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What are the associations between extroversion, enjoyment, and wellness in group vs non-group physical activity? A pilot study.

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ABSTRACT

Objectives: One issue regarding prescription of physical activity (PA) is adherence, with enjoyment being shown to be a factor, and extroversion being associated with enjoyment. Furthermore, anecdotal evidence suggests that PA as part of a group yields superior levels of enjoyment than non-groups, however this has not been explored to date. It is the purpose of this study to explore associations between enjoyment and extroversion in group vs non-group PA.

Methods: 17 subjects were recruited and randomised into two groups: 'group' and 'non-group'. 'Group' subjects walked for 30-minutes for 5 consecutive days as part of a pair, and 'non-group' subjects doing the same intervention alone. All subjects completed two surveys, one pre-intervention measuring extroversion using the Goldberg Transparent Bi-Polar Inventory and wellness using the Warwick-Edinburgh Mental Well-being Scale. The post-intervention survey measured wellness and enjoyment of the intervention using the Physical Activity Enjoyment Scale. A pedometer was also worn.

Findings: The multiple regression model statistically predicted enjoyment ($F(7,7) = 15.168$, p=<0.001,adj.R^2=0.876), with only sub-group type and wellness levels adding significantly to the prediction (p=<0.05). Moreover, the 'group' sub-group took significantly more steps than the 'non-group' sub-group (18,395 vs 13,168; p=<0.001).

Conclusions: Wellbeing and sub-group type were predictors of enjoyment. Furthermore, subjects who walked in pairs took more steps than subjects who walked alone. Practitioners should consider prescribing PA as part of a group to yield higher enjoyment levels and higher levels of activity. Due to the small sample size, further study is needed with more subjects.

KEYWORDS

Physical Activity; Personality; Extroversion; Enjoyment; Group; Non-group.

1. INTRODUCTION

Physical inactivity (defined as not meeting physical activity guidelines) is well associated with a variety of health issues. Health practitioners commonly prescribe physical activity (PA) as a means of prevention [1], alleviation of symptoms [2], and cure [3] for some of these issues. One of the challenges that faces health practitioners is that of adherence [4], with around 50% of adults failing to adhere to a PA program within the first six months [5].

There is evidence to suggest that enjoyment is a factor in the motivation behind PA [6], with one study suggesting enjoyment as the largest motivating factor for exercise, with the 'social aspect of PA' also being a significant motivator [7].

Furthermore, significant positive associations between exercise enjoyment and exercise adherence have been reported in several population groups [8–10].

Moreover, personality traits have been consistently associated with enjoyment; several studies have found significant positive associations between extroversion and enjoyment, albeit in a non-PA setting [9,11].

It is well established that group-based PA interventions can yield significant health benefits, including increases in strength and mobility [12], decreased risk of falls in the elderly [13], and increased positive affect [14], and there is some anecdotal evidence suggesting that there are multiple benefits of exercising as part a group over exercising alone [15]. Few studies, however, have compared group vs non- based group- PA interventions.

The purpose of this pilot study, therefore, is to explore associations between extroversion and exercise enjoyment within a PA intervention conducted in a group vs conducted alone. A secondary aim of this study is to determine whether or not wellbeing and total steps was affected by the types of PA intervention.

2. METHODS

2.1. Procedure

Ethical approval was granted by the Anglia Ruskin University Institutional Ethical Panel for this study. Healthy adults (>18) were recruited to take part via online advertisements and completed an online survey, which included a measurement of extroversion, wellbeing, age, height, and weight. Subjects were then randomly allocated (according to BMI, sex, age and extroversion levels) to either 'group' or 'non-group' sub-groups. All subjects were asked to take a brisk walk for 30mintues, for 5 consecutive days, as recommended by the UK Department of Health [16]. Subjects in the 'group' sub-

group were assigned another subject to always walk with, so that they were in the same pairs for every walk. Subjects in the 'non-group' sub-group were asked to complete the walk alone. During the walk, all subjects wore an Omron Walking Style Pro pedometer [17] so steps could be recorded. Within 24 hours of the final walk, all subjects completed a second questionnaire, which repeated measurements of wellbeing, and measured enjoyment of the intervention. Figure 1 shows a schematic of the full intervention process:

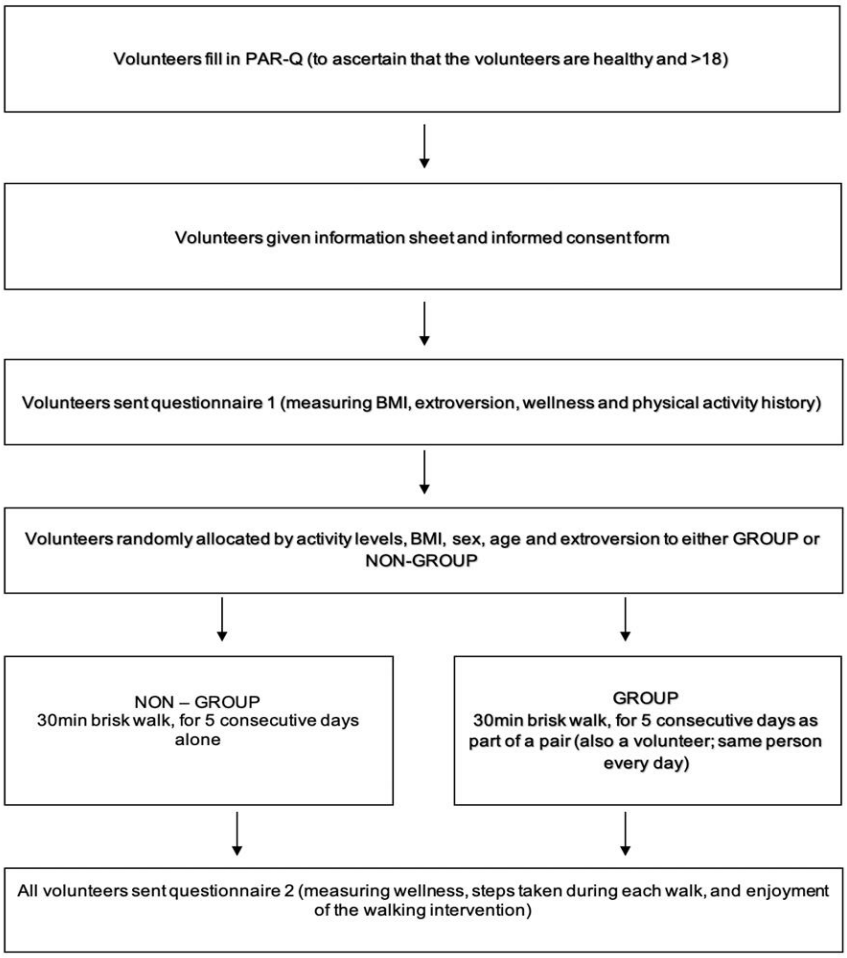

Figure 1: Schematic showing procedure of study

2.2. Measurements

2.2.1 Personality

Extroversion was measured using the extroversion section of the Goldberg transparent bi-polar inventory (TBPI) (18). This survey comprises of six questions on a six-point Likert scale, with mutually opposing statements at either end of the scale (strongly agree at one end to strongly disagree at the other end). Extroverted statements are scored higher than the mutually opposing introverted statements, and the total score is used to determine extroversion level, with 36 being the most extroverted and 6

being the least extroverted. This method has been validated by several authors across several population groups, showing good content validity and test-retest reliability [18,19].

2.2.2 Wellbeing

The Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) [20] consists of 14 positively phrased Likert-scale questions, designed to measure both hedonic and eudaimonic aspects of mental wellbeing [21]. Scores range from 14 to 70, with higher scores indicating greater levels of mental wellbeing. The WEMWBS reports good content validity (α =0.89) and test-retest reliability (0.83). Several authors have also validated this measure across several adult populations [22–25].

2.2.3 Steps

Steps were counted using Omron pedometers, worn at the hip as per manufacturer's instructions (17). These pedometers have been well validated across several population groups [26,27].

2.2.4 Enjoyment

Enjoyment was measured using the Physical Activity Enjoyment Scale (PACES) [28]. PACES consists of 18 questions on a 7-point bi-polar Likert scale, with mutually opposing statements on each end. Scores range from 18 to 126, with higher scores indicating greater levels of overall enjoyment. PACES has been validated in several adult population groups [28–30].

2.3 Data Analysis

All data was analysed using IBM SPSS [31]. Primary data analysis was a multiple linear regression analysis to predict enjoyment from intervention type, age, BMI, sex, wellbeing, and extroversion levels. Mean scores of intra-intervention group variables were compared via a paired samples t-test.

Pre vs post intervention WEMWBS was compared using a paired samples t-test, to ascertain whether wellbeing was affected by intervention, with differences compared via an independent samples t-test. Inter-group total steps were compared via independent samples t-test.

3. RESULTS

3.1 Sample characteristics

A total of eighteen subjects (7 males and 11 females) volunteered for the study, which yielded seventeen completed full sets of data (mean age = 38.06 SD = 9.77), with one drop out (the subject reported a previously undisclosed mental illness during the intervention). Mean BMI was 23.09 (2.78).

Mean total extroversion scores were 27.82 (SD = 6.4). Mean wellbeing scores were 49.41 (7.97) and 51.53 (9.84) for pre-intervention and post-intervention, respectively. Mean enjoyment score was 89.47 (10.76). Table 1 shows complete descriptive statistics:

Table 1. Descriptive Statistics of subjects

Variable	Minimum	Maximum	Mean	SD	Cronbach's α
Age	22	57	38.06	9.77	
BMI	17.59	27.16	23.09	2.78	
Total TPBI	18	36	27.82	6.4	0.85
WEMWBS pre intervention	35	61	49.41	7.97	0.90
WEMWBS post intervention	33	70	51.53	9.843	0.95
PACES	68	107	89.47	10.759	0.91

3.2 Primary results

A multiple regression was run to predict enjoyment (PACES) from gender, age, weight, wellbeing (WEMWBS), and extroversion levels (TPBI). The multiple regression model statistically predicted enjoyment, F(7,7) = 15.168, p = <0.001, adj. R2 = 0.876. Intervention group and wellbeing were the only variables to add statistically significant results to the prediction, p = <0.05. Regression coefficients, standard errors and 95% CIs can be found in Table 2 (below):

Table 2. Summary of multiple regression analysis.

Variable	*B*	SE_B	ß	*95% CI*	
Intercept	19.786	27.149		-44.411	83.984
Group	8.63	3.38	0.384*	0.637	16.623
Sex	-11.832	5.631	-0.537	-25.148	- 1.483
Age	-0.135	0.271	-0.106	-0.776	0.507
BMI	0.995	1.022	0.238	-1.422	3.412
Extroversion	0.233	0.225	0.130	-0.3	0.766
Wellness	0.978	0.215	0.647*	0.47	1.486
Total steps	0.00	0.001	-0.56	-0.002	0.002

Note: *p = <0.05 *B* = unstandardized regression coefficient; SE_B = standard error of the coefficient; ß = standardized coefficient, 95% CI = 95% Confidence Interval

An independent-samples t-test was run to determine if there were differences in PACES score and total steps between the 'group' and 'non-group' interventions. Data are mean ± standard deviation, unless otherwise stated. PACES scores were lower for the 'non-group' (85.63 ± 12.282) than the 'group' (92.89 ± 8.462) intervention, a non-statistically significant difference of -7.264 (95% CI, -18.056 – 3.528), t(15) = -1.435, p= 0.172, d= 0.69. Total steps were lower for the 'non-group' (13168 ± 3426.86) than the 'group' (18395.7 ± 1517.54) intervention, a statistically significant difference of -5227.52 (95% CI, -7910.06 - -2544.99), t(15)= -4.154, p= <0.001, d= 1.97. Figures 2 and 3 show these differences graphically:

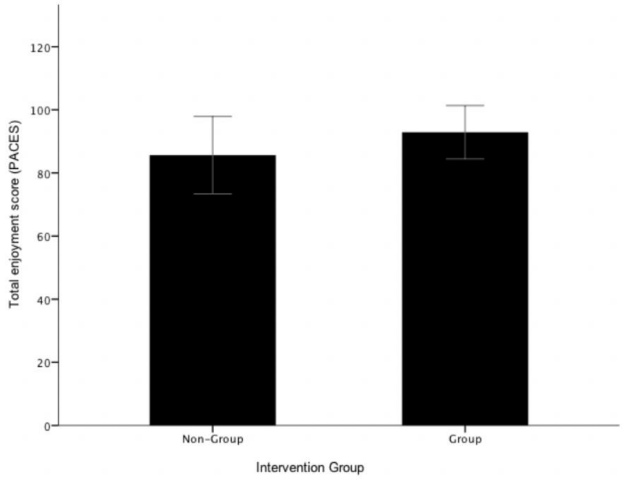

Figure 2. Mean results for PACES (non-significant)

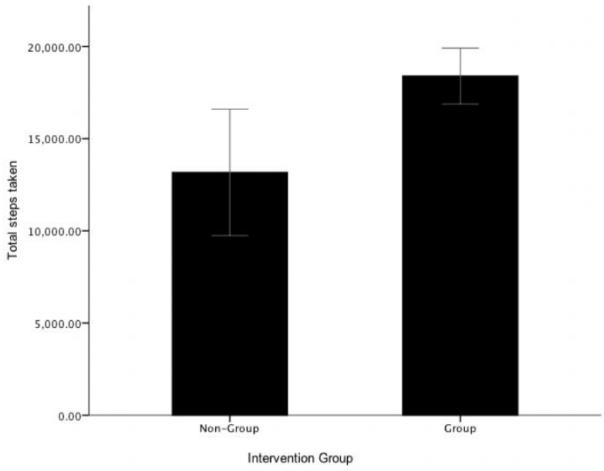

Figure 3. Mean results for total steps (significant difference p=<0.001)

Wellness pre vs post-intervention

A paired-samples t-test was used to determine whether there was a difference between WEMWBS scores pre vs post-intervention, in each sub-group. In the 'group' sub-group, subjects scored higher in the post-intervention WEMWBS (55.88 ± 9.746) than the pre-intervention WEMWBS (52.5 ± 6.676), an increase of 3.375 (95%CI, -1.699 - 8.449), however this failed to reach a level of statistical significance t(8)= 1.573, p=0.16, d= 0.56. In the 'non-group' sub-group, subjects scored higher in the post-intervention WEMWBS (47 ± 9.008) than the pre-intervention WEMWBS (46.88 ± 8.919), an increase of 0.125 (95%CI, -4.28 - 4.03), however this failed to reach a level of statistical significance t(7)= 0.071, p=0.945, d=0.03.

4. DISCUSSION

The primary aim of this pilot study was to explore associations between extroversion and enjoyment in group vs non-group PA interventions. The multiple regression showed that extroversion failed to be a significant predictor of enjoyment, with being part of the 'group' subgroup and having higher levels of wellness predicting higher enjoyment scores. Furthermore, subjects who walked as part of a group took significantly more step than subjects who walked alone.

These results suggest that, in this sample, there is no difference in enjoyment between subjects who are more extroverted, regardless of whether or not they are conducting PA alone or as part of a group. These results concur with Lochbaum and Lutz [32], who did not find statistically significant associations with enjoyment levels and extroversion in a 30-minute bout of step aerobic exercise. They did, however, expect to find a statistically significant association, mainly because extroversion has been consistently associated with positive emotional experiences [33].

The overall null results from this study regarding extroversion are not in agreement with several studies that have found significant associations between extroversion and enjoyment, albeit in a non-PA setting [9,11]. Watson and Clark [33] measured associations between positive affect and extroversion using the TPBI in their cross-sectional study of 'college-aged' American students, (n=1317), and found similar effect sizes to the current study (Watson and Clark=0.58 vs 0.542 and 0.417 for the current study), indicating that the null results from this study could have been because of a lack of subjects.

Being part of the 'group' subgroup was also a significant predictor of enjoyment, which adds quantitative evidence to the anecdotal evidence suggesting that conducting PA in groups could be more enjoyable than conducting PA alone. One possible explanation for this is that humans prefer to be part of a group than alone in several social situations [34,35]. Being part of a social group has also been shown to decrease all-cause mortality [36]. This data is suggestive that practitioners prescribe PA interventions as part of groups, rather than alone. Further studies are required to refute or confirm this. A significant, albeit unintended, finding of this study was the strong, statistically significant, linear relationship between wellbeing and enjoyment. This indicates that subjects with higher wellbeing scores are more likely to enjoy the intervention than subjects with lower scores. This is in agreement with the literature surrounding the general descriptions of wellbeing. The UK Department of Health [37] states that (subjective) wellbeing includes positive affect, of which enjoyment is a component. This finding is, therefore, unsurprising and provides further quantitative data to support this definition of wellbeing.

The 'group' sub-group took significantly more steps than the subjects that were part of the 'alone' sub-group, which is broadly in agreement previous research. For example, Boles [38] found, in his analytical cross-sectional study of walking paces vs group size (n= 96), that people who walk alone are significantly slower than those walk within a group, with Costa [39] finding, in an analytical cross-sectional study of 2544 subjects, that group size is not a predictor for walking speed. The evidence from these studies (including the current study) suggests that walking speed may be affected by whether or not you are alone or in a group, but the size of the group may not matter. If groups of people walk faster than non-groups, then it would be beneficial to recommend that PA walking interventions be conducted as part of any size group, rather than alone. This would mean that the subjects would walk faster, and therefore work harder and yield more benefits from PA.

One limitation to this study is the small sample size. This, however, was a pilot study and the results do indicate that future, larger studies in this area would yield significant results. A further limitation regarding the measuring of personality traits is that only one of the five personality traits were measured, meaning that a comprehensive exploration on personality traits and their connection to enjoyment and group PA was not possible. Furthermore, there was no control group in this study. Despite these limitations, the novel findings of this study, and its intervention study design, warrants further research in this area.

5. CONCLUSIONS

These results suggest that conducting a 30-minute walking intervention for 5 consecutive days as part of a group yields superior benefits than conducting the same intervention alone, with extroversion levels not influencing these. These benefits include higher levels of enjoyment and more total steps being taken. The small sample size should be taken into consideration, yet the results from this study warrants further exploration in further studies.

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AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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