RUNNING HEAD: Physical Orderliness Changes Decisions and Behaviors

Physical Order Produces Healthy Choices, Generosity, Conventionality, Whereas Disorder Produces Creativity

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Abstract

Order and disorder are prevalent in both nature and culture, which suggests that each environ confers advantages for different outcomes. Three experiments tested the novel hypotheses that orderly environments lead people toward tradition and convention, whereas disorderly environments encourage breaking with tradition and convention — and that both settings can alter preferences, choice, and behavior. Experiment 1 showed that relative to participants in a disorderly room, participants in an orderly room chose healthier snacks and donated more money. Experiment 2 showed that participants in a disorderly room were more creative than participants in an orderly room. Experiment 3 showed a predicted crossover effect: Participants in an orderly room preferred options labeled as classic whereas those in a disorderly room preferred options labeled as new. Whereas prior research on physical settings has shown that orderly settings encourage better behavior than disorderly settings, the current research tells a nuanced story of how different environments suit different outcomes.

The human mind likes order, rules, and tradition. Yet, disorder, unruliness, and unconventionality also hold appeal. In fact, both order and disorder are prevalent in nature (Koole & Van den Berg, 2005) and culture (Baumeister, 2005). Order and disorder therefore might be functional, particularly insofar as they could activate different psychological states and benefit different kinds of outcomes.

Past work suggests that feelings and inferences about (dis)order exist across a range of constructs (Douglas, 1966). At the trait level, preference for order is associated with valuing tradition, convention, and conservatism. In contrast, individuals at ease with disorder can tolerate ambiguity and place a high value on freedom (Dollinger, 2007; Feather, 1971; Kaplan & Kaplan, 1989).

We reasoned that such dispositional differences in reactions to order versus disorder might translate to the situational level. We hypothesized that orderly environments would encourage adherence to social convention and overall conservatism, whereas disorderly would environments encourage people to seek novelty and unconventional routes. Three experiments supported these hypotheses.

Scholarship on the behavioral effects of physical orderliness largely comes from sociology's Broken Windows Theory (Keizer et al., 2008; Wilson & Kelling, 1982), which argues that minor signs of disorder can cause much bigger consequences such as delinquency and criminality. Psychology has shown that a related dimension, cleanliness (e.g., exposure to cleaning-related scents), leads to morally good behaviors such as reciprocity (Liljenquist et al., 2010; Mazar & Zhong, 2010; Zhong, Strejcek, & Sivanathan, 2010). The broad conclusion from both fields is that environmental disorder impels bad or even destructive behavior whereas cleanliness supports normatively good and moral outcomes.

Our point of departure from prior work was to reason that order and disorder are common states of the environment that activate different mindsets, which in turn might benefit different outcomes. Yet little work has investigated whether physical orderliness influences

behaviors that are not decidedly moral. Furthermore, to our knowledge, no work has shown positive consequences of a disorderly environment. The current work does both, and in doing so establishes that variations in physical orderliness produce wider-ranging effects than what is currently known. Our findings imply that varying the environment can be an effective way to shape behavior.

We tested outcomes that have been linked to tradition and convention, namely healthy food choices (Roberts et al., 2009), financial generosity (Schweizer, 2008), creativity (Simonton, 1999), and preference for tradition (Eidelman, Crandall, & Pattershall, 2009). We predicted that physical order, more than relative disorder, would lead to the desirable behaviors of healthy eating and charitable giving (Experiment 1). We also hypothesized that there would be positive outcomes from physical disorder. This novel hypothesis took the form of expecting that a disorderly room, compared to an orderly one, would enhance the desirable behavior of creativity (Experiment 2). Last, Experiment 3 tested the normatively-neutral outcome of preference for tradition versus novelty, which we predicted would be strengthened or weakened depending on the physical environment (i.e., a crossover effect).

Experiment 1: Environmental Order Encourages Charitable Donations and Healthy Choices

Experiment 1 tested whether physical order would promote healthy choices and charitable behavior. Following from hints in the literature regarding convention and healthy eating (Roberts et al., 2009) and cleanliness and giving (Liljenquist et al., 2010), we predicted that people placed in an orderly (versus disorderly) environment would donate more money to charity and choose a healthy over an unhealthy snack.

Method

Participants and design. Thirty-four Dutch students participated. Participants were randomly assigned to an orderly versus disorderly condition.

Procedure. We manipulated environmental orderliness by having participants complete the study in an orderly or disorderly room (Appendix A). The rooms were adjacent (therefore having the same sunlight exposure and view) and had the same size and configuration. The main difference was their orderliness. The disorderly room had papers and common office items scattered throughout the workspace. The orderly room had no clutter.

Participants first were told they would receive €3 for participating. Then they completed unrelated filler questionnaires to ensure that participants spent the same amount of time (10 minutes) in the orderly or disorderly environment.

Next, participants were presented with an opportunity to donate to a charity. Participants learned that the department supports a charity that supplies children with toys and books (Fennis, Janssen, & Vohs, 2009). Participants wrote the amount, if any, they chose to donate on paper, which they placed into a sealed envelope (to dispel self-presentation concerns).

The researcher then discussed the concepts measured in the filler questionnaires as a partial debriefing. Upon exiting, participants were allowed to take an apple or chocolate bar, which constituted the healthy food choice measure. Participants then were fully debriefed.

Results and Discussion. The results supported our predictions. Participants in the orderly room donated over twice as much as those who completed the study in the disorderly room (M=€2.95, SD=2.94 versus M=€1.17, SD=1.55), $t(32)=2.21$, $p=.03$, $d=.78$. Descriptively, 82% of participants in the orderly room donated any money versus 47% in the disorderly room, $\chi^2(1)=4.34$, $p<.04$, $\varphi=.36$. Also as predicted, participants in the orderly room chose the apple (over the chocolate) more often than those in the disorderly room[1] (M=67% versus M=20%), $\chi^2(1)=6.65$, $p<.05$, $\varphi=.44$.

The results confirmed the prediction that an orderly (versus disorderly) environment leads to desirable, normatively-good behaviors. Sitting in a tidy room led to healthier food

choices and greater financial support of charitable institutions, relative to sitting in a cluttered room.

Experiment 2: Environmental Disorder Stimulates Creativity

Experiment 1 demonstrated that environmental order, more than disorder, encourages healthy choices and charitable behavior. Experiment 2 took a different tack and investigated contexts in which a disorderly environment could produce normatively desirable behavior. Given that orderliness is paired with valuing convention, a disorderly state should encourage breaking with convention, which is needed to be creative (Simonton, 1999). Therefore, we predicted that being in a disorderly, versus orderly, environment would have the desirable effect of stimulating creativity.

Experiment 2 improved upon Experiment 1 in using two identical rooms for both conditions. Experiment 2 simply altered each room to be either orderly or disorderly. These changes help to assuage concerns that specific differences other than variations in orderliness could account for the results.

Method

Participants and design. Forty-eight American students participated in a two-condition (orderly versus disorderly environment) design.

Procedure. Participants completed tasks in a room arranged to be either orderly or disorderly (Appendix B). To measure creativity, we adapted the Alternative Uses Task (Guilford, 1967). Participants imagined that a company wanted to create new uses for the ping-pong balls that it manufactures. They were instructed to list up to ten new uses for ping-pong balls.

Scoring creativity. Participants' ideas were scored for their creativity. Two coders, blind to condition, rated each idea on a three-point scale (1=*not at all*; 3=*very creative*; Kappa=.81, $p<.01$), with disagreements resolved through discussion.

Creative output was operationalized in three ways. One method was the average creativity. A second method was overall creativity, which was calculated by summing scores for

each participant's ideas. A third method was to count highly creative ideas (Friedman & Förster, 2001). This entailed tallying the number of ideas that coders rated a 3 on the scoring metric.

Results. We predicted that participants in the disorderly room would generate more creative solutions than would participants in the orderly room. In support of that prediction, the average creativity of participants' ideas differed by condition ($M_{disorderly}$=1.80, *SD*=.47, versus $M_{orderly}$=1.41, *SD*=.48), *t*(46)=2.82, *p*<.01, *d*=.83. Likewise, analyses of overall creativity scores showed that participants in the disorderly room were more creative than those in the orderly room ($M_{disorderly}$=7.9, *SD*=4.40 versus $M_{orderly}$=5.6, *SD*=3.10), *t*(46)=2.08, *p*< .05, *d*=.61.

Last, analyses of the number of highly creative ideas generated also supported our hypothesis. As expected, participants in the disorderly room generated more highly creative ideas than did participants in the orderly room ($M_{disorderly}$=1.00, SD=1.35 versus $M_{orderly}$=.21, SD=.41), *t*(46)=2.74, *p*<.01, *d*=.81.

Discussion. Being creative is aided by breaking away from tradition, order, and convention (Dollinger, 2007; Simonton, 1999), and a disorderly environment seems to help people do just that. Three operationalizations of creativity supported our prediction that sitting in a messy, disorderly room would stimulate more creative ideas than sitting in a tidy, orderly room. It could be that our disorderly laboratory stimulated creativity because it violated participants' expectations, which past work has shown can aid creativity (Ritter et al., 2012). Thus, we observed a previously undocumented effect — that cues of disorder can produce highly desirable outcomes.

Experiment 3: Environmental Effects on Preference for Traditional versus Novel Options

The prior experiments' outcomes had a normative slant to them, in that donating money to help needy children, healthy eating, and creativity are esteemed and widely valued behaviors. The current experiment tested whether orderly and disorderly environments can influence outcomes that are devoid of a normative interpretation.

We measured preference for a new versus a classic option. Participants completed a task ostensibly to help local restaurateurs create new menus. One of the options was labeled differently by condition. The option was framed as either classic, which signals the established choice, or new, which is the unexplored option (Eidelman et al., 2009). We predicted that participants would choose the option framed as classic more when seated in the orderly (versus disorderly) room, and, conversely, choose the option framed as new when seated in a disorderly (versus orderly) room.

The physical location of the rooms was changed from the two locations used in Experiments 1-2. As in Experiment 2, two rooms were made up to be orderly or disorderly, depending on condition. These changes help to reduce concerns that features particular to the rooms were at work and not the proposed account of orderliness versus disorderliness.

Method

Participants and design. One-hundred-and-eighty-eight American adults participated in a 2 (environmental orderliness: orderly versus disorderly) x 2 (label: classic versus new) between-subjects design.

Procedure. We manipulated environmental orderliness by randomly assigning participants to complete the study in a room arranged to be orderly versus disorderly (Appendix C).

Participants were told that the study concerned preferences for menu items at a nearby deli. Participants imagined they were getting a fruit smoothie with a “boost” (i.e., additional ingredients). The boost was available in three types: health, wellness, or vitamin.

We varied the health boost option frame so that it cued the concept of convention or novelty. To cue novelty, the label showed a star around the word *new* (Appendix D). To cue convention, the word inside the star was *classic*. The dependent measure was choice of the health boost option.

Results. We predicted an interaction between label and environmental orderliness, such that being in the orderly room would make the classic option more appealing, whereas the disorderly room would encourage choice of the new option. We performed a logistic regression with choice of the health boost as the dependent measure and environment and label conditions as between-subject factors. The main effects were not significant (χ^2s <0.5), whereas the expected interaction was, $\chi^2(1)=7.59$, $p<.01$, $\varphi=.20$.

Planned contrasts supported our predictions (Figure 1). When the health boost was framed as classic, participants were more likely to choose it when in the orderly than disorderly room ($M_{orderly}$=35% versus $M_{disorderly}$=18%), $\chi^2(1)=3.73$, $p=.05$, $\varphi=.20$. In contrast, when the health boost was framed as novel, participants showed the reverse pattern ($M_{disorderly}$=36% versus $M_{orderly}$=17%), $\chi^2(1)=4.53$, $p<.04$, $\varphi=.22$.

Discussion. Experiment 3 showed that environmental order affected preferences for established versus novel outcomes. The results supported our prediction that an orderly environment activated a mindset of following convention while a disorderly environment promoted exploring new avenues. There is no normatively correct option to choose in this context. Rather, orderliness seemed to encourage a general mindset for conservatism and tradition while disorder had the converse effect.

General Discussion

Order and disorder are concepts as old as the physical objects that create them. Considering that neither order nor disorder has won out (i.e., humans have not sought to eliminate either one), we reasoned that each environment suits different outcomes. Drawing on work from personality, moral psychology, and even sociology, we hypothesized that physical order would promote a mindset of tradition and convention, which would benefit healthfulness, charitable donations, and upholding the status quo. We also hypothesized that physical disorder

would promote a mindset of unconventionality, leading to enhanced creativity and an appreciation for novelty. Three experiments supported our predictions.

The results were robust across a range of methodological and conceptual changes. We used a total of six rooms, suggesting that the results were not due to the particulars of specific places. The findings obtained among diverse samples of participants — from European to American students to American community adults. The experiments took a multi-method, multi-measure approach, such as measuring conventionality as both reduced creativity and preference for established routes. Our investigation included choice and we thrice measured behavior (healthy snack choice, donations, and creativity). The consistency of results across methodological, sample, and physical changes speaks to the effect's robustness.

Prior work has tended to characterize disorderly environments as capable of producing wild, harmful, or bad behavior, while orderly environments evoke honesty, prosociality, and goodness. The results of our experiments suggest that the effects of physical orderliness are broader and more nuanced than that. Disorderly environments seem to inspire breaking free of tradition, which can produce fresh insights. Orderly environments, in contrast, encourage convention and playing it safe. Such tendencies can imply good, bad, or simply neutral consequences depending on the context. In short, our work demonstrates that an understanding of the psychological consequences of physical orderliness must be broadened to include a range of normative and non-normative outcomes.

Conclusion

There exists a large and growing industry around instilling environmental orderliness. Proponents claim that people see measurable life improvements from becoming neat and tidy, and they can point to multiple billions of dollars in annual revenue as evidence of success. In contrast, many creative individuals with Nobel prizes and other ultra-prestigious awards prefer — and in fact cultivate — messy environments as an aid to their work (Abrahamson &

Freedman, 2007). One such person was Einstein, who famously quipped, “If a cluttered desk is a sign of a cluttered mind, of what, then, is an empty desk a sign?”

As with many vociferous debates, it seems that both sides have a point. Orderly environments promote convention and healthy choices, which could improve life by helping people follow social norms and boosting well-being. Disorderly environments stimulate creativity, which has widespread importance for culture, business, and the arts. The use of systematic experiments to reveal the causal role of each setting means that people can harness the power of each environment to achieve their goals.

Footnotes

1. Two participants in each condition elected not to choose a snack, so their data were omitted from healthy food choice analyses.

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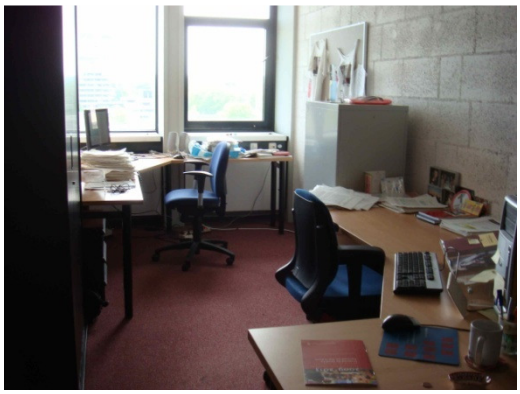
Appendix A: Rooms used in Experiment 1

Orderly Condition

Disorderly Condition



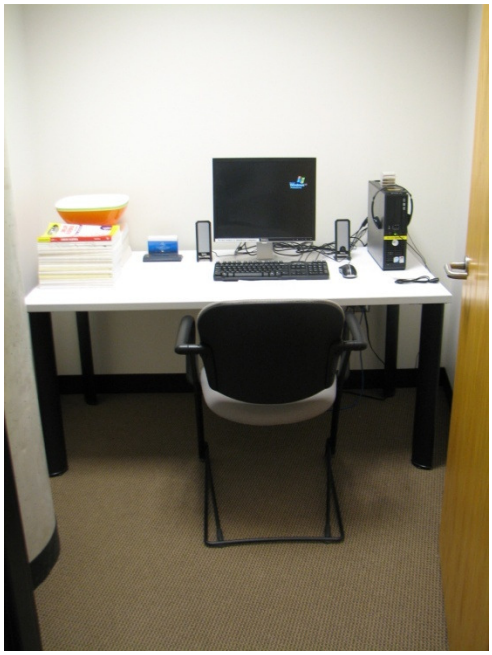
Appendix B: Rooms Used in Experiment 2

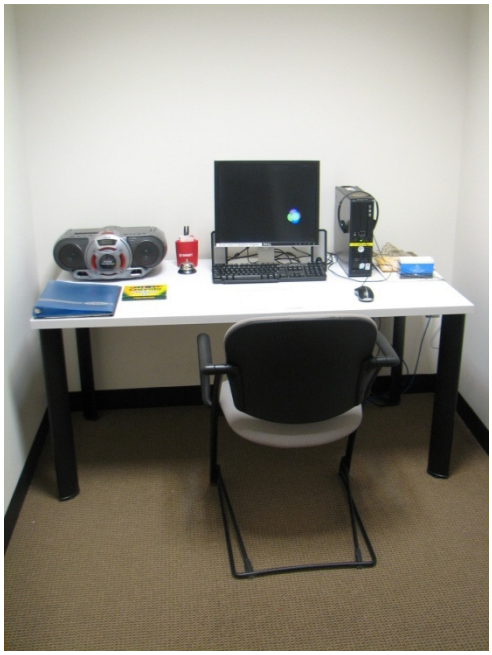
Orderly Condition

Disorderly Condition

Appendix C: Rooms Used in Experiment 3

Orderly Condition





Disorderly Condition

Appendix D: Option sets in Experiment 3

Classic Condition

Health Boost

Wellness Boost

Vitamin Boost

New Condition

Health Boost

Wellness Boost

Vitamin Boost

Figure 1. Choice Shares of Healthy Boost Option in Experiment 3