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Physical Order Produces Healthy Choices, Generosity, and 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 an option labeled as classic, but those in a disorderly room preferred an option labeled as new. Whereas prior research on physical settings has shown that orderly settings encourage better behavior than disorderly ones, the current research tells a nuanced story of how different environments suit different outcomes.

Keywords

environmental effects, creativity, decision making

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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 in 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 order and disorder exist across a range of cultures and constructs. 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). At a cultural level, the anthropologist Mary Douglas (1966) noted that physical order often is linked to morality, patterns, and correctness, whereas disorder is linked to deviations and taboo.

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 environments would 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, Lindenberg, & Steg, 2008; Wilson & Kelling, 1982), which posits 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, Zhong, & Galinsky, 2010; Mazar & Zhong, 2010; Zhong, Strejcek, & Sivanathan, 2010). The broad conclusion from both fields is that

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environmental disorder impels bad or even destructive behavior, whereas cleanliness supports normatively good and moral outcomes.

Our point of departure from prior work was our reasoning that order and disorder are common states of the environment that activate different mind-sets, which in turn might benefit different outcomes. 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 explored both possibilities, and in doing so established that variations in physical orderliness produce effects that are wider ranging than those 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, Jackson, Fayard, Edmonds, & Meints, 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 with 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; we predicted that this preference would depend on the physical environment (i.e., a crossover effect).

Experiment 1: Environmental Order Encourages Healthy Choices and Charitable Donations

Experiment 1 tested whether physical order would promote healthy choices and charitable behavior. On the basis of hints in the literature that convention is associated with healthy eating (Roberts et al., 2009) and cleanliness with giving (Liljenquist et al., 2010), we predicted that people placed in an orderly environment would be more likely to choose a healthy snack over an unhealthy snack than would people placed in a disorderly environment and that they would also donate more money to charity.

Method

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

Procedure. We manipulated environmental orderliness by having participants complete the study in an orderly or disorderly room (Fig. 1). The rooms were adjacent (and therefore had the same sunlight exposure and view), and they had the same size and configuration. The main difference was their orderliness. The disorderly room had papers and common office items scattered throughout the work space. The orderly room had no clutter.

Participants first were told that they would receive €3 for participating. Then they completed unrelated filler questionnaires intended to ensure that all participants

Fig. 1. The rooms used in the orderly (left) and disorderly (right) conditions of Experiment 1.

spent the same amount of time (10 min) in the orderly or disorderly environment.

Next, participants were presented with an opportunity to donate to a charity. They learned that the department in which the study was being conducted 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 a sheet of paper, which they placed into a sealed envelope (so that self-presentation concerns would be dispelled).

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 measure of healthy food choice. Participants then were fully debriefed.

Results and discussion

The results supported our predictions. Participants who completed the study in the orderly room donated more than twice as much as those who completed the study in the disorderly room (M = €3.19, SD = 3.01, vs. M = €1.29, SD = 1.76), $t(32) = 2.24$, $p = .03$, $d = 0.73$. Fully 82% of participants in the orderly room donated some money, versus 47% in the disorderly room, $\chi^2(1, N = 34) = 4.64$, $p < .04$, $\varphi = .37$. 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% vs. M = 20%), $\chi^2(1, N = 30) = 6.65$, $p < .05$, $\varphi = .44$.

The results confirmed the prediction that an orderly (vs. disorderly) environment leads to more desirable, normatively good behaviors. Sitting in a tidy room led to healthier food choices and greater financial support of a charitable institution, 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 a context 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 environment would have the desirable effect of stimulating creativity.

Experiment 2 improved upon Experiment 1 in using two identical rooms. That is, for Experiment 2, we simply altered each room to be either orderly or disorderly. These changes helped to assuage concerns that differences other than variations in orderliness could account for any observed differences in results between conditions.

Method

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

Procedure. Participants completed tasks in a room arranged to be either orderly or disorderly (Fig. 2). 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 manufactured. They were instructed to list up to 10 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 3-point scale (1 = *not at all creative*, 3 = *very creative*; $\kappa = .81$, $p < .01$); disagreements were resolved through discussion.

Creative output was operationalized in three ways. One method was to average the creativity scores for each participant. The second method was to sum each participant's scores (overall creativity). The third method was to count each participant's highly creative ideas (Friedman & Förster, 2001), that is, those that the 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. This prediction was supported by the measure of average creativity, which differed by condition (disorderly: $M = 1.80$, $SD = 0.47$; orderly: $M = 1.41$, $SD = 0.48$), $t(46) = 2.82$, $p < .01$, $d = 0.83$. Likewise, analyses of overall creativity showed that participants in the disorderly room were more creative ($M = 7.9$, $SD = 4.40$) than those in the orderly room ($M = 5.6$, $SD = 3.10$), $t(46) = 2.08$, $p < .05$, $d = 0.61$. Analyses of the number of highly creative ideas also supported our hypothesis. As expected, participants in the disorderly room generated more highly creative ideas ($M = 1.00$, $SD = 1.35$) than did participants in the orderly room ($M = 0.21$, $SD = 0.41$), $t(46) = 2.74$, $p < .01$, $d = 0.81$.

Finally, to rule out the alternate explanation that effort rather than creativity drove the results, we tested whether the number of ideas produced differed by condition. It did not, $t < 1$.

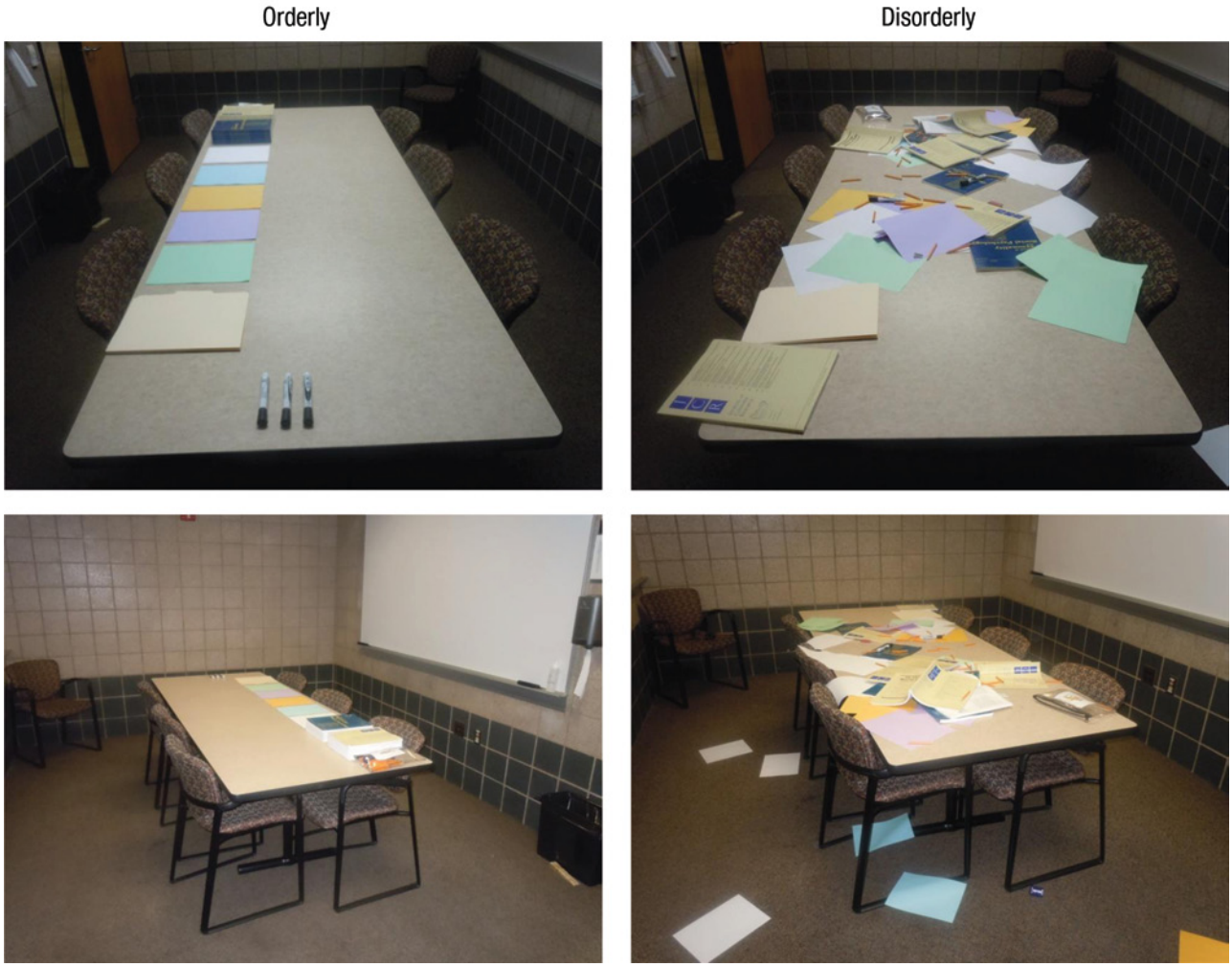

Fig. 2. The rooms used in the orderly (left) and disorderly (right) conditions of Experiment 2.

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 violated participants' expectations, which can aid creativity (Ritter et al., 2012). Our preferred explanation, though, is that cues of disorder can produce creativity because they inspire breaking free of convention. What is more, 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, eating healthy foods, and being creative are esteemed and widely valued behaviors. Experiment 3 tested whether orderly and disorderly environments can influence outcomes that are devoid of a normative interpretation (see the Pretest section in Results).

We measured preference for a new versus a classic option. Participants completed a task that ostensibly would help local restaurateurs create new menus. One of the options was labeled differently in the two conditions. That option was framed as either classic, the established

choice, or new, an unexplored option (Eidelman et al., 2009). We predicted that participants would choose the option framed as classic more when seated in an orderly (vs. disorderly) room, and, conversely, that they would choose the option framed as new more when seated in a disorderly (vs. orderly) room.

The physical location of the rooms was changed from the locations used in Experiments 1 and 2. As in Experiment 2, two rooms were made up to be orderly or disorderly, depending on condition. These changes helped to reduce concerns that features particular to the rooms, rather than the rooms' orderliness, drove any difference in results between the conditions.

Method

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

Procedure. We manipulated environmental orderliness by randomly assigning participants to complete the study in a room arranged to be orderly or disorderly (Fig. 3).

Participants were told that the study concerned preferences for menu items at a nearby snack shop. Participants imagined that they were getting a fruit smoothie with a "boost" (i.e., additional ingredients). Three types of boosts were available: health, wellness, or vitamin. We varied the framing of the health-boost option so that it cued the concept of convention or novelty (Fig. 4). To cue novelty, we added a star with the word *new* superimposed. To cue convention, we added a star with the word *classic* superimposed. The dependent measure was choice of the health-boost option.

Fig. 3. The rooms used in the orderly (left) and disorderly (right) conditions of Experiment 3.

Pretest. We conducted a pretest to confirm whether the choice of the classic or new option was indeed devoid of normative overtones. As in the main

Fig. 4. The option sets used to cue convention (left) and novelty (right) in Experiment 3.

experiment, participants (n = 28) read about the local snack shop and its fruit smoothies. They read that the menu display showed a boost option with a "new" sign next to it, whereas another boost had a "classic" sign. Participants rated which option, if either, was the "correct" option, the "right" option, and the "better" option, using a sliding scale (0 = *new*, 50 = *neither*, 100 = *classic*).

Results

Pretest. As expected, the overwhelming reaction in the pretest was that neither the classic nor the new option was normatively correct. For all three judgments of normativeness, the average rating was not statistically different from 50, the numerical rating corresponding to *neither* (correct option: M = 52.50, SD = 21.90; right option: M = 50.29, SD = 21.18; better option: M = 48.04, SD = 22.19), ts < 1. These data confirm our claim that this experiment tested the effects of physical orderliness on outcomes that do not reflect what is normatively good or correct—a novel contribution to the literature.

Main experiment. We predicted an interaction between label and environmental orderliness, such that being in the orderly room would make the classic option more appealing, whereas being in the disorderly room would make the new option more appealing. We performed a logistic regression with choice of the health boost as the dependent measure, and environmental orderliness and label as between-subject factors. The main effects were not significant (χ^2s < 0.5), whereas the expected interaction was, $\chi^2(1, N = 188) = 7.59$, $p < .01$, $\varphi = .20$.

Planned contrasts supported our predictions (Fig. 5). When the health boost was framed as classic, participants were more likely to choose it if they were in the orderly room (M = 35%) than if they were in the disorderly room (M = 18%), $\chi^2(1, N = 188) = 3.73$, $p = .05$, $\varphi = .20$. In contrast, when the health boost was framed as novel, participants showed the reverse pattern (disorderly room: M = 36%; orderly room: M = 17%), $\chi^2(1, N = 188) = 4.53$, $p < .04$, $\varphi = .22$.

Discussion

Experiment 3 showed that environmental order affected preferences for established versus novel outcomes. The results supported our prediction that an orderly environment would activate a mind-set of following convention whereas a disorderly environment would promote exploring new avenues. Highlighting the novelty of these results were the conclusions from a pretest, which confirmed that there was no normatively correct option in this context. Rather, orderliness seemed to encourage a general mind-set for conservatism and tradition, and disorder had the effect of stimulating the desire for the unknown.

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 psychology, moral psychology, and even sociology, we hypothesized that physical order would promote a mind-set of tradition and convention, which would encourage healthy behavior, charitable donations, and upholding the status quo. We also hypothesized that

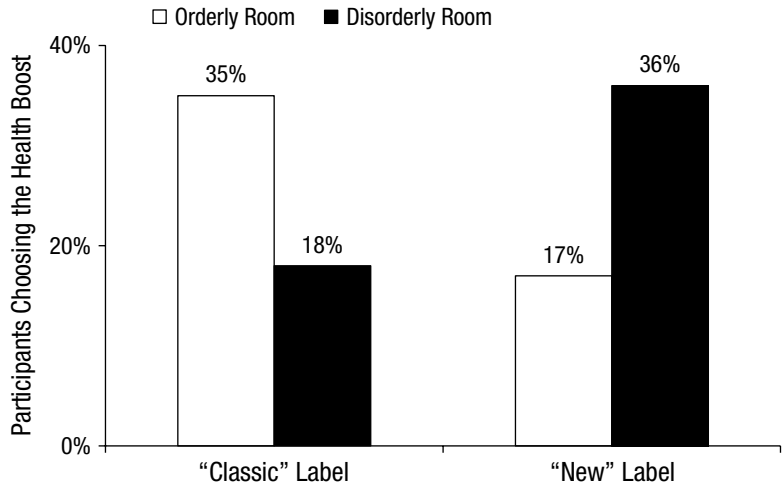

Fig. 5. Results from Experiment 3: percentage of participants choosing the health-boost option as a function of the option's label and environmental orderliness.

physical disorder would promote a mind-set 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, which suggests that the results were not due to the particulars of specific places. The findings obtained among diverse samples of participants—European students, American students, and American community adults. The experiments took a multimethod, multimeasure approach, for example, by measuring conventionality as both reduced creativity and preference for established routes. Our investigation included choice measures, and we measured behavior (healthy-snack choice, donations, and creativity) three times. 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, and orderly environments as evoking 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 understanding the psychological consequences of physical orderliness requires a broad perspective that includes a range of normative and nonnormative outcomes.

Conclusion

There exists a large and growing industry centered on instilling environmental orderliness. Proponents claim that people see measurable life improvements from becoming neat and tidy, and the industry 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 is widely reported to have observed, "If a cluttered desk is a sign of a cluttered mind, of what, then, is an empty desk a sign?" (e.g., www.goodreads.com).

As is the case 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. Our systematic investigations revealed that both kinds of settings can enable people to harness the power of these environments to achieve their goals.

Author Contributions

K. D. Vohs developed the study concept. All authors contributed to the study designs. Data collection and analyses were overseen by all authors. K. D. Vohs drafted the manuscript, and J. P. Redden and R. Rahinel provided critical revisions. All authors approved the final version of the manuscript for submission.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Note

1. Two participants in each condition elected not to choose a snack, so their data were omitted from this analysis.

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