004; Warburton & Torff, 2005; Zohar et al., 2001). For teacher educators in dance, physical education and beyond who value high-CT activities – a judgment that does not rule out low-CT activities – the key would seem to be the research and development of preservice practices that promote optimal use of CT activities for both high- and low-advantage students.

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