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Dancer perceptions of the cognitive, social, emotional, and physical benefits of modern styles of partnered dancing



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ABSTRACT

Objective: To study dancers' perceptions of the physical, cognitive, affective, and social benefits of partnered dancing.

Method: 225 dancers (71% female) were recruited through a community ballroom dance center and completed an online survey designed to measure their perceptions of the physical, cognitive, affective, and social benefits of modern, partnered dance styles (swing, Lindy Hop, and ballroom dancing). Subgroups were formed for analyses. For one set of analyses, groups based on length of dance participation were formed: experienced (dancing for more than 2 years) or novice (dancing for less than a year) dancers. For another set of analyses, groups based on frequency of dance practice were formed: committed (dancing at least one or more times per week) or occasional (dancing two or fewer times per month).

Results: The majority of participants reported perceived benefits in physical fitness, cognition, affect, and social functioning. Experienced dancers reported significantly greater self-perceived physical, social, and cognitive benefits than novice dancers. Committed dancers were more likely than occasional dancers to report improvements in physical fitness, $U = 6942$, $z = 2.38$, $r = 0.16$, $p < 0.05$. A Mann-Whitney test indicated that self-reported improvements in mood (i.e., feeling less depressed and more happy) were greater for women than for men, $U = 3945$, $z = -3.07$, $r = 0.20$, $p < 0.001$. Length and frequency of dance participation significantly predicted perceived physical benefits [$X^2(1,6) = 35.463$, $p < 0.001$, $R^2 = 0.16$] and social benefits [$X^2(1,6) = 15.776$, $p < 0.05$, $R^2 = 0.07$], but not cognitive benefits.

Conclusions: Results suggest that participation in partnered dance styles is associated with perceived improvements in physical fitness, cognitive functioning, social functioning, mood, and self-confidence, and that perceived benefits may increase as individuals dance more frequently and over longer periods of time.

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1. Introduction

A recent *meta*-analysis suggests that exercise interventions may have similar effects to drug interventions for mortality benefits in the secondary prevention of heart disease and complications associated with heart disease, thus providing an important new avenue for physical fitness as a medical treatment.²⁴ In populations for which physical exercise is challenging, such as those with chronic health problems, dance offers an option that may be deemed more

enjoyable and, thus, more sustainable over longer periods of time. For example, various forms of solo dancing have been found to be beneficial in engaging obese individuals in physical exercise and in reducing body mass index, waist circumference and body fat.^{23,27} Dancing has also been shown to improve cardiovascular parameters in hypertensive patients as well as balance and gait, thus reducing the risk of falls in the elderly and in individuals with Parkinson's.^{3,31,18,15} Partnered dancing has been found to be superior to solo dancing, in improving health-related quality of life in the Parkinson's population.¹² Moreover, when compared to Foxtrot and Waltz, partnered Argentine tango, showed the most improvement in the Berg Balance Scale, velocity of stride, and backward stride length.^{14,13} These results suggest that improvements in fitness and coordination may not be equal across all forms of dance

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and indicate that further research examining effects of more specific categories of dance is needed.

In addition to providing physical activity, dance involves emotion, social interaction, sensory stimulation, motor coordination, and music. Prior research on motivation for dance indicated that adults dance to improve their mood, fitness, self-confidence, and mastery and to socialize with others.^{20,21} This research suggests that adults expect improvements in more than just the physical domain, yet there is very little research examining perceived or objectively measured cognitive, social, or emotional improvements associated with dancing.

Several studies suggest that there are social and/or affective benefits to dance. Tortora³⁰ stated that dance might produce social benefits because it enables nonverbal cues and gestures to be expressed, possibly enhancing social interactions among children. A few studies have documented improvements in mild depression, and one study documented increased serotonin levels in adolescents.^{1,16} However, research examining the impact of a bout of ballroom dancing on mood in healthy adults indicated that mood improvements were reported by recreational dancers, but not competitive dancers, suggesting that the context of dancing is an important consideration in judging perceived benefits.³³

Prior studies have also attempted to examine relationships between dance and cognitive functioning in the elderly, with mixed results. At least two studies, involving social or jazz solo dancing found no significant cognitive differences between elderly dancers and the controls, though one study measured cognitive differences using only self-report, and the other study was based on a small sample ($N=24$) of dancers.^{2,31} In contrast, an earlier study with a large sample ($N=469$) found that dancing was one of several activities that were associated with decreased risk of dementia in the elderly.³² A recent study confirmed this conclusion, finding that a regular schedule of dancing into old age can preserve cognitive functioning (measured using performance on several objective cognitive tasks) as well as motor and perceptual abilities.¹⁸

Based on preliminary evidence supporting dance as an activity beneficial for physical and psychological health, we proposed to investigate dancers' perceptions of the physical and psychological benefits of modern partnered dance forms. In the literature, there are few studies that involve any form of partnered dancing and those that do are mostly concerned with benefits to the elderly or infirm populations rather than healthy adults. The partnered dances sparsely sampled in the literature include Argentine tango, foxtrot, waltz, and salsa, but do not include the more popular, fast-paced dances, such as Swing and Lindy Hop. Thus, our study was designed to produce the first report of perceived health benefits of modern partnered dancing styles in a group of healthy adults.

2. The present study

The objective of this study was to study the perceived physical, cognitive, affective, and social benefits of modern partnered dancing in a community sample of adults. The study was designed to address four hypotheses.

Hypothesis 1. Individuals who socially dance and/or take dance lessons will perceive benefits in physical fitness, affect, cognition, and social functioning.

Hypothesis 2. Experienced dancers will report greater benefits than novice dancers.

Hypothesis 3. Committed dancers will report greater physical fitness benefits than occasional dancers.

Hypothesis 4. Length and frequency of dance participation will predict the degree of self-perceived benefits.

Table 1
Participant Characteristics ($N=225$).

Age (in years)	
13–19	3%
20–27	15%
28–35	13%
36–47	18%
48+	51%
Gender	
Female	71%
Male	29%
Race/Ethnicity	
White, Non-Hispanic	68%
Asian	11%
Multiple Races/Ethnicities	10%
Hispanic or Latino/a	9%
Black or African American	1%
Decline to State	1%
Marital Status	
Single	45%
Married	26%
Divorced	21%
Widowed	7%
Domestic Partnership	1%
Education Level	
High School	6%
Associates Degree	9%
College	47%
Master's	25%
Ph.D.	6%
Professional Degree	7%

3. Method

3.1. Participants

Participants ($N=225$) were recruited by the Atomic Ballroom Dance Center as described in the procedures section. Seventy-one percent of participants were female ($n=160$) and 29% were male ($n=65$; see Table 1). The preferred dance styles reported were primarily swing, ballroom, and the Lindy Hop (see Table 2).

3.2. Procedures

This study was approved by the Internal Review Board (IRB) of the University of California, Irvine as a community-participatory research study. Our community partner, the Atomic Ballroom Dance Center in Irvine, California distributed the survey electronically to their dance participants. Data collection included a de-identified survey that was completed online via Survey Monkey. At the introduction to the survey, the text from the IRB-approved Study Information Sheet was provided. Instructions clearly stated that participants could choose whether or not to proceed with the survey after reviewing this study information sheet.

Emails containing the survey link were sent to the dance center's email list. The center had multiple email addresses per person, and duplicates were also sent due to enrollment in multiple classes. Thus, it is unknown the exact number of unique individuals who were approached via email. A total of 1185 of the emails bounced back, were screened as spam, or were not received as individuals had opted out of receiving emails. 3124 emails were accessed by a recipient, and the survey link was clicked on 381 times. A total of 225 surveys were completed.

3.3. Measures

A survey instrument consisting of theoretically derived items was developed for this study as the literature on the benefits of

Table 2
Dance History and Habits (N = 225).

Frequency of Social Dancing	
Once a year	2%
A few times a year	16%
Once or twice a Month	23%
Once or twice a week	39%
More than twice a week	20%
Preferred Dance Style	
Swing and Lindy Hop	43%
Ballroom	21%
West Coast Swing	14%
Salsa	9%
Country	5%
Other	4%
Argentine Tango	3%
All	1%
Preferred Dance Partner	
Friends	38%
Partner	24%
New Acquaintances	23%
Anyone	15%
Start of Dance Lessons	
Less than 6 months ago	10%
6 months to 1 year ago	9%
1 to 2 years ago	13%
More than 2 years ago	68%
Current Participation in Dance Lessons	
Never	9%
Once a year	7%
A few times a year	22%
Once or twice a Month	17%
Once or twice a week	29%
More than twice a week	16%
Dance Motivation	
To Have Fun	67%
To Improve Mood	5%
For New Acquaintances	6%
To Practice Steps	3%
For Fitness	7%
To Relax	9%
All of the Above	3%

dance did not reveal any previously validated surveys addressing the targeted domains. Items were selected based on prior theoretical and empirical research and hypothesized outcomes. Survey items are summarized in Table 3 and evaluated respondent perceptions of the physical (items 1 and 2), cognitive (items 3 and 4), affective (item 7) and social (items 6, 8, 9, 10, and 11) benefits of dance. In addition, one item (5) addressed self-confidence, which has affective, cognitive, and behavioral components. For regression analyses, items were combined to create composite scores. No composite was created for affect or self-confidence, as each was measured by a single item. Cronbach's alphas were calculated for the three composites and yielded sufficient internal consistency, with alphas of 0.78, 0.85, and 0.92 for the physical, cognitive, and social composites, respectively.

3.4. Primary analyses

We analyzed aggregate survey data using SPSS version 23. Data was first analyzed for skewness and equivalence of subgroup sizes in order to select the most appropriate statistical tests. We examined the associations between variables using several analytical approaches. First, to provide an overview of the relationships among variables, we calculated Spearman's rho correlations.

Second, to more precisely examine the relationship between length and frequency of dance participation and perceived outcomes, we formed subgroups for additional analyses. For one set of analyses, subsamples based on length of dance practice were

formed: experienced (dancing for more than 2 years) versus novice (dancing for less than a year) dancers. For another set of analyses, subsamples based on frequency of dance practice were formed: committed (dancing at least one or more times per week) or occasional (dancing two or fewer times per month). Medians and ranges were calculated for the full sample as well as for subsamples. Differences between the means of subsamples, or groups, were tested for significance using Mann-Whitney *U* Tests. Mann-Whitney *U* Tests were selected as the appropriate method of analysis as the survey used a Likert scale, and we also observed skewed distributions for many items. The effect size (*r*) is the appropriate measure of effect for Mann-Whitney *U* Tests and is equal to *z* divided by the square root of *N*; *r*'s of 0.10, 0.30, and 0.50 are considered small, medium, and large effects, respectively.¹¹

Third, to examine whether differences in frequency and length of dance participation were significantly different at each level of measurement, we used ordinal regression models to examine predictors of perceived outcomes.

4. Results

Hypothesis 1. Individuals who socially dance and/or take dance lessons will perceive benefits in physical fitness, cognition, affect, social functioning, and self-confidence.

Medians for participant perceptions of benefits are reported in Table 3. High percentages of participants agreed that dance improved physical fitness (84%) and physical coordination (92%). The majority of participants agreed that dance helped with focusing and paying attention for longer periods of time (70%), and improved their memory or ability to learn new things (82%). A very high percentage (95%) of participants agreed that dance helped improve their affect. Medians yielded moderate to high percentages of participants agreeing that partnered dance helped improve their comfort in making and keeping eye contact (80%), in meeting new people (89%), and making physical contact with others (89%). Participants reported decreased nervousness in social situations (89%) and improved social interpersonal skills (88%). Ninety-three percent of participants agreed that dance helped improve their self-confidence. A Mann-Whitney *U* test indicated that self-reported improvements in mood were greater for women (*Median* = 6.0, *Range* = 5.0) than for men (*Median* = 5.0, *Range* = 5.0), *U* = 3945, *z* = -3.07, *r* = 0.20, *p* < 0.001. There were no other significant gender differences in perceived benefits.

Hypothesis 2. Experienced dancers will report greater benefits than novice dancers.

Length of dance participation significantly correlated with physical benefits ($r_s = 0.29$, $p < 0.01$), cognitive benefits ($r_s = 0.16$, $p < 0.05$), social benefits ($r_s = 0.21$, $p < 0.01$), but not with self-confidence or positive mood (see Table 4). Experienced dancers reported significantly greater benefits in the physical, cognitive, and social domains, with effect sizes in the small to medium range (see Table 5).

Hypothesis 3. Committed dancers will report greater physical fitness benefits than occasional dancers.

Frequency of dance participation significantly correlated with physical benefits ($r_s = 0.22$, $p < 0.01$), but not with other domains (Table 4). A Mann-Whitney *U* test indicated that committed dancers (i.e., those who reported dancing at least one or more times per week; *Median* = 6.0, *Range* = 3.0) were more likely than occasional dancers (i.e., those who danced two or fewer times per month; *Median* = 5.5, *Range* = 5.0) to report improvements in physical fitness, *U* = 6942, *z* = 2.38, *r* = 0.16, *p* < 0.05.

Table 3
Participant Perceptions of Dance Classes (N = 225).

	Median (SD)	Percent who agreed ^a
1. My dance classes have helped me improve my physical fitness (e.g., endurance, weight)	5.00 (1.21)	84%
2. My dance classes have helped my physical coordination	5.00 (1.02)	92%
3. My dance classes have helped me improve my ability to focus or pay attention for longer periods of time	4.00 (1.27)	70%
4. My dance classes have helped me improve my memory or ability to learn new things	5.00 (1.21)	82%
5. My dance classes have increased my self-confidence	5.00 (1.04)	93%
6. My dance classes have helped me feel more comfortable making and keeping eye contact with someone	5.00 (1.27)	80%
7. My dance classes have helped me improve my mood (I feel less depressed and more happy)	5.00 (0.99)	95%
8. My dance classes have helped me feel more comfortable when meeting new people	5.00 (1.08)	90%
9. My dance classes have made me feel more comfortable with my physical contact from other people	5.00 (1.14)	89%
10. My dance classes have helped me feel less nervous in social situations	5.00 (1.18)	85%
11. My dance classes have helped me improve my social or interpersonal skills	5.00 (1.12)	88%

Note. Participants responded using a 6-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4 = Slightly agree, 5 = Agree, 6 = Strongly agree).

^a Reports the percentage of students who selected either "Strongly agree," "Agree," or "Slightly agree" in response to the question.

Table 4
Correlations Between Gender, Age, Dance Participation Characteristics, and Perceived Outcomes.

	Correlations							
	1	2	3	4	5	6	7	8
1. Gender								
2. Age	0.17**							
3. Dance Frequency	0.16*	0.23**						
4. Length of Participation	0.13*	0.29**	0.12					
5. Physical Benefits	-0.04	0.20**	0.22**	0.29**				
6. Cognitive Benefits	-0.09	0.17*	0.10	0.16*	0.65**			
7. Social Benefits	-0.06	-0.00	0.07	0.21**	0.53**	0.62**		
8. Self-Confidence	-0.07	-0.05	0.09	0.07	0.58**	0.58**	0.66**	
9. Positive Mood	-0.21**	-0.09	0.04	0.04	0.34**	0.41**	0.60**	0.52**

Note.

* $p < 0.05$.

** $p < 0.01$.

Table 5
Mann-Whitney U Tests of Differences Between Novice and Experienced Dancers.

Perceived Improvements	Novice Median (Range)	Experienced Median (Range)	Z	U	r	p
Physical fitness	4.00 (5)	5.00 (5)	3.90	4309	0.28	0.00**
Physical coordination	4.00 (4)	5.00 (5)	4.45	4451	0.32	0.00**
Ability to focus or pay attention	4.00 (5)	4.00 (5)	2.44	3867	0.18	0.01*
Memory & ability to learn new things	4.00 (5)	5.00 (5)	2.82	3983	0.20	0.00**
Self-confidence	5.00 (5)	5.00 (5)	0.74	3338	0.05	0.46
Comfort with eye contact	4.00 (5)	5.00 (5)	3.02	4044	0.22	0.00**
Mood	6.00 (5)	6.00 (5)	-0.09	3090	0.01	0.93
Comfort meeting new people	5.00 (4)	5.00 (5)	2.39	3841	0.17	0.02*
Comfort with physical contact	4.00 (4)	5.00 (5)	3.29	4105	0.24	0.00**
Less anxiety in social situations	4.00 (4)	5.00 (5)	2.06	3744	0.15	0.04*
Social or interpersonal skills	4.00 (4)	5.00 (5)	2.29	3812	0.16	0.02*

Note. N = 193. Experienced dancers started more than 2 years prior to the study (n = 152); novice dancers started less than a year prior to the study (n = 41). Degrees of freedom = 1. Effect size (r) = z divided by the square root of N.

* $p < 0.05$.

** $p < 0.01$.

Hypothesis 4. Length and frequency of dancing will predict the degree of self-perceived benefits.

We analyzed data using a multiple ordinal regression in order to predict perceived physical benefits based on the length and frequency of dance participation. A significant regression equation was found [$X^2(1,6) = 35.463, p < 0.001$], with an $R^2 = 0.16$. For frequency of dance, levels two (dancing a few times per year) and four (dancing one to two times per week) were significantly different from level five, or dancing more than two times per week (p 's < 0.01). For length of dance participation, all levels were significantly different (p 's < 0.01, 0.01, and 0.05, respectively).

A multiple ordinal regression was calculated to predict perceived cognitive benefits based on the length and frequency of dance participation. A nonsignificant regression equation was found [$X^2(1,6) = 9.713, p = 0.14$], with an $R^2 = 0.05$. For frequency

of dance, none of the levels were significantly different from the reference level five. For length of dance participation, only level one (dancing less than six months) was significantly different from the reference level four, or dancing more than two years ($p < 0.05$).

A multiple ordinal regression was calculated to predict perceived social benefits based on the length and frequency of dance participation. A significant regression equation was found [$X^2(1,6) = 15.776, p < 0.05$], with an $R^2 = 0.07$. For frequency of dance, none of the levels were significantly different from the reference level five, or dancing more than two times per week. For length of dance participation, levels two (dancing for six months to one year) and three (dancing for one to two years) were significantly different from the reference level, or dancing more than two years (p 's < 0.05 and 0.01, respectively).

5. Discussion

5.1. Physical benefits of dance participation

Our results suggest that dancing frequently and over a longer period of time is associated with greater perceived physical benefits (e.g., fitness, coordination), and a significant regression model indicated that 16% of the variance in perceived physical benefits was explained by the frequency and length of participation. These perceptions are consistent with prior studies,^{23,27} which documented a positive effect of solo dancing on physical fitness (reduced BMI, waist circumference, and body fat). Moreover, results from research with elderly participants demonstrated that long term social dancing improved balance and gait,^{31,14,15,2,18} which is consistent with perceptions of improved coordination and physical fitness documented in this study. Our results are also consistent with Murrock and Gary's²³ findings that a minimum of seven dance sessions were needed over an eight week period (approximately one dance session per week) to demonstrate an observed dose effect on reducing obesity. It is worth noting that the primary motivation for dancing reported by our study participants was to have fun. This is important because it seems reasonable to expect that in order for a physical activity to be sustained over the long-term, participants should perceive the activity as enjoyable.

5.2. Cognitive benefits of dance participation

We found a small correlation between length of dance participation and perceived cognitive benefits, but, contrary to our expectations, we found no significant relationship between frequency of dance participation and perceived cognitive benefits. However, cognitive benefits were correlated with age, with older participants indicating greater cognitive benefits; thus, it is possible that at least *perceptions* of cognitive benefits will be greater among older participations. Future research should examine both perceptions of cognitive benefits and objectively measured cognitive benefits across different age groups. We do not yet know if cognitive benefits themselves differ according to age, or if older dancers are simply more likely to recognize the cognitive benefits of their dance participation than dancers in their twenties and thirties.

Our regression model suggested that when examining the relationship between length of dance participation and perceived cognitive outcomes, a longer period of time may be needed than has been studied in prior research; significant differences between levels were only noted for those who had danced for less than six months and those who had danced for more than two years. Prior research has produced inconsistent results when evaluating the impact of dance on cognitive functioning. Verghese³¹ indicated that elderly participants did not improve in cognitive functioning (based on performance on several cognitive tasks) following dance training, which is inconsistent with our finding that participants perceived benefits in attention, focus, memory, and the ability to learn new things. This difference may be due to methodological (e.g., measurement, age of participants) differences between the studies. Our results are, however, consistent with prior research indicating that dancing was associated with reduced risk for dementia.³² Moreover, our findings were consistent with a study of elderly dance participants who demonstrated significant improvements in cognitive functioning (based on objective cognitive task performance) compared to a control group that did not participate in dance.¹⁸ Further study is needed to empirically test the effects of coordinative dance on cognitive functioning, as many of the existing studies, including ours, are correlational; moreover, future studies should include multi-method approaches (i.e., participant self-report measures as well as objective tests of cognitive

function) to empirically evaluate the impact of dance on cognition and specific domains within cognition, and should follow participants over a longer period of time than has previously been typical.

5.3. Affective benefits of dance participation

Participants in our study also reported perceived benefits in affect and self-confidence. Perceived improvements in affect observed in this study were consistent with prior research reporting significant improvements in mild depression for both females and males over a 12 week period of dance training,¹ although in our study, women were more likely than men to report improvements in affect. Additionally, in a study on the effects of dance movement therapy on psychological health and neurohormones, Jeong et al.¹⁶ demonstrated that dance training improved negative psychological symptoms (e.g., depression, anxiety) possibly by altering levels of serotonin and dopamine. Our study further suggests that dance may improve affect in those without depression or negative psychological symptoms. Improved perceptions of self confidence observed in our study are consistent with Muller-Pinget et al.'s²² finding that dance classes improved perception of body image and self-esteem in obese individuals who did not demonstrate significant weight loss following dance classes. Taken together, these findings suggest that dance training may be able to promote a positive self-image.

5.4. Social benefits of dance participation

Finally, our results suggest that dancing over a longer period of time is associated with greater perceived social benefits, and a significant regression model indicated that about 7% of the variance in perceived social benefits was explained by the frequency and length of dance participation. However, there were no significant differences between levels of frequency of dance participation, but there were significant differences between levels measuring length of time for dance participation. This suggests that social benefits may occur, or be more recognizable, over time.

5.5. Limitations and implications for future research

Limitations of this study included those common with online survey methods (e.g., responses may have depended on present state, thus inaccurately reflecting their complete experience; a self-selection bias in who decided to complete the survey; a low response rate), and an uneven gender distribution. Additionally, in this study we were primarily concerned with participants' self-perceptions, and, therefore, we did not collect data from other sources (e.g., ratings from family members, objective testing of physical and cognitive changes). Moreover, the study was conducted with a sample of adults who self-selected into dance intervention, and we did not examine existing psychopathology among participants or potential excessive dancing, which has been shown to be linked with mild psychopathology.^{20,21}

This study was the first in our series of planned studies to examine the social, emotional, cognitive, and physical benefits of dance. Our aim in this study was to examine dancers' perceptions in order to identify potential hypotheses about the impact of dance in various domains as part of our preliminary work in preparation for a randomized, controlled dance intervention study. Moreover, we aimed to better understand how the length of intervention and frequency of training might impact outcomes. Our findings indicate that a randomized dance intervention study is warranted. Future research should include multiple measurements, including measurements of physical fitness and body composition as well as cognitive and affective functioning, prior to the start of an intervention, during the intervention, and following the intervention to

measure changes over time and study whether improvements are maintained following termination of the intervention phase of the study. Our results suggest that certain outcomes may be more recognizable over longer periods of time, indicating that long-term interventions and follow-up are necessary to fully understand the potential benefits of dance.

6. Conclusion

Results from our study suggest that social partner dancing is associated with self-perceived positive improvements in physical fitness, cognitive functioning, social functioning, affect, and self-confidence. Sustainable, lifelong participation in physical activity is important for physical and mental health, and our results suggest that dancing is an activity that many individuals perceive as enjoyable and would willingly continue across their lifetime, particularly as they recognize benefits to their overall health and wellbeing.

Conflict of interest

None declared.

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