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Using Norm-Based PSAs to Foster Green Behavior in a University: Some Preliminary Results from Lithuania

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Abstract

Three field studies using norm-based public service announcements were carried out in a university context. The studies yielded inconclusive results, pointing toward the need to investigate the contextual and individual effectiveness of persuasive communication based on making social norms salient. The presented studies are discussed as the first steps in introducing persuasive pro-environmental communication in a specific university context and some ways forward are proposed.

Key words: social norms, public service announcement, recycling, elevator use, pro-environmental behavior

Introduction

Universities are at the forefront of positive social change, both as leaders in the process, and as positive examples. In education, social participation, and in their internal processes, universities are expected to be agents of change in promoting sustainability (Dagiliūtė & Liobikienė, 2015; Soylu, Yelken, & Külekci, 2016). It is apparent that if universities are to be the leaders of positive environmental change, it is not enough to conduct research on pro-environmental behaviors and sustainability, but they also need to adopt the practices themselves – they also need to walk the talk (Hartman, Johnston, & Hill, 2018). This leads to universities adopting various sustainable development goals and incorporating social and environmental sustainability into their internal policies (Kościelniak, 2014), as well as undertaking infrastructural changes that accommodate sustainable behaviors, such as green food options, reduction of waste and energy consumption, various affordances for sustainable practices (Brinkhurst, Rose, Maurice, & Ackerman, 2011; Stevens, Petermans, & Vanrie, 2016).

Many authors have investigated how universities and other educational organizations can both be green organizations themselves, (e.g. engaging in ranking systems that show the degree to which an organization is sustainable (Suwartha & Sari, 2013) and how they can help the community develop their environmental citizenship through

incorporating sustainability courses into various study programs and generally making the curriculum more green (Haigh, 2005; Strachan, 2018; Svalfors, 2018; Xiong et al., 2013). While universities can be and are active agents of change for sustainability, they also have the potential to be a good testing ground for various approaches that, at first, are applied internally and can then spill over to the broader public. Universities, being at the forefront of human knowledge and progress, have the responsibility and the capacity to engage in testing various approaches for positive social change.

For experimental and social psychology, a university is a very useful context in which a lot of processes can be controlled and replicated. The social and environmental interactions that go on in this context are fairly consistent, allowing for an iterated approach toward various solutions of promoting sustainable practices. Such a context allows one to conduct research in a controlled yet fairly natural environment and to build upon results as they come in. The studies presented in this article are built on this premise and provide preliminary results from three field studies in promoting sustainable behaviors in a university context.

One cost effective way of promoting socially desirable behaviors and sustainability is persuasive communication through public service announcements (PSAs) (Bator & Cialdini, 2000). Static visual reminders of desired behaviors can be an effective way of encouraging and directing behavior and can blend into the various environments of public spaces. Such PSAs have the potential to be long lasting, robust and cheap means of encouraging behavior, on the condition that they are done well and effectively (Poškus, Pilkauskaitė Valickienė, & Kuzinas, 2018, 2019).

Previous research in an educational context in Lithuania has shown that static visual PSAs with appeals that present normative messages have great potential in promoting pro-environmental attitudes and intentions among high-school students (Poškus, 2017). Generally, for a PSA to be effective, one needs to follow certain guidelines: making the message clear, making the ad humorous, providing positive examples of the desired behavior and highlighting its need and prevalence (Bator & Cialdini, 2000; Cialdini, 2003). These guidelines are based on persuasion theory (Bator & Cialdini, 2000) and the innate human tendency to follow social norms as an heuristic in making effective decisions quickly (Cialdini, 2003; Kallgren, Reno, & Cialdini, 2000; Poškus, 2016). There is a large body of literature that highlights the effectiveness of norm-based interventions in eliciting desired behavior (Poškus, 2016), with the added value of such communication being largely underestimated and underdetected (Jaeger & Schultz, 2017; Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008), thus making it less prone to elicit a contrarian response.

It must be noted, however, that norm-based communication and PSAs might not work as universally and as straightforwardly as previously thought. There is evidence that individuals with differing personality patterns are differently persuaded by normative PSAs (Poškus, 2017), and that the visual aspect of persuasive communication has the potential for added value in its effectiveness (Poškus et al., 2019). Building on this research, we sought to introduce norm-based and visually congruent (Poškus et al., 2019) (meaning that the image and the appeal present the same normative message) persuasive PSAs in a university context and to conduct preliminary assessments of their effectiveness in persuading the community to engage in pro-environmental activities.

The Present Studies

Three field studies utilizing norm-based persuasive communication, constructed based on previous research (Bator & Cialdini, 2000; Cialdini, 2003; Poškus, 2017; Poškus et al., 2018, 2019), were conducted. The studies were designed to be as natural and non-intrusive as possible and all of the university's community could participate in them. The presented studies reflect the initial steps that the university is taking in improving its sustainability through introducing communication that directs the community toward sustainable practices. The studies are meant to be the first step in an iterative process and should be viewed as such. All data related to this article are openly available through the OSF platform: <https://osf.io/9kt27>.

Study 1 – Persuading the Community to Take the Stairs

This study was intended to test whether PSAs that were designed based on previous research could effectively persuade community members to take the stairs rather than using the elevator.

Method

Participants

The whole community of Mykolas Romeris University were potential participants in this study and they were not informed about the study to make sure that such knowledge did not influence the results. No personal or other identifying information was gathered during the study and individuals' behavior was observed in a public space without intruding into their privacy. A total of 6267 observations were made. We opted for live observations rather than visual recording to ensure that no personal identifying information is gathered.

Procedure

Student volunteer pairs (the primary and the secondary observer) were posted in all of the four floors of the university building, in public places that allowed them to clearly, yet inconspicuously, monitor whether individuals choose the stairs or the elevator. Only individuals entering the stairwell with the elevator were observed.

Each floor was monitored in two shifts: from 08:00 to 13:00 and from 13:00 to 18:00. Behaviors were monitored for four days, each day a week apart. This strategy was chosen to maximize representativeness while minimizing the time required to conduct the observations. Observers noted their observations in a simple table that had rows for different times and columns for different decisions (elevator vs stairs). They simply wrote down one letter in the appropriate cells in the table to indicate whether the observed individual was either male or female.

The first two weeks were meant to determine the baseline behavior, while the last two weeks were meant to assess the effect of the intervention, which was installed the day after the second observation time. The intervention (a large sticker with a PSA) was installed onto the elevator door, making sure that everyone approaching the stairwell would see it.

While our best effort was spent making sure that all floors are monitored at all times during the intervention, some data from some floors is missing due to unforeseen circumstances (the study was conducted during the start of the flu season, so some observers unexpectedly called in sick). Missing data, however, should not have an impact on the overall results, since we are focusing on the ratio of individuals taking the stairs or the elevator, not absolute quantities. The data is openly available and can be inspected independently.

Materials

An A0 sized sticker was placed on the doors of the elevators in all floors of the building I of the university. The figure was cut into three pieces so that the top of the sticker is always visible, while the rest of the sticker moves together with the elevator doors.

The stimulus was meant to be as clean and parsimonious as possible. The appeal at the top of the stimulus reads “Most people choose the stairs. Care for nature – choose the stairs yourself!” The wording of the appeal was based on previous research that highlighted the usefulness of normative appeals (Poškus, 2017; Poškus et al., 2018), while the visual aspect of the PSA was chosen to illustrate the desired behavior and have a congruent image-appeal combination, which was found to be more effective than just one or the other (Poškus et al., 2019).

Measures

The observers recorded the approximate time and floor for each behavior, while sex of the individual was assessed visually. The agreement between both raters was very high (Table 1); the data from the primary rater was used for conducting all the analyses.

Table 1

Interclass Correlations of the Observations Between Rater Pairs

	Interclass correlation	95% Confidence interval	
		Lower	Upper
Number of men taking the stairs	0.983	0.970	0.990
Number of women taking the stairs	0.992	0.985	0.955
Number of men taking the elevator	0.985	0.975	0.992
Number of women taking the elevator	0.985	0.974	0.992
Total number of people taking the stairs	0.991	0.984	0.995
Total number of people taking the elevator	0.990	0.982	0.994

Analysis

A chi-squared analysis with an additional moderated analysis splitting the sample by sex was conducted to determine whether the intervention had an effect on individuals' behavior and to explore possible sex differences.

Results

The contingency table with observed and expected counts of individuals taking the stairs or the elevator prior and after the intervention, as well as a split by observed individuals' sex is presented in Table 2.

Table 2
Observed and Expected Counts of Individuals Taking the Stairs or the Elevator

Sample	Choice		Stage of the study		
			Pre	Post	
Males	Stairs	Count	962	816	
		Expected count	956	822	
	Elevator	Count	173	159	
		Expected count	179	153	
			Total count	1135	975
	$\chi^2(1)=0.449, p=0.503, N=2110$				
Females	Stairs	Count	1907	1581	
		Expected count	1945	1543	
	Elevator	Count	411	258	
		Expected count	373	296	
			Total count	2318	1839
	$\chi^2(1)=10.404, p=0.001, N=4157$				
Total	Stairs	Count	2869	2397	
		Expected count	2901	2365	
	Elevator	Count	584	417	
		Expected count	552	449	
			Total count	3453	2814
	$\chi^2(1)=5.066, p=0.024, N=6267$				

Note. Pre – outcomes before introducing the intervention, Post – outcomes after introducing the intervention. Expected counts are rounded to whole numbers.

The effect is statistically significant for the total sample, while moderation analysis reveals that the effect reaches significance only for female members of the university community. While the data shows statistical significance, it must be noted that the effect is not. This is perhaps due to the community already preferring the stairs to the elevator and thus there might be a ceiling effect for the effect.

Discussion

The results indicate a small but significant effect of the PSA in persuading the community to take the stairs rather than taking the elevator. This effect is moderated by sex – the PSA was significant for women, but not for men. There are a few possible explanations for this result.

A possible confounding factor that dissuaded men from taking the stairs could be that the PSA only depicted women, which some men might not perceive as an ingroup whose example to follow. Alternatively, men might be less prone to adopt normative behavior if there is no clear benefit to it, but there is fitness in acting against the norm (a similar example could be men being much more prone to traffic law violations than women) (González-Iglesias, Gómez-Fraguela, & Luengo-Martín, 2012). Thus, even though normative messages do tend to be effective, there might be important contextual and sex differences in how they affect human behavior. If we were to only analyze the overall effectiveness of the intervention, we would falsely assume that it had a universal positive effect for everyone.

Due to time constraints and lack of available personnel, the study was limited to conducting observations one day per week, which could have confounded the results by allowing irregularities in activities or various events to skew the data. Additionally, there is some missing data from some of the days, since observers were not present because of unforeseen circumstances. Thus, even though the data seems quite straightforward, it should not be taken as completely representative of the effects of the intervention.

Study 2 – Sorting Waste in Hallways

This study was intended to test whether norm-based PSAs have a positive effect on the quality of waste sorting behavior in large hallways.

Method

Participants and Procedure

The whole community of Mykolas Romeris University were potential participants in this study and they were not informed about the study to make sure that such knowledge did not influence the results. We opted for not recording video of individual behavior to avoid gathering identifying information without participants' consent.

Two large hallways that receive a lot of traffic and had coffee machines were chosen for the experiment. We placed recycling bins (one bin for paper and plastic, and one bin for general waste) in both locations. The bins were placed next to the coffee machine in both locations in anticipation that the coffee machine is potentially the biggest source of waste, so we intended to make the recycling bins very accessible and easy to find.

To ascertain the baseline for correctly sorted waste, we left the recycling bins without additional stimuli in the halls for two weeks. After two weeks had passed, we put up A2 sized posters (Figure 2) above the bins that were intended to encourage observers to engage in waste sorting behavior. In another two weeks' time the posters were removed, and the behavior was further observed for an additional two weeks. Each day during the experiment, we emptied out the bins and weighed their contents as well as the portion of their contents that was incorrectly sorted. Precise dates and weighing results are presented in Table 3.

Materials

We used two grey 60-liter trash bins with closed tops for each location. The bins had the required waste type written on their lids (paper and plastic or general waste). Closed top bins were chosen so as not to prime observers with the contents of the bin. No additional information was presented on the bins in order to make the stimulation as clean as possible in terms of what produces the effect.

Similarly to Study 1, the stimulus was intended to be clean and parsimonious. Since it is quite hard to provide clearly understandable descriptive imagery of waste sorting behavior, we adapted a stimulus from a previous study by simplifying it (Poškus, 2017). The stimulus was intended to both highlight the desired behavior (the cartoon bin is throwing trash in itself) and to elicit positive emotions (Poškus et al., 2018, 2019). The text reads "Increasingly more people are sorting waste. Throw trash where it belongs! SORT WASTE!" This appeal highlights the trending descriptive norms of a desired

behavior, with an added explanation of the expected behavior from the observer. Additionally, the large text at the bottom of the image is an injunctive appeal that reminds the observers of their duty to sort waste.

The amount of waste was weighed, and all present waste was removed at the end of each day just before building closure. The weight values were recorded in grams.

Analysis

One-way analysis of variance, being a fairly robust method (Schmider, Ziegler, Danay, Beyer, & Bühner, 2010), was chosen to determine whether the percentage of correctly sorted waste differed prior, during, and after the normative posters were present above the recycling bins.

Research results

The overall weight values of total, correctly sorted, as well as incorrectly sorted waste, as well as the percentages of correctly sorted waste throughout the duration of the experiment are presented in the summary table (Table 3). No differences were found in the percentage of correctly sorted paper and plastic throughout the observed period ($F(2,30)=1.856, p=0.174$, see Figure 1 for descriptives). Similarly, no significant differences were found for the percentage of incorrectly sorted general waste ($F(2,30)=1.156, p=0.328$, see Figure 2 for descriptives).

Table 3
Summary Table of Waste Recorded During Study 2

Date	PP total	PP incorrect	GW total	GW incorrect	PP incorrect %	GW incorrect %	STAGE
19-2-18	570	10	230	10	1.8	4.3	BEFORE
19-2-19	110	0	181	0	0.0	0.0	BEFORE
19-2-20	184	0	157	24	0.0	15.3	BEFORE
19-2-21	361	8	348	10	2.2	2.9	BEFORE
19-2-22	250	3	17	10	1.2	58.8	BEFORE
19-2-23	357	34	105	4	9.5	3.8	BEFORE
19-2-25	176	0	269	38	0.0	14.1	BEFORE
19-2-26	246	0	275	0	0.0	0.0	BEFORE
19-2-27	313	0	216	99	0.0	45.8	BEFORE
19-2-28	1263	42	104	42	3.3	40.4	BEFORE
19-3-1	119	8	402	49	6.7	12.2	BEFORE
19-3-2	223	12	191	36	5.4	18.8	BEFORE
19-3-4	352	14	165	54	4.0	32.7	DURING
19-3-5	243	3	144	95	1.2	66.0	DURING
19-3-8	185	2	191	75	1.1	39.3	DURING
19-3-9	453	21	769	116	4.6	15.1	DURING
19-3-11	82	0	65	4	0.0	6.2	DURING
19-3-12	261	0	354	7	0.0	2.0	DURING
19-3-13	420	32	146	81	7.6	55.5	DURING

See next page for continuation of table

Continuation of Table 3

19-3-14	403	0	288	73	0.0	25.3	DURING
19-3-15	299	12	111	31	4.0	27.9	DURING
19-3-18	355	0	248	63	0.0	25.4	DURING
19-3-19	528	0	518	99	0.0	19.1	DURING
19-3-20	443	63	337	27	14.2	8.0	AFTER
19-3-21	448	33	318	49	7.4	15.4	AFTER
19-3-22	536	64	193	59	11.9	30.6	AFTER
19-3-23	378	0	733	94	0.0	12.8	AFTER
19-3-25	286	2	212	65	0.7	30.7	AFTER
19-3-26	207	40	498	105	19.3	21.1	AFTER
19-3-27	671	4	532	160	0.6	30.1	AFTER
19-3-28	671	4	532	160	0.6	30.1	AFTER
19-3-29	307	0	125	13	0.0	10.4	AFTER
19-3-30	326	5	509	96	1.5	18.9	AFTER

Note. PP – paper and plastic, GW – general waste. Stage refers to the stage of the experiment, before the intervention (putting up the posters), during the intervention, and after the removal of the intervention. Weights are presented in grams.

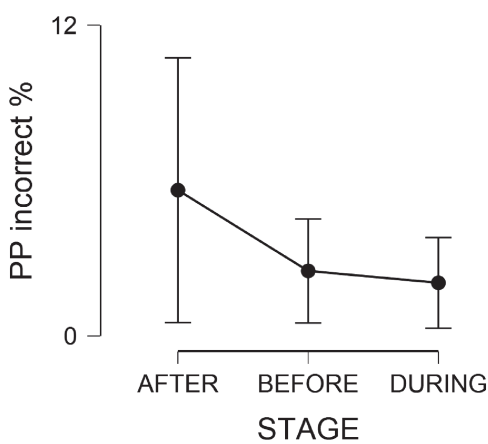


Figure 1. Descriptive plot of incorrectly sorted paper and plastic during the experiment

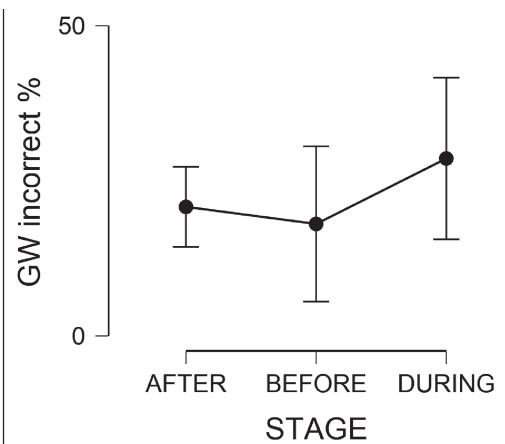


Figure 2. Descriptive plot of incorrectly sorted general waste during the experiment

Discussion

No significant differences in the percentages of correctly sorted waste were found when comparing waste sorting before putting up PSAs, during their presence, and after removing them. This result is twofold. First, this indicates that PSAs encouraging community members to sort waste do not affect behavior beyond the effect that sorting bins have on behavior. Second, there might be a ceiling effect that prevents us from finding significant results due to the sorting being already quite high.

This study employed a very clean design and the bins were neither color-coded, nor did we present any additional information on what sort of waste needs to go in which

receptacle. This was done with the intention to see whether normative PSAs alone can help in improving sorting behavior, which they did not. Thus, it seems that persuasive communication alone is insufficient and it needs to be presented with clear affordances and cues from the environment. While normative messages do change how people intend to behave (Poškus, 2017; Poškus et al., 2019), the environment needs to accommodate that intention by having clear guidelines how to act upon those intentions.

There are some confounds that could have affected the study, namely, the university being a public space and periodically having events that produce excessive amounts of waste due to increased traffic in the hallways. Such occasions might dissuade individuals to take the time to investigate which trash receptacle is the appropriate one, which might lead to reduced percentages of correctly sorted waste. Additionally, the hallways produce quite an anonymous environment where peers do not necessarily observe one's behavior and thus there is no pressure to act in accordance with normative PSA other than personal choice.

Study 3 – Sorting waste in classrooms

This study was intended to be a replication of Study 2 in a slightly different context. In this study, the waste bins were put in small auditoriums (seating around 30 people) to investigate whether spaces where one's behavior is more likely to be observed by one's peers yields different results than the same intervention in a more public space.

Method

Participants, Procedure and Measures

The whole community of Mykolas Romeris University were potential participants in this study and they were not informed about the study to make sure that such knowledge did not influence the results.

Two classrooms of equal size (seating around 30 people) and of equal traffic were chosen for the study. One classroom had only the sorting bins without any additional information placed instead of the general waste bin, while the other classroom had sorting bins placed together with a PSA (the same stimulus as in Study 2, see Figure 2). The stimulus was the same as in Study 2.

The amount of waste was weighed, and all present waste was removed just before the building closure. The weight values were recorded in grams. Waste was removed at reasonable times, giving time for the bins to fill up (see Table 4).

Analysis

Only a few data points are available due to the design of the study and the study is, therefore, limited to a qualitative examination of the data.

Results

While the small amount of observations recorded in this study impedes any formal significance testing, the condition that had a PSA presented together with the sorting bins resulted in no incorrectly sorted waste, giving that condition a mean and variance

of the percentage of incorrectly sorted waste equal to zero. Against that condition any other result, which does not equal zero would constitute a statistically significant difference (see Table 4).

Table 4
Summary Table of Waste Recorded During Study 3

Date	PP	PP incorrect	GW	GW incorrect	PSA	PP incorrect %	GW incorrect %
2019-04-10	70	0	144	0	YES	0	0
2019-04-12	45	0	83	0	YES	0	0
2019-04-15	0	0	0	0	YES	0	0
2019-04-23	201	0	140	0	YES	0	0
2019-04-10	151	42	629	412	NO	28	66
2019-04-12	177	0	275	22	NO	0	8
2019-04-15	34	0	59	0	NO	0	0
2019-04-23	278	25	153	20	NO	9	13

Note. PP – paper and plastic, GW – general waste. Weights presented in grams.

Discussion

This study was intended to replicate the findings of Study 2 in a different environment. Our working hypothesis was that in a more closed environment, where one's peers are closer and more likely to observe one's behavior, the social norms highlighted in the PSAs would have a more pronounced effect. The data tends toward this assumption, but there are too few observations to draw definitive conclusions.

An additional factor in this study could be that the stimuli were visible for at least the duration of the class, which is usually at least 90 minutes. Thus, the intervention had more time to make social norms salient for the observers. Consistency in normative stimuli has previously been found to be a possible factor in their effectiveness (Poškus, 2017), therefore future research must explore whether norm-based PSAs are effective in similar contexts because of viewing time, or because of the presence of a relevant social group.

This study could be a starting point toward investigating the effectiveness of norm-based messages in different contexts and whether the likelihood of one's behavior being observed adds to the effectiveness of norm-based messages in situations where they have been found to be effective. It is reasonable to assume that social norms, being a reflection of the expectations of society, would have a more pronounced affect where one is faced with the group that has these expectations.

General discussion

Social norms are generally seen as being very effective in eliciting desired behavior, from hotel towel reuse (Bohner & Schlüter, 2014; Goldstein, Cialdini, & Griskevicius, 2008), to littering (Cialdini, Reno, & Kallgren, 1990), to promoting pro-environmental intentions (Poškus, 2017). Overall, norm-based interventions seem to be more effective in changing immediate behavior than any other type of approach (Abrahamse & Steg,

2013; Poškus, 2016). However, it seems that social norms do not necessarily affect everyone equally (Poškus, 2017) and both individual differences and contextual factors can affect how persuasive normative messages are. While of limited statistical significance, our results provide a foundation upon which we can build more precise approaches, tailoring pro-environmental messages to be more effective in different situations.

The three studies presented in this article highlight that, despite being regarded as very effective, interventions that use norm-based communication can have limited results if other factors are not addressed and accounted for. Our preliminary studies were aimed at using as precise and as uncluttered stimuli as possible, which yielded limited results and point toward the need for more complex and systematic approaches. It is clear that persuading individuals to do the right thing is only one step in changing behavior and other steps are needed to make sure that the behavior is accessible and easy to perform (Stevens et al., 2016) and is indeed the default behavior in a given situation (Campbell-Arvai, Arvai, & Kalof, 2014).

The university context is a perfect testing ground for pro-environmental initiatives and persuasive communication and allows for an iterative process of constructing precise means of communicating desirable behavior. The present studies are the starting point in introducing pro-environmental messages in Mykolas Romeris University which is one of the steps of making the university move toward sustainable development (Dagi-liūtė & Liobikienė, 2015). Continuing with this trend, we aim to develop precise and targeted communication that is both cost-effective and persuasive, while adapting the internal infrastructure to accommodate the promoted pro-environmental behaviors.

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