

Digital Doris

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Background

In January 2017, Moving Memory Dance Theatre¹ (www.movingmemorydance.com) was awarded funding to explore the possibilities of developing their digital kit, nicknamed Doris, which is used to enhance their participatory programme. As part of the project, Moving Memory approached the University of Kent School of Sports and Exercise Science and invited Ian Farr, under the supervision of Dr Samantha Winter, to evaluate the impact of Doris on the health and well-being of participants in dance-theatre workshops. Ian has a degree in Psychology, a masters in Cognitive Neuropsychology and is currently studying for a PhD at Kent. His research explores the relationship between health, behaviour and cognition, especially the effects of self-perceptions of older adults on their movements. His goal is to explain processes between age attitudes, psychological factors such as motivation and anxiety and neuromuscular mechanisms. Ian's research interests therefore align closely with Moving Memory's own interest in influencing societal views of getting older and informing healthier ageing.

Digital Doris – Dance-theatre Workshop Evaluation

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Abstract

Dance and reported wellbeing share an association which may serve to attenuate age-related functional limitations. The aim of this research was to evaluate the use of 'Digital Doris', as part of the Moving Memory dance workshops, on performers' self-concept and wellbeing. Participants (*Total number=25, Mean age=62.5 years, SD²=7.2*) attended 2 taster sessions and could subsequently join a 4-week workshop series. Positive effects of the workshop on physical self-perception and age-based stereotype threat were identified. Additionally, associations between physical self-perceptions and exercise self-efficacy and self-esteem were also identified. Qualitative analysis also suggested that Digital Doris provided benefits to group identity and self-esteem. Directions for future research with Moving Memory are proposed.

¹ Moving Memory's practice involves a unique combination of creative movement, dance and theatre which can be understood as, and compared with, dance

² Standard deviation

Introduction

Older adults' quality of life is inherently linked with physical activity (BMA, 2016). To promote active aging, the World Health Organisation emphasises the value of participation in 'social, economic, cultural, spiritual and civic affairs' (WHO, 2002). For example, meta-analyses have identified benefits for older adults through dance in terms of aerobic power, lower body muscle endurance, strength and flexibility, balance, agility, and gait, as well as reducing cardiovascular risks (Keogh, Kilding, Pidgeon, Ashley, & Gillis, 2009). Furthermore, the benefits of participation are not limited to physical outcomes; participation in a 14-week exercise group improved older adults' subjective wellbeing, for example. Moreover, these psychological benefits may also play a crucial protective role against functional limitations (Matarasso, 1997; McAuley, Szabo, Gothe, & Olson, 2013). For example, declines in older adults' psychological health are associated with declines in physical health (Garatachea et al., 2015).

In line with these research findings, The Department of Health has recommended participatory dance interventions, as they have been shown to not only improve balance and falls outcomes, enhance wellbeing, but also to improve cultural identity and foster communities, as well as enrich quality of life (Department of Health/Dance South West, 2011). Of particular note, from a 12 week dance programme consisting of 23 sessions, 111 participants between age 60-75 showed marked improvements in cognition, 6-minute walk test, Timed Up and Go test, lower limb endurance, as well as resting heart rate and other medical outcomes (Hui, Chui, & Woo, 2009).

McAuley et al. (2013) posit that some of the psychological benefits associated with physical activity may be mediated by self-efficacy. Self-efficacy is the confidence an individual has in their ability to perform a task (Bandura, 1977). McAuley et al. (2013) assert that the relationship self-efficacy shares with physical activity is reciprocal, such that one propagates the other. Highlighting this important function, Seeman et al. (1999) used longitudinal data to identify that weaker self-efficacy for activities of daily living for older men and women predicted functional status decline as measured by the Nagi Performance Scale. Of course, because of the reciprocal relationship between physical health and self-efficacy (McAuley et al., 2013), self-efficacy in this study may simply reflect poorer baseline functional status and therefore be predictive of functional decline. However, crucially, Seeman et al (1999) controlled for underlying functional ability and consequentially emphasise the role self-efficacy plays in preventing functional limitations. These findings are corroborated in research by McAuley and colleagues (2005) who evidenced indirect effects of physical activity and self-efficacy on self-esteem indices. Moreover, they identified longitudinal relationships between initial self-efficacy and physical activity with subsequent activity and efficacy measures, therefore underscoring the crucial interplay between physical activity and psychological factors.

Additionally, self-concept is crucial in health-related behaviour change in relation to engagement with physical activity (Strachan, Brawley, Spink, & Glazebrook, 2010). Specifically, previous physical activity involvement was shown to be a key predictor in physical activity identification. Importantly, high identifiers were associated with proximal goal setting behaviour and higher life satisfaction. Extending these results and supporting the positive impact on self-concept from physical activity, in a quasi-experimental design, participants' body self-concept and subjective wellbeing was improved following a 14 week exercise program (Stoll & Alfermann, 2002). Additionally, in interviews with 15 men and women over 70 years the importance of considering all aspects of the 'thinking, feeling, reflective self' be considered, as opposed to the body as an object, in order to facilitate older populations becoming more active (Grant, 2001). In conclusion of these studies, it is apparent that maintaining or developing an older adult's physical self-concept is crucial in preserving not only physical health or psychological health, but in creating a virtuous cycle between the two.

Participatory arts have been shown to support individuals' physical and emotional wellbeing. Greaves (2006) identified that 'participant-determined programmes of creative, exercise and/or cultural activities, with an emphasis on social interaction' developed physical self-efficacy and reduced symptoms of depression in socially isolated older adults. Crucially, the intervention showed the dance workshops to operate as a vehicle for social inclusion. The psychological advantages that a physical and social activity such as dance has upon an older adults' wellbeing is further evidenced by Robertson & Pelclova (2014). Using a mixture of qualitative and quantitative methods, the researchers posit that dance enables rekindling memories of youth and reconnects individuals to their history, and that of youthful identity. This is a critical function, as an individuals' self-concepts are shaped by past experiences, and the groups to which individuals categorise and identify themselves (Hogg & Reid, 2006; Tajfel & Turner, 1979; Turner & Oakes, 1986). Additionally, social support and social integration may be more predictive of underlying health than behavioural risks such as smoking and obesity (Haslam et al., 2018). Therefore, building a social group which connects with a functionally able and physically-active self-concept is likely to stimulate physical activity and psychological wellbeing, which will fuel the prosperous cycle between these facets of health and ultimately result in improved health outcomes (Stoll & Alfermann, 2002; Strachan et al., 2010).

As part of their creative movement workshops, Moving Memory Dance Theatre Company (MMDTCO) and digital artists, Butch Auntie (www.butchauntie.com) created Digital Doris - software that projects a transient image which performers can interact with. Doris supports dance activities including warm up-exercises, improvisation and choreographic composition. It encourages creative engagement and enables learning and feedback by playback of dances. Additionally, the workshops are thematically grounded in autobiographical expressions, which further connects individuals with their history, and that of a youthful identity - what the company term, 'storytelling via the body'.

The aim of this study is to ascertain the interactions between engagement with a programme using Digital Doris and individuals' physical self-concept, perceptions of age, and their overall view of self-worth. Specifically, it is predicted that involvement in the Moving Memory dance workshops, supported by Digital Doris, will 1) positively impact older adults' physical self-perception 2) reduce stereotype threat, and 3) increase their confidence in their ability to continue a programme of dance.

Method

Participants

Participants were twenty-five performers over 50 years old (Mean age=62.5 years, SD=7.2) attending a dance workshop (MMDT, University of Kent, Canterbury, UK). Participants attended a taster workshop (n=20, mean age=61.2, SD=6.8) and were invited to join existing members of the company for a 4-week workshop series (n=15, mean age=63.8, SD=7.6). Initially, no end-purpose for these workshops was stated but, in practice, the group made a short, public performance which was video-recorded. Participants were free to engage in the workshops, without participating in the study. Those who participated gave informed consent following University Sport and Exercise Science Ethics Board guidelines.

Procedure

The study comprised four measurement time-points, at the start and end of both the taster and 4-week series. At each time point, participants completed 5 questionnaires to investigate their attitudes about age identity, physical self, and self-esteem. Finally, an ad hoc, informal focus group was conducted and video-recorded after the performance to obtain qualitative feedback regarding attitudes of group membership in relation to physical self-perception and well-being.

Age

Age identification and age categorisation were taken using two indices as per the European Social Survey (2008). The scales depend on individuals' subjective interpretation of the age identity and age category, rating from very young to very old. Additionally, actual age (both groups) and subjective age (performance workshop only) were reported as whole numbers.

Stereotype threat

Aronson and Steele's (1995) scale for measuring racial intelligence stereotypes was adapted for use with age stereotypes of physical activity and included items such as "In physical activity people of my age often face biased evaluations". Ratings of agreement of the 5 items were by 7-point Likert scale. Due to the small number of items of this scale, scale score reliability was not conducted for this measure (Tabachnick & Fidell, 2006).

Self Esteem

Self-esteem was measured using Rosenberg's Self Esteem ten-item (Rosenberg, 1965). Items included statements such as "I wish I could have more respect for myself". Participants rated agreement/ disagreement with the statements using a 4-point scale. Cronbach's alpha showed strong scale score reliability ($\alpha = 0.89$).

Exercise Self-Efficacy

The belief in their own ability to continue the dance workshop for a sustained period of time was measured using the Exercise Self-Efficacy Scale and required participants to rate their confidence in completing various durations of the programme from 0% (not at all confident) up to 100% (completely confident in their ability). Cronbach's alpha showed very strong scale score reliability ($\alpha = 0.96$).

Physical Self-Perception

Participants' self-reported physical identity was measured using the Physical Self-Perception Profile (Fox & Corbin, 1989). This asked participants to identify with one of four statements for each of thirty items comprising four subdomains: bodily attractiveness, sports competence, physical strength and physical conditioning. Participants rated the statement that they felt was most true for them, e.g. "Some people are not very confident about their level of physical conditioning and fitness vs others always feel confident that they maintain excellent conditioning and fitness". Due to the lack of strong evidence for the multidimensionality of the scale, the aggregate score was used as the measure of physical self-perception. This showed very strong scale score reliability ($\alpha = 0.92$).

Statistical Analysis

To test for assumptions of normative distribution, box plots and Shapiro Wilk tests were employed. Common cut-off points ($3 > SD, p < .005$), were used for assessing distribution (Tabachnick & Fidell, 2007).

The two taster sessions were not predominantly the same people (0.4 of sample in both initial and final sessions). Pairwise deletion of repeated cases would be typical in such data, and therefore use only statistically independent data. However, this would potentially discard useful data and limit the subsequent inferences for this study. Therefore, initial and final sessions within the taster workshops were treated as independent samples for this purpose, with acknowledgement of this statistical limitation. Independent *t*-tests were conducted across the initial and final taster sessions and also between the initial taster session and the final performance workshop. The data were treated as age-matched pairs within the performance programme at the beginning and end sessions of the workshop, whereby missing values were filled with mean values for the session. As such, repeated measures *t*-tests were conducted between the initial and final performance workshop.

Correlations were conducted across measures to identify relationships between physical self-concept and physical activity self-efficacy, and self-esteem before and after the dance workshops.

In order to gain an understanding of the experiences of the participants, thematic analysis was applied to the focus group transcripts (Braun & Clarke, 2006). Thematic analysis is a qualitative technique that allows researchers to identify common and shared ideas across participants, and has been commonly used in similar health and age related research (Jancey et al., 2007; McAdams, St Aubin, & Logan, 1993).

Results

Quantitative Data

Differences were found between initial and final sessions of the performance workshops for stereotype threat ($t(11)=2.457$, $p=0.032$), and physical self-perception ($t(11)=2.569$, $p=0.026$). No other significant findings were identified between sessions in either workshops. Hypothesised correlations between physical self-perception, and exercise self-efficacy ($r(31)=0.578$, $p=0.001$), and self-esteem ($r(32)=-0.361$, $p=0.042$) were supported. Age identity was correlated with stereotype threat ($r(30)=-0.390$, $p=0.033$), demonstrating that as individuals identified with an older age, they experienced more stereotype threat. Interestingly, a similar correlation was not identified with actual age ($r(31)=-0.249$, $p=0.177$).

Qualitative Data

The focus group revealed several emergent themes based on the dance workshops. The development of a positive group identity was a key message that many performers voiced. This is epitomised by reflections of “sense of belonging” which could not be achieved through solo dancing. Age identity reflected the distinctiveness of the group and enabled a positive social comparison versus dance classes “full of teenagers”. Additionally, the group was seen as having a more positive status when compared to dance classes that are all about “standing behind someone and copying them” and which focussed on “fitness and clapping” and did not enable “freedom and creativity”.

The group was recognised as being “collaborative” by working toward a shared goal, illustrating the social function of the final performance. Indeed, performers recognised the value of each other, and of the group “you get so much out of someone else’s idea”, and while “you know you have had an opportunity to contribute”, ultimately success was attributable to the group. This end goal did not replace or detract from intrinsic motivation however, “I enjoy the creative process...it’s not focussed on the performance for me” and performers felt they “can just let go”. This reflects the flow state that performers achieved, a sign of joy, characterised by loss of self-consciousness and high intrinsic motivation (Csikszentmihalyi, 1991). This is epitomised in one performer’s statement “I love doing this”. This reflects the paradox of control in flow states defined as a lack of worry about losing control, and as such self-concerns about one’s age were not apparent. Additionally, the “creative process” allows people “to put [their] ideas in and other people go with it”, which reflects the value of autonomy, which is associated with self-esteem (Deci & Ryan, 1995).

Crucially, performers responded in favour of the creative “stimulus” of Digital Doris, and recognised the facilitation provided by the tool and this stimulus enabled the flow states to be achieved, “I don’t need to think about technique, I can just use my body [to respond to those stimuli]”. Again, this reflects the flow state that was able to be achieved by using the technology.

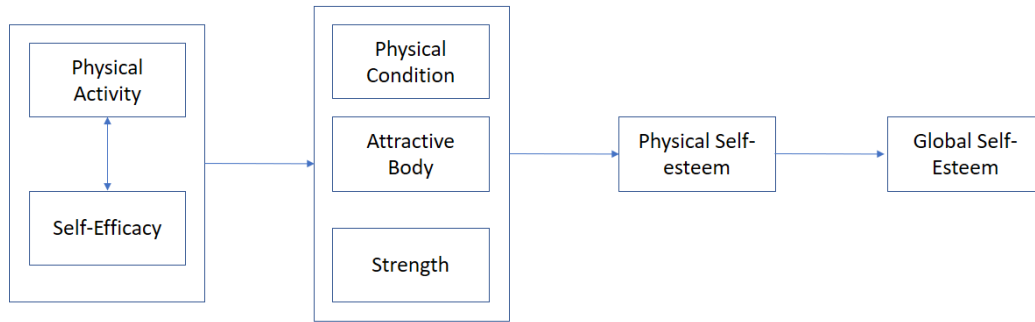
Discussion

The aim of the study was to investigate self-concept and wellbeing as a result of the Moving Memory dance workshops using Digital Doris. Primarily, the research supports the advantage of Digital Doris in Moving Memory dance workshops and highlights the beneficial impact of the continued involvement in the workshops on physical activity identity and also on measures of wellbeing. Physical self-concept is inherently associated with mental and emotional benefits

(Sonstroem, 1998), and may serve to protect against functional limitations. These findings are supported by the improvements from involvement in the dance workshops on physical-self and in global psychological wellbeing. Indeed, findings from previous research was corroborated in correlations between physical identity, physical self-efficacy, and self-esteem. This is a particularly relevant result as participation in the workshops had been found to improve performers' physical self-perception, which in turn is associated with the aforementioned psychological factors. Were the study to use a larger sample then it is expected that the benefits of the workshops on self-efficacy and self-esteem would have also been elucidated statistically. As such, these factors warrant further investigation. In terms of age identity, the relationship between age-identity and stereotype threat reinforces the importance of subjective age in regards to perceptions of how others see themselves. This result is especially pertinent as the association with experiences of threat was found to be stronger in subjective than chronological age. Such conclusions are supported by previous findings whereby in order to cope with negative stereotypes, dissociation from one's own age group ultimately leads individuals to identify with younger age groups (Weiss & Lang, 2012). However, further associations between subjective-chronological age differential and stereotype threat was not garnered in the current research, and so warrants further attention.

The additional finding of reductions in experiences of age-based stereotype threat in the performance workshop group is pertinent. Ageism and stereotype threat have been shown to reduce physical performance measures such as hand-grip strength (Swift, Lamont, & Abrams, 2012), gait speed (Hausdorff, Levy, & Wei, 1999), and overall physical function (Levy, Pilver, Chung, & Slade, 2014). The finding that a reversal of threatening experiences through use of Digital Doris as part of the Moving Memory dance workshops is noteworthy; it highlights that the *perception* of others' attitudes of an individual's age and physical self can be changed through physical activity. Additionally, a long-term consequence of stereotype threat is withdrawal from the stereotyped domain. After the fourth decade of life, the importance of physical activity increases significantly in order to maintain neuromuscular function (Metter, Conwit, Tobin, & Fozard, 1997). Therefore, challenging stereotype threat is a vital task to ensure the engagement in physical activity and consequentially maintain physical health in later life. This research shows that the Moving Memory dance workshops supported by Digital Doris positively impact this key issue.

Due to the correlations of self-efficacy, self-esteem, physical self-perception it is possible to conclude from this research that there are important associations between how someone sees themselves and how confident they feel in their ability to carry out physical activities. Such conclusions are synonymous with findings in established research (McAuley et al., 2005), whereby interactions between self-efficacy and physical activity contribute to physical self-perception and self-esteem downstream. This research did not directly support the direction of these relationships but did corroborate that the relationships exist. Additionally, high physical activity self-efficacy has been shown to predict engagement with physical tasks (Strachan et al., 2010). Therefore, reductions in self-efficacy may explain withdrawal that are associated with stereotype threat (Swift, Abrams, Lamont, & Drury, 2016) and therefore serve to protect against functional limitations associated with age. Importantly, these relationships have been influenced by the Moving Memory workshops through impacting physical self-perception.



Adapted from McAuley (2005)

Furthermore, it worth noting that there was very little attrition in the group, so it is suggested that this shared goal bolstered social cohesion and consequential self-concept measures. As shared goals increase social cohesion and produce perceptions of positive group status, it is understandable that self-perception questionnaires and qualitative feedback converged on this in the performance workshops.

In terms of the measures used, all were found to have overall reliability. However, some performers reported that they found the physical self-perception profile challenging to compete as they did not consider dance a sport. Nevertheless, the reliability of the PSPP was endorsed statistically and therefore remains an appropriate tool. However, future research may consider alternative measures, or removal of this subsection. Additionally, the focus group was included in the research ad hoc. More rigorous scrutiny may be expected if this was not the case. Regardless, key emergent themes of group identity and the relationship between identity and self-esteem from the focus group were supported in the quantitative data. Additionally, the focus group evoked themes of flow states and intrinsic motivation which were not measured by questionnaire, but do have well evidenced associations with happiness and reductions in anxiety (Csikszentmihalyi, 2014), and increased perceived control and self-esteem (Deci & Ryan, 1995) respectively.

The research was limited by overall sample size and it is recommended that future work is taken in to address this in order to ascertain the impact of using Digital Doris in the dance workshops. That is, while physical-self and stereotype threat were positively impacted by the work, which in turn correlated to other measures of psychological wellbeing and self-worth, a direct effect on these measures over the time course was not identified statistically. It is suspected that additional data points would enable the direct effect of Digital Doris as part of the Moving Memory workshops to be evidenced. Additionally, while not recorded, it is apparent that the workshops attracted a typically white and female sample. This may be reflective of the geographical demographic, or gender stigmatization towards dance activities. However, there is no apparent research suggestive that dance benefits are exclusive to a specific ethnicity or gender demographics, so outreach to engage otherwise untapped groups is recommended to maximise the benefits of Moving Memory. On this note, participants' average age was lower than that of national retirement, and so caution must be exercised in terms of the generalisability of these findings until further research can be carried out.

To ascertain whether the impact of the workshops was because of using the Digital Doris or because of the Moving Memory dance workshops, a control group would be recommended to run concurrently that did not use the interactive media. However, because of the numbers involved in this study, this would have been neither practically nor statistically efficient. In this vein, there was also no control for additional activity taken part in outside of the workshops. This was not recorded

because of practical limitations in ensuring performers did not tire of completing questionnaires but would have strengthened the control of extraneous variables in this research.

It is important to note that while the dance workshops improved physical self-concept, it was not the intention for this study to investigate associations of self-perception with subsequent physical functionality. Measures of physical performance completed before and after the workshop programme would allow for the impact of the workshops to be quantified in terms of physical functionality. Due to the importance of social integration (Haslam et al., 2018), self-concept (Strachan et al., 2010) and well-being (Netz, Becker, Tenenbaum, & Wu, 2005) to physical functionality in later life it is therefore suggested that future attention be directed towards the relationship between physical self-concept, social identity, and physical function in Moving Memory workshop participants.

Overall, the study has shown the fundamental impact that Digital Doris has in terms of developing positive group identity, improving physical self-concept, and reducing perceptions of ageism. The associations that these factors have with additional factors of wellbeing has also been established. Together, these factors are key in developing effective routes towards active aging (Swift et al., 2016). Additionally, participatory arts can promote social inclusion (Greaves, 2006), which has been shown to predict underlying health more effectively than traditional behavioural risk prediction models (Haslam et al., 2018). The Moving Memory dance workshops, using Digital Doris, offer an alternative to other forms of physical activity, which is non-prescriptive, creative, and autobiographical. Ultimately the development of positive social identity, self-concept, and quality of life is evident.

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