

“Step it up: Use of encouragement in a walking-buddy intervention”

Purpose: The purpose of our study was to investigate the impact of encouraging email messages on individuals’ exercise self-efficacy (which is your confidence that you can exercise, regardless of barriers you might face) and average number of steps obtained each day during a 10-week period.

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Aim: The aim was to determine whether twice weekly emails of encouragement would increase participants’ confidence in their ability to fit movement in their day (measured by the pedometer) and whether the emails impacted total number of steps. We used the pedometer as a tool to measure steps obtained.

Design: Participants were randomly assigned to one of three email groups: 1) a group who received words of encouragement which stressed individual effort and improvement (task-involving), 2) a group who received words of encouragement which stressed competing with one another to get the most steps among the group (ego-involving), and 3) a group who received no encouragement at all in the emails (neutral). Participants were not aware that the emails differed as prior knowledge could compromise their effort in the walking program.

Hypothesis: We hypothesized that the content of the email would impact participants’ confidence levels and number of steps. The neutral group served as a control. Specifically, we hypothesized that the task-involving group would get significantly more steps and report higher exercise self-efficacy than the ego-involving or neutral group.

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Description of the Variables Measured in the Study

Caring Climate: The Caring Climate Survey measured the degree to which participants perceived the email messages conveyed that everyone in the study would be treated with kindness and respect by the organizers.

Task-involving Climate: This scale (Huddleston, Fry, & Brown, 2012; Moore, Brown, & Fry, under review) measured the degree to which the participants perceived that the organizers wanted them to focus on their individual effort and personal improvement as well as foster cooperation with other participants. Participants were asked to rate the degree to which they perceived the email content to be task-involving, using a 5-point Likert scale, 1 (*strongly disagree*) to 5 (*strongly agree*). A sample item included, “In the email communication I received from the coordinator, all fitness levels are made to feel valued.”

Ego-involving Climate: This scale (Huddleston, Fry, & Brown, 2012; Moore, Brown, & Fry, under review) measured the degree in which the participants perceived that the organizers valued and recognized only the participants who acquired the most steps weekly and who performed the best. Embarrassment techniques were sometimes used as a tool to help motivate those who were not performing the best. Participants were asked to rate the degree to which they perceived the email content to be ego-involving, using a 5-point Likert scale, 1 (*strongly disagree*) to 5 (*strongly agree*). A sample item included, “In the email communication I received from the coordinator, participants are encouraged to do better than other participants”.

Self-Efficacy for Exercise: Self-efficacy for exercise (or how confident participants were that they could reach a goal of 10,000 steps daily) (Certin et al., 2010) was measured by asking participants to respond to how confident they were that they could continue to acquire steps when presented with a list of potential barriers. The barriers included: bad weather, poor health, lack of motivation, lack of social support, lack of facility access, time constraints, lack of needed skills or knowledge, concerned about appearance. Participants were asked to indicate their level of agreement that each barrier prevented them from reaching their step goals by using a 5-point Likert scale, 1 (*strongly disagree*) to 5 (*strongly agree*). Lower scores indicated higher confidence in ability to keep exercising, despite barriers faced.

Exercise Adherence: Participants completed daily step logs for the purpose of quantifying exercise participation. Participants had to report at least 75% of the time (or 52 days out of 70) to be included in the final data analysis.

Email Group	Original n (N = 106)	Gender		Age		Adherence Rate	Drop Out Rate	Total # of Miles Walked
		M	F	Mean	SD			
Task	37	8	27	42.59	11.46	62%	5%	10,532
Ego	35	7	24	41.00	12.87	37%	9%	4,406
Neutral	34	1	33	44.59	11.95	50%	0%	5,839

Note: “Drop out rate” indicates participants who requested to be removed from the study before the end of the 10-week time period.

Note. No significant difference in age for each group, $F(2, 96) = .70, p = .50$

Summary of Pedometer Results

Content of the emails.

STATISTICAL RESULTS: A one-way between-groups analysis was conducted to determine whether the participants perceived the content of their emails as task, ego, and caring respectively. Participants were randomly assigned to one of three email groups (task, ego, or neutral). There was a statistically significant difference between groups for task, $F(2, 68) = 31.40, p = .001$, ego, $F(2, 68) = 9.75, p = .001$ and caring content, $F(2, 66) = 23.84, p = .001$. The effect size, calculated using eta squared, was large for all three groups, including .49 (task), .32 (ego), and .42 (caring) (Cohen, 1988). Post-hoc comparisons using the Tukey HSD test indicated that those in the task group were significantly more likely to identify their email content as high task-involving and caring and low ego-involving compared to the ego and neutral groups. Similarly, the ego group were significantly more likely to identify their email content as high ego-involving and low task-involving and caring as compared to the other two email groups.

WHAT DOES THIS MEAN? The first step in this study was to ensure that the content of the emails reflected the appropriate type of climate that we were trying to create (i.e., if a participant were assigned the task-involving email group, they should perceive the email content as task-involving). The email content was generated by a group of faculty, staff, and students trained in motivational climates in exercise settings. The results suggested that we were successful in creating email content to match the assigned group. That is, participants assigned to the task-involving emails were more likely to perceive the content as high task-involving, high caring, low ego-involving whereas those participants assigned to the ego-involving emails were more likely to perceive the content as high ego-involving, low task-involving and caring.

Adherence in the 10-week program.

STATISTICAL RESULTS: A chi-square test was performed and no relationship was found between the neutral group and the task group on whether individuals adhered to the program (i.e., reported at least 75% of daily steps), $\chi^2(1, N = 71) = 1.07, p = .21$. The same was true between the neutral group and the ego group, $\chi^2(1, N = 69) = 1.16, p = .20$. However, when looking at only the task and ego email groups (leaving out the neutral group), there was a significant relationship between email group and adherence, $\chi^2(1, N = 72) = 4.50, p = .03$. The results indicated that 62% of the task email group adhered to the program versus 37% of the ego email group.

WHAT DOES THIS MEAN? In order to determine whether participants “fully participated” in the 10-week program, we had to define what “fully participated” meant. We chose to define adherence as “recording daily steps at least 75% of the time” during the 10-week program. Of the total 106 participants, 5 dropped out of the study early and 48 participants did not meet the adherence definition. Given that only 53 participants actually reported their daily steps consistently, we were interested in whether the type of emails participants received influenced their willingness to report steps. The results indicated that the email group did not matter. However, after removing the neutral email group, there was a statistical difference between task and ego.

Email’s impact on Self-Efficacy for Exercise.

STATISTICAL RESULTS: A mixed between-within subjects analysis of variance was conducted to assess the impact of three different email types (task, ego, and neutral) on participants’ scores on the Self-Efficacy for Exercise across three time periods (pre-10 week program, mid-10 week program, post-10 week program). There was no significant interaction between email group and time, Wilks’ Lambda = .95, $F(4, 74) = .51, p = .73$, partial eta squared = .03. There was a significant main effect for time, $F(2) = 3.80, p = .03$. Using the commonly

reported guidelines proposed by Cohen (1988), the effect size was moderate (partial eta square = .09). This suggests that there was a change in Self-Efficacy for Exercise scores across the three different time periods, with participants becoming more confident in their ability to meet their step goals by the end of the 10-week program. The main effect comparing the three types of email groups was not significant, $F(2, 38) = 1.07, p = .35$, suggesting no difference in the self-efficacy for exercise among the three email groups.

WHAT DOES THIS MEAN? We were looking to see if confidence to meet daily step goals increased over time for all participants. In addition, we wanted to know if there was a difference in how confident a person was that they could meet their step goals every day by email group. In other words, would participants in one email group (such as task) be more confident in their ability to meet their step goals than participants in another email group (such as ego or neutral)? The results indicated that confidence to reach daily step goals increased over time, so that participants were MORE confident in their abilities by the end of the 10-week program than they were at the beginning. This is notable considering that the potential impact of weather in Kansas during the 10-week period (it got much colder as the 10-week program progressed!) and given that our 10-week program concluded at the end of the Fall semester and start of the holiday season. These are typical barriers that often prevent a person from meeting their exercise goals. Our results suggest that the 10-week program may have helped participants build their confidence in themselves to keep active. However, the type of email that participants received did not significantly impact their confidence. In other words, whether participants were in the task, ego, or neutral group, their confidence to meet their step goals did not change.

Email's impact on number of total steps reported.

STATISTICAL RESULTS: A one-way between-groups analysis was conducted to explore the impact of the email group on number of steps obtained during a 10-week pedometer program. Participants were randomly assigned to one of three email groups (task, ego, or neutral). The test of homogeneity of variances was violated ($p = .004$) and therefore both the Welch and Brown-Forsythe robust tests of equality of means were used. There was a statistically significant difference in steps for the three email groups for both Welch: $F(2, 28.60) = 3.98, p = .03$ and Brown-Forsythe: $F(2, 42.32) = 5.29, p = .01$. The effect size, calculated using eta squared, was .15, considered a large effect according to Cohen (1988). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for the task group was significantly higher than the mean score for the ego group. The neutral group did not significantly differ from either the task ($p = .051$) or ego groups ($p = .90$).

WHAT DOES THIS MEAN? This was the main interest of our study. That is, we wanted to know if participants' email content would impact the number of steps they achieved over a 10-week period. The results indicated that there was a difference between the task and ego groups. Those who received task emails achieved more steps by the end of the program than those who received ego emails. This suggests that while some may enjoy a competitive environment where they are compared to others' performances, this type of environment is not ideal for everyone (which was also reflected in the number of people who didn't "adhere" in the ego group compared to the task group). Interestingly, the neutral group's steps did not significantly differ from either the task or ego groups. There are several reasons this might have occurred. First, we likely attracted individuals who were motivated to be more active and excited to use a pedometer. The neutral group did not get the benefit of the task-involving motivation, but they also were not impacted by the ego-involving messages either, which might have taken away the focus of giving their best effort and monitoring personal improvement. Second, the study design was such that it might have become obvious to those in the control group that they were not in a group that would receive motivating emails. As such, our results might be a reflection of the John Henry effect, where individuals realize they are in the control group and work harder to overcome the "disadvantage" (Saretsky, 1972). Therefore, rather than give-up because they did not receive any motivation, they may have ensured they met their step goals, regardless of lack of motivating messages.

Means, Standard Deviations, and Reliability Coefficients of the Study Scales

Measure (all 1-5 scale range)	TASK EMAIL (n = 17)		EGO EMAIL (n = 10)		NEUTRAL EMAIL (n = 14)		Reliability Coefficient
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	
Caring	4.44	.59	1.71	.84	3.02	.77	.99
Task	4.14	.63	3.05	.833	2.33	.94	.92
Ego	1.70	.81	3.04	.81	2.17	.86	.91
Self-Efficacy Pre	2.64	.85	2.43	.48	2.70	.50	.74
Self-Efficacy Mid	2.27	.69	2.23	.47	2.45	.45	.88
Self-Efficacy Post	2.11	.65	2.28	.63	2.30	.68	.85
# of Total Steps	720,284	413,474	411,879	307,832	464,657	47,793	

Note. Alpha coefficients measure the reliability of the individual scales; values of .7 and above suggest the measures were reliable.

Note. The lower the self-efficacy score, the greater the confidence in ability to exercise

Correlations between Climate and Self-Efficacy at each time point

Measure	Caring	Task	Ego	Self Efficacy Time 1	Self Efficacy Time 2	Self Efficacy Time 3
Caring	1.00					
Task	.85*	1.00				
Ego	-.31*	-.31*	1.00			
Self Efficacy 1	.07	.08	-.21	1.00		
Self Efficacy 2	-.05	-.05	.02	.33*	1.00	
Self Efficacy 3	-.41**	-.29	.23	.20	.00	1.00

* significant at the $p < .05$ level.

** significant at the $p < .01$ level.