Proceedings of the 5th International Conference on International Law and Legal Policy
DOI: 10.54254/2753-7048/2026.37673

Research on the Relationship Between Environmental Perception and Personal Moral Judgment: The Moderating Role of Conscientiousness

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Abstract. The relationship between environmental orderliness and individual moral judgment has attracted increasing scholarly attention; however, existing studies primarily focus on main effects, with insufficient examination of personality traits as boundary conditions. This study employed a single-factor between-subjects experimental design, using static images of orderly and disorderly classrooms to manipulate the classroom environment variable, and explored the effect of the classroom environment's orderliness on the moral judgment of secondary school students, as well as the moderating role of conscientiousness. A total of 217 valid .responses were collected. Moral judgment was measured using six campus-life scenarios on a 7-point scale, and conscientiousness was assessed with the two-item Conscientiousness dimension of the Ten-Item Personality Inventory (TIPI). An independent-samples t-test and a two-way ANOVA were conducted for data analysis. Results showed that the main effect of environmental orderliness on moral judgment was not significant, $t(215) = 0.71$, $p = 0.4785$; the interaction effect between environmental orderliness and conscientiousness also failed to reach statistical significance, $F(1, 213) = 1.108$, $p = 0.2938$. Neither Hypothesis H1 nor H2 was supported. The results indicate that the static picture-priming paradigm may not be ecologically valid for adolescent samples and that the mechanism involved in the processing of moral judgment is quite different from that involved in overt deviant behavior. This study offers an empirical basis for selecting paradigms in future studies and provides descriptive findings on the potential threshold effect in conscientiousness moderation.

Keywords: Environmental orderliness, moral judgment, conscientiousness, broken windows theory, bet

1. Introduction

The question of whether an orderly or a disorderly physical environment will influence people's evaluations of immoral behavior represents a fundamental issue in research on the relationship between environmental psychology and moral psychology. The Broken Windows Theory suggests that environmental cues of disorder, such as littering, graffiti, and vandalism, represent a lack of social control, which promotes a wide range of deviant behaviors [1]. Keizer et al. conducted field

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DOI: 10.54254/2753-7048/2026.37673

experiments that showed that disordered environments can lead to rule-breaking behaviors [2]. These studies provide evidence that physical surroundings have a direct effect on behavior and that physical surroundings can also have an indirect effect on an individual's cognition and behavioral tendencies.

Within moral psychology, a growing number of researchers began to explore the link between spatial order and moral thinking, and van der Wal et al. [3] confirmed that the physical environmental order has a significant impact on the level of moral awareness and moral judgment, with order inducing stricter moral judgments. Pfattheicher et al. [4] performed an extensive review and detected that environmental cleanliness systematically has an impact on prosocial and moral decisions. Vohs et al. [5] also found that an orderly setting enhances rule-based and altruistic decisions, whereas a chaotic setting enhances creative decisions. The general findings of these studies indicate that a physically orderly and neat setting can be one factor that can lead to a moral judgment in a given situation.

However, the previous research has mostly focused on how environmental tidiness directly affects moral reasoning; the effects of personality have been overlooked. Preferences for order, self-control, and rule-following are not the same across people either, and neither are responses to the same environmental cues identical in terms of variability of moral judgment. One of the Big Five personality traits is conscientiousness, which indicates the extent to which individuals are organized, self-disciplined, and willing to abide by rules [6]. Highly conscientious individuals are more likely to be attracted to stable and orderly contexts, demonstrate greater internalization of rules, and exhibit higher resistance to threats in moral judgments.

Based on the preceding theoretical and empirical review, this study proposed two hypotheses:

H1: High school students who view images of disorderly classrooms will rate immoral behaviors as significantly less severe, indicating more lenient moral judgment.

H2: Conscientiousness moderates the effect of environmental orderliness on moral judgment; the tendency toward more lenient moral judgment in disorderly environments is more pronounced among low-conscientiousness individuals, whereas high-conscientiousness individuals are less influenced by environmental cues.

2. Literature review

2.1. Extension of Broken Windows Theory: from overt behavior to internal moral judgment bias

Early research on Broken Windows Theory focused primarily on observable external violations. The 1969 abandoned car experiment conducted by Zimbardo showed that the physical state of the environment can increase the likelihood of destructive and theft-related behaviors, thereby implying that physical environmental factors influence people's perception of and reaction to social norms [1]. Most later empirical research remained within this behaviorist stream and focused on the predictive power of environmental cues for more observable behaviors such as littering and intrusion into public places. However, the dependent variables in these studies measured whether people engaged in transgression, and little attention was paid to the internal appraisal of the rightness or wrongness and severity of an act. These results, therefore, cannot be taken as evidence of altered moral judgments [2].

Moral behavior and moral judgment are related yet psychologically distinct constructs. Overt moral behavior can be more easily influenced by situational temptations, costs of immoral behavior, and external monitoring, whereas moral judgment reflects only one's internal cognitive assessment

DOI: 10.54254/2753-7048/2026.37673

of the legitimacy and acceptability of an action. When a person's external behavior changes, that does not always mean that their morality has changed. This separation indicates the need for independent investigation of the impact of environmental order stimuli on individuals' internal standards of moral evaluation.

Recent research has attempted to link moral cognitive evaluation with behavioral observation. From a psychological point of view, Haga [7] demonstrated that morally loaded labels in the physical environment can influence individuals' perceptions and social judgments, suggesting that environmental cues affect moral cognition through both affective and cognitive pathways, distinct from Broken Windows Theory's emphasis on behavioral contagion. A spatially clean environment also affects the perceived severity of uncivil behavior as well as the social characteristics of the actors, according to a study by Rodríguez-Gómez et al. [8]. That is, environmental order influences the assessment of both the behavior and the individual performing the action, and environmental cues have a multi-level effect on moral cognition.

2.2. Differential psychological effects of orderly versus disorderly environments: divergent findings and boundary conditions

The literature has not yet reached agreement between two views of the psychological influence of environmental order. The first line of research showed that orderly environments have normative reinforcement effects on moral judgments, as van der Wal et al. [3] found that physical environmental order significantly influences moral awareness and judgment. The proposed process was that orderly environments resulted in lower perceptions of world randomness, which in turn led to greater psychological attachment to social rules.

Vohs et al. [5], however, proposed a dual psychological effect of chaotic environments: environmental chaos negatively affects compliance with existing social norms while positively affecting cognitive flexibility. This may make individuals more flexible in their thinking and less likely to adhere to rules and may help them look at morally compromising situations in a variety of ways, leading to more lenient judgments.

To account for these conflicting empirical findings, Greene et al. [9] found that increased cognitive load selectively interferes with utilitarian moral judgment, suggesting that the effect of environmental cues on moral evaluation may depend on individuals' available cognitive resources. This finding provides a theoretical rationale for considering individual differences—such as conscientiousness—as potential moderators of environmental effects.

2.3. The moderating role of conscientiousness: theoretical logic and empirical evidence

Need-supply fit is a previous approach used to explain the moderating effect of conscientiousness. Conscientious people are those who have a natural psychological tendency towards order, predictability, and clear rules to guide decision-making and behavior [6]. Highly conscientious persons have been observed to be able to mitigate the impact of environmental messages and take in information via top-down cognitive regulation, thus preserving relatively stable standards in moral judgments. Low-conscientiousness individuals, on the other hand, do not feel the need for internal control, do not exhibit high cognitive resistance, and are more likely to make moral decisions based on the context they are in.

Based on the need-supply fit framework, highly conscientious people have a natural proclivity towards order, regularity, and strict behavioral rules [6]. People who are high on the conscientiousness scale can handle external disruption of order in a top-down fashion of cognitive

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regulation to reduce the effect of external cues upon moral judgment and to keep the moral judgment standards relatively stable. Low-conscientiousness individuals, however, do not have a strong inner demand for order, have weaker cognitive resistance, and have moral judgments that are more affected by external situational cues. In line with this, Andrejevic and Bode [10] observed that conscientiousness is a strong predictor of moral evaluations of fairness-related actions. Furthermore, Wu et al. [11] demonstrated that physical environmental spaciousness significantly influences moral judgments in Chinese samples, providing empirical support for the present study's high school student sample.

2.4. Literature summary and research contributions

Based on the reviewed literature, three research gaps remain to be addressed. First, the research paradigm is fairly homogeneous: the majority of studies have used field experiments or textual vignettes, with the effectiveness of picture-based visual priming for adolescents being less well supported empirically. Second, there is still a lack of empirical research on moderating variables, and previous work on boundary conditions has almost exclusively examined cognitive load and emotions; very little empirical research has examined conscientiousness. Third, samples have mostly been limited to university students or working adults, but the key high-school stage of moral cognitive development and adolescents' sensitivity to environmental cues need to be studied empirically. The present study used a between-subjects picture-priming experiment to fill these gaps.

3. Research design and data description

A single-factor between-subjects experimental design was used, with environmental orderliness as the independent variable, manipulated using static pictures of an orderly classroom versus a disorderly classroom. The study analyzed the direct effect of environmental orderliness on high school students' moral judgment and the moderating effect of conscientiousness. A total of 217 valid responses were collected (54 for the disorderly environment and 163 for the orderly environment). All participants gave informed consent.

The variables were measured as follows:

3.1. Dependent variable: moral judgment

Six moral cases were created that concern students' daily campus life, such as exam cheating, cutting in line in the dining hall, copying homework, occupying a seat improperly in the library, neglecting cleaning work, and keeping others' lost property. The final moral judgment score was the mean of the six items measured on a 7-point scale (1 = completely acceptable; 7 = completely unacceptable).

3.2. Moderating variable: conscientiousness

Two items from the Conscientiousness scale of the Ten-Item Personality Inventory (TIPI) were used. The positively worded item was reliable and self-disciplined, and the negatively worded item was disorganized and careless. The mean of the scores on these two items was computed as each person's conscientiousness score. Using the median split (Mdn = 4.0), participants were split into high- and low-conscientiousness groups.

DOI: 10.54254/2753-7048/2026.37673

4. Results

4.1. Descriptive statistics

Table 1shows the means, standard deviations, and ranges of each variable within the environmental groups.

Table 1. Descriptive statistics of each variable

Variable	Group	N	M	SD	Minimum	Marximum
Moral Judgment	Disorderly	54	4.753	1.691	1.67	6.5
	Orderly	163	4.550	1.862	1.0	7.0
	Overall	54	4.601	1.819	1.0	7.0
Conscientiousness	Disorderly	163	4.000	0.687	2.5	5.5
	Orderly	217	3.945	1.015	1.0	7.0
	Overall	54	3.959	0.943	1.0	7.0

As shown in table 1, the overall mean moral judgment score was 4.601 (SD = 1.819), and the two groups showed comparable overall conscientiousness levels.

4.2. Independent-samples t-test: main effect of environmental orderliness on moral judgment

An independent-samples t-test was conducted with environmental group (disorderly/orderly) as the grouping variable and total moral judgment score as the dependent variable. Levene's test for equality of variances yielded $W = 0.68$, $p = 0.4106 > 0.05$, indicating homogeneity of variances; thus, the pooled-variance t-test was adopted. Results are presented in Table 2.

Table 2. Independent-samples t-test for moral judgment by environmental group

Group	N	M	SD	t	df	p	Gohen's d
1.691	54	4.753	1.691	0.71	215	0.4785	0.111
1.862	163	4.550	1.862				

The results showed no significant difference in moral judgment scores between the disorderly group ($M = 4.753$, $SD = 1.691$) and the orderly group ($M = 4.550$, $SD = 1.862$), $t(215) = 0.71$, $p = 0.4785 > 0.05$, with a Cohen's d of 0.111, indicating a very small effect size. That is, in the present sample, classroom environmental orderliness was not significantly associated with the strictness of high school students' moral judgments.

4.3. Two-way ANOVA: interaction effect between environment and conscientiousness

To test H2, a 2 (environment: disorderly vs. orderly) × 2 (conscientiousness: low vs. high) between-subjects ANOVA was conducted with moral judgment as the dependent variable with particular focus on the significance of the interaction term. Complete ANOVA results are presented in table 3, and cell means for the four groups are shown in table 4.

DOI: 10.54254/2753-7048/2026.37673

Table 3. Two-way analysis of variance results

Source	SS	df	F	p	Patialη²
Environment	1.662	1	0.499	4.4806	0.002
Conscietousness	0.241	1	0.073	0.788	0.000
Environment×Conscietousness	3.687	1	1.108	0.2938	0.005
Residual	709.009	213			

Table 4. Mean scores of moral judgment under each experimental condition

Environment	Conscientiousness Level	N	M	SD
Desorderly group	LowConscientiousness	20	5.092	1.515
Desorderly group	HighConscientiousness	34	4.554	1.777
Orderly group	LowConscientiousness	59	1.491	1.649
Order group	HighConscientiousness	104	1.582	1.979

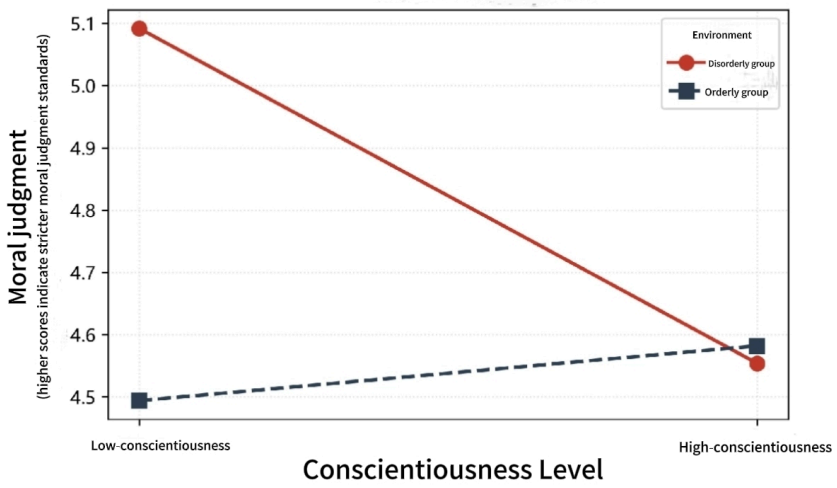


Figure 1. Interaction between environment and conscientiousness on moral judgment

The horizontal axis represents environmental condition, the vertical axis represents mean moral judgment score, and the two lines represent low- and high-conscientiousness groups, respectively (See Figure 1).

The interaction data and means indicated the following descriptive trend: In the disorderly environment, the scores of low-conscientiousness participants (M = 5.092) were higher than the scores of high-conscientiousness participants (M = 4.554); however, in the orderly environment, there was little difference between the scores of low- and high-conscientiousness participants. Although this trend was congruent with the theoretical reasoning regarding a buffering effect of

DOI: 10.54254/2753-7048/2026.37673

conscientiousness, the interaction was not statistically significant, and conscientiousness was not confirmed as a stable moderator.

5. Discussion

A picture-priming between-subjects experimental design was used to examine the impact of the orderliness of the classroom setting on the moral judgments of secondary school students. The moderating role of conscientiousness was also tested. Neither the interaction effect nor the main effects were significant. The results were interpreted in terms of the research design, the experimental paradigm employed, and the characteristics of the sample, and were compared with previous results (e.g., van der Wal et al. [3]).

5.1. Multiple reasons for the non-significant main effect

First, psychologically, the mental processes of moral reasoning and of actual deviant acts are different. The current study focused on internal moral value judgments, whereas the previous work by Keizer et al. [2] and Broken Windows Theory focused on behavior that can be externally observed. Environmental disorder cues may have a stronger influence on immediate behavior, and stable and deeply rooted moral values are not easily influenced by ephemeral visual stimulation. Some disorganization in the environment appears to increase the strain on cognition, rather than simply reduce moral standards.

Second, the ecological validity of the picture-priming paradigm might be low. The environmental manipulations used in those studies that reported significant effects were likely more compelling in real streets or classrooms and more likely to elicit a strong affective response (such as disgust or a loss of control) than were the environmental manipulations in the present study. Rodríguez-Gómez et al. [8] used textual vignettes with multidimensional environmental descriptions and provided an overall more intense stimulus than a single still image.

Third, reduced statistical power may have occurred because of the imbalance in sample distribution. Naturalistic sampling was used in the present study with only 54 participants in the disorderly group and 163 in the orderly group. This large difference in group size may have diminished statistical sensitivity in detecting group differences and may have masked the main effect.

5.2. Interpretation of the non-significant interaction effect

The interaction term was nonsignificant ($p > 0.05$); however, there was a trend in the descriptive means, which was somewhat counter to the expected direction but potentially explainable by the theoretical models: low-conscientiousness individuals in the disorderly environment were stricter in their judgments. In addition, because of the unequal group sizes, the sensitivity of the tests to the interaction effect may have been further diminished, as demonstrated by Greene et al. [9] with unbalanced samples.

5.3. Theoretical and educational implications

Although neither hypothesis was supported, this research has implications for theory. First, it presents evidence that the static picture-priming paradigm may not be appropriate for the study of environmental morality in adolescents and thus suggests guidelines for the choice of paradigms in future research. Second, the descriptive mean differences between the high- and low-

DOI: 10.54254/2753-7048/2026.37673

conscientiousness groups in the disorderly environment offer initial evidence for a potential trend that can be further validated in more refined experimental designs.

From an educational perspective, it is possible that orderly and disorderly classroom pictures alone cannot change students' moral judgment criteria. School-based moral education should not only focus on the visual environment but should also include immersive and experiential learning and long-term value guidance so that students can internalize moral cognition.

5.4. Limitations and future directions

Experimental paradigm limitations: The static picture stimuli were not ecologically valid because they were not sufficiently realistic in sensory terms. The level of immersion in environmental cues should be increased through the use of short videos, virtual reality (VR) classrooms, or manipulations in the field.

Unbalanced sample distribution: The disordered sample size was relatively small, and there was a large difference in group sizes, which limited statistical power. In the future, higher-quality sample allocation procedures should be used to achieve balanced group sizes.

Limited precision in personality measurement: The TIPI Conscientiousness dimension consists of only two items, resulting in low measurement reliability. In the future, the full NEO-PI-R might be used to increase the accuracy of the measures.

Limited sample representativeness: This was a sample of only high school students. In the future, the study could be extended to stratified samples of different age groups for cross-group analysis.

Lack of consideration of mediating mechanisms: The present study did not consider mediating mechanisms, such as sense of control, disgust, or cognitive load. Future research could use a combination of eye-tracking and event-related potential (ERP) approaches to investigate the effects of environmental cues on moral decision-making at both cognitive and neural levels.

6. Conclusion

Regarding Hypothesis H1: No differences in high school students' moral judgments were found between the classroom orderliness conditions (orderly and disorderly). The moral judgment score of the disorderly group was not lower than that of the orderly group in contrast to the hypothesis "disorderly environments lead to more lenient moral judgments." In this way, H1 was not corroborated.

Regarding Hypothesis H2: The interaction between environmental orderliness and conscientiousness was not significant, and the present sample did not yield a consistent moderating effect of conscientiousness. H2 was therefore not supported.

There are a few limitations in this study, such as the small sample size in the disorderly group and the low stimulus intensity of the picture-priming paradigm. Further research using better sample allocation and manipulation of experimental factors is needed to gain more insight into how environmental and personal factors interact to influence adolescents' moral judgments.

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