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Published in:

Scandinavian Journal of Psychology

DOI:

[10.1111/sjop.12334](https://doi.org/10.1111/sjop.12334)

Publication date:

2017

Document version

Final published version

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Citation for pulished version (APA):

Roessler, K. K., Bramsen, R. H., Dervisevic, A., & Bilberg, R. M. (2017). Exercise based interventions for alcohol use disorder: A comment on motivational aspects of participation. *Scandinavian Journal of Psychology*, 58(1), 23-28. <https://doi.org/10.1111/sjop.12334>

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Health and Disability

Exercise based interventions for alcohol use disorder: A comment on motivational aspects of participation

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Roessler, K. K., Bramsen, R. H., Dervisevic, A. & Bilberg, R. (2017). Exercise based interventions for alcohol use disorder: A comment on motivational aspects of participation. *Scandinavian Journal of Psychology*, 58, 23–28.

Exercise based treatment for alcohol use disorders have shown an impact on mental health (e.g., depression or anxiety), and alcohol outcomes (e.g., craving or abstinence). However, there is a lack of information on the role of motivational aspects of participation in the process of designing exercise interventions for alcohol use disorder. This study aims to examine: (1) whether motivational aspects are taken into account when the type and delivery method of exercise interventions are chosen; (2) whether motivational aspects are taken into account post intervention; and (3) whether there are different traditions regarding payment for participants. A systematic search was conducted to identify eligible studies in order to investigate the impact of motivational aspects including payment for participation. Twelve samples including ten to 620 participants were investigated. Participants were predominantly male and in their 40s, ranging from 20 to 69 years. Aerobic exercise (running, walking, fitness) either in a group or individual condition is the most frequently used exercise form. Two studies included ball games or cycling, while only one study offered the opportunity to choose between a wide range of sports. Motivational aspects are mentioned explicitly in half of the studies, mostly with regard to adherence to participation and social integration as the reason for using a group condition. Achievement is mentioned in two studies but not explicitly with regard to planning the intervention design. Five studies include payment for participation in exercise. Findings of the present study identify that motivational aspects for participation are rarely involved in the planning of an exercise intervention. With regard to the specific psychosocial vulnerability of an alcohol use disorder population, this should be an important aspect of further research studies.

Key words: Alcohol use disorder, exercise intervention, motivational aspects, payment.

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The copyright line for this article was changed on 21 December 2016 after original online publication.

INTRODUCTION

Alcohol use disorder (AUD) is a significant health problem affecting physical, social and psychological aspects of life. Results from epidemiological surveys point toward high rates of substance use disorders with 9.5% of the adult population meeting the DSM-IV criteria (Grant, Stinson, Dawson *et al.*, 2004). To date, treatment has primarily focused on different types of pharmacotherapy and psychological interventions (National Institute for Health and Clinical Excellence, 2011). However, results indicate that the outcome of these traditional treatment programmes is only modest (Cutler & Fishbain, 2009) showing a high relapse rate (Mann, Hoffmann, Reinhard *et al.*, 2013). Despite the lack of convincing results, practitioners are continuously being asked to select and implement evidence-based treatment for alcohol use disorders (Brown, Abrantes, Minami *et al.*, 2014). Consequently, there has been an increase in studies investigating motivational interviewing (Jones, Latchford & Tober, 2015) and alternative types of treatment, including exercise based treatment for alcohol use disorders (Murphy, 1970; Read & Brown, 2003; Vancampfort, De Hert, Stubbs *et al.*, 2015). Indeed, in a recent systematic review focusing on the evidence for exercise treatments (Giesen, Deimel & Bloch, 2015), a number of potentially relevant factors have been identified. The review investigated the impact of exercise on adherence and safety, physical functioning, psychological outcomes (e.g., depression or

anxiety), and alcohol outcomes (e.g., craving or abstinence). In general, exercise was shown to be a non-harmful treatment with adherence rates between 66 and 74%. Most examined outcomes were physical parameters such as maximum oxygen uptake, heart rate, or strength. The review indicates that exercise can improve the level of physical and psychological functioning for individuals with an alcohol use disorder and has the potential to encourage a healthy lifestyle. However, depression and anxiety did not show any significant changes. In general, the role of exercise on mental health, especially the harm and benefits regarding depression, has been discussed controversial in research, indicating both the lack of any correlation (Krogh, Speyer, Gluud & Nordentoft, 2010), and a positive correlation (Blumenthal, 2011; Donaghy, 2007).

While acknowledging the value of Giesen *et al.*'s (2015) systematic review, we still lack information about *motivational* aspects for participation in exercise, which may depend of the type of applied exercise or of the organisation of supportive relationships in exercise interventions for alcohol use disorder. Understandably, the focus has been on outcomes of alcohol intake or mental health, and little attention is paid to individual motives for sports participation. In order to achieve a persistent life style change, however, motives for participation may be central for the direction and intensity of human behavior (McClelland, 1985). To our knowledge no study to date has investigated whether different motives for participating in sports may affect the outcome after an

exercise intervention and facilitate successful treatment. Motives as background for behavior have to be separated from individual skills or values. The strength of motives may predict the probability of success, and especially the need for achievement is shown to be of high importance (McClelland, 1985).

While McClelland's (1985) theory is a genuine psychological theory on motivation focusing especially on the work-related central human needs for achievement, affiliation, and power, we tried in this study to pay attention to exercise-related motives. Studies on exercise motivation have been performed both with clinical (e.g., Roessler, 2010) and non-clinical populations (e.g., Duda & Hall, 2007). They attempt to understand the relationship between motivation and sport participation or adherence (Lindner & Kerr, 2001), the type of sport chosen (Kerr, Au & Lindner, 2004; Lindner & Kerr, 2001), or sociodemographic aspects (Biddle & Mutrie, 2005; Withall, Jago & Fox, 2011).

Motives for exercise cover a wide range, including health, physical fitness, relaxation, achievement, physical well-being, social wellbeing, mastery, or performance (Ashford, Biddle & Goudas, 1993). However, some central motives can determine adherence, and seem to be relevant for all participants independent of their socio-economic situation or clinical diagnosis, namely fun, health, social integration, and achievement (Duda & Hall, 2007).

Offering payment as a motivation for recruitment to participation in exercise studies is deemed controversial (Grady, 2005). In the US, it is a common practice to offer payment as reimbursement for time and effort or as a method to overcome lack of interest or other barriers, while in Europe, payment for participation often is seen as an ethical dilemma because it might support adherence out of individual financial need (Grady, 2005). In the case of substance abuse, though, we find an extensive literature demonstrating the effectiveness of contingency management, expressing that certain behavior either is rewarded or suppressed (Prendergast, Podus, Finney, Greenwell & Roll, 2006). The idea is to enhance the adherence to participation in exercise or to substitute costs associated with exercise (e.g., transport or time). The open question to be discussed is to which degree payment can be seen as a further motive for exercising.

The identification of motives in AUD interventions requires a synthesis of results of empirical investigations. We want to investigate: (1) whether motivational aspects are taken into account when the type and delivery method of exercise interventions are chosen; (2) whether motivational aspects are taken into account post intervention; and (3) whether there are different practices regarding payment for participants.

METHOD

A first step identified exercise studies investigating a clinical population of individuals DSM-diagnosed (American Psychiatric Association, 2000) with an AUD or a population of individuals with risky alcohol intake. To be included, studies had to use physical exercise as primary treatment, as adjunct treatment or as a relapse prevention strategy to reduce alcohol intake. Exercise is hereby defined as a subcategory of physical activity, which is planned, structured and repetitive. Exercise involves bodily movement produced by skeletal muscles that expends energy and is

positively correlated with physical fitness (Caspersen, Powell & Christenson, 1985). The search was limited to English, German and Scandinavian languages.

To identify studies examining exercise-based interventions for alcohol use disorders a systematic search was conducted in March 2015. The systematic search was performed in the databases: PubMed MEDLINE, PsycINFO, Cinahl, SPORTDiscuss and Scopus. In addition, a manual search was performed using cross-references from review articles.

Search terms included combinations of the following: (alcohol intake, alcohol use disorder, alcoholism,) and (exercise, fitness, physical activity, training, therapy, treatment, program).

To identify eligible empirical data for our analysis, we screened titles and abstracts of studies identified through the systematic and manual search. Studies that did not meet the prior listed selection criteria were excluded and the remaining studies were analysed full text. Based on this analysis eligible studies were selected. The systematic search (all years to present) resulted in a total of 4,558 studies published, the first studies found in 1950. After going through the inclusion criteria and looking for duplicates, 12 studies were considered eligible for analysis. The exercise programs of these studies were applied either as adjunct treatment for inpatient or outpatient alcohol patients or as treatment offers for other participants (e.g., college students). All studies were read with special emphasis on the mentioning of motivational aspects.

RESULTS

Samples and type of studies

The total sample size of the participants in the studies ranged from nine to 620, with only four studies including more than 50 participants and only one more than 100 participants (Kendzor, Dubbert, Olivier, Businelle & Grothe, 2008) (see Table 1). When leaving Kendzor *et al.* (2008) out of the account, the mean of included participants was 34 (SD 18.0). The range of age was between 20 and 69 years, with a mean age of 39.7 (SD 8.9) years. Data on gender composition were available for all participants and showed a trend towards predominantly male samples.

An overview of applied exercise forms

Almost all studies applied aerobic exercise such as running or walking (Murphy, Pagano & Marlatt, 1986; Palmer, Vacc & Epstein, 1988; Roessler, Bilberg, Jensen, Kjærgaard, Dervisevic & Nielsen, 2013a; Sinyor, Brown, Rostant & Seraganian, 1982). Brown, Abrantes, Read *et al.* (2009, 2010) and Brown *et al.* (2014) published three studies, all investigating aerobic exercise, the latest study was a randomized trial of adjunct treatment where one group received aerobic exercise and the other group received brief advice to do exercise on their own. Aerobic exercise is also applied in Kendzor *et al.* (2008) and Mamen, Pallesen and Martinsen (2011), but here it is offered as a part of a battery of possible exercises. Both studies included a wide range of activities, for example jogging, cycling, cross-country skiing, swimming, or mountain biking. Murphy *et al.* (1986) also included meditation as a control group in a randomization study together with a third group with running and walking in groups. One study investigated basketball as an intervention (Tsukue & Shohoji, 1981) and one study cycling (Ussher, Sampuran, Doshi, West & Drummond, 2004). The last study by Weinstock, Capizzi, Weber, Pescatello and Petry (2014) involved making an individual plan for each participant in Motivational Enhancement

Table 1. The 12 included studies

Intervention (year)	Sample (N/gender/male Mean Age)	Applied exercise	Consideration about motivational aspects during design phase	Consideration about motivational aspects post intervention	Payment for participation in exercise	Consideration about payment as motivational aspect
Brown <i>et al.</i> (2009)	19 42% 44.4	Aerobic exercise	Social integration	No	Yes	Financial support for program adherence
Brown <i>et al.</i> (2010)	16 69% 38.3	Aerobic exercise	No	No	Yes	No
Brown <i>et al.</i> (2014)	49 55% 44	Aerobic exercise	Self-efficacy	Social integration	Yes	Financial support for program adherence
Kendzor <i>et al.</i> (2008)	620 100% 56.9	Running, walking, cycling, swimming	No	No	No	./.
Mamen <i>et al.</i> (2011)	33 74% 30.5	Running, cycling, skiing, swimming, hiking, ball games	Achievement, Fun, Social Integration	Social integration, achievement	No	./.
Murphy <i>et al.</i> (1986)	60 100% 21-30	Running, walking meditation	No	Social integration	Yes	No
Palmer <i>et al.</i> (1988)	53 70% 37.2	Running, walking, body building	Achievement	Achievement	No	./.
Roessler <i>et al.</i> (2013a)	10 70% 24.1	Running, walking	No	Social integration	No	./.
Sinyor <i>et al.</i> (1982)	58 79% 42	Running, walking	No	No	No	./.
Tsukue <i>et al.</i> (1981)	25 100% 26 to 69 years	Basketball	Social Integration	No	No	./.
Ussher <i>et al.</i> (2004)	20 65% 40.1	Cycling	No	No	No	./.
Weinstock <i>et al.</i> (2014)	31 36% 20.6	Individual activity	Motivation in general	Yes	Yes	Support as reinforcement

Therapy (MET) in combination with contingency management (CM). In general, the most commonly used physical activity for a population with alcohol use disorders is aerobic exercise.

Considerations about motivational aspects during the design phase and post intervention

Mamen *et al.* (2011) was the study reflecting most explicitly on motivational aspects during the design phase of the intervention and post intervention, pointing out that exercise usually was not tailored to individual participants. The authors described this to be a paradox, when it is known that a long-lasting change of habits will be more likely when suitable training is tailored to each individual. Therefore, their exercise intervention was based on pleasure and preferred activities. As important social aspect of compliance, all patients got a training partner, and worked as a team. The participants received a wide range of activities (e.g., cross-country skiing, ball games) and both individual and competitive team activities were supported.

In five other studies motivational aspects were mentioned shortly in the introduction as relevant issue, but first reflected after

the intervention had ended. For example Murphy *et al.* (1986) found that the group condition was more likely to facilitate participant compliance. In the running condition subjects had a program individually tailored to their needs, and were exposed to experienced runners who provided feedback, and served as role models. In addition, meeting as a group three times a week seemed to provide important structure for the participants. The participants also received social support from their peers in the group. Additionally, the importance of a group-based running program was supported by the fact that subjects who did not meet as a group during the follow-up period ran less far during this period. Murphy's study included 60 participants in a running, meditation and control group.

Roessler *et al.* (2013a) did not reflect explicit the motivational aspects when designing the intervention, but discussed the role of the social support, the motivating role of the instructor, and a safe environment post intervention. Brown *et al.* (2009, 2010, 2014) reflected about self-efficacy as important effect of exercising and discussed the role of social support for behavioral change. They taught their participants cognitive behavioral strategies for helping them to incorporate exercise in everyday life. Post intervention

they concluded that the group behavioral training might have been a reason for the low attrition rate, and showed that treatment adherence is facilitated by group interventions. Palmer, Palmer, Michiels and Thigpen (1995) emphasized before the intervention the motivational mastery aspect of strength training (here called bodybuilding) as increased locus of control. The feeling of mastery is post intervention described as the mechanism by which depression was reduced in this group.

Tsukue and Shohoji (1981) had introduced basketball as exercise, hence it increased strength and combined individual skills with team spirit. Post intervention they described that, besides the improved coordination, the basketball court was an expansion of the inpatients' environment. The activity helped to nurture patience and friendship and to enhance social skills.

Weinstock *et al.* (2014) addressed explicit motivation as the central aspect of adherence. MET and CM were, in this study, either alone or in combination used to increase intrinsic motivation for maintaining an exercise routine with accelerometers. The MET intervention was called wellness intervention giving individual feed back to the participants, while the MET+CM condition added reinforcement when the participants completed targeted behavior.

Payment to participants

When investigating how motivational aspects for participation are considered in the study design, there is a need to consider the role of payment for participation. In general, studies from the United States have a long tradition of payment, where participants are financially compensated for their involvement.

Weinstock *et al.* (2014) for example, used explicit prizes as reinforcement for physical activity. Participants obtained each week for verified physical activity draws from a prize bowl, including small (\$1), large (\$20), and jumbo (\$100) gift certificates. A participant could earn up to \$230 during the intervention period, and a motivating effect of the reinforcement was shown. Likewise, Brown *et al.* (2009, 2010) introduced an incentive system. They provided participants with \$5 for attending each weekly combined group and exercise session and additional \$5 for returning the completed exercise self-monitoring form (from the prior week). Similar to Weinstock *et al.* the participants got the opportunity to draw a prize from a prize bowl (ranging from \$10–\$50) at each weekly session, when attending consecutive.

According to the studies included in the present overview, 5 out of 12 employed payment for participation. However, none of the studies considered whether this extrinsic motivation could influence the results of the study.

DISCUSSION

In our review, we concentrated on the four motives of fun, health, social integration, and achievement (Duda & Hall, 2007), and find that motives for sports participation seldom are picked out or reflected as a central theme when designing studies using exercise as intervention for AUD. Searching for a reflection on different or potential aspects of motivation, only a few studies have taken account of these motives in the design of the intervention. The

motive achievement was only mentioned as team competition in Mamens *et al.* (2011) study and as mastery in Palmers *et al.* (1988) study. Given that participants in the described interventions are predominantly male, and acknowledging that aspects of competition are more likely to motivate men (Kilpatrick, Herbert & Bartholomew, 2005), this is surprising. The motivational aspect of positive emotional states caused by exercise was the motivator most often mentioned in the intervention studies. Aspects of pleasure or suitable activities were named as important in different studies. Social integration mentioned as social bonding or social support appeared to be accepted as important, especially when reflecting the effect of exercise interventions. Many of the analysed studies seemed to accept implicitly that the motivating aspect of exercising was the group condition, but no study explicitly compared a group versus individual exercise condition. However, a recent Norwegian study (Muller & Clausen, 2015) adds interesting new information as they focused specifically on the feasibility of group exercises in an intervention targeting vulnerable participants. Here, the combination of aerobic exercise, ball games, and strength training combined with a close relation to the instructor showed promising results.

Most of the reviewed studies included exercise as adjunct treatment for alcohol use disorder patients treated in inpatient or outpatient hospital wards. Individuals with alcohol use disorders have various comorbidities, which can affect treatment outcome and affect consideration of motivational aspects. A future question will be to define which motivational factors might be chosen when designing interventions for alcohol use disorder. Payment (voucher-based or prize incentive) is mostly in the US-based studies used as reinforcement or motivation for staying abstinent over a time period or like in the studies presented here, being adherent to a program (Petry, 2000). Therefore, it might be meaningful to increase the outcomes over a short time period by modifying patients behavior through payment, hoping that the positive experiences from the intervention lead to a change of lifestyle. However, payment will not support an autonomous choice. For long-term results, a more qualified method to change the motivation for a certain behavior is recommended. Research over the last decades has for example shown that low social support and social isolation increase morbidity (Kaplan, Salonen, Cohen, Brand, Syme & Puska, 1988), but questions such as "how do people seek support from others?" or "what are the features of relationships that have supportive implications?" are seldom posed when designing exercise interventions.

When reflecting critical on our theoretical approach, the focus on the motives fun, health, social integration, and achievement might not to cover all the mentioned motivational aspects of the studies. Brown *et al.* (2009), mention for example, self-efficacy as motivational aspect in the design phase, Tsukue & Shohoji (1981) point out environmental aspects of physical activity, and Murphy *et al.* (1986) discuss the role of feedback.

However, our paper aims to provide arguments showing that motives for participation in physical activity should be a part of the research design, especially in an exercise intervention with vulnerable subjects. Research has shown that the interpersonal relational aspects as a focus on specific feedback of the instructor, the role of a safe environment, or a focus on training partner

might be specifically relevant for patients (Mamen *et al.* 2011; Roessler, 2010; Roessler, Birkebaek, Ravn, Andersen & Glintborg, 2013b). Alcohol use disorder patients are at risk of experiencing significant interpersonal distress, and studies suggest that patients' subjective perceptions of social problems are fundamental to diagnosis and treatment, not only of alcohol problems (Mueller, Degen, Petitjean, Wiesbeck & Walter, 2009; Albrecht, Burleson & Sarason, 1992). In addition, interpersonal distress may be a reason behind increased alcohol consumption. Thus, motivational and interpersonal aspects experienced by the patient should be a beneficial focus area of treatment. Future studies in exercise as treatment for alcohol use disorder should therefore be strengthened by the inclusion of potential psychological mediators, elucidating the association between motives and adherence, such as health beliefs and compliance.

CONCLUSION

The current study suggests two central conclusions: first, is it necessary to understand the role of motivation for sports participation in current rehabilitation for addiction. Psychological motives are insufficiently addressed both in the design and the post intervention reflection of many ongoing intervention studies using exercise for alcohol use disorder patients. Second, including motivational aspects for participation in physical exercise interventions is important in order to enhance treatment adherence.

This might prove to be a more effective strategy to improve the rate of behavior change. Future studies should include additional instruments for assessment of motives such as the individual locus of control, self-efficacy, coping strategies or intrinsic motivation. In addition, strategies for a more individual targeted exercise strategy or a preparation of the surrounding environment should be developed in different clinical settings.

We would like to thank Gillian Tober for valuable and inspiring comments on the final manuscript. This research was supported by the Tryg Foundation, the Lundbeck Foundation, and the Region Southern Denmark.

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Received 28 April 2016, accepted 19 August 2016