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Injunctive and Descriptive Norm Effects on Physical Activity

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Abstract

This study investigated the application of focus norm theory to exercise using a non-self-report measure. While the current study was underpowered and all conclusions are tentative, the current study incorporated popular and inexpensive technology which could help make exercise interventions more accessible to a diverse population. Effective and accessible interventions could help reduce the rates of overweight and obese adults which could aid in increasing the health and quality of life for a substantial portion of adults in the United States.

Introduction

- Regular physical activity has many physical and psychological benefits such as reduced risks of cardiovascular disease, depression, obesity, and improved cognitive functioning (US Department of Health and Human Services, 2008). In 2012, only 20.8% of American adults met the guidelines for both aerobic and strengthening activities and 46.6% of American adults met neither the aerobic activity nor the muscle strengthening guidelines (National Center for Health Statistics, 2014). While physical inactivity is not the sole cause of obesity, physically inactive adults have an increased risk of becoming overweight or obese (US Department of Health and Human Services, 2008). Excess body weight also has serious health and financial consequences (Field et al., 2001). Obese and overweight adults have an increased risk for developing diabetes, gallstones, hypertension, heart disease, high cholesterol and stroke compared to normal weight adults (Field et al., 2001). Social influence is the process of change in an individual's thoughts, feelings, attitudes, or behaviors as a result of interactions with others (Rashotte, 2006).
- Several exercise interventions at the personal, workplace, and community levels have successfully increased physical activity; however, the effects of exercise interventions often decline shortly after the intervention ends (Roux et al., 2008). Therefore, there is a pressing need for interventions that are, at the very least, cost effective and easily administered. Social influence may be one additional element that could be used in designing efficient, effective, and theory-based exercise interventions.
- Several theories offer explanations for how social influence generates individual change (Cialdini, Reno, & Kallgren, 1990). Cialdini, Reno, and Kallgren (1991) suggested that increasing the salience of a social norm increases the compliance to that social norm thereby increasing or decreasing the prevalence of a behavior. Focus normative theory further states that there are two types of norms, descriptive norms and injunctive norms. A descriptive norm is a person's conscious or unconscious perception of how often a behavior occurs, whereas, an injunctive norm is the perception of whether a behavior is culturally acceptable (Cialdini, Reno, & Kallgren, 1990). Focus theory of normative conduct might be used to create effective and easily accessible exercise interventions.

Hypotheses

Participants recorded how often they participated in physical activity for four weeks using the Fitbit Zip pedometer. Participants received either descriptive or descriptive plus injunctive feedback through a multimedia messaging service (MMS) sent via email to the participants' mobile phones. Broadly, it was expected that normative feedback groups would differ on the key outcome variables, such that:

Hypothesis 1: Participants would increase number of steps from week 1 to week 2 of the study as a result of self-monitoring via the Fitbit Zip pedometer.

Hypothesis 2: Regardless of condition (descriptive or injunctive feedback), participants below the norm for weeks 1 and 2 would increase their number of steps for week 3 and week 4 of the study after receiving the normative feedback.

Hypothesis 3: Participants above the norm for weeks 1 and 2 in the descriptive norm condition would decrease number of steps for week 3 and week 4 of the study after receiving the normative feedback.

Hypothesis 4: Participants in the descriptive plus injunctive norm condition would take more steps than participants in the descriptive norm condition for week 3 and week 4 of the study.

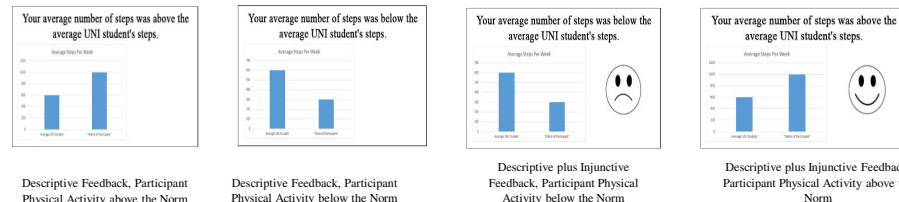
Method

- Fifty two undergraduate students with a mean age of 18.66 ($SD = 0.83$) from a Midwestern university were recruited in this study. Participants were recruited from the university's online participant pool; they received credit for participation toward their Introduction to Psychology course.
 - Twenty-seven participants were randomly assigned to the descriptive condition and 25 participants were randomly assigned to the descriptive plus injunctive condition
 - Seven participants did not come into the lab for debriefing and never returned the Fitbit Zip; consequently, data for these seven participants was lost. Additionally, one other participant was missing more than 50% of the Fitbit Zip pedometer data. These eight participants were dropped from the study. This resulted in 21 participants in the descriptive condition and 23 participants in the descriptive plus injunctive condition.
- ### Key Materials
- Participants were issued a Fitbit Zip pedometer for the duration of the current study. The Fitbit Zip wireless activity tracker is a pedometer that tracks number of steps, distance, and calories burned. The Fitbit Zip uploads the information wirelessly to Mac or PC computers via a USB component that plugs into the computer's USB port. The Fitbit Zip also syncs to supported mobile phones using Bluetooth. The Fitbit Zip stores minute-by-minute data for seven days and a daily total for 23 days until the device is synced to a computer. For the current study, the Fitbit Zip was used to track participants' number of steps which was used as the dependent variable. Number of steps was used as a non-self-report measure of physical activity prior to and following exposure to normative feedback.
 - Normative feedback was delivered 15 and 22 days after beginning participation. The normative feedback delivered on day 15 was the average number of steps of all participants for week one and two of the study ($M = 98,560.43$, $SD = 42078.19$). The normative feedback delivered on day 22 was the average of the number of steps of all participants for week two and three of the study ($M = 77317.35$, $SD = 43514.72$). Bar graphs that compared the mean number of steps and each participant's number of steps for the respective weeks were created. A graphic including the bar graph and questions about the graph was created and sent to the participants' mobile phone as a multimedia messaging service (MMS) picture message. The descriptive feedback graphic included the bar graph that showed participants their average number of steps per week in comparison to the average number of steps per week for the typical university student. The descriptive plus injunctive feedback graphic also included the bar graph with an additional smiling or frowning emoticon. Schultz and colleagues (2007) used this same manipulation to look at the effects of normative information on energy consumption (See Figure 1).
 - Participants completed the self-administered long form of the International Physical Activity Questionnaire (IPAQ-L; The International Physical Activity Questionnaire, 2002). The IPAQ-L is a 27 item self-report measure of physical activity that measures five domains of physical activity including job-related physical activity; housework, house maintenance, and caring for family; transportation physical activity; recreation, sport, and leisure-time physical activity; and time spent sitting. For the purposes of this study, the "usual week" and English version of the IPAQ-L was used. Participants were asked to answer questions such as "Not counting any walking you have already mentioned, during a usual week, on how many days do you walk for at least 10 minutes at a time in your leisure time?" Items are fill-in-the blank with number of minutes per day, hours per week, and days per week (The International Physical Activity Questionnaire, 2002). For the current study, the IPAQ-L assess self-reported past physical activity as a control to note any group differences in physical activity prior to the recording of steps via pedometers. The IPAQ-L responses were converted into calories using a standardized formula. These caloric indices were used for all subsequent analysis.

Procedure

- Participants completed the first phase of the study individually, outside of the lab via Qualtrics. Participants completed a demographic questionnaire and the International Physical Activity Questionnaire (IPAQ-L; The International Physical Activity Questionnaire, 2002) to assess past physical activity before beginning participation in the study.
- Participants also signed up for one of four, in-person informational sessions via Qualtrics where they were able to ask questions and receive the Fitbit Zip pedometer. The participant was then issued a Fitbit Zip pedometer as well as information about the Fitbit Zip. The participant was instructed to wear the pedometer daily.
- The participant was informed that the researchers would distribute several messages using a multimedia messaging service (MMS) sent via email to the participant's phones. On day 15 and 22 of participation in the current study, normative feedback was delivered via a MMS message and participants were asked to respond electronically to questions about the normative feedback.
- On the twenty-ninth day after beginning participation, questions about the participant's perceived compliance were sent via and participants returned the Fitbits.

Figure 1. Normative Feedback



Results

- Over 20% of the data was missing. The descriptive norm condition (63.38%) had more missing data than the descriptive norm plus injunctive norm condition (36.62%).
- The first hypothesis was not supported as there was a statistically significant median decrease in number of steps (5340.5) decreased from week one ($Mdn = 35745.00$) to week two ($Mdn = 31672.50$) for both the descriptive and injunctive norm conditions, $z = -2.56$, $p = 0.010$, $r = 0.39$.
- The second hypothesis was not supported as there was not a statistically significant median increase in number of steps from week ones and two ($Mdn = 29056.00$) to week three ($Mdn = 25734.00$), $z = -0.71$, $p = 0.50$, or from week three ($Mdn = 28261.00$) to week four ($Mdn = 29387.50$), $z = 0.32$, $p = 0.75$, $r = 0.10$, for the descriptive norm conditions. This hypothesis also was not supported for the injunctive norm condition as there was not a statistically significant median increase in number of steps from week one and two ($Mdn = 26842.75$) to week three ($Mdn = 22890.00$), $z = 0.41$, $p = 0.69$, $r = 0.17$, or from week three ($Mdn = 22045.00$) to week four ($Mdn = 30249.00$), $z = 0.00$, $p = 1.00$, $r = 0.00$.
- The third hypothesis was partially supported as there was a statistically significant median decrease in number of steps from week ones and two ($Mdn = 37368.00$) to week three ($Mdn = 30358.00$), $z = 2.18$, $p = 0.03$, $r = 0.48$, but there was not a statistically significant median decrease in number of steps from week three ($Mdn = 29632.00$) to week four ($Mdn = 28587.00$), $z = -0.64$, $p = 0.52$, $r = 0.14$.
- The fourth hypothesis was not supported as there were not statistically significant median differences between the two conditions for week three, $U = 254.00$, $p = 0.77$, $r = 0.04$, or week four, $U = 253$, $p = 0.79$, $r = 0.04$.

Discussion/Implications

Conclusions

- This study investigated the effects of normative feedback on physical activity.
- The first hypothesis that participants would increase number of steps from week one to week two of the study as a result of self-monitoring via the Fitbit Zip pedometer was not supported.
- The second hypothesis that, regardless of condition (descriptive or injunctive feedback), participants below the norm for weeks one and two would increase their number of steps for week three and week four of the study after receiving the normative feedback was not supported.
- The third hypothesis that participants above the norm for weeks one and two in the descriptive norm condition would decrease number of steps for week three and week four of the study after receiving the normative feedback was partially supported for both week three and week four of the study. However, these results are likely a consequence of the decrease in number of total steps in both the descriptive and descriptive plus injunctive norm conditions after the week long university holiday.
- The fourth hypothesis that participants in the descriptive plus injunctive norm condition would take more steps than participants in the descriptive norm condition for week three and week four of the study was not supported.

Limitations

- The current study was underpowered. The initial sample size was small ($n = 52$) and eight participants were dropped from the study resulting in an even smaller sample size ($n = 44$). There was also a large amount of missing data (i.e. over 20%). The missing data resulted from a lack of compliance in wearing the Fitbit Zip pedometer.
- Several participants did not respond to the manipulation check that accompanied the normative feedback message suggesting that the normative information was not utilized by all participants. This limits the limits the ability to test the application focus theory of normative conduct to exercise behavior.

Implications

- While the current study was underpowered and all conclusions are tentative, the current study incorporated popular and inexpensive technology which could help make exercise interventions more accessible to a diverse population

Future Directions

- The current study requires further replication as the current study had a large amount of missing data and the results are inconsistent with focus normative theory and previous research.
- Future research may seek to further investigate the use of technology in exercise interventions.

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