

MASTER THESIS

**EMPLOYEE'S PREFERENCES ON
SOCIAL SUPPORT FEATURES TO
MOTIVATE PHYSICAL ACTIVITY USING
MOBILE APPLICATIONS**

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Preface

This thesis is the final part of my Master's degree in Health Sciences at the University of Twente, specializing in Personalized Monitoring and Training. Assignments began at Roessingh Research and Development, Enschede. The topic that was raised due to the COVID-19 outbreak, a period of hard work, needed support, resulted in a thesis that was delivered proudly entitled "EMPLOYEE PREFERENCES ON SOCIAL SUPPORT FEATURES TO MOTIVATE PHYSICAL ACTIVITIES USING MOBILE APPLICATIONS".

The successful completion of this Master's thesis is inevitable without guidance and support from my supervisors. First, I would like to thank Dr. ir. M. Tabak and Dr. ir. B.J.F. van Beijnum as my first and second supervisors for their support, critical, and valuable feedback. Secondly, I would like to thank Dr. ir. M. Cabrita as my external supervisor who was closely involved with the project for her critical guidance at Roessingh Research and Development. Their guidance, feedback, and support were well conveyed even virtually.

Thirdly, I would like to thank all participants (employees from companies and universities in the Netherlands) who were willing to fill and share the survey. Without you, this thesis would not have been possible.

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Abstract

Background: According to WHO, the workplace is an optimal environment to promote health promotion programs for employees. The coronavirus (COVID-19) outbreak in 2020 has made employees work from home which could increase sedentary behavior. The difference between employees' needs and preferences regarding the health promotion programs that initiated by the company restrain the participation. Designing health promotion programs using mHealth with social support features from Persuasive Design System (PSD) could increase participation rate. Several studies showed that personality, self-efficacy, and group identity could motivate people to do physical activity with social support from colleagues. This study aims to investigate employees' preferences for social support features in mobile health applications based on personality, self-efficacy, and group identity which can potentially increase engagement in using the applications while working remotely due to the outbreak.

Methods: This study focuses on employees who work in a company located in the Netherlands, whose job required sitting for a long time. Data collected using an online questionnaire through a quantitative cross-sectional design. Personality measured using the Big Five Inventory (BFI-10), exercise self-efficacy using modified Physical Exercise Self-Efficacy Scale, and group identity using Group Identity Scale. The data analyzed using SPSS to investigate descriptive and correlation between the variables with social support features in PSD.

Results: Participants (n=132) did not achieve vigorous (65.2%) and moderate (76.5%) physical activity guidelines. Personality traits showed that employees with lower Extraversion preferred Cooperation while higher Agreeableness, higher Conscientiousness, and lower Neuroticism preferred Recognition. Only higher Openness preferred Social Learning. Employees with higher exercise self-efficacy preferred Cooperation and Social Learning while employees with lower exercise self-efficacy preferred Normative Influence and Competition. Employees with lower group identity preferred Recognition and Social Learning while employees with higher group identity preferred Recognition. There was positive correlation between exercise self-efficacy with Social Facilitation ($\alpha=0.001$), Cooperation ($\alpha=0.001$), Normative Influence ($\alpha=0.004$), and Recognition ($\alpha=0.031$). Personality traits showed positive correlation between lower Openness and Cooperation ($\alpha=0.043$), lower Neuroticism and Comparison ($\alpha=0.001$), lower Extraversion and Normative Influence ($\alpha=0.016$) but negative correlation with Recognition ($\alpha=0.031$). There was no correlation between social support features and group identity.

Conclusion: Recognition and Cooperation are employees' most preferred social support features based on personality, exercise self-efficacy, and group identity. Exercise self-efficacy and personality plays vital roles in defining employees' preference for social support features for physical activity.

Keywords: Physical activity, employee, social support, mHealth, PSD, personality, self-efficacy, group identity

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1. Introduction

1.1 Background

Physical inactivity has become a major concern for public health (Blair, 2009). Almost one-quarter of adults (23.3%) worldwide are insufficiently active. (Stevens et al., 2017). The World Health Organisation (WHO) has agreed on a plan to target a 10% reduction in physical inactivity by 2025. According to the WHO and the World Economic Forum, the workplace is the optimal environment to implement health promotion programs for employees (Quintiliani, Sattelmair, Activity, & Sorensen, 2007). Western workplace environments are mostly desk-based and require a lot of sitting without substantial and effective movement during work hours (Ryde GC et al., 2014; Clemes, O'Connell, & Edwardson, 2014; Hadgraft et al., 2016). Employees tend to sit for half of the weekday due to work-related (Kazi, Duncan, Clemes, & Haslam, 2014; Miller & Brown, 2004) where up to 71% of working hours are sedentary activities (Clemes et al., 2014). The increasing usage in automation and information technology is predicted to have a potential increment in decreased physical activity such as working in the office (Hendriksen, Bernaards, Steijn, & Hildebrandt, 2016; Wahlström, 2019). Employees who are less physically active tend to have more absenteeism, higher expenses for healthcare costs, and potentially have less work performance (Ackland, Grove, & Bull, 2005; Pronk N.P., 2009). The coronavirus (COVID-19) outbreak in 2020 has worsened employee's physical activity. The outbreak made employees work from home and changed the way they work and interact with their colleagues. Working from home is likely to increase the amount of time of sedentary behavior (Olsen, Brown, Kolbe-Alexander, & Burton, 2018).

Several health promotion programs in the workplace have been generated to motivate employees to be more physically active (The Institute for Health and Productivity Studies, 2010). However, health promotion programs initiated by the company tend to induce pressure and negative reactions from colleagues which is a common reason for them to not participate in these programs (Linnan, Weiner, Graham, & Emmons, 2007). Employees can feel reluctant to participate if the program is perceived as a one-size-fits-all intervention caused by a lack of room for adjustment and various preferences (Linnan et al., 2007). The difference between employees' needs and preferences regarding the health promotion programs and the provided interventions by their company might also restrain the participation (Rongen, 2015). Factors that affect participation rates are demographic groups and the types of the given interventions that encourage involvement in health promotion activities (Grosch et al., 1998). For example, women had higher rates of participation rates than men and obese individuals were less likely to participate in an on-site fitness program than low-risk individuals, while the obese risk group

was more likely to participate in a wellness educational program (Lewis, Huebner, Yarborough, 1996). These factors are influenced by demographics, cognition, behaviors, the social environment, and the physical environment (Buckworth and Dishman, 1999). Several studies showed that cognition, behavior, and social environment can be represented by personality, self-efficacy, and group identity as several factors that influence participation in health promotion interventions for physical activity. (Hegwood, 2009; Buchan, Ollis, Thomas, & Baker, 2012; E, Mcauley, A, Szabo., Necha, Gothe., E., A, 2011; Tajfel and Turner, 1979).

Personality is influenced by behavior and cognitions of an individual that may affect the way people view exercise (Hegwood, 2009). Personality defines the personalized preferences of health promotion programs by creating a profile of the user preferences (de Vette, 2019; Shuttleworth, 2015). Studies have shown how each type of personality in the Five-Factor Model reacts in perceived and received support (Swickert, Hittner, & Foster, 2010), the usage of social media (Shuttleworth, 2015) and social network sites (Liu & Campbell, 2017). Personality as an example of the individual differences drives an individual's preference resulting in a greater tendency to physical activity engagement (Box, Feito, Brown, & Petruzzello, 2019). Personality is also able to differentiate between people with low and high motivation to be physically active. (Kimberly Barry & McCarthy, 2001). Therefore, it will be useful to define the types of social support features for physical activity based on their traits of personalities.

Some researchers stated that there is a strong correlation between personality and self-efficacy (Molloy, Randall, Wikman, Perkins-Porras, Messerli-Burgy, & Steptoe, 2012; Strobel, Tumasjan, & Sporrle, 2011). Self-efficacy defined as psychological theories about behavior change that control belief in the ability to execute a behavior (Baretta et al., 2019). Self-efficacy is the most significant consistent predictor of health-related behavior (Buchan et al., 2012; E, Mcauley, A, Szabo., Necha, Gothe., E., A, 2011). Pekmezi, Jennings, and Marcus (2009) suggest that an individual's belief in ability to perform a behavior will lead to a higher chance of engagement in the behavior itself. This concept has important implications for health behavior change and has been applied to numerous health domains, such as physical activity promotion (Pekmezi, Jennings, & Marcus, 2009). Exercise self-efficacy is people's level of confidence in their ability to exercise regularly (Everett, Salamonson, & Davidson, 2009). Iwasaki et al. (2017) found that exercise self-efficacy plays an important role in promoting physical activity in the workplace.

Emotional relationships that build through teamwork between employees will form social identification. Social or group identity defined as recognition and attachment from the

members of a group to share a vision of unity and a common future (Tajfel and Turner, 1979). Group identity has a significant correlation with group cohesion where the group sticks together to achieve objectives, support conformity to the norms, and the attendance of the group. It has been found that social support plays a vital role to drive group identity and explains the effectiveness of group-based exercise programs (Golaszewski, 2018).

Designing health promotion interventions based on employee's preferences could improve the participation rate in such programs for physical activity. A technology-based intervention used in health promotion programs found to be more effective than without the use of technology (Hakala et al., 2017). Technology has become a vital tool for employees to maintain social relationships and work from home. One particular type of technology that may provide an effective medium to promote physical activity is mobile health technology (mHealth). mHealth technology examples are wearable physical activity monitors or trackers and smartphone applications (apps) designed to maintain health and wellbeing. There is also reasonable evidence to support the use of mHealth in the promotion of physical activity in workplace programs (Buckingham, Williams, Morrissey, Price, & Harrison, 2019).

In order to persuade employees to participate in health promotion programs through mHealth, Persuasive System Design (PSD) could be added to improve user engagement when preferences of the user are effectively met (Bakkes, Tan, & Pisan, 2012; Petty & Cacioppo, 1979; van Gemert-Pijnen, Kelders, Kip, & Sanderman, 2018). PSD aims to influence people's behavior to support and improve health and well-being (Asbjørnsen, Smedsrød, Nes, & Wentzel, 2019; Elloumi, 2017). One of the categories of software features in PSD is social support features. It could motivate users by comparing or sharing information by leveraging the social influence of other people to achieve desired behaviors (van Gemert-Pijnen et al., 2018).

Several studies showed that social support networking is one of the most effective behavior change strategies to motivate physical activity (Kahn et al., 2002; Pelssers, 2015; Simoski, Klein, Van Halteren, & Bal, 2018). The existence of a social network allows a group-based program to be designed to integrate with support from significant others like co-workers or managers (Pedersen, Halvari, & Williams, 2018). Briefly, online community-based interventions through a platform could offer social support in order to motivate individuals where it contributes positively to physical activity (Elloumi, 2017; Kahn et al., 2002; Pelssers, 2015). These online interventions could be the opportunity, especially during a coronavirus outbreak, to promote virtual social support for physical activity while also enhancing social interaction with colleagues.

Based on the research findings, defining an employee's social support features preference model for physical activity becomes important to have effective health promotion interventions. The usage of the types of social support to motivate physical activity has been known in many studies, however, the utilization of social support in the context of features in the PSD element in mobile health applications is still lacking. The study presented in this thesis primarily focused on social support features in PSD that apply to mobile health applications.

1.2. Objectives

Social support features can potentially increase user engagement in using an mHealth application. The objective of this study is to investigate employee's preferences for social support features in a mobile health application promoting physical activity based on personality, self-efficacy, and group identity. It would be useful for health promotion providers and mobile application developers to maximize the usage of their product's features according to the intention of the developer.

1.3 Research questions

1. Which social support features in a mobile health application promoting physical activity are preferred according to employees' personality traits?
2. Which social support features in a mobile health application promoting physical activity are preferred according to the employees' exercise self- efficacy?
3. Which social support features in a mobile health application promoting physical activity are preferred according to the employees' group identity in the company?

2. Literature Review

The literature review refers to previous research and the relevance between physical activity in the office, social support as interventions, Persuasive System Design (PSD) in mHealth, PSD, personality, exercise self-efficacy, group identity that are related to the aim of this study.

2.1. Physical activity in the office

Physical activity has been a major focus for health promotion programs in the workplace (Hoare, Stavreski, Jennings, & Kingwell, 2017). Well-being is an important influencing factor between employee and employer relations, job satisfaction, and productivity (Hemp, 2004; Puig-Ribera et al., 2015). Physical activity is defined as “any bodily movement produced by skeletal muscles that result in energy expenditure” (Lindström, Britta, 1997). The recommendation of physical activity is 10.000 steps per day or at least 150 minutes of moderate-intensity activity a week or 75 minutes of vigorous-intensity activity a week (WHO, 2018). Lack of physical activity had contributed a significant cost amounting to 11.1% of healthcare expenditures from 2006-2011 for businesses (The Institute for Health and Productivity Studies, 2010). Cabrita, Tabak, and Vollenbroek-Hutten (2016) suggest that workplace physical activity interventions are more effective for sedentary workers. Health promotion programs in any kind of worksite have shown that participation from employees reached 20-50% (Badland & Schofield, 2004). Table. 1 shows interventions that have been done by companies using technology. Interventions in the office mostly encourage employees to be active during lunch or taking short breaks from work (Commissaris et al., 2016).

Table 1. Interventions to promote physical activity in the office

| Author | Year | Interventions |
|---|------|--|
| Faghri et al. | 2008 | Walking, e-technologies, pedometer |
| Puig-Ribera et al. (Abdin, Welch, Byron-daniel, & Meyrick, 2018) | 2008 | Walking interventions on quality of life and job performance |
| Slotmaker et al. (Buckingham, Williams, Morrissey, Price, & Harrison, 2019) | 2009 | Belt-worn ‘AM 101’ activity monitor/ accelerometer (PAM BV, Netherlands) used with the associated website (PAM COACH). |
| To, Chen, Magnussen, & To | 2013 | Pedometer and applied internet-based intervention |

| | | |
|--|------|---|
| S. Schröer, J. Haupt, C. Pieper | 2014 | Education (e-mails), program feedback (pedometer use and e-mail), motivation (e-mail tips), environmental approaches (staircase use promotion and walking circuit) and components of the social cognitive theory [18], such as self-monitoring (pedometer use), goal setting (10 000 steps/day) and social support (worksite step competition). |
| Ganesan et al. (Abdin et al., 2018) | 2016 | Non-interactive pedometer and 'Stepathlon' mobile app (also available as a website). |
| Patel et al. (Buckingham et al., 2019) | 2018 | 'Moves' smartphone app (Proto Geo Oy, Finland) for step tracking. |
| Boerema, Van Velsen, & Hermens | 2019 | a mHealth intervention that provides activity suggestions, based on a physical activity prediction model, consisting of past and current physical activity and digital agendas for breaking up long sedentary |

The majority of studies are behavioral and psychological strategies such as exercise, counseling, health promotion messages and feedback (e.g. tips and reminder) (Cabrita, Tabak, & Vollenbroek-Hutten, 2016). Health promotion messages had higher significance on physical activity behavior than individual health counseling. It also gives similar results with walking intervention than individual health counseling due to the opportunity to be active on working days (Malik, Blake, & Suggs, 2014). The usage of pedometers applied in technology, included activities at social and environmental levels are another effective intervention than those without these characteristics (De Cocker, De Bourdeaudhuij, & Cardon, 2010; Faghri et al., 2008; Living & Environment, 2019; To et al., 2013). It showed that physical activity interventions using technology in the workplace have had a positive impact in improving well-being and reducing sedentary behavior.

2.2 Social support as interventions

The intention of defining employee's preference is to find effective health promotion interventions to motivate and change behavior. Exposure to behavior change programs is required for effective interventions (Robroek, Lindeboom, & Burdorf, 2012). Social Cognitive Theory (SCT) is one of behavior change theories that is often used when researching health promotion. According to Bandura (1998), SCT focuses on socio structural and personal determinants of health. A workplace is an ideal place to implement health promotion programs to improve healthy behavior where SCT focuses on increasing social support and the opportunity for incentives and encouragement (Hegwood, 2009).

Social support is defined as the presence of connection of network between family, friends, and colleagues to gain information, encouragement, emotional support, and enhancing

motivation the environment to support in a behavior (McSpadden et al., 2016; Tezci, Sezer, Gurgan, & Aktan, 2015). The effectiveness of group-based behavior change intervention has been known through systematic review and is used for promoting behavior change and improving health such as, promoting physical activity (Harden et al., 2015) and walking (Hanson & Jones, 2015). The role of community-based social support was evidenced to improve physical activity through a 'buddy' system by setting a walking group to provide companionship (Kahn et al., 2002). Social support from a group of people with the same mutual goal has a slightly higher impact than family (Scarapicchia, Amireault, Faulkner, & Sabiston, 2017). There is strong evidence that the higher correlation of social support among the employee was associated with increased physical activity which may lead to facilitating behavior change (Scarapicchia et al., 2017). Social support is also defined as the intention to help others (Cohen, 2004). The concept includes belongingness, emotional, esteem, informational, and tangible support (Barrera, 1986; Cohen and Wills; 1985; Wills and Shinar 2000). Barrera (1986) explained belongingness or companionship refers to spending time with others. Emotional social support refers to the perception of being recognized and cared for by others. Esteem social support refers to the presence of positive comparison to others. Informational social support refers to the availability of information to solve problems. Tangible or instrumental social support refers to the availability of practical help.

2.3 Persuasive System Design (PSD)

Behavior change techniques (BCTs) are procedures of an intervention designed to change behavior (van Gemert-Pijnen et al., 2018). It can be chosen based on previous research and works as the 'active ingredients' of a successful behavior change (both traditional and digital) intervention (Walsh, Corbett, Hogan, Duggan, & McNamara, 2016). Changing behavior requires motivation and persuasive design using persuasive system design (PSD) by Oinas-Kukkonen and Harjumaa through eHealth design. BCTs and PSD mainly work overlap due to the same aim to target change behavior. The difference is that PSD specifically applied in technology while BCTs applied in any kind of intervention to influence behavior (van Gemert-Pijnen et al., 2018). The persuasive design aims to influence people's behavior to support and improve health and well-being by using technology (Lau, Lau, Chung, Ransdell, & Archer, 2012).

Evidence has shown that mobile health applications that use PSD have positive clinical outcomes in long-term health behavior issues such as having a healthy diet and encouraging physical activity (Lau et al., 2012). There are four categories of system features; primary task support, dialogue support, system credibility support, and social support (Everlo, 2019). Social

support emphasizes the impact of social influence that could motivate the user (McSpadden et al., 2016). The effectiveness of social support has been proven to improve physical activity using apps especially social comparison and social normative feedback (Simoski et al., 2018). In one large systematic review about web-based interventions to improve health and well-being, social support features were hardly used, however, it seemed that interventions that did employ these features more elaborately achieved higher adherence rates (van Gemert-Pijnen et al., 2018). In Table.2, the definition of seven features in social support were explained (Everlo, 2019).

Table 2. Definition of social support features

| Features | Definition |
|---------------------|---|
| Social learning | The ability to observe other users on their performance and the outcome |
| Social comparison | The ability to compare performance with other users |
| Normative influence | The ability to leverage norms or peer pressure that could persuade the user |
| Social facilitation | The ability to identify other users |
| Cooperation | The ability to motivate other users by leveraging to cooperate |
| Competition | The ability to motivate other users by leveraging to compete |
| Recognition | The ability of public recognition for a user who performs |

According to Wright (2016), social support through an online network has increased in recent years. It is shown by the rising number of online support groups/communities which has the potential ability to reach a large group of people fostered by social support consisting of people with health concerns (Wright, 2016; Blackford, Jancey, Howat, Ledger, & Lee, 2013; Sutin et al., 2016). Several studies have shown that it could give benefits such as convenient and anonymous connections with others who have the same health problems. It also can replace or extend offline support (Hwang et al., 2010; Wright, 2015). However, it also has negative aspects such as delayed feedback and privacy issues of sharing health information (Wright, 2000b; Wright and Bell, 2003). Rains and Young (2009) conducted a meta-analysis that showed an online support network group was related to increased perceived support, reduced depression, increased quality of life, and increased self-efficacy in terms of managing health problems.

2.4 mHealth

Technology gives improvement as supporting equipment for the promotion of physical activity through monitoring, diagnosis, and treatment (Living & Environment, 2019). The concept of eHealth could be utilized as one of the interventions for health promotion including health information networks, telemedicine services, health portals, and personal wearable devices (Cabrita et al., 2016). The most common used-technology is a mobile phone. As of June 2017,

almost 100.000 from more than 3 million smartphone applications at Google Play Store were categorized as health & fitness apps (App- Brain, 2017). Smartphones have become tools to gain access to the internet and social media where it can lead to an online network (Wright, 2016). The emergence of mobile health applications in a smartphone has shown the impact on health issues, such as diet and physical activity (Boulos et al., 2014).

Mobile health (mHealth) interventions are a subset of eHealth which involves mobile devices and apps. It allows continuous self-monitoring and could receive immediate advice and support from peers (Yerrakalva, Yerrakalva, Hajna, & Griffin, 2019). There is a growing interest in using apps to modify behaviors such as PA or sedentariness to improve or maintain health. Mobile health applications and pedometers were the most used-technology for self-monitoring in a physical activity tracker (Hakala et al., 2017). Body-worn sensors such as smartwatches are being developed to give accurate and objective individual measurements daily. The measurements are integrated with its online platform that provides support and is promising to stimulate adherence for physical activity (Elloumi, 2017). Nowadays, many popular smartphones (Samsung Galaxy and Apple iPhone) and apps (Moves App, Health Mate App, and Fitbit App) provided with features for detecting steps or accelerometers that encourage a user to wear or bring the phone for an accurate measure which seems to be a promising way to measure and encourage healthy behaviors (Bort-Roig et al., 2014). Tong and Laranjo (2018) stated that social features in BCTs in mHealth for physical activity promotion showed that social features mostly used to deliver social support and social comparison. However, based on user preferences, some users tend to be motivated with social support and competition aspects while others more engage in social comparison.

mHealth could also be applied in the workplace (Buckingham et al., 2019). Many companies have started providing fitness trackers to their employees for free or at a reduced price. The presence of social components has the potential to influence a higher sense of teamwork within the workplace, increased productivity and well-being, and decreased absenteeism which is beneficial for both employee and company (Puig-Ribera, McKenna, Gilson, & Brown, 2008).

2.5 Personality

Personality gives effects on an individual's exercise behavior by looking at their motives, barriers, and preference types of exercise to participate (Hegwood, 2009). Studies have shown that several traits of the Five-Factor Model are routinely implicated in engaging in more physical activity (Iva et al., 2019; Sutin et al., 2016). It has five primary traits and the results of the test scores could predict how people behave in real-life situations. The factors are

Neuroticism (the tendency to be nervous, anxious, depressed, and insecure), Extraversion (the tendency to be sociable and outgoing), Openness (the tendency to be creative, curious, and unconventional), Agreeableness (the tendency to be cooperative, warm, and trusting), and Conscientiousness (the tendency to be disciplined and organized) (Robbins. S, 2014; Stevens et al., 2017; Tolea et al., 2013). Among all traits, Neuroticism, Extraversion, and Conscientiousness have been reported as reliable correlates of physical activity being at least as important as other more extrinsic correlates of physical activity. Another recent meta-analysis found that higher Extraversion, Conscientiousness, and Openness were all related to higher levels of physical activity, whereas higher levels of neuroticism were related to lower levels of physical activity (Tolea et al., 2013). In contrast to the other traits, Agreeableness (the tendency to be cooperative) tends to be unrelated to physical activity. Participants who scored higher in Neuroticism were at greater risk for physical inactivity, whereas participants who scored higher in Extraversion, Openness, Agreeableness, and Conscientiousness were less likely to be physically inactive (Courneya, 1998; Sutin et al., 2016; Blumer et al, 2012). A study that specifically measures personality and social support design features in PSD that applied in technology are still lacking. No meta-analysis has been conducted on the relation between the Big Five personality traits and social support (Barańczuk, 2019).

One study hypothesized using the relation between personality and social media features could reflect online' personality is an identical representation of offline personality. Given the development of technology, getting social support could also gain from social media. Studies show a significant positive correlation between the use and frequency of using social media with personality especially with Extraversion and Openness traits and negative correlation with Neuroticism. Extraversion and Agreeableness tend to communicate and share their activities with their friends using social media more than people with lower Extraversion and Agreeableness personality (Correa, Hinsley, & Zúñiga, 2012; Ross, Orr, Sisic, Arseneault, & Orr, 2009; Gosling et al., 2011; Zywicki & Danowski, 2008). A study also showed Extraversion and Openness correlate predictors for the usage of social networking sites (SNSs) (Liu & Campbell, 2017). However, the results showed that there are no differences found between the low and high scoring groups on each of the Big Five traits and the intention to use the social support design features (Shuttleworth, 2015).

2.6 Exercise self-efficacy

Self-efficacy plays a key role as a determinant and mediator for adoption and impact of physical activity behavior (Baretta et al., 2019). According to social cognitive theory, there is a synergistic correlation between self-efficacy and social support (Bandura, 1997). Individuals that have higher self-efficacy gain more support into exercise. Self-efficacy could encourage

an individual who lacks social support for having exercise ambition. Moreover, individuals who lack self-efficacy could gain ambition and self-belief through the presence of social support (Bandura, 1997; Dishman, Saunders, Motl, Dowda, & Pate, 2009).

According to Bandura, there are four sources of information that could increase self-efficacy. The most important one is enactive mastery where people will have higher confidence to repeat performance that they already accomplished in the past. The second source is vicarious modeling where people are more confident when they see someone else doing the task. The effectiveness will increase if the person has similar conditions. The third source is verbal persuasion where people convince through motivational statements. The last one is arousal by giving an energized state to perform better (Robbins. S, 2014). Common reported reasons for employees to not doing exercise include, "being too tired, having no interest, having no time during the workday, having no time before or after work, already being involved in other programs, and not wanting to participate in such programs with co-workers" (Kruger et al., 2006).

2.7 Social identity

Social identity defined from two theories approaches which is social identity theory and self-categorization theory (Hornsey, 2008). This approach provides recognition of individuals as themselves also as group members. It explains their participation as group members could give a different result of behavior to positively differentiate their in-group from comparison outgroups on valued dimensions (Haslam, 2004). It develops a desire to discover and align one's attitudes and behaviors with others who share them. For instance, an individual who identifies with an exercise group will become motivated to align with the norms, values, and ideals to be a member of that group (Haslam, 2004; Turner et al., 1987). Research has shown that group-based exercise environments are more effective to engage in physical activity (Burke et al., 2006; Estabrooks et al., 2008; Estabrooks et al. 2011)

Cameron (2004) developed a model that described social identity as having three dimensions: cognitive centrality, in-group affect, and in-group ties. Cognitive centrality is the frequency of thinking about being a group member. In-group affect defined as the positivity of feelings associated with membership in the group. In-group ties defined as the perception of belongings and fits in with the group members.

Group identity is a connection that is developed through social interactions within a social network that could influence behavior, feelings of a certain group (Scott, Corman, & Cheney, 1998). Social support works as a motivator for group identity and defines the effectiveness of

a group-based exercise program (Stevens et al., 2017). Group identity could maximize in-group similarity. Moreover, it correlates with the concept of group cohesion. Group cohesion is defined as a process that drives the closeness of a group and remains together to achieve common goals for the satisfaction of member affective needs (Carron et al., 1988). Studies have shown that there is a positive association between perceived group cohesion and increased exercise adherence (Carron & Spink, 1993; Carron et al., 1988; Spink, 1992; Spink & Carron, 1994). Individuals with high group identity would be motivated when the group is active and accessible. The presence of social support builds sustained identities through the individual's self and their environment (Golaszewski, 2018).

In conclusion, the differences in employees' personality traits, levels of exercise self-efficacy, and levels of group identity affect motivation for physical activity. Evidence has shown social support as effective intervention in increasing physical activity. Social support features as one of PSD elements that applied in mobile health applications can be a solution for intervention tools. Therefore, investigating employees' social support feature preferences for physical activity interventions in the office is essential for achieving program effectiveness.

3. Research Model

Research questions were formed in a research model that are supported by literature findings. It was created to provide an overview of the scope of research in this study whereas it only focused for variables inside the bolded box (Figure 1). Based on the literature findings, the research model in proposed five traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness) of personality in the Five-Factor Model, exercise self-efficacy in Social Cognitive Theory, and group identity in Social Identity Theory have an association with social support and physical activity. Social support features in PSD (Social facilitation, Cooperation, Normative Influence, Competition, Social Learning, Social Comparison, and Recognition) could be utilized in mobile health applications as a medium to promote physical activity according to the preferences of employees. This makes employees' preference for social support features that applied in mobile health applications becomes important.

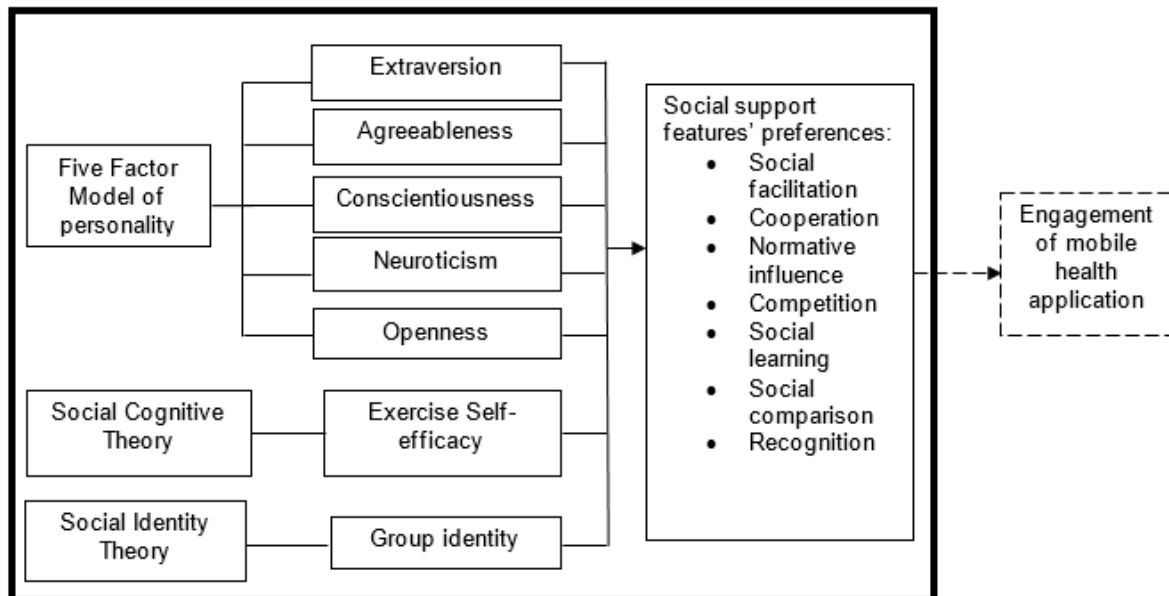


Figure 1. Research model

4. Methods

This study was designed using an online survey with a quantitative cross-sectional design. The survey was conducted from the 2nd of June until the 10th of June 2020. To investigate employees' preference for social support features on PSD elements, the following methodology was used.

4.1 Participants

The participants were recruited through several online platforms (e.g. sending emails and links to companies, universities, and social media). The number of samples using Lemeshow sample size formula where the confidence level is 95% with a rough estimation of the anticipated population proportion is 50% and the absolute precision of 10% (Lemeshow & Lwanga, 1991). Criteria for included participants in this study were older than 18 years old, employees in a company and university located in the Netherlands, whose job required sitting for a long time, and willing to participate. Once they answer 'No' for those questions, they will directly go to the end of the survey. Based on the calculation, the minimum amount of samples was 96 samples.

4.2 Procedures

To answer the research questions, data was collected using a survey through an online tool named Qualtrics. Potential participants were informed about the purpose of the survey, benefits and risks of participating, and contact information of the researcher. Informed consent was given as a form of their willingness to participate. The survey contained 26 questions divided into 11 sections. Participants were asked to complete several scales to measure demographic characteristics, the usage of physical activity tracker and group physical activity experience, physical activity intensity level, group identity, social support features preferences, exercise self-efficacy, supportive role, and personality (Appendix.7).

4.3 Measurements

4.3.1 Demographic

The measurements of demographic characteristics were age, gender, nationality, level of education, length of work in the same company, and the presence of chronic disease. Group physical activity and mHealth usage experience measured to give insights about their knowledge and experience of the interventions.

4.3.2 Physical activity intensity levels

Current physical activity routine was measured with the modified International Physical Activity Questionnaire (IPAQ) – Short Form (Hegwood, 2009). The aim to measure the intensity level of physical activity was to describe participants' habits and behavior on physical activity. The IPAQ contains four generic items with seven questions to measure moderate and vigorous physical activity, walking and sleeping time for the past 7 days. The range and minutes for each type of intensity of physical activity was adjusted according to the feedback from the pilot questionnaire and the condition in real life. The ranges were between 0 to more than 60 minutes for each level of intensity. The range of sleeping time was between 4 to 9 hours.

4.3.3 Group identity

Group identity was measured using Group Identity Scale contained 12 items that assess three aspects of the dimensional strength of group identification (Patricia, 2005). The aim was to define the relationship between colleagues in a group member. Four items represent each aspect (cognitive centrality, in-group affect, in-group ties) on a 7-point Likert scale ranging from (1)-strongly disagree to (7)-strongly agree (Obst, White, Mavor, & Baker, 2011). The Group Identity Scale were analyzed and divided into each category whereas half of the items are negative-scored (Centrality: 1, 2R, 3, 4R; In-group Affect: 5, 6R, 7, 8R; In-group Ties: 9, 10, 11R, 12R) (Patricia, 2005).

4.3.4 Social support features in PSD preference

Social support as one of the PSD elements contained seven features. Each feature was interpreted into illustrate interventions that correspond to its definition. Each illustrative intervention that represents each feature ranked based on participants' preference. An illustrative situation about the company's plan on physical activity interventions that requires social support from colleagues through a mobile health application was given before they asked to rank their preference of the interventions. The rankings were coded from 1 (the most preferred) to 7 (the least preferred). According to its definition, the measurements are examples of the implementation of social support features (Ahmad, Zairah, Rahim, & Ya, 2019; Elloumi, 2017)

Table 3. Example of physical activity interventions of social support features in PSD

| Features | Interventions | Explanation of interventions |
|---------------------|--|--|
| Social facilitation | Reminder from colleagues to do physical activity | Colleagues are able to remind each other to do physical activity |
| Cooperation | Getting a group of colleagues with the same physical activity goal | Colleagues are grouped and given the same physical activity goal |

| | | |
|---------------------|---|--|
| Normative influence | Getting notification of colleague's achievements on physical activity | Colleagues can get notification of a colleague's achievements on physical activity |
| Competition | Competition for steps' achievement with colleagues | Colleagues can have a competition on targeted steps between groups |
| Social learning | Sharing successful physical activity tips | Colleagues are able to share successful tips of physical activity |
| Social comparison | Having a comparison of steps' achievement | Colleagues are able to share and compare other colleagues' number of steps |
| Recognition | Emoticon appreciation of physical activity achievements | Colleagues are able to give appreciation on the achievement of physical activity in a form of emoticon |

4.3.5 Exercise self-efficacy

Exercise self-efficacy were assessed using a modified Physical Exercise Self-Efficacy Scale Questionnaire (Bandura & Bandura, 1997). The modification aimed to measure participants' belief in their capability to be engaged to physical activity interventions during 10 unpleasant conditions. The participants could choose as many interventions they prefer to do or choose none of the interventions for each unpleasant condition (e.g. tired, bad mood, pressure from work, etc.).

4.3.6 Supportive role

Supportive role was measured to determine higher and lower levels of supportive role for each physical activity intervention. The aim was to determine the level of support of the participants in order to have a sustainable group-based program. The participants could choose as many interventions whether they prefer to invite or initiate or choose none of the interventions (Appendix. 8).

4.3.7 Personality

Personality traits were assessed with the Big Five Inventory-10 (BFI) which is a short version of the standard BFI. It is composed by 10 items with 2 items for each factor that represent the core traits of each Big Five domain where the other item of each domain is scored reversely. The items rated on a five-step scale from 1 = "disagree strongly" to 5 = "agree strongly" (Gunnarsson, Gustavsson, Holmberg, & Weibull, 2015) which defined in the mean value. BFI-10 were analyzed according to the results of the scoring scales. Each trait represented in two questions (Extraversion: 1R, 6; Agreeableness: 2, 7R; Conscientiousness: 3R, 8; Neuroticism: 4R, 9; Openness: 5R; 10) where one of the items is reversed-scored (R) (Rammstedt & John, 2007).

4.4 Data analysis

The results of the responses were extracted from Qualtrics in SPSS and Excel form. Descriptive statistics and cross-tabulation from IBM SPSS v.25 and Microsoft Excel used to investigate descriptive statistics and relationships between variables (Field, 2009). The incomplete survey was excluded before being analyzed.

4.4.1 Demographic

Demographic characteristics were analyzed using descriptive statistics to calculate the total and percentages for each level. The results showed the majority of the characteristics of the participants.

4.4.2 Physical activity intensity levels

Moderate and vigorous intensity levels were analyzed by multiplying between the days of the activity done within a week and the minutes of physical activity within each day. The total time of moderate and vigorous physical activity subtracted by sleeping time generates sedentary time. The results were coded and calculated using descriptive statistics to define participants' physical activity intensity levels. Achieved moderate physical activity defined for at least 150 minutes of moderate-intensity activity a week and vigorous physical activity for at least 75 minutes of vigorous-intensity activity a week (WHO, 2018).

4.4.3 Group identity

The mean value of each category was calculated to determine the most influential category. High and low group identity analyzed by the mean value of all categories. High and low group identity defined based on the value of mean where between 1 and 4 is low and between 5 and 7 is high.

4.4.4. Social support features preference

The ranking of the preference of social support features were analyzed using descriptive statistics to calculate the total and percentages for each feature. The results showed the ranking for each feature.

4.4.5 Exercise self-efficacy and supportive role

The missing data for the unchosen intervention was recoded to 0 in order to calculate the chosen interventions. Exercise self-efficacy and supportive role were analyzed by calculating the amount and percentages of the chosen interventions for each unpleasant condition using descriptive statistics. The result was analyzed and divided into high and low self-efficacy. Higher and lower self-efficacy was determined based on the number of unpleasant conditions with the highest percentage and mean value in each intervention. Higher self-efficacy defined

when the number of unpleasant conditions with the highest percentage of intervention reached minimum half of the conditions while lower self-efficacy defined when it reached below half of the conditions.

4.4.6 Supportive role

A higher supportive role determined when the percentages of chosen physical activity intervention were above 50% for both roles while a lower supportive role determined when the percentages were below 50% for at least one role.

4.4.7 Personality

The Five-Factor Model suggests a normal distribution of scores (ranging from 0 to 100 with an average score of 50 on each factor) to define high and low personality for each trait (de Vette, 2019). The mean value of each trait was grouped into three categories (disagree, neither agree nor disagree, agree) to determine the agreement to its statements.

4.4.7 Relationship and correlation

The relationship between all variables with the ranking of social support features were analyzed using cross-tabs. The association represented in the amount and percentage between the features and the variables. To measure the correlation between independent variables and dependent variables, ordinal regression was used. Logistic regression model often used to analyze ordinal outcomes (Adeleke & Adepoju, 2010). The ranking of social support features was reversely coded to have the same order of value with variables that were measured using Likert scale (personality and group identity).

5. Results

Based on the analysis, the preference of social support features in a mobile health application promoting physical activity according to employees' personality, exercise self-efficacy and group identity were established. Demographic characteristics and physical activity intensity level gave background description of the included participants.

5.1 Demographic

A total of 178 participants out of 226 participants completed the survey. 132 participants defined as included participants and the other 46 participants excluded from the survey due to the location of the company that located outside the Netherland and the types of job that did not involve a lot of sitting. The percentages of demographic characteristics elaborated in Table 4. More than half of the participants were female (59.8%) and age between 25-34 years old (53.8%). Their nationality was mostly non-Dutch (58.3%). Most of them were master's graduates (62.9%) and have been working for less than a year in the company (40.2%). Only 13 participants have chronic illnesses. Their physical activity experience on the usage of activity tracker and have done group physical activity with their colleagues also took account as that could reflect their preferences (Table. 5). The number of participants that use or have used an activity tracker (50.8%) was almost identical to the ones who never used one. More than half of them have done group physical activity with their colleagues before the pandemic situation (76.5%).

Table 4. Demographic characteristics

| Demographic characteristics | N | Percentage (%) |
|-----------------------------|-----|----------------|
| Age | 132 | 100 |
| 18-24 | 27 | 20.5 |
| 25-34 | 71 | 53.8 |
| 35-44 | 22 | 16.7 |
| 45-54 | 6 | 4.5 |
| 55-64 | 6 | 4.5 |
| Gender | 132 | 100 |
| Male | 53 | 40.2 |
| Female | 79 | 59.8 |
| Nationality | 132 | 100 |
| Dutch | 55 | 41.7 |
| Non-Dutch | 77 | 58.3 |
| Level of education | 132 | 100 |
| High school | 3 | 2.3 |
| Bachelor | 25 | 18.9 |
| Master | 83 | 62.9 |

| | | |
|----------------|-----|------|
| Doctorate | 21 | 15.9 |
| Length of work | 132 | 100 |
| <1 year | 53 | 40.2 |
| 1-2 years | 27 | 20.5 |
| 2-5 years | 24 | 18.2 |
| >5 years | 28 | 21.2 |

Table 5. Group physical activity and mHealth usage experience

| Physical activity experience | N | Percentage (%) |
|---|-----|----------------|
| Usage of an activity tracker | 132 | 100 |
| Yes | 67 | 50.8 |
| No | 65 | 49.2 |
| Group physical activity with colleagues | 132 | 100 |
| Yes | 101 | 76.5 |
| No | 31 | 23.5 |

5.2 The physical activity intensity levels

Most of the participants work from home for the last 7 days due to the pandemic situation (98.5%). The highest percentage of vigorous activity was no vigorous activity (28%) with a range of 0-420 minutes per week where the second-highest percentage were 30 - 60 minutes per week (16.7%). The highest percentage of moderate activity was no moderate activity (15%), where the second rank was between 30 to 60 minutes per week (11.4%). The highest percentage of walking activity was between 0 to 60 minutes per week (12.9%). The highest percentage of sleeping hours were 7-8 hours for the last 7 days (40.9%). By calculating the physical activity minutes per week (vigorous, moderate, and walking) subtracted by the sleeping hours per minute per week, given a result the highest percentage of sedentary behavior was 29% with its value between 6-7 hours per day. Table 6 showed that half of the respondents did not achieve the recommendation of vigorous and moderate physical activity.

Table 6. Physical activity intensity levels

| Physical activity intensity level | N | Percentage (%) |
|-----------------------------------|-----|----------------|
| Vigorous activity per minutes | 132 | 100 |
| <75 | 86 | 65.2 |
| ≥75 | 46 | 34.8 |
| Moderate activity per minutes | 132 | 100 |
| <150 | 101 | 76.5 |
| ≥150 | 31 | 23.5 |

5.3 Social support features' preferences in PSD

The blue highlights in Table 7 represents the highest percentage of each social support feature based on the ranking. The most preferred social support feature was Recognition by sending emoticon appreciation of physical activity achievements (22%) and the second rank was Cooperation by getting a group of colleagues with the same physical activity goal (21.2%). The third rank was Social Comparison by having a comparison of steps' achievement (18.9%). The fourth and fifth rank had identical results (19.7%) were Competition by having a competition for steps' achievement with colleagues. The sixth rank was Normative Influence by getting notification of a colleague's achievements on physical activity (23.5%). The least preferred were Social Facilitation by getting a reminder from colleagues to do physical activity (22.7%).

Table 7. Social support features' preferences in PSD

| Preference ranking | Social facilitation | | Cooperation | | Normative influence | | Competition | | Social learning | | Social comparison | | Recognition | |
|--------------------|---------------------|------|-------------|------|---------------------|------|-------------|------|-----------------|------|-------------------|------|-------------|------|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| Most preferred | 18 | 13.6 | 24 | 18.2 | 10 | 7.6 | 14 | 10.6 | 25 | 18.9 | 12 | 9.1 | 29 | 22 |
| 2nd rank | 16 | 12.1 | 28 | 21.2 | 15 | 11.4 | 20 | 15.2 | 22 | 16.7 | 12 | 9.1 | 19 | 14.4 |
| 3rd rank | 12 | 9.1 | 21 | 15.9 | 15 | 11.4 | 13 | 9.8 | 22 | 16.7 | 25 | 18.9 | 24 | 18.2 |
| 4th rank | 23 | 17.4 | 13 | 9.8 | 21 | 15.9 | 17 | 12.9 | 15 | 11.4 | 26 | 19.7 | 17 | 12.9 |
| 5th rank | 16 | 12.1 | 17 | 12.9 | 20 | 15.2 | 26 | 19.7 | 19 | 14.4 | 17 | 12.9 | 17 | 12.9 |
| 6th rank | 17 | 12.9 | 15 | 11.4 | 31 | 23.5 | 24 | 18.2 | 16 | 12.1 | 21 | 15.9 | 8 | 6.1 |
| Least preferred | 30 | 22.7 | 14 | 10.6 | 20 | 15.2 | 18 | 13.6 | 13 | 9.8 | 19 | 14.4 | 18 | 13.6 |
| Total (%) | 132 | 100 | 132 | 100 | 132 | 100 | 132 | 100 | 132 | 100 | 132 | 100 | 132 | 100 |

5.4 Personality

Table 8 showed based on the normal distribution at 50, the participants tend to have higher Agreeableness (71.2%) and Conscientiousness (62.9%) traits. The percentage of Openness was a bit higher than the normal distribution (59.1%), however it also tended to show weak agreement to its characteristics (\bar{x} =3.47). The participants also tend to have lower Extraversion (40.9%) and Neuroticism (34.8%) traits. Neuroticism tends to disagree with its characteristics (\bar{x} =2.87).

Table 8. Personality

| Personality | N=132 | Percentage (%) | Mean | SD |
|-------------------|-------|----------------|------|-------|
| Extraversion | 54 | 40.9 | 3.06 | 0.973 |
| Agreeableness | 94 | 71.2 | 3.76 | 0.818 |
| Conscientiousness | 83 | 62.9 | 3.56 | 0.775 |
| Neuroticism | 46 | 34.8 | 2.87 | 0.918 |
| Openness | 78 | 59.1 | 3.47 | 0.817 |

5.5 Exercise self-efficacy

Table 9 showed that most of participants have low exercise self-efficacy. The blue highlights in Table 10 showed the highest percentages of each social support feature based on each unpleasant condition. More than half of the participants preferred to have none of the interventions especially during vacation/day off (57.6%) but preferred doing the interventions after a vacation (25.8%). The least preference out of all interventions was getting a notification (Normative Influence) when they feel under pressure from work. When they were tired (29.5%), they preferred to share or get shared tips of physical activity (Social Learning), although the number of participants that preferred having none of the interventions were identical. When they were in a bad mood (48.5%), they also preferred to have none of the interventions, however, some of them (24.2%) preferred to get emoticons for their achievements of physical activity (Recognition). When they felt they had no time for physical activity, they preferred to have none of the interventions (43.9%) and however, some of them preferred (18.9%) to share or get shared tips of physical activity (Social Learning). During vacation or day off, they preferred shared or get shared tips on physical activity (Social Learning) (16.7%) despite the amount of having none of the interventions was higher. When the weather is bad, they preferred to share or get shared tips of physical activity (Social Learning) (34.1%) which the percentage was similar with having none of the intervention (37.9%). When they feel under pressure from work, they prefer to join a group of colleagues with the same physical activity goal (Cooperation) (25%). After having a vacation, they preferred to join a group of colleagues with the same physical activity goal (Cooperation) (36.4%) which was higher than having none of the intervention (25.8%). When they have too much to do at home, some of them (18.2%) preferred to get a reminder to do physical activity (Social Facilitation) and share or get shared tips of physical activity (Social Learning) where half of the participants preferred to have none of the interventions. When they have other interesting things to do, most of them preferred to have none of the interventions, but some of them (26.5%) preferred to join a group of colleagues with the same physical activity goal (Cooperation). When they lacked support from family or friends, they preferred to join a group of colleagues with the same physical activity goal (Cooperation) where it also the highest percentage (41.7%) out of all interventions.

Table 9. High and low exercise self-efficacy

| Features | Exercise self-efficacy | | | |
|---------------------|------------------------|------|------|------|
| | Low | | High | |
| | N | % | N | % |
| Social facilitation | 121 | 91.7 | 11 | 8.3 |
| Cooperation | 113 | 85.6 | 19 | 14.4 |
| Normative influence | 122 | 92.4 | 10 | 7.6 |
| Competition | 123 | 93.2 | 9 | 6.8 |

| | | | | |
|-------------------|-----|------|----|------|
| Social learning | 116 | 87.9 | 16 | 12.1 |
| Social comparison | 122 | 92.4 | 10 | 7.6 |
| Recognition | 114 | 86.4 | 18 | 13.6 |

Table 10. Exercise self-efficacy preference

| Unpleasant conditions | Social facilitation N=132 | | Cooperation N=132 | | Normative influence N=132 | | Competition N=132 | | Social learning N=132 | | Social comparison N=132 | | Recognition N=132 | | None of intervention N=132 | |
|--|------------------------------|------|----------------------|------|------------------------------|------|----------------------|------|--------------------------|------|----------------------------|------|----------------------|------|-------------------------------|------|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| When I am feeling tired | 31 | 23.5 | 38 | 28.8 | 18 | 13.6 | 23 | 17.4 | 39 | 29.5 | 20 | 15.2 | 35 | 26.5 | 39 | 29.5 |
| When I am in bad mood | 19 | 14.4 | 25 | 18.9 | 14 | 10.6 | 12 | 9.1 | 29 | 22 | 12 | 9.1 | 32 | 24.2 | 64 | 48.5 |
| When I feel I don't have time | 21 | 15.9 | 23 | 17.4 | 15 | 11.4 | 13 | 9.8 | 25 | 18.9 | 16 | 12.1 | 24 | 18.2 | 58 | 43.9 |
| When I am on vacation/day off | 18 | 13.6 | 21 | 15.9 | 18 | 13.6 | 17 | 12.9 | 22 | 16.7 | 21 | 15.9 | 21 | 15.9 | 76 | 57.6 |
| When the weather is bad | 18 | 13.6 | 31 | 23.5 | 16 | 12.1 | 17 | 12.9 | 45 | 34.1 | 21 | 15.9 | 26 | 19.7 | 50 | 37.9 |
| When I am feeling under pressure from work | 30 | 22.7 | 33 | 25 | 6 | 4.5 | 8 | 6.1 | 31 | 23.5 | 11 | 8.3 | 28 | 21.2 | 56 | 42.4 |
| After a vacation | 30 | 28.8 | 48 | 36.4 | 28 | 21.2 | 30 | 22.7 | 35 | 26.5 | 34 | 25.8 | 30 | 22.7 | 34 | 25.8 |
| When I have too much to do at home | 24 | 18.2 | 19 | 14.4 | 13 | 9.8 | 13 | 9.8 | 24 | 18.2 | 18 | 13.6 | 20 | 15.2 | 66 | 50 |
| When there are other interesting thing to do | 29 | 22 | 35 | 26.5 | 24 | 18.2 | 21 | 15.9 | 26 | 19.7 | 25 | 18.9 | 27 | 20.5 | 51 | 38.6 |
| Lack of support from family or friends | 35 | 26.5 | 55 | 41.7 | 19 | 14.4 | 19 | 14.4 | 40 | 30.3 | 22 | 16.7 | 37 | 28 | 35 | 26.5 |
| Mean | 25.5 | 19.9 | 32.8 | 24.8 | 17.1 | 12.9 | 17.3 | 13.1 | 31.6 | 23.9 | 20 | 15.1 | 28 | 21.2 | 52.9 | 40 |

5.6 Supportive role

Table 11 described that most of the participants were willing to invite other colleagues to do the interventions ($\bar{x}=36.1$). They were most willing to invite others (47.7%) to get a group of colleagues with the same physical activity goal (Cooperation). Based on the percentage from both interventions, the participants who had lower supportive roles preferred Normative Influence, Competition, Social Comparison, and Recognition where participants who had higher supportive roles preferred Social Facilitation, Cooperation, and Social Learning.

Table 11. Supportive role

| Features | Invite others N=132 | | Initiate the activity N=132 | |
|--------------------------|------------------------|------|--------------------------------|------|
| | N | % | N | % |
| Social facilitation | 42 | 31.8 | 33 | 25 |
| Cooperation | 63 | 47.7 | 52 | 39.4 |
| Normative influence | 21 | 15.9 | 21 | 15.9 |
| Competition | 20 | 15.2 | 20 | 15.2 |
| Social learning | 48 | 36.4 | 33 | 25 |
| Social comparison | 34 | 25.8 | 20 | 15.2 |
| Recognition | 37 | 28 | 31 | 23.5 |
| None of the intervention | 24 | 18.2 | 30 | 22.7 |
| Mean | 36.1 | 27.4 | 30.0 | 22.7 |

5.7 Group identity

Higher and lower group identity were divided into two identically. The participants tend to have positive feelings associated with membership in the group (In-group affect) where the participants agreed with its characteristics (Table 12).

Table 12. Group identity

| Group Identity | N=132 | Percentage (%) | Mean |
|-----------------|-------|----------------|------|
| Low | 66 | 50 | 4.31 |
| High | 66 | 50 | 5.47 |
| Centrality | 87 | 65.9 | 4.39 |
| In-group affect | 128 | 97 | 5.6 |
| In-group ties | 101 | 76.5 | 4.69 |

5.8 Relationship

5.8.1 Demographic characteristics – Social support features preference

According to the demographic characteristics, most of the participants preferred Recognition and Cooperation the most and least preferred Social Facilitation. However, males preferred Social learning (Appendix. 1)

5.8.2 Physical activity intensity levels – Social support features preferences

Based on the participants' physical activity intensity levels, relationship with social support features was investigated (Appendix. 2). Participants who did not achieve moderate and vigorous physical activity recommendations preferred getting emoticons for their achievements of physical activity (Recognition) the most (16.7% and 15.90%). Participants who achieved moderate physical activity recommendations preferred getting emoticons for

their achievements of physical activity (Recognition) the most (5.30%). Participants who achieved vigorous physical activity recommendations preferred to share or get shared tips for physical activity (Social Learning) (9.10%). All of the participants least preferred getting a reminder from colleagues to do physical activity (Social Facilitation).

5.8.3 Personality – Social support preference

The blue highlights in Appendix 3 showed that most and least preferred social support features based on personality traits. Personality traits showed that employees with lower Extraversion (12.1% out of 40.9%) preferred getting a group of colleagues with the same physical activity goal (Cooperation) while higher Agreeableness (15.2% out of 71.2%), higher Conscientiousness (15.2% out of 62.9%), and lower Neuroticism (15.9% out of 34.8%), preferred getting emoticons for their achievements of physical activity (Recognition). Only higher Openness (12.1% out of 59.1%) preferred Social Learning. All personality traits least preferred getting a reminder from colleagues to do physical activity (Social Facilitation) except higher Extraversion and Neuroticism that least preferred getting notification of a colleague's achievements on physical activity (Normative Influence).

5.8.4 Exercise self-efficacy – Social support preference

Based on the amount of blue highlights and mean value in each physical activity intervention (Table 10), the participants who had higher exercise self-efficacy preferred Cooperation and Social Learning, however Social Learning have higher preference in unpleasant conditions and Cooperation have higher mean value which represent the more likely to be chosen. Participants who had lower exercise self-efficacy preferred Normative Influence and Competition.

5.8.5 Group identity – Social support preference

Participants with lower group identity preferred Social Learning (10.6%) and Recognition (10.6%) the most and least preferred Social Facilitation (10.6%) (Appendix. 4). Participants with higher group identity preferred Recognition (11.4%) the most and least preferred Social Facilitation (12.1%). In-group affect plays a role in higher self-efficacy's preference (Appendix. 5)

5.9 Correlation

There was significant correlation between social support features (Social Facilitation, Cooperation, Normative Influence, Comparison, and Recognition) with exercise self-efficacy and several personality traits (Appendix. 6). It showed positive correlation between exercise self-efficacy with Social Facilitation ($\alpha=0.001$), Cooperation ($\alpha=0.001$), Normative Influence

($\alpha=0.004$), and Recognition ($\alpha=0.031$) which means that the higher the mean value of self-efficacy, the higher preference for those features. Personality traits also showed positive correlation between lower Openness and Cooperation ($\alpha=0.043$), lower Neuroticism and Comparison ($\alpha=0.001$), lower Extraversion and Normative Influence ($\alpha=0.016$). Lower Extraversion showed negative correlation with Recognition ($\alpha=0.041$). There was no correlation between social support features and group identity.

6. Discussions

Defining employee's preferences aims to find suitable group-based physical activity interventions based on personality, exercise self-efficacy, group identity to motivate employees to be more physically active while working remotely. The COVID-19 outbreak could provide a depiction of working from home or working remotely which can affect social relations and support among workers. The need for social support is assumed increase when an individual has to face unwanted or unpredicted change (Leonard Pearlin et al., 1981). This condition might affect people's social support preference to fulfill their support needs where most of them preferred Recognition as emotional support and Cooperation to gather and do physical activity together. These results would give insights for several options of interventions in order to avoid one-size-fits-all intervention.

This study found that Recognition and Cooperation are the most preferred social support features for all personality traits except higher Openness that preferred Social Learning. Cooperation also preferred and gave higher chances to increase interaction by inviting colleagues to join the intervention. People with higher Agreeableness and Conscientiousness traits preferred getting support through emoticons for their achievements of physical activity (Recognition) the most. Most of the participants had Agreeableness traits where they tend to be good-natured, trusting, and cooperative. This might be explained by the fact that this type of personality was motivated to look good from other people's perspectives (Tobin, 2002) by recognizing colleagues' achievements in physical activity. Their warm characteristics are also linked to higher perceived availability of social support and perceived received support (Treacy, Bolkan, & Sagbakken, 2018). Higher Agreeableness is also associated with their ability to form an offline friendship that cannot be conducted due to working from home (Liu & Campbell, 2017) which might change the way they interact via online to maintain their friendship. High Conscientiousness tends to be reliable to give or get an emoticon through mobile device applications. They tend to be disciplined and organized which could relate to spending less time on social network sites. However, working from home due to the outbreak might change their social needs. The reason for their preference through Recognition features might be influenced by the need to socialize. People with higher Openness characteristics tend to be creative and curious which might influence their preference in Social Learning features by sharing or getting shared information about physical activity. The preference ranking of Social Learning corresponded to one study that did not consider social learning to be an important aspect of persuasive applications (Matthews, Win, Oinas-Kukkonen, & Freeman, 2016). Lower Neuroticism preference is linked to better social functioning (Back et al., 2011; Wilson et al., 2015) which corresponds to Recognition as their preferred social

support features. This type of trait tends to handle stress well and as a result may lead to a lower need for social support (Funder & Sneed, 2003). Lower Neuroticism was associated with more physical activity and less inactivity and sedentary behavior (Sutin et al., 2016). This means that people with lower Neuroticism find physical activity to be enjoyable (Rhodes, Courneya, & Jones, 2003) and being recognized for physical activity achievement through getting emoticons could enhance their motivation. Lower Extraversion preferred getting a group of colleagues with the same physical activity goal (Cooperation). It suits with Barańczuk (2019) suggestion that human resource practitioners and clinicians could concentrate on providing people low in extraversion could be provided with programs that increase the ability to form good and intimate social relationships by developing interpersonal competence, social skills, and assertiveness. Having a group of colleagues with the same physical activity goal through Cooperation feature would be a great start to persuade this type of personality especially due to an outbreak physically and improve togetherness between colleagues. However, the results appear to be contradictory to its trait since lower Extraversion tends to be less outgoing. According to its trait, it showed that the participants tend to use social media less to communicate and may not find physical activity as rewarding (Sutin et al., 2016) It corresponds with a negative correlation with Recognition whereas they do not find emoticons as a reward for their physical activity achievement from their colleagues. Lower Extraversion tends to be less outgoing, however they are still seeking social attention. This might also explain the positive correlation with Normative Influence because they preferred to be notified by others' physical activity achievement.

Figure 2. showed a model of social support features for each personality trait which most of the traits preferred Recognition. In terms of an employee, recognition of employee's achievements give a positive environment to improve motivation and their moods especially most of the participants (Phillips et al., 2017). Giving an emoticon of other colleagues' physical activity achievement could also be defined as emotional support. Whereas having a significant association with physical activity enhances encouragement with others to perform intended behavior together (Laux et al., 2018; Stephan, Sutin, & Terracciano, 2014).

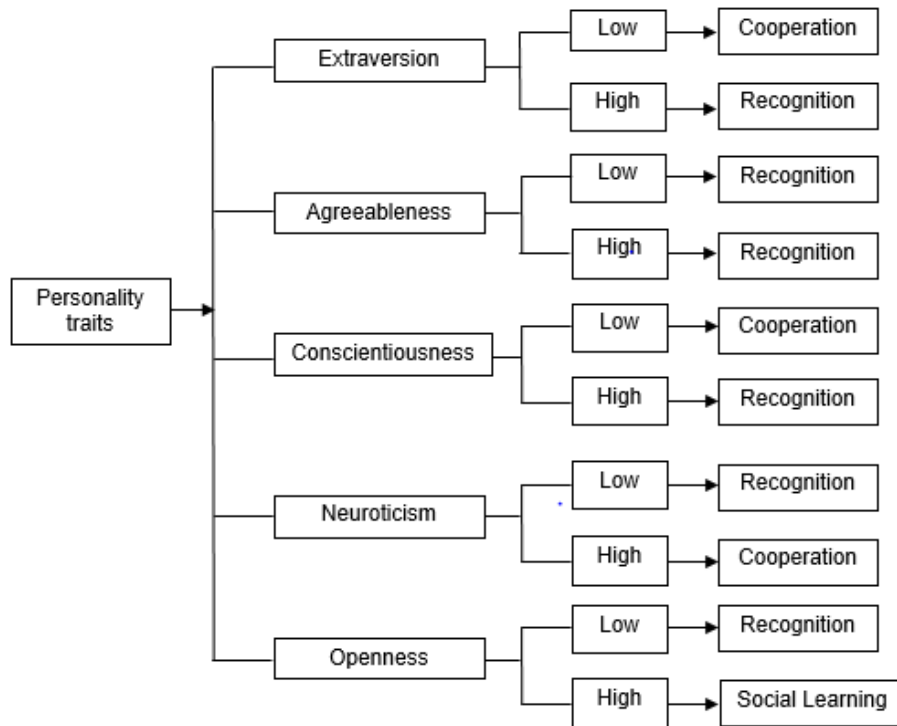


Figure 2. Model for social support features based on personality trait

A model in Figure 3. showed the different preferences of social support features between high and low exercise self-efficacy. People with higher exercise self-efficacy already believe in their ability for doing physical activity which it only needs to be enhanced by giving social support such as Cooperation and Social Learning. Social learning gives the possibility to share information to other colleagues which is an activity that people likely do during unpleasant situations (tired, don't have time, on vacation, weather is bad, too much to do at home). Cooperation is the most preferred intervention after vacation, when they lack support from family or friends, and when they have other interests to do. The feeling of wanting to meet and group with other colleagues to do physical activity influenced and improve togetherness. The presence of a group that has the same goal could attract people even when they have other interests to do. As stated by Bandura in Robbins. S (2014), vicarious modeling and similar conditions could improve the self-efficacy and Cooperation and Social Learning features implemented. People with lower exercise self-efficacy needs to be challenged by getting notification of colleagues' physical activity achievement (Normative Influence) or having a competition (Competition). It corresponds to Bandura (Warner & Wurm, 2011), individuals who lack exercise self-efficacy could gain ambition and self-belief through the presence of social support. The role of the supportive role is important to be the one who invites others to join or to be the one who initiates the activity. This role is important to maintain the sustainability of

the activities and also maintain relations with colleagues. Cooperation as the most preferred intervention has required an invitation from other colleagues to make a group.

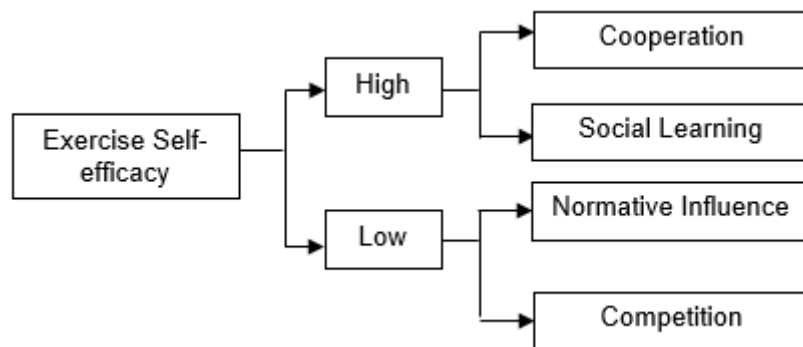


Figure 3. Model for social support features based on exercise self-efficacy

Figure 4. showed that people with a higher level of group identity preferred Recognition the most and people with a lower level of group identity preferred Social Learning and Recognition. The feeling of getting recognition from their colleagues through emoticons gives a positive feeling (In-group affect) that the person was associated with the group. This also implies that by giving emoticons, colleagues will also send back to align with the norms and activities in the group (Stevens et al., 2017). According to (Cameron, 2004), the emotional relationship between the members in the group plays a huge role in group identity theory which a group with a low level of group identity drives conflicts such as leaving the group. These results would also be affected by the fact that the participants working in the same company which makes it hard to leave the group. However, the results of group identity may be biased because employees have not met with their colleagues.

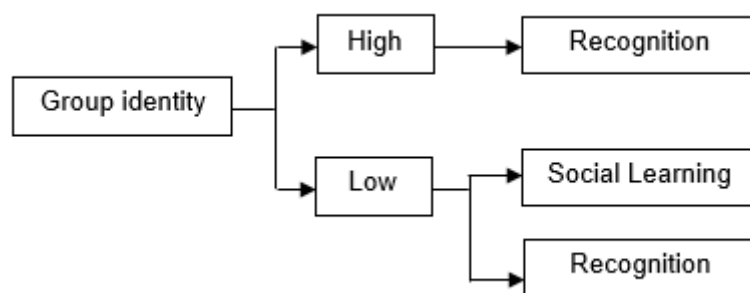


Figure 4. Model for social support features based on group identity

Figures 2, 3, and 4 could be used as a filter suggestions model for social support features in mobile health applications according to the results of employees' characteristics which influenced their preferences. Figure 5 showed the correlation of three variables (personality, exercise self-efficacy, and group identity) with the social support features. It showed that

exercise self-efficacy plays an important role in 4 out of 7 features in social support features which correlates with Everett, Salamonson, & Davidson (2009) and Bandura’s statement in Warner & Wurm (2011). This model (Figure. 5) would be beneficial as additional information to define social support preferences. Cooperation is the feature that shows significant correlation and align with the cross-tabulation results for exercise self-efficacy.

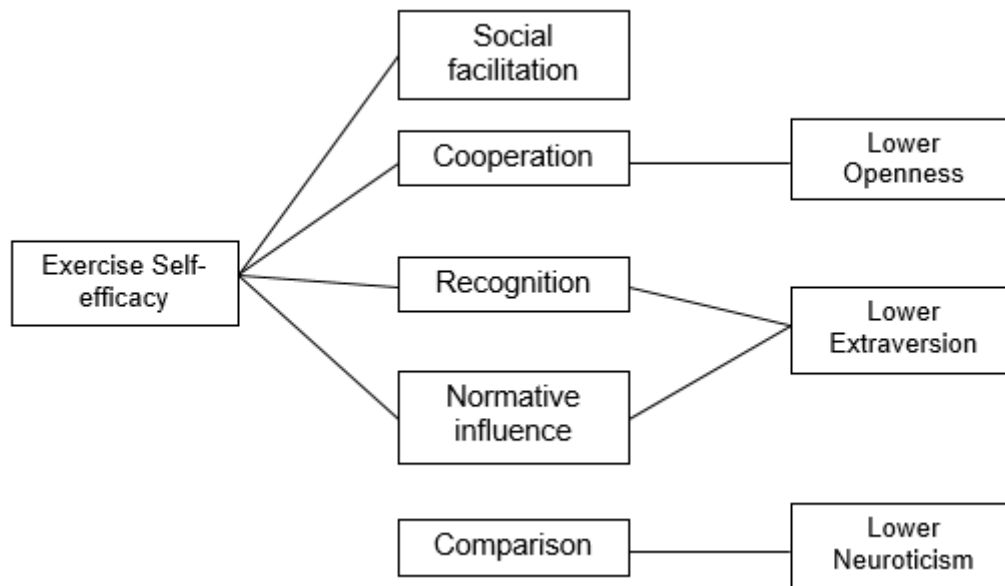


Figure 5. Model for social support features preference based on correlation with exercise self-efficacy and personality

7. Strength and limitation

There was a change of the study design due to the COVID-19 outbreak from experimental studies to survey studies that might affect the results. This circumstance could provide an overview of the possibility of working remotely that might be continued by the company in the future. Another strength of this study is the specific ranking of the preferences where the participants could only choose one rank for each intervention rather than using a Likert scale that has an interval. The limitation of this study is the sample size that will hardly represent the population and variance of the participants because of the dispersion of the questionnaire mostly in the academic environment. Another limitation is the group of the Likert scale result to determine the characteristic therefore this would limit valuable and specific information. Group identity results could be biased because employees have not seen their colleagues due to the outbreak that made them working from home.

8. Future works

For future studies, using more specific type of questionnaire to define personality traits would give deeper trait classification. The usage of Likert scale to measure exercise self-efficacy for preferred interventions would give a more specific level of beliefs. The results of group identity also might differ and needs to be compared after the activity has gone back to normal. Overall, it would be beneficial to investigate the combination of independent variables using the discrete choice to define a profile using a discrete choice model to gain more specific features as a suggestion to fit their needs and preferences. Based on the preferred features, the engagement of mobile health applications using social support features to motivate physical activity also suggested to be investigated.

9. Conclusion

The conclusion of this study by answering research questions: (1) Personality traits showed that employees with lower Extraversion preferred Cooperation while higher Agreeableness, higher Conscientiousness and lower Neuroticism preferred Recognition. Only higher Openness preferred Social Learning; (2) Employees with high exercise self-efficacy preferred Social Learning and Cooperation features while employees with low exercise self-efficacy preferred Normative Influence, Competition, and Social Comparison; (3) Employees with high and low group identity preferred Recognition, however low group identity also preferred Social Learning. This study contributes for health promotion providers and mobile application developers to maximize the usage of their product's features according to the intention of the developer.

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Appendix

Appendix 1. Demographic - Social support features preferences

| Features | Preference rank | Age (%) | | | | | Gender (%) | | Nationality (%) | | Level of education (%) | | | | Length of work (%) | | | |
|---------------------|-----------------|---------|-------|-------|-------|-------|------------|--------|-----------------|-----------|------------------------|----------|--------|-----------|--------------------|-----------|-----------|----------|
| | | 18-24 | 25-34 | 35-44 | 45-54 | 55-64 | Male | Female | Dutch | Non-Dutch | High school | Bachelor | Master | Doctorate | <1 year | 1-2 years | 2-5 years | >5 years |
| Social facilitation | 1st | 3 | 6.8 | 2.3 | 0 | 1.5 | 6.8 | 6.8 | 6.1 | 7.6 | 0 | 3.8 | 8.3 | 1.5 | 6.1 | 3 | 2.3 | 2.3 |
| | 2nd | 2.3 | 6.1 | 2.3 | 0.8 | 0.8 | 4.5 | 7.6 | 4.5 | 7.6 | 0 | 2.3 | 8.3 | 1.5 | 8.3 | 0.8 | 0.8 | 2.3 |
| | 3rd | 2.3 | 4.5 | 1.5 | 0 | 0.8 | 4.5 | 4.5 | 2.3 | 6.8 | 0.8 | 2.3 | 3.8 | 2.3 | 6.1 | 0.8 | 0 | 2.3 |
| | 4th | 3 | 9.8 | 1.5 | 1.5 | 1.5 | 6.8 | 10.6 | 6.8 | 10.6 | 0 | 2.3 | 12.9 | 2.3 | 3.8 | 6.1 | 3.8 | 3.8 |
| | 5th | 3.8 | 6.8 | 1.5 | 0 | 0 | 5.3 | 6.8 | 5.3 | 6.8 | 0.8 | 1.5 | 8.3 | 1.5 | 5.3 | 2.3 | 3 | 1.5 |
| | 6th | 2.3 | 6.1 | 4.5 | 0 | 0 | 3.8 | 9.1 | 3 | 9.8 | 0 | 3.8 | 6.8 | 2.3 | 4.5 | 1.5 | 4.5 | 2.3 |
| | 7th | 3.8 | 13.6 | 3 | 2.3 | 0 | 8.3 | 14.4 | 13.6 | 9.1 | 0.8 | 3 | 14.4 | 4.5 | 6.1 | 6.1 | 3.8 | 6.8 |
| Cooperation | 1st | 4.5 | 10.6 | 2.3 | 0.8 | 0 | 3.8 | 14.4 | 7.6 | 10.6 | 0.8 | 4.5 | 10.6 | 2.3 | 11.4 | 2.3 | 1.5 | 3 |
| | 2nd | 6.8 | 8.3 | 4.5 | 0.8 | 0.8 | 9.8 | 11.4 | 8.3 | 12.9 | 0.8 | 5.3 | 12.9 | 2.3 | 6.8 | 5.3 | 4.5 | 4.5 |
| | 3rd | 3 | 6.1 | 2.3 | 2.3 | 2.3 | 6.1 | 9.8 | 9.1 | 6.8 | 0 | 3 | 10.6 | 2.3 | 4.5 | 1.5 | 4.5 | 5.3 |
| | 4th | 0.8 | 6.8 | 2.3 | 0 | 0 | 3.8 | 6.1 | 4.5 | 5.3 | 0 | 0.8 | 5.3 | 3.8 | 4.5 | 1.5 | 0.8 | 3 |
| | 5th | 2.3 | 6.8 | 3 | 0 | 0.8 | 6.8 | 6.1 | 4.5 | 8.3 | 0 | 1.5 | 7.6 | 3.8 | 3 | 4.5 | 3 | 2.3 |
| | 6th | 1.5 | 7.6 | 1.5 | 0.8 | 0 | 3.8 | 7.6 | 5.3 | 6.1 | 0.8 | 0.8 | 9.1 | 0.8 | 5.3 | 2.3 | 2.3 | 1.5 |
| | 7th | 1.5 | 7.6 | 0.8 | 0 | 0.8 | 6.1 | 4.5 | 2.2 | 8.3 | 0 | 3 | 6.8 | 0.8 | 4.5 | 3 | 1.5 | 1.5 |
| Normative influence | 1st | 1.5 | 6.1 | 0 | 0 | 0 | 3 | 4.5 | 3.8 | 3.8 | 0 | 0.8 | 6.8 | 0 | 2.3 | 3 | 1.5 | 0.8 |
| | 2nd | 2.3 | 4.5 | 2.3 | 0.8 | 1.5 | 4.5 | 6.8 | 4.5 | 6.8 | 0.8 | 1.5 | 7.6 | 1.5 | 3.8 | 0.8 | 3 | 3.8 |
| | 3rd | 4.5 | 6.1 | 0.8 | 0 | 0 | 6.1 | 5.3 | 2.3 | 9.1 | 0 | 4.5 | 5.3 | 1.5 | 4.5 | 4.5 | 1.5 | 0.8 |
| | 4th | 3.8 | 8.3 | 3 | 0 | 0.8 | 6.8 | 9.1 | 7.6 | 8.3 | 0 | 3.8 | 9.8 | 2.3 | 8.3 | 3 | 1.5 | 3 |
| | 5th | 0 | 9.1 | 2.3 | 2.3 | 1.5 | 4.5 | 10.6 | 9.1 | 6.1 | 0 | 1.5 | 10.6 | 3 | 7.6 | 0 | 2.3 | 5.3 |
| | 6th | 6.1 | 13.6 | 2.3 | 0.8 | 0.8 | 10.6 | 12.9 | 9.1 | 14.4 | 0.8 | 6.1 | 12.1 | 4.5 | 8.3 | 6.8 | 3 | 5.3 |
| | 7th | 2.3 | 6.1 | 6.1 | 0.8 | 0 | 4.5 | 10.6 | 5.3 | 9.8 | 0.8 | 0.8 | 10.6 | 3 | 5.3 | 2.4 | 5.3 | 2.3 |
| Competition | 1st | 2.3 | 6.1 | 2.3 | 0 | 0 | 3.8 | 6.8 | 3 | 7.6 | 0 | 2.3 | 5.3 | 3 | 2.3 | 3 | 2.3 | 3 |
| | 2nd | 3.8 | 9.8 | 0.8 | 0 | 0.8 | 7.6 | 7.6 | 6.8 | 8.3 | 0 | 4.5 | 7.6 | 2.3 | 6.1 | 3.8 | 2.3 | 3 |
| | 3rd | 0.8 | 4.5 | 3.8 | 0 | 0.8 | 3 | 6.8 | 4.5 | 5.3 | 0 | 0.8 | 8.3 | 0.8 | 4.5 | 0.8 | 3 | 1.5 |
| | 4th | 2.3 | 7.6 | 2.3 | 0 | 0.8 | 3.8 | 9.1 | 4.5 | 8.3 | 0.8 | 2.3 | 8.3 | 1.5 | 6.1 | 2.3 | 2.3 | 2.3 |
| | 5th | 5.3 | 9.8 | 3.8 | 0.8 | 0 | 6.8 | 12.9 | 7.6 | 12.1 | 0.8 | 6.1 | 10.6 | 2.3 | 7.6 | 4.5 | 3 | 4.5 |
| | 6th | 3 | 7.6 | 2.3 | 3 | 2.3 | 9.1 | 9.1 | 10.6 | 7.6 | 0 | 2.3 | 11.4 | 4.5 | 6.8 | 2.3 | 3 | 6.1 |
| | 7th | 3 | 8.3 | 1.5 | 0.8 | 0 | 6.1 | 7.6 | 4.5 | 9.1 | 0 | 0.8 | 11.4 | 1.5 | 6.8 | 3.8 | 2.3 | 0.8 |
| Social learning | 1st | 3.8 | 8.3 | 3.8 | 2.3 | 0.8 | 10.6 | 8.3 | 8.3 | 10.6 | 0 | 2.3 | 12.9 | 3.8 | 6.8 | 3.8 | 5.3 | 3 |
| | 2nd | 0 | 11.4 | 3.8 | 0.8 | 0.8 | 3.8 | 12.9 | 8.3 | 8.3 | 0 | 1.5 | 11.4 | 3.8 | 5.3 | 3.8 | 2.3 | 5.3 |
| | 3rd | 2.3 | 10.6 | 3 | 0.8 | 0 | 5.3 | 11.4 | 5.3 | 11.4 | 0.8 | 2.3 | 10.6 | 3 | 9.1 | 3 | 2.3 | 2.3 |
| | 4th | 2.3 | 6.1 | 0.8 | 0.8 | 1.5 | 6.8 | 4.5 | 6.1 | 5.3 | 0 | 1.5 | 9.1 | 0.8 | 3.8 | 3 | 2.3 | 2.3 |
| | 5th | 3.8 | 6.1 | 3 | 0 | 1.5 | 4.5 | 9.8 | 6.1 | 8.3 | 0.8 | 3 | 9.1 | 1.5 | 4.5 | 3 | 3 | 3.8 |
| | 6th | 3 | 8.3 | 0.8 | 0 | 0 | 5.3 | 6.8 | 4.5 | 7.6 | 0 | 3.8 | 6.8 | 1.5 | 6.8 | 2.3 | 0.8 | 2.3 |
| | 7th | 5.3 | 3 | 1.5 | 0 | 0 | 3.8 | 6.1 | 3 | 6.8 | 0.8 | 4.5 | 3 | 1.5 | 3.8 | 1.5 | 2.3 | 2.3 |
| Social comparison | 1st | 2.3 | 3.8 | 2.3 | 0.8 | 0 | 4.5 | 4.5 | 2.3 | 6.8 | 0.8 | 3.8 | 3.6 | 0.8 | 4.5 | 0.8 | 1.5 | 2.3 |
| | 2nd | 1.5 | 6.1 | 1.5 | 0 | 0 | 4.5 | 4.5 | 2.3 | 6.8 | 0 | 0.8 | 6.1 | 2.3 | 3.8 | 3 | 0.8 | 1.5 |
| | 3rd | 3.8 | 11.4 | 3 | 0.8 | 0 | 5.3 | 13.6 | 12.1 | 6.8 | 0 | 1.5 | 12.9 | 4.5 | 6.1 | 4.5 | 3 | 5.3 |
| | 4th | 4.5 | 9.8 | 3.8 | 1.5 | 0 | 6.8 | 12.9 | 6.1 | 13.6 | 0.8 | 4.5 | 12.9 | 1.5 | 6.8 | 3 | 6.1 | 3.8 |

| | | | | | | | | | | | | | | | | | | |
|-------------|-----|-----|------|-----|-----|-----|-----|------|------|------|-----|-----|------|-----|-----|-----|-----|-----|
| | 5th | 2.3 | 6.8 | 1.5 | 1.5 | 0.8 | 5.3 | 7.6 | 6.8 | 6.8 | 0 | 2.3 | 6.8 | 3.8 | 4.5 | 3 | 2.3 | 3 |
| | 6th | 3.8 | 6.8 | 3.8 | 0 | 1.5 | 6.1 | 9.8 | 6.8 | 9.1 | 0.8 | 2.3 | 12.1 | 0.8 | 5.3 | 5.3 | 3 | 2.3 |
| | 7th | 2.3 | 9.1 | 0.8 | 0 | 2.3 | 7.6 | 6.8 | 6.1 | 8.3 | 0 | 3.8 | 8.3 | 2.3 | 9.1 | 0.8 | 1.5 | 3 |
| Recognition | 1st | 3 | 12.1 | 3.8 | 0.8 | 2.3 | 7.6 | 14.4 | 10.6 | 11.4 | 0.8 | 1.5 | 15.2 | 4.5 | 6.8 | 4.5 | 3.8 | 6.8 |
| | 2nd | 3.8 | 7.6 | 1.5 | 1.5 | 0 | 5.3 | 9.1 | 6.8 | 7.6 | 0 | 3 | 9.1 | 2.3 | 6.1 | 3 | 4.5 | 0.8 |
| | 3rd | 3.8 | 10.6 | 2.3 | 0.8 | 0.8 | 9.8 | 8.3 | 6.1 | 12.1 | 0.8 | 4.5 | 11.4 | 1.5 | 5.3 | 5.3 | 3.8 | 3.8 |
| | 4th | 3.8 | 5.3 | 3 | 0.8 | 0 | 5.3 | 7.6 | 6.1 | 6.8 | 0.8 | 3.8 | 4.5 | 3.8 | 6.8 | 1.5 | 1.5 | 3 |
| | 5th | 3 | 0.3 | 1.5 | 0 | 0 | 6.8 | 6.1 | 3 | 9.8 | 0 | 3 | 9.8 | 0 | 7.6 | 3 | 1.5 | 0.8 |
| | 6th | 0.8 | 3.8 | 1.5 | 0 | 0 | 1.5 | 4.5 | 2.3 | 3.8 | 0 | 0 | 4.5 | 1.5 | 3 | 0 | 1.5 | 1.5 |
| | 7th | 2.3 | 6.1 | 3 | 0.8 | 1.5 | 3.8 | 9.8 | 6.8 | 6.8 | 0 | 3 | 8.3 | 2.3 | 4.5 | 3 | 1.5 | 4.5 |

Appendix 2. Physical activity intensity level – social support features preferences

| Features | Preference rank | Moderate activity (%) | | | | Vigorous activity (%) | | | |
|---------------------|-----------------|-----------------------|--------|------|--------|-----------------------|--------|------|--------|
| | | <150 | | ≥150 | | <75 | | ≥75 | |
| | | N=101 | %=76.5 | N=31 | %=26.5 | N=86 | %=65.2 | N=46 | %=34.8 |
| Social facilitation | 1st | 13 | 9.80% | 5 | 3.80% | 13 | 9.80% | 5 | 3.80% |
| | 2nd | 14 | 10.60% | 2 | 1.50% | 13 | 9.80% | 3 | 2.30% |
| | 3rd | 8 | 6.10% | 4 | 3.00% | 6 | 4.50% | 6 | 4.50% |
| | 4th | 14 | 10.60% | 9 | 6.80% | 14 | 10.60% | 9 | 6.80% |
| | 5th | 15 | 11.40% | 1 | 0.80% | 8 | 6.10% | 8 | 6.10% |
| | 6th | 15 | 11.40% | 2 | 1.50% | 12 | 9.10% | 5 | 3.80% |
| | 7th | 22 | 16.70% | 8 | 6.10% | 20 | 15.20% | 10 | 7.60% |
| Cooperation | 1st | 19 | 14.40% | 5 | 3.80% | 15 | 11.40% | 9 | 6.80% |
| | 2nd | 21 | 15.90% | 7 | 5.30% | 16 | 12.10% | 12 | 9.10% |
| | 3rd | 14 | 10.60% | 7 | 5.30% | 15 | 11.40% | 6 | 4.50% |
| | 4th | 9 | 6.80% | 4 | 3.00% | 7 | 5.30% | 6 | 4.50% |
| | 5th | 11 | 8.30% | 6 | 4.50% | 12 | 9.10% | 5 | 3.80% |
| | 6th | 14 | 10.60% | 1 | 0.80% | 13 | 9.80% | 2 | 1.50% |
| | 7th | 13 | 9.80% | 1 | 0.80% | 8 | 6.10% | 6 | 4.50% |
| Normative influence | 1st | 8 | 6.10% | 2 | 1.50% | 6 | 4.50% | 4 | 3.00% |
| | 2nd | 11 | 8.30% | 4 | 3.00% | 12 | 9.10% | 3 | 2.30% |
| | 3rd | 13 | 9.80% | 2 | 1.50% | 10 | 7.60% | 5 | 3.80% |
| | 4th | 16 | 12.10% | 5 | 3.80% | 14 | 10.60% | 7 | 5.30% |
| | 5th | 12 | 9.10% | 8 | 6.10% | 13 | 9.80% | 7 | 5.30% |
| | 6th | 23 | 17.40% | 8 | 6.10% | 19 | 14.40% | 12 | 9.10% |
| | 7th | 18 | 13.60% | 2 | 1.50% | 12 | 9.10% | 8 | 6.10% |
| Competition | 1st | 10 | 7.60% | 4 | 3.00% | 7 | 5.30% | 7 | 5.30% |
| | 2nd | 15 | 11.40% | 5 | 3.80% | 12 | 9.10% | 8 | 6.10% |
| | 3rd | 11 | 8.30% | 2 | 1.50% | 10 | 7.60% | 3 | 2.30% |
| | 4th | 12 | 9.10% | 5 | 3.80% | 13 | 9.80% | 4 | 3.00% |
| | 5th | 22 | 16.70% | 4 | 3.00% | 16 | 12.10% | 10 | 7.60% |
| | 6th | 17 | 12.90% | 7 | 5.30% | 16 | 12.10% | 8 | 6.10% |
| | 7th | 14 | 10.60% | 4 | 3.00% | 12 | 9.10% | 6 | 4.50% |
| Social learning | 1st | 19 | 14.40% | 6 | 4.50% | 13 | 9.80% | 12 | 9.10% |
| | 2nd | 16 | 12.10% | 6 | 4.50% | 16 | 12.10% | 6 | 4.50% |
| | 3rd | 18 | 13.60% | 4 | 3.00% | 16 | 12.10% | 6 | 4.50% |
| | 4th | 10 | 7.60% | 5 | 3.80% | 9 | 6.80% | 6 | 4.50% |
| | 5th | 14 | 10.60% | 5 | 3.80% | 13 | 9.80% | 6 | 4.50% |
| | 6th | 15 | 11.40% | 1 | 0.80% | 11 | 8.30% | 5 | 3.80% |
| | 7th | 9 | 6.80% | 4 | 3.00% | 8 | 6.10% | 5 | 3.80% |
| Comparison | 1st | 10 | 7.60% | 2 | 1.50% | 11 | 8.30% | 1 | 0.80% |
| | 2nd | 10 | 7.60% | 2 | 1.50% | 7 | 5.30% | 5 | 3.80% |
| | 3rd | 17 | 12.90% | 8 | 6.10% | 17 | 12.90% | 8 | 6.10% |
| | 4th | 24 | 18.20% | 2 | 1.50% | 18 | 13.60% | 8 | 6.10% |
| | 5th | 13 | 9.80% | 4 | 3.00% | 10 | 7.60% | 7 | 5.30% |
| | 6th | 12 | 9.10% | 9 | 6.80% | 10 | 7.60% | 11 | 8.30% |
| | 7th | 15 | 11.40% | 4 | 3.00% | 13 | 9.80% | 6 | 4.50% |
| Recognition | 1st | 22 | 16.70% | 7 | 5.30% | 21 | 15.90% | 8 | 6.10% |
| | 2nd | 14 | 10.60% | 5 | 3.80% | 10 | 7.60% | 9 | 6.80% |
| | 3rd | 20 | 15.20% | 4 | 3.00% | 12 | 9.10% | 12 | 9.10% |
| | 4th | 16 | 12.10% | 1 | 0.80% | 11 | 8.30% | 6 | 4.50% |
| | 5th | 14 | 10.60% | 3 | 2.30% | 14 | 10.60% | 3 | 2.30% |
| | 6th | 5 | 3.80% | 3 | 2.30% | 5 | 3.80% | 3 | 2.30% |
| | 7th | 10 | 7.60% | 8 | 6.10% | 13 | 9.80% | 5 | 3.80% |

Appendix 3. Personality – social support features preference

| Features | Preference rank | Extraversion | | | | Agreeableness | | | | Conscientiousness | | | | Neuroticism | | | | Openness | | | |
|---------------------|-----------------|--------------|---------|-------|---------|---------------|---------|-------|---------|-------------------|---------|-------|---------|-------------|---------|-------|---------|----------|---------|-------|---------|
| | | Low | | High | | Low | | High | | Low | | High | | Low | | High | | Low | | High | |
| | | N =78 | % =59.1 | N =54 | % =40.9 | N =38 | % =28.8 | N =94 | % =71.2 | N =49 | % =37.1 | N =83 | % =62.9 | N =86 | % =65.2 | N =46 | % =34.8 | N =54 | % =40.9 | N =78 | % =59.1 |
| Social facilitation | 1st | 13 | 9.8% | 5 | 3.8% | 4 | 3.0% | 14 | 10.6% | 8 | 6.1% | 10 | 7.6% | 12 | 9.1% | 6 | 4.5% | 5 | 3.8% | 13 | 9.8% |
| | 2nd | 9 | 6.8% | 7 | 5.3% | 5 | 3.8% | 11 | 8.3% | 6 | 4.5% | 10 | 7.6% | 11 | 8.3% | 5 | 3.8% | 10 | 7.6% | 6 | 4.5% |
| | 3rd | 6 | 4.5% | 6 | 4.5% | 7 | 5.3% | 5 | 3.8% | 5 | 3.8% | 7 | 5.3% | 6 | 4.5% | 6 | 4.5% | 7 | 5.3% | 5 | 3.8% |
| | 4th | 15 | 11.4% | 8 | 6.1% | 4 | 3.0% | 19 | 14.4% | 8 | 6.1% | 15 | 11.4% | 17 | 12.9% | 6 | 4.5% | 7 | 5.3% | 16 | 12.1% |
| | 5th | 9 | 6.8% | 7 | 5.3% | 2 | 1.5% | 14 | 10.6% | 5 | 3.8% | 11 | 8.3% | 10 | 7.6% | 6 | 4.5% | 3 | 2.3% | 13 | 9.8% |
| | 6th | 6 | 4.5% | 11 | 8.3% | 5 | 3.8% | 12 | 9.1% | 5 | 3.8% | 12 | 9.1% | 10 | 7.6% | 7 | 5.3% | 10 | 7.6% | 7 | 5.3% |
| | 7th | 20 | 15.2% | 10 | 7.6% | 11 | 8.3% | 19 | 14.4% | 12 | 9.1% | 18 | 13.6% | 20 | 15.2% | 10 | 7.6% | 12 | 9.1% | 18 | 13.6% |
| Cooperation | 1st | 16 | 12.1% | 8 | 6.1% | 7 | 5.3% | 17 | 12.9% | 9 | 6.8% | 15 | 11.4% | 12 | 9.1% | 12 | 9.1% | 11 | 8.3% | 13 | 9.8% |
| | 2nd | 17 | 12.9% | 11 | 8.3% | 7 | 5.3% | 21 | 15.9% | 10 | 7.6% | 18 | 13.6% | 18 | 13.6% | 10 | 7.6% | 15 | 11.4% | 13 | 9.8% |
| | 3rd | 12 | 9.1% | 9 | 6.8% | 4 | 3.0% | 17 | 12.9% | 5 | 3.8% | 16 | 12.1% | 12 | 9.1% | 9 | 6.8% | 7 | 5.3% | 14 | 10.6% |
| | 4th | 6 | 4.5% | 7 | 5.3% | 4 | 3.0% | 9 | 6.8% | 6 | 4.5% | 7 | 5.3% | 11 | 8.3% | 2 | 1.5% | 5 | 3.8% | 8 | 6.1% |
| | 5th | 10 | 7.6% | 7 | 5.3% | 5 | 3.8% | 12 | 9.1% | 7 | 5.3% | 10 | 7.6% | 14 | 10.6% | 3 | 2.3% | 5 | 3.8% | 12 | 9.1% |
| | 6th | 9 | 6.8% | 6 | 4.5% | 6 | 4.5% | 9 | 6.8% | 7 | 5.3% | 8 | 6.1% | 11 | 8.3% | 4 | 3.0% | 7 | 5.3% | 8 | 6.1% |
| | 7th | 8 | 6.1% | 6 | 4.5% | 5 | 3.8% | 9 | 6.8% | 5 | 3.8% | 9 | 6.8% | 8 | 6.1% | 6 | 4.5% | 4 | 3.0% | 10 | 7.6% |
| Normative influence | 1st | 6 | 4.5% | 4 | 3.0% | 6 | 4.5% | 4 | 3.0% | 4 | 3.0% | 6 | 4.5% | 8 | 6.1% | 2 | 1.5% | 5 | 3.8% | 5 | 3.8% |
| | 2nd | 12 | 9.1% | 3 | 2.3% | 5 | 3.8% | 10 | 7.6% | 5 | 3.8% | 10 | 7.6% | 9 | 6.8% | 6 | 4.5% | 3 | 2.3% | 12 | 9.1% |
| | 3rd | 8 | 6.1% | 7 | 5.3% | 3 | 2.3% | 12 | 9.1% | 5 | 3.8% | 10 | 7.6% | 9 | 6.8% | 6 | 4.5% | 5 | 3.8% | 10 | 7.6% |
| | 4th | 16 | 12.1% | 5 | 3.8% | 4 | 3.0% | 17 | 12.9% | 6 | 4.5% | 15 | 11.4% | 17 | 12.9% | 4 | 3.0% | 9 | 6.8% | 12 | 9.1% |
| | 5th | 9 | 6.8% | 11 | 8.3% | 8 | 6.1% | 12 | 9.1% | 7 | 5.3% | 13 | 9.8% | 13 | 9.8% | 7 | 5.3% | 10 | 7.6% | 10 | 7.6% |
| | 6th | 18 | 13.6% | 13 | 9.8% | 9 | 6.8% | 22 | 16.7% | 15 | 11.4% | 16 | 12.1% | 19 | 14.4% | 12 | 9.1% | 14 | 10.6% | 17 | 12.9% |
| | 7th | 9 | 6.8% | 11 | 8.3% | 3 | 2.3% | 17 | 12.9% | 7 | 5.3% | 13 | 9.8% | 11 | 8.3% | 9 | 6.8% | 8 | 6.1% | 12 | 9.1% |
| Competition | 1st | 8 | 6.1% | 6 | 4.5% | 1 | 0.8% | 13 | 9.8% | 5 | 3.8% | 9 | 6.8% | 10 | 7.6% | 4 | 3.0% | 3 | 2.3% | 11 | 8.3% |
| | 2nd | 13 | 9.8% | 7 | 5.3% | 6 | 4.5% | 14 | 10.6% | 8 | 6.1% | 12 | 9.1% | 9 | 6.8% | 11 | 8.3% | 8 | 6.1% | 12 | 9.1% |
| | 3rd | 5 | 3.8% | 8 | 6.1% | 4 | 3.0% | 9 | 6.8% | 5 | 3.8% | 8 | 6.1% | 11 | 8.3% | 2 | 1.5% | 5 | 3.8% | 8 | 6.1% |
| | 4th | 7 | 5.3% | 10 | 7.6% | 6 | 4.5% | 11 | 8.3% | 7 | 5.3% | 10 | 7.6% | 11 | 8.3% | 6 | 4.5% | 7 | 5.3% | 10 | 7.6% |
| | 5th | 18 | 13.6% | 8 | 6.1% | 10 | 7.6% | 16 | 12.1% | 6 | 4.5% | 20 | 15.2% | 18 | 13.6% | 8 | 6.1% | 11 | 8.3% | 15 | 11.4% |
| | 6th | 17 | 12.9% | 7 | 5.3% | 7 | 5.3% | 17 | 12.9% | 11 | 8.3% | 13 | 9.8% | 17 | 12.9% | 7 | 5.3% | 13 | 9.8% | 11 | 8.3% |
| | 7th | 10 | 7.6% | 8 | 6.1% | 4 | 3.0% | 14 | 10.6% | 7 | 5.3% | 11 | 8.3% | 10 | 7.6% | 8 | 6.1% | 7 | 5.3% | 11 | 8.3% |
| | 1st | 15 | 11.4% | 10 | 7.6% | 7 | 5.3% | 18 | 13.6% | 6 | 4.5% | 19 | 14.4% | 15 | 11.4% | 10 | 7.6% | 9 | 6.8% | 16 | 12.1% |

| | | | | | | | | | | | | | | | | | | | | | |
|-----------------|-----|----|-------|----|-------|---|------|----|-------|----|------|----|-------|----|-------|----|------|----|-------|----|-------|
| Social learning | 2nd | 13 | 9.8% | 9 | 6.8% | 8 | 6.1% | 14 | 63.6% | 10 | 7.6% | 12 | 9.1% | 16 | 12.1% | 6 | 4.5% | 5 | 3.8% | 17 | 12.9% |
| | 3rd | 13 | 9.8% | 9 | 6.8% | 4 | 3.0% | 18 | 81.8% | 9 | 6.8% | 13 | 9.8% | 14 | 10.6% | 8 | 6.1% | 12 | 9.1% | 10 | 7.6% |
| | 4th | 9 | 6.8% | 6 | 4.5% | 8 | 6.1% | 7 | 46.7% | 6 | 4.5% | 9 | 6.8% | 6 | 4.5% | 9 | 6.8% | 8 | 6.1% | 7 | 5.3% |
| | 5th | 10 | 7.6% | 9 | 6.8% | 2 | 1.5% | 17 | 89.5% | 10 | 7.6% | 9 | 6.8% | 15 | 11.4% | 4 | 3.0% | 10 | 7.6% | 9 | 6.8% |
| | 6th | 10 | 7.6% | 6 | 4.5% | 4 | 3.0% | 12 | 75.0% | 5 | 3.8% | 11 | 8.3% | 12 | 9.1% | 4 | 3.0% | 4 | 3.0% | 12 | 9.1% |
| | 7th | 8 | 6.1% | 5 | 3.8% | 5 | 3.8% | 8 | 61.5% | 3 | 2.3% | 10 | 7.6% | 8 | 6.1% | 5 | 3.8% | 6 | 4.5% | 7 | 5.3% |
| Comparison | 1st | 8 | 6.1% | 4 | 3.0% | 4 | 3.0% | 8 | 6.1% | 8 | 6.1% | 4 | 3.0% | 8 | 6.1% | 4 | 3.0% | 6 | 4.5% | 6 | 4.5% |
| | 2nd | 5 | 3.8% | 7 | 5.3% | 2 | 1.5% | 10 | 7.6% | 5 | 3.8% | 7 | 5.3% | 11 | 8.3% | 1 | 0.8% | 6 | 4.5% | 6 | 4.5% |
| | 3rd | 15 | 11.4% | 10 | 7.6% | 8 | 6.1% | 17 | 12.9% | 11 | 8.3% | 14 | 10.6% | 21 | 15.9% | 4 | 3.0% | 9 | 6.8% | 16 | 12.1% |
| | 4th | 14 | 10.6% | 12 | 9.1% | 6 | 4.5% | 20 | 15.2% | 7 | 5.3% | 19 | 14.4% | 14 | 10.6% | 12 | 9.1% | 10 | 7.6% | 16 | 12.1% |
| | 5th | 12 | 9.1% | 5 | 3.8% | 8 | 6.1% | 9 | 6.8% | 7 | 5.3% | 10 | 7.6% | 6 | 4.5% | 11 | 8.3% | 9 | 6.8% | 8 | 6.1% |
| | 6th | 13 | 9.8% | 8 | 6.1% | 4 | 3.0% | 17 | 12.9% | 4 | 3.0% | 17 | 12.9% | 11 | 8.3% | 10 | 7.6% | 6 | 4.5% | 15 | 11.4% |
| | 7th | 11 | 8.3% | 8 | 6.1% | 6 | 4.5% | 13 | 9.8% | 7 | 5.3% | 12 | 9.1% | 15 | 11.4% | 4 | 3.0% | 8 | 6.1% | 11 | 8.3% |
| Recognition | 1st | 12 | 9.1% | 17 | 12.9% | 9 | 6.8% | 20 | 15.2% | 9 | 6.8% | 20 | 15.2% | 21 | 15.9% | 8 | 6.1% | 15 | 11.4% | 14 | 10.6% |
| | 2nd | 9 | 6.8% | 10 | 7.6% | 5 | 3.8% | 14 | 10.6% | 5 | 3.8% | 14 | 10.6% | 12 | 9.1% | 7 | 5.3% | 7 | 5.3% | 12 | 9.1% |
| | 3rd | 19 | 14.4% | 5 | 3.8% | 8 | 6.1% | 16 | 12.1% | 9 | 6.8% | 15 | 11.4% | 13 | 9.8% | 11 | 8.3% | 9 | 6.8% | 15 | 11.4% |
| | 4th | 11 | 8.3% | 6 | 4.5% | 6 | 4.5% | 11 | 8.3% | 9 | 6.8% | 8 | 6.1% | 10 | 7.6% | 7 | 5.3% | 8 | 6.1% | 9 | 6.8% |
| | 5th | 10 | 7.6% | 7 | 5.3% | 3 | 2.3% | 14 | 10.6% | 7 | 5.3% | 10 | 7.6% | 10 | 7.6% | 7 | 5.3% | 6 | 4.5% | 11 | 8.3% |
| | 6th | 5 | 3.8% | 3 | 2.3% | 3 | 2.3% | 5 | 3.8% | 2 | 1.5% | 6 | 4.5% | 6 | 4.5% | 2 | 1.5% | 0 | 0.0% | 8 | 6.1% |
| | 7th | 12 | 9.10% | 6 | 4.5% | 4 | 3.0% | 14 | 10.6% | 8 | 6.1% | 10 | 7.6% | 14 | 10.6% | 4 | 3.0% | 9 | 6.8% | 9 | 6.8% |

Appendix 4. Low and high group identity – social support features preference

| Features | Preference rank | Group Identity | | | |
|---------------------|-----------------|----------------|--------|------|--------|
| | | Low | | High | |
| | | N | % | N | % |
| Social facilitation | 1st | 10 | 7.60% | 8 | 6.10% |
| | 2nd | 8 | 6.10% | 8 | 6.10% |
| | 3rd | 6 | 4.50% | 6 | 4.50% |
| | 4th | 13 | 9.80% | 10 | 7.60% |
| | 5th | 6 | 4.50% | 10 | 7.60% |
| | 6th | 9 | 6.80% | 8 | 6.10% |
| | 7th | 14 | 10.60% | 16 | 12.10% |
| Cooperation | 1st | 11 | 8.30% | 13 | 9.80% |
| | 2nd | 13 | 9.80% | 15 | 11.40% |
| | 3rd | 9 | 6.80% | 12 | 9.10% |
| | 4th | 5 | 3.80% | 8 | 6.10% |
| | 5th | 13 | 9.80% | 4 | 3.00% |
| | 6th | 10 | 7.60% | 5 | 3.80% |
| | 7th | 5 | 3.80% | 9 | 6.80% |
| Normative influence | 1st | 4 | 3.00% | 6 | 4.50% |
| | 2nd | 9 | 6.80% | 6 | 4.50% |
| | 3rd | 8 | 6.10% | 7 | 5.30% |
| | 4th | 12 | 9.10% | 9 | 6.80% |
| | 5th | 7 | 5.30% | 13 | 9.80% |
| | 6th | 15 | 11.40% | 16 | 12.10% |
| | 7th | 11 | 8.30% | 9 | 6.80% |
| Competition | 1st | 6 | 4.50% | 8 | 6.10% |
| | 2nd | 11 | 8.30% | 9 | 6.80% |
| | 3rd | 8 | 6.10% | 5 | 3.80% |
| | 4th | 12 | 9.10% | 5 | 3.80% |
| | 5th | 12 | 9.10% | 14 | 10.60% |
| | 6th | 9 | 6.80% | 15 | 11.40% |
| | 7th | 8 | 6.10% | 10 | 7.60% |
| Social learning | 1st | 14 | 10.60% | 11 | 8.30% |
| | 2nd | 11 | 8.30% | 11 | 8.30% |
| | 3rd | 9 | 6.80% | 13 | 9.80% |
| | 4th | 6 | 4.50% | 9 | 6.80% |
| | 5th | 10 | 7.60% | 9 | 6.80% |
| | 6th | 8 | 6.10% | 8 | 6.10% |
| | 7th | 8 | 6.10% | 5 | 3.80% |
| Comparison | 1st | 7 | 5.30% | 5 | 3.80% |
| | 2nd | 5 | 3.80% | 7 | 5.30% |
| | 3rd | 15 | 11.40% | 10 | 7.60% |
| | 4th | 10 | 7.60% | 16 | 12.10% |
| | 5th | 7 | 5.30% | 10 | 7.60% |
| | 6th | 11 | 8.30% | 10 | 7.60% |
| | 7th | 11 | 8.30% | 8 | 6.10% |
| Recognition | 1st | 14 | 10.60% | 15 | 11.40% |
| | 2nd | 9 | 6.80% | 10 | 7.60% |
| | 3rd | 11 | 8.30% | 13 | 9.80% |
| | 4th | 8 | 6.10% | 9 | 6.80% |
| | 5th | 11 | 8.30% | 6 | 4.50% |
| | 6th | 4 | 3.00% | 4 | 3.00% |
| | 7th | 9 | 6.80% | 9 | 6.80% |

Appendix 5. Group identity dimensions – social support features preference

| Features | Preference rank | Centrality, N=65.9% | | In-group affect, N=97% | | In-group ties, N=76.5% | |
|---------------------|-----------------|---------------------|--------|------------------------|--------|------------------------|--------|
| | | N | % | N | % | N | % |
| Social facilitation | 1st | 9 | 6.80% | 17 | 12.90% | 10 | 7.60% |
| | 2nd | 11 | 8.30% | 16 | 12.10% | 14 | 10.60% |
| | 3rd | 8 | 6.10% | 12 | 9.10% | 11 | 8.30% |
| | 4th | 17 | 12.90% | 22 | 16.70% | 17 | 12.90% |
| | 5th | 10 | 7.60% | 15 | 11.40% | 13 | 9.80% |
| | 6th | 12 | 9.10% | 16 | 12.10% | 13 | 9.80% |
| | 7th | 20 | 15.20% | 30 | 22.70% | 23 | 17.40% |
| Cooperation | 1st | 17 | 12.90% | 24 | 18.20% | 17 | 12.90% |
| | 2nd | 17 | 12.90% | 27 | 20.50% | 22 | 16.70% |
| | 3rd | 16 | 12.10% | 21 | 15.90% | 17 | 12.90% |
| | 4th | 9 | 6.80% | 13 | 9.80% | 9 | 6.80% |
| | 5th | 12 | 9.10% | 16 | 12.10% | 12 | 9.10% |
| | 6th | 8 | 6.10% | 14 | 10.60% | 13 | 9.80% |
| | 7th | 8 | 6.10% | 13 | 9.80% | 11 | 8.30% |
| Normative influence | 1st | 8 | 6.10% | 10 | 7.60% | 9 | 6.80% |
| | 2nd | 9 | 6.80% | 15 | 11.40% | 10 | 7.60% |
| | 3rd | 10 | 7.60% | 14 | 10.60% | 13 | 9.80% |
| | 4th | 15 | 11.40% | 20 | 15.20% | 12 | 9.10% |
| | 5th | 15 | 11.40% | 20 | 15.20% | 17 | 12.90% |
| | 6th | 19 | 14.40% | 30 | 22.70% | 24 | 18.20% |
| | 7th | 11 | 8.30% | 19 | 14.40% | 16 | 12.10% |
| Competition | 1st | 11 | 8.30% | 14 | 10.60% | 13 | 9.80% |
| | 2nd | 14 | 10.60% | 20 | 15.20% | 14 | 10.60% |
| | 3rd | 9 | 6.80% | 11 | 8.30% | 11 | 8.30% |
| | 4th | 10 | 7.60% | 16 | 12.10% | 13 | 9.80% |
| | 5th | 15 | 11.40% | 25 | 18.90% | 16 | 12.10% |
| | 6th | 17 | 12.90% | 24 | 18.20% | 19 | 14.40% |
| | 7th | 11 | 8.30% | 18 | 13.60% | 15 | 11.40% |
| Social learning | 1st | 14 | 10.60% | 24 | 18.20% | 19 | 14.40% |
| | 2nd | 14 | 10.60% | 20 | 15.20% | 19 | 14.40% |
| | 3rd | 15 | 11.40% | 22 | 16.70% | 14 | 10.60% |
| | 4th | 8 | 6.10% | 15 | 11.40% | 11 | 8.30% |
| | 5th | 16 | 12.10% | 18 | 13.60% | 16 | 12.10% |
| | 6th | 11 | 8.30% | 16 | 12.10% | 12 | 9.10% |
| | 7th | 9 | 6.80% | 13 | 9.80% | 10 | 7.60% |
| Comparison | 1st | 9 | 6.80% | 12 | 9.10% | 9 | 6.80% |
| | 2nd | 8 | 6.10% | 12 | 9.10% | 9 | 6.80% |
| | 3rd | 16 | 12.10% | 24 | 18.20% | 18 | 13.60% |
| | 4th | 17 | 12.90% | 25 | 18.90% | 23 | 17.40% |
| | 5th | 10 | 7.60% | 17 | 12.90% | 15 | 11.40% |
| | 6th | 15 | 11.40% | 20 | 15.20% | 14 | 10.60% |
| | 7th | 12 | 9.10% | 18 | 13.60% | 13 | 9.80% |
| Recognition | 1st | 19 | 14.40% | 27 | 20.50% | 24 | 18.20% |
| | 2nd | 14 | 10.60% | 18 | 13.60% | 13 | 9.80% |
| | 3rd | 13 | 9.80% | 24 | 18.20% | 17 | 12.90% |
| | 4th | 11 | 8.30% | 17 | 12.90% | 16 | 12.10% |
| | 5th | 9 | 6.80% | 17 | 12.90% | 12 | 9.10% |
| | 6th | 5 | 3.80% | 8 | 6.10% | 6 | 4.50% |
| | 7th | 16 | 12.10% | 17 | 12.90% | 13 | 9.80% |

Appendix 6. Correlation social support features – personality, exercise self-efficacy, group identity

| Correlation | Estimate | Std. Error | Wald | df | Sig. |
|-----------------------------|----------|------------|--------|----|-------|
| Social facilitation | | | | | |
| Low Extraversion=-1.00 | 0.689 | 0.382 | 3.251 | 1 | 0.071 |
| Low Extraversion=.00 | -0.067 | 0.406 | 0.027 | 1 | 0.869 |
| High Extraversion =1.00 | 0a | . | . | 0 | . |
| Low Agreeableness=-1.00 | 0.664 | 0.614 | 1.168 | 1 | 0.28 |
| Low Agreeableness=.00 | -0.364 | 0.403 | 0.814 | 1 | 0.367 |
| High Agreeableness=1.00 | 0a | . | . | 0 | . |
| Low Conscientiousness=-1.00 | 0.291 | 0.488 | 0.355 | 1 | 0.551 |
| Low Conscientiousness=.00 | -0.318 | 0.397 | 0.642 | 1 | 0.423 |
| High Conscientiousness=1.00 | 0a | . | . | 0 | . |
| Low Neuroticism=-1.00 | 0.566 | 0.369 | 2.352 | 1 | 0.125 |
| Low Neuroticism=.00 | -0.429 | 0.452 | 0.901 | 1 | 0.343 |
| High Neuroticism=1.00 | 0a | . | . | 0 | . |
| Low Openness=-1.00 | -0.133 | 0.439 | 0.091 | 1 | 0.763 |
| Low Openness=.00 | 0.586 | 0.398 | 2.162 | 1 | 0.141 |
| High Openness=1.00 | 0a | . | . | 0 | . |
| Exercise self-efficacy | 2.278 | 0.695 | 10.739 | 1 | 0.001 |
| Low group identity=.00 | 0.179 | 0.318 | 0.315 | 1 | 0.575 |
| High group identity=1.00 | 0a | . | . | 0 | . |
| Cooperation | | | | | |
| Low Extraversion=-1.00 | -0.025 | 0.379 | 0.004 | 1 | 0.947 |
| Low Extraversion=.00 | 0.312 | 0.404 | 0.597 | 1 | 0.44 |
| High Extraversion =1.00 | 0a | . | . | 0 | . |
| Low Agreeableness=-1.00 | -0.059 | 0.604 | 0.01 | 1 | 0.922 |
| Low Agreeableness=.00 | -0.584 | 0.4 | 2.127 | 1 | 0.145 |
| High Agreeableness=1.00 | 0a | . | . | 0 | . |
| Low Conscientiousness=-1.00 | -0.511 | 0.481 | 1.127 | 1 | 0.288 |
| Low Conscientiousness=.00 | -0.368 | 0.391 | 0.886 | 1 | 0.347 |
| High Conscientiousness=1.00 | 0a | . | . | 0 | . |
| Low Neuroticism=-1.00 | -0.493 | 0.368 | 1.794 | 1 | 0.18 |
| Low Neuroticism=.00 | -0.15 | 0.45 | 0.111 | 1 | 0.739 |
| High Neuroticism=1.00 | 0a | . | . | 0 | . |
| Low Openness=-1.00 | 0.329 | 0.432 | 0.578 | 1 | 0.447 |
| Low Openness=.00 | 0.812 | 0.402 | 4.083 | 1 | 0.043 |
| High Openness=1.00 | 0a | . | . | 0 | . |
| Exercise self-efficacy | 2.047 | 0.631 | 10.529 | 1 | 0.001 |
| Low group identity=.00 | -0.132 | 0.322 | 0.168 | 1 | 0.682 |
| High group identity=1.00 | 0a | . | . | 0 | . |
| Normative influence | | | | | |
| Low Extraversion=-1.00 | 0.935 | 0.389 | 5.777 | 1 | 0.016 |
| Low Extraversion=.00 | 1.015 | 0.41 | 6.121 | 1 | 0.013 |
| High Extraversion =1.00 | 0a | . | . | 0 | . |
| Low Agreeableness=-1.00 | 0.528 | 0.607 | 0.757 | 1 | 0.384 |
| Low Agreeableness=.00 | 0.52 | 0.4 | 1.691 | 1 | 0.194 |
| High Agreeableness=1.00 | 0a | . | . | 0 | . |
| Low Conscientiousness=-1.00 | -0.653 | 0.492 | 1.758 | 1 | 0.185 |
| Low Conscientiousness=.00 | 0.045 | 0.388 | 0.013 | 1 | 0.908 |
| High Conscientiousness=1.00 | 0a | . | . | 0 | . |
| Low Neuroticism=-1.00 | 0.52 | 0.366 | 2.012 | 1 | 0.156 |
| Low Neuroticism=.00 | -0.036 | 0.447 | 0.007 | 1 | 0.936 |
| High Neuroticism=1.00 | 0a | . | . | 0 | . |

| | | | | | |
|-----------------------------|--------|-------|--------|---|-------|
| Low Openness=-1.00 | -0.034 | 0.434 | 0.006 | 1 | 0.937 |
| Low Openness=.00 | -0.607 | 0.4 | 2.301 | 1 | 0.129 |
| High Openness=1.00 | 0a | . | . | 0 | . |
| Exercise self-efficacy | 2.354 | 0.827 | 8.107 | 1 | 0.004 |
| Low group identity=.00 | 0.189 | 0.318 | 0.353 | 1 | 0.552 |
| High group identity=1.00 | 0a | . | . | 0 | . |
| Competition | | | | | |
| Low Extraversion=-1.00 | -0.172 | 0.38 | 0.205 | 1 | 0.651 |
| Low Extraversion=.00 | -0.183 | 0.4 | 0.209 | 1 | 0.648 |
| High Extraversion =1.00 | 0a | . | . | 0 | . |
| Low Agreeableness=-1.00 | -0.39 | 0.604 | 0.417 | 1 | 0.518 |
| Low Agreeableness=.00 | -0.096 | 0.396 | 0.059 | 1 | 0.808 |
| High Agreeableness=1.00 | 0a | . | . | 0 | . |
| Low Conscientiousness=-1.00 | -0.6 | 0.479 | 1.572 | 1 | 0.21 |
| Low Conscientiousness=.00 | 0.208 | 0.386 | 0.291 | 1 | 0.59 |
| High Conscientiousness=1.00 | 0a | . | . | 0 | . |
| Low Neuroticism=-1.00 | -0.03 | 0.363 | 0.007 | 1 | 0.934 |
| Low Neuroticism=.00 | -0.215 | 0.444 | 0.234 | 1 | 0.628 |
| High Neuroticism=1.00 | 0a | . | . | 0 | . |
| Low Openness=-1.00 | -0.277 | 0.435 | 0.406 | 1 | 0.524 |
| Low Openness=.00 | -0.66 | 0.396 | 2.785 | 1 | 0.095 |
| High Openness=1.00 | 0a | . | . | 0 | . |
| Exercise self-efficacy | -0.18 | 0.758 | 0.056 | 1 | 0.813 |
| Low group identity=.00 | 0.397 | 0.318 | 1.558 | 1 | 0.212 |
| High group identity=1.00 | 0a | . | . | 0 | . |
| Social learning | | | | | |
| Low Extraversion=-1.00 | 0.059 | 0.376 | 0.024 | 1 | 0.876 |
| Low Extraversion=.00 | -0.039 | 0.404 | 0.009 | 1 | 0.923 |
| High Extraversion =1.00 | 0a | . | . | 0 | . |
| Low Agreeableness=-1.00 | 0.358 | 0.604 | 0.352 | 1 | 0.553 |
| Low Agreeableness=.00 | -0.002 | 0.397 | 0 | 1 | 0.996 |
| High Agreeableness=1.00 | 0a | . | . | 0 | . |
| Low Conscientiousness=-1.00 | -0.037 | 0.475 | 0.006 | 1 | 0.939 |
| Low Conscientiousness=.00 | -0.103 | 0.385 | 0.071 | 1 | 0.789 |
| High Conscientiousness=1.00 | 0a | . | . | 0 | . |
| Low Neuroticism=-1.00 | -0.131 | 0.363 | 0.131 | 1 | 0.717 |
| Low Neuroticism=.00 | -0.16 | 0.445 | 0.13 | 1 | 0.719 |
| High Neuroticism=1.00 | 0a | . | . | 0 | . |
| Low Openness=-1.00 | -0.178 | 0.429 | 0.173 | 1 | 0.677 |
| Low Openness=.00 | -0.224 | 0.391 | 0.329 | 1 | 0.566 |
| High Openness=1.00 | 0a | . | . | 0 | . |
| Exercise self-efficacy | 0.178 | 0.608 | 0.086 | 1 | 0.769 |
| Low group identity=.00 | -0.012 | 0.313 | 0.001 | 1 | 0.97 |
| High group identity=1.00 | 0a | . | . | 0 | . |
| Comparison | | | | | |
| Low Extraversion=-1.00 | -0.205 | 0.38 | 0.293 | 1 | 0.589 |
| Low Extraversion=.00 | -0.647 | 0.405 | 2.558 | 1 | 0.11 |
| High Extraversion =1.00 | 0a | . | . | 0 | . |
| Low Agreeableness=-1.00 | -0.716 | 0.611 | 1.373 | 1 | 0.241 |
| Low Agreeableness=.00 | 0.422 | 0.398 | 1.124 | 1 | 0.289 |
| High Agreeableness=1.00 | 0a | . | . | 0 | . |
| Low Conscientiousness=-1.00 | 0.691 | 0.481 | 2.066 | 1 | 0.151 |
| Low Conscientiousness=.00 | 0.743 | 0.392 | 3.599 | 1 | 0.058 |
| High Conscientiousness=1.00 | 0a | . | . | 0 | . |
| Low Neuroticism=-1.00 | 0.348 | 0.364 | 0.915 | 1 | 0.339 |
| Low Neuroticism=.00 | 1.583 | 0.463 | 11.685 | 1 | 0.001 |
| High Neuroticism=1.00 | 0a | . | . | 0 | . |

| | | | | | |
|-----------------------------|--------|-------|-------|---|-------|
| Low Openness=-1.00 | 0.01 | 0.431 | 0.001 | 1 | 0.981 |
| Low Openness=.00 | 0.158 | 0.393 | 0.162 | 1 | 0.688 |
| High Openness=1.00 | 0a | . | . | 0 | . |
| Exercise self-efficacy | 0.88 | 0.737 | 1.425 | 1 | 0.233 |
| Low group identity=.00 | -0.186 | 0.316 | 0.348 | 1 | 0.556 |
| High group identity=1.00 | 0a | . | . | 0 | . |
| Recognition | | | | | |
| Low Extraversion=-1.00 | -0.782 | 0.383 | 4.178 | 1 | 0.041 |
| Low Extraversion=.00 | -0.633 | 0.413 | 2.349 | 1 | 0.125 |
| High Extraversion =1.00 | 0a | . | . | 0 | . |
| Low Agreeableness=-1.00 | -0.207 | 0.605 | 0.117 | 1 | 0.732 |
| Low Agreeableness=.00 | 0.299 | 0.4 | 0.558 | 1 | 0.455 |
| High Agreeableness=1.00 | 0a | . | . | 0 | . |
| Low Conscientiousness=-1.00 | 0.287 | 0.48 | 0.357 | 1 | 0.55 |
| Low Conscientiousness=.00 | -0.719 | 0.391 | 3.374 | 1 | 0.066 |
| High Conscientiousness=1.00 | 0a | . | . | 0 | . |
| Low Neuroticism=-1.00 | -0.214 | 0.366 | 0.342 | 1 | 0.559 |
| Low Neuroticism=.00 | 0.139 | 0.446 | 0.097 | 1 | 0.756 |
| High Neuroticism=1.00 | 0a | . | . | 0 | . |
| Low Openness=-1.00 | 0.786 | 0.44 | 3.193 | 1 | 0.074 |
| Low Openness=.00 | 0.13 | 0.393 | 0.11 | 1 | 0.74 |
| High Openness=1.00 | 0a | . | . | 0 | . |
| Exercise self-efficacy | 1.283 | 0.594 | 4.665 | 1 | 0.031 |
| Low group identity=.00 | -0.192 | 0.316 | 0.367 | 1 | 0.545 |
| High group identity=1.00 | 0a | . | . | 0 | . |

Appendix 7. Online questionnaire

7.1 Introduction and informed consent



Dear Sir / Madam,

Due to this pandemic situation, employees have to deal with working from home situations. This condition could increase the amount of time for sedentary behavior. This questionnaire aims to define an employee's preference for social support features in a mobile device application to increase motivation for physical activity.

The results of this survey can be used to develop and enhance virtual social support for physical activity while also promoting social interaction with colleagues. It is also beneficial for companies to provide suitable group-based physical activity interventions and also to give information for health promotion providers and mobile application developers to maximize the usage of their product's features.

It will only take around 10 minutes to finish the survey. With your participation, you have contributed to defining your preference for physical activities with your colleagues.

Thank you.

Contact person: Nissa Farzana Koesoemahardja (nissafarzanakoesoemahardja@student.utwente.nl)



This research is part of Roessingh Research and Development.

1. Participating in this questionnaire is voluntary and you can stop filling in at any time.
2. Your data is processed anonymously.
3. Your information can be used anonymously for scientific publications by researchers or companies, possible future research, and by researchers in other academic institutions who do similar work.
4. You are 18 or older.

Have you read all of the above and agree to participate in the questionnaire?

- Yes, I agree
 No, I do not agree



7.2 Filter questions for included participants



Is your company located in the Netherlands?

- Yes
- No



Do you work in an office job that involves a lot of sitting?

- Yes
- No



7.3 Demographic characteristics



Age

- 18 - 24
- 25 - 34
- 35 - 44
- 45 - 54
- 55 - 64

Gender

- Male
- Female
- Prefer not to answer

Nationality

- Dutch
- Non-Dutch

Level of education

- Primary level
- High school
- Bachelor
- Master
- Doctorate

Length of time working in the company

- Less than 1 year
- 1-2 years
- 2-5 years
- More than 5 years

Have you been diagnosed with chronic illnesses?

- Yes
- No



7.4 Group physical activity and mHealth usage experience

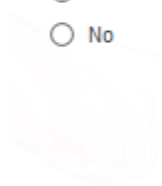


Have you ever done physical activities (e.g walking together during lunch break, using steps counter, fitness/exercise equipment, workout class) while in the office or outside with colleagues before this pandemic situation?

- Yes
- No

Have you ever used an activity tracker device/application (e.g. Fitbit device or Apple Health) for a period longer than one week?

- Yes
- No



7.5 Physical activity intensity levels



Are you working from home in the last 7 days?

- Yes
 No

The question will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that require more physical effort and make your breathing much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

During the last 7 days, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling? (**days per week**)

How much time did you usually spend doing **vigorous** physical activities on one of those days? (**minutes per day**)

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** physical activities refer to activities that require more physical effort and make your breathing somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking (**days per week**)

How much time did you usually spend doing **moderate** physical activities on one of those days? (**minutes per day**)

Think about all the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time? (**days per week**)

How much time did you usually spend **walking** on one of those days? (**minutes per day**)

During the last 7 days, how much time did you spend **sleeping** regularly? (**hours per day**)



7.6 Group identity scale



Now think about relationship with your colleagues in your office who engage in similar activities that you do which makes you feel attached. Please answer the following questions with them in mind.

| | Strongly disagree | Disagree | Somewhat disagree | Neither agree or disagree | Somewhat agree | Agree | Strongly agree |
|---|-----------------------|-----------------------|-----------------------|---------------------------|----------------------------------|-----------------------|-----------------------|
| I often think about being part of a group of colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Being part of a group of colleagues has little to do with how I feel about myself in general. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Being part of a group of colleagues is an important part of my self image. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The fact I am part of a group of colleagues rarely enters my mind. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Strongly disagree | Disagree | Somewhat disagree | Neither agree or disagree | Somewhat agree | Agree | Strongly agree |
| In general I'm glad to be part of a group of colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I often regret being part of a group of colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Generally I feel good about myself when I think about being part of a group of colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I don't feel good about being part of a group of colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |

| | Strongly disagree | Disagree | Somewhat disagree | Neither agree or disagree | Somewhat agree | Agree | Strongly agree |
|--|-----------------------|-----------------------|-----------------------|---------------------------|----------------------------------|-----------------------|-----------------------|
| I have a lot in common with other colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I feel strong ties to other colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I find it difficult to form a bond with other colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I don't feel a strong sense of being connected to other colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |

7.7 Social support features preference



Imagine you are working in an office where you spend most of your working hours sitting on your desk. Due to this pandemic situation, you have to work from home. This condition increases the amount of your time for sedentary behavior (sitting or lying down). Your company plans to make several physical activity programs to motivate their employees to be more physically active. The programs require group interaction and social support from your colleagues through a mobile device application.

Which one would you prefer to be involved in?

Please rank it from 1 (most preferred) until 7 (least preferred). Each activity can be ranked once.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Reminder from colleagues to do physical activity | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Getting a group of colleagues with the same physical activity goal | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Getting notification of colleague's achievements on physical activity | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Competition for steps' achievement with colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Sharing successful physical activity tips | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Having a comparison of steps' achievement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Emoticon appreciation of physical activity achievements | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

7.8 Exercise self-efficacy



Which online intervention would you prefer to do with your colleagues through a mobile device application even when you are in these conditions?

Choose/tick as many interventions as you like.

| | Reminder from colleagues to do physical activity | Getting a group of colleagues with the same physical activity goal | Getting notification of colleague's achievements on physical activity | Doing competition for steps' achievement with colleagues | Sharing successful physical activity tips | Having a comparison of steps' achievement | Emoticon appreciation of physical activity achievements | None of the interventions |
|--|--|--|---|--|---|---|---|---------------------------|
| When I am feeling tired | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| When I am in bad mood | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| When I feel I don't have time | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| When I am on vacation/day off | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| When the weather is bad | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | Reminder from colleagues to do physical activity | Getting a group of colleagues with the same physical activity goal | Getting notification of colleague's achievements on physical activity | Doing competition for steps' achievement with colleagues | Sharing successful physical activity tips | Having a comparison of steps' achievement | Emoticon appreciation of physical activity achievements | None of the interventions |
| When I am feeling under pressure from work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| After a vacation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| When I have too much to do at home | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| When there are other interesting thing to do | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Lack of support from family or friends | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

7.9 Supportive role



Which online intervention would you prefer to do with your colleagues through a mobile device application as a supportive helper?

Choose/tick as many interventions as you like.

| | Reminder from colleagues to do physical activity | Getting a group of colleagues with the same physical activity goal | Getting notification of colleague's achievements on physical activity | Doing competition for steps' achievement with colleagues | Sharing successful physical activity tips | Having a comparison of steps' achievement | Emoticon appreciation of physical activity achievements | None of the interventions |
|---------------------------------|--|--|---|--|---|---|---|---------------------------|
| Invite other colleagues to join | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Initiate the activity | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

[→](#)

7.10 Personality



How well do the following statements describe your personality?

I see myself as someone who ...

| | Strongly disagree | A little disagree | Neither agree nor disagree | A little agree | Strongly agree |
|-------------------------------------|-----------------------|-----------------------|----------------------------|----------------------------------|-----------------------|
| ... is reserved | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ... is generally trusting | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ... tends to be lazy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ... is relaxed, handles stress well | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ... has few artistic interests | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Strongly disagree | A little disagree | Neither agree nor disagree | A little agree | Strongly agree |
| ... is outgoing, sociable | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> |
| ... tends to find fault with others | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ... does a thorough job | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ... gets nervous easily | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ... has an active imagination | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |