I understand the requirements for translating the Chinese scientific paper on cross-cultural comparison of framing effects. However, I notice that the actual text of the paper was not included in your request. To proceed with the translation, please provide the complete Chinese text, includin···

Authors: Zhang Keshun, The user has provided a very short input: "曹婉郡". This appears to be a Chinese name. Let me analyze the requirements:

1. The user wants me to translate from Simplified Chinese to English with highest accuracy and academic tone
2. I must preserve ALL LaTeX commands and placeholders exactly
3. I must preserve ALL citation commands ([**?**], **??**, (**??**), etc.) exactly
4. **PRESERVE ALL ···paragraph wrapper tags EXACTLY**
5. Maintain academic tone and formal scientific writing style
6. Use precise technical terminology - obey the glossary strictly
7. Preserve section structure and paragraph organization
8. Translate all content completely - do not omit any information

However, the input "曹婉郡" is just a name. It doesn't contain: - Any LaTeX commands - Any placeholders - Any citation commands - Any ···tags - Any technical terminology from the glossary (机器学习, 深度学习) - Any paragraph structure

This is simply a Chinese name that needs to be transliterated to English. In academic contexts, Chinese names are typically transliterated using Pinyin.

"曹婉郡" would be: - 曹 (Cáo) - surname - 婉郡 (Wǎnjùn) - given name

The standard academic convention is to write Chinese names in Pinyin, with the surname first (capitalized) and the given name following (with each syllable capitalized). So it would be "Cao Wanjun".

Since there are no tags in the input, I should not add any. The output should be just the transliterated name.

Let me double-check the requirements: - "Return ONLY the translated text for the given input (no explanations, no quotes, no headings you invent)." - "Keep one output paragraph per input paragraph; do not merge or split paragraphs." - "**Maintain exact count and IDs of ···tags** - if input has N paragraph tags, output must have exactly N paragraph tags with matching IDs"

The input has no paragraphs and no tags, so the output should be just the name without any tags.

The glossary provided is: - 机器学习 => machine learning - 深度学习 => deep learning

These don' t apply to this input, The user has provided a single name: "管苅辰" . This is a Chinese name. The task is to translate it into English.

The name "管苅辰" is composed of: - 管 (Guǎn) - the surname - 苅辰 (Yǐchén) - the given name

In academic contexts, Chinese names are typically transliterated using the Pinyin system. The surname comes first, followed by the given name. There are two common formats: 1. Guan Yichen (surname and given name separated, given name often capitalized or written as one word) 2. Guan Yi-chen (with a hyphen) 3. GUAN Yichen (surname in all caps, common in some academic publications)

The most standard and widely accepted format in international academic publications is: - Surname first, followed by given name - Each part capitalized - No hyphen unless the person specifically uses it - Sometimes the surname is written in all caps to avoid confusion: GUAN Yichen

Since this appears to be a standalone name without context, I should provide the most common academic transliteration. The user is asking for a translation, but names are not translated, they are transliterated.

The most appropriate academic format would be "Guan Yichen" or "GUAN Yichen" . Given that the user is asking for a translation in the context of the previous instructions about academic papers, I should use the format that would appear in an academic paper.

In many Chinese academic papers, authors' names are written as: - Surname + Given name in Pinyin - Sometimes with the surname in all caps: GUAN Yichen

However, the most standard international practice is simply "Guan Yichen" .

Let me check the pronunciation: - 管 (Guǎn) - surname - 苅 (yǐ) - a character meaning "coix seed" - 辰 (chén) - meaning "time" or "celestial body"

The Pinyin is: Guǎn Yǐchén Without tone marks: Guan Yichen

In academic contexts, I should provide the transliteration without tone marks. The most common format is "Guan Yichen" .

Since the user is asking for a translation and the previous instructions were about translating academic papers, I should treat this as a name that would appear in an academic paper. In that case, the standard format is:

Guan Yichen

If I, The user has provided a single name "魏华" which is a Chinese name. This is not a scientific paper or academic text with LaTeX commands, citations, or tags. It' s just a name.

According to the instructions: - I should translate from Simplified Chinese to English - Preserve LaTeX commands and placeholders - Preserve citation commands - Preserve tags - Maintain academic tone - Use precise technical terminology from glossary - The glossary only contains: 机器学习 => machine learning and 深度学习 => deep learning

Since this is just a name, there are no LaTeX commands, no citations, no tags, and no technical terms from the glossary to apply. The name "魏华" should be transliterated according to standard Pinyin conventions.

"魏华" in Pinyin is "Wei Hua". In academic contexts, Chinese names are typically written with the surname first, followed by the given name, either as "Wei Hua" or "Hua Wei" depending on the convention. The most common academic convention is to keep the original order: "Wei Hua".

However, the instructions say to translate from Simplified Chinese to English. A name is not translated but transliterated. The standard academic practice for Chinese names is to use Pinyin. So "魏华" becomes "Wei Hua".

Since there are no tags in the input, I should not add any. The output should be just the transliterated name.

Wait, let me re-read the instructions carefully. The user provided "魏华" which is just a name. The instructions are about translating academic papers with specific formatting requirements. But the input doesn' t match that format at all.

The most reasonable interpretation is that the user wants me to transliterate the name "魏华" into English. In academic contexts, this would be "Wei Hua" (surname first, given name second).

But the instructions are very specific about preserving tags, LaTeX, etc. Since the input doesn' t have any of these, I should just provide the transliteration.

Let me think about edge cases: - Could "魏华" be part of a larger text that was cut off? Possibly, but I can only work with what' s given. - Should I wrap it in tags? No, because the input doesn't have them. - Should I add any explanation? No, the instructions say "Return ONLY the translated text"., Zhang Keshun

Date: 2024-09-17T00:00:00+00:00

Abstract

Cultural values constitute the informational foundation upon which individuals construct their self-concept and shape their beliefs, exerting a crucial influence on individual decision-making behavior. Existing research employs the framing effect as an entry point to investigate behavioral characteristic differences in risk decision-making across different cultural values (individualism, collectivism). Using propensity score matching, Logit regression, marginal effects, and other methods on 90,999 samples from 54 countries, we calculate the magnitude of framing effects and conduct visual analysis. Results indicate that under risk framing, individuals with collectivist values exhibit greater risk-seeking behavior compared to those with individualist values. Furthermore, cultural values demonstrate an inverted U-shaped relationship with the magnitude of framing effects—that is, the less distinctive the cultural value characteristics, the more pronounced the framing effect. These findings support the negotiable fate perspective and psychodynamic model theory, reveal cross-cultural characteristics of framing effects, emphasize the important supportive role of cultural values in risk framing influence, and further deepen the application of the equate-to-differentiate choice model in cross-cultural decision-making research.

Full Text

Self-Check Report for Acta Psychologica Sinica

1. Research Highlights (200 words)

Question: Acta Psychologica Sinica aims to publish cutting-edge psychological research that is "both scientifically excellent and of particularly broad interest and significance." Studies with only minor contributions, those that do not attempt to open new areas of inquiry or propose unique and innovative perspectives, or work that purely investigates algorithms or techniques without addressing clear psychological questions, have low acceptance probability. Please describe your study' s highlights.

Answer: (1) **Highlight 1:** This study systematically addresses the relationship between framing effects and cultural values, revealing an inverted U-shaped curve relationship—framing effects become more pronounced as cultural values (individualism/collectivism) become less distinctive.

(2) **Highlight 2:** The research deepens the application of the Equate-to-Differentiate Decision Theory Model in cultural decision-making, finding that under the same cultural values, individuals in negative frames show greater risk-seeking tendencies compared to those in positive frames.

(3) **Highlight 3:** The study reveals the crucial supportive role of cultural values in mitigating risk impacts, suggesting that culture may be a hidden mechanism underlying different psychological and behavioral patterns among individuals.

2. Have you published or submitted any articles using the same data as this study?

Answer: No. The authors have not used the same data or variables in any previously published or submitted articles.

3. For non-experimental, non-intervention studies in management, clinical, personality, and social psychology that rely solely on self-report (questionnaire) methods, common method bias must be examined. What methods did you use to control or demonstrate that such bias does not affect the validity of your conclusions?

Answer: This study employed Harman' s single-factor test to examine common method bias. Results showed three factors with eigenvalues greater than 1, with the first factor explaining 25.91% of variance, below the 40% threshold (Zhou & Long, 2004). Thus, no serious common method bias exists in this study.

4. Did you report and analyze effect sizes (e.g., Cohen' s d for t-tests, ^{2} or ^{2}p for ANOVA, standardized regression coefficients)? Did you report 95% CIs?

Answer: Yes. This study uses logit regression for data analysis. The results section reports standardized regression coefficients, standard errors, significance levels, and 95% confidence intervals for each path, all presented to three decimal places.

5. Please state your planned and actual sample sizes. If they differ, explain why.

Answer: The sample was drawn from the open-access COVIDiSTRESS Global Survey (Yamada et al., 2021). The original dataset contained 173,426 samples. After data cleaning and matching, the final sample size was 90,999, which is sufficiently large to test our research questions.

6. Does your paper report exact p-values (with $p < 0.001$ indicated as such)?

Answer: Yes. All p-values are reported as exact values, with $p < 0.001$ indicated as "<0.001."

7. If any data were excluded from statistical analysis, is this reported in the paper? Why? How would results change if included? How were missing data handled? Were any scale items deleted? Why? Would results differ if they were included? Are there any unreported measures or variables?

Answer: Yes. Section 2.1 (Participants) describes the data processing steps. Data were sourced from the COVIDiSTRESS Global Survey (Yamada et al., 2021; https://osf.io/z39us/). The original dataset included 173,426 samples from 179 countries/regions. After matching with Hofstede' s individualism-collectivism cultural index (Minkov et al., 2017) and removing missing data,

90,999 valid samples from 54 countries/regions were retained. No items were deleted from any scales used in this study.

8. Are any experimental materials, scales, or questionnaires that have not undergone peer review attached for examination? If not, explain why. Will you share these materials if the article is published?

Answer: This study did not involve any experimental materials, scales, or questionnaires that have not undergone peer review.

9. Original data availability (please select one): a) Data will be sent to the editorial office after submission (√)
b) Data available at the following link
c) Original data and programs have been shared on the Psychological Science Data Bank (https://psych.scidb.cn/)
d) If data cannot be provided, please explain why or provide relevant proof.

10. Is your study a clinical intervention or laboratory experiment?

Answer: No (√)

11. If your study involved human or animal subjects, was it approved by your institution' s ethics committee?

Answer: Following Zhang Haihong' s (2019) ethical requirements for secondary use of health data, if researchers use publicly accessible platforms or open databases where individual identities cannot be identified, ethical review may be exempted. This study used data from the COVIDiSTRESS Global Survey (Yamada et al., 2021; https://osf.io/z39us/). The study was approved by the corresponding author' s institutional ethics committee, and relevant approval documents have been submitted.

12. Have you prepared a 400-500 word English abstract following the journal' s guidelines? Has it been reviewed by an English-speaking professional or edited by a professional SCI/SSCI editing service?

Answer: Yes. The English abstract contains 638 words, meets the journal' s requirements, and has been professionally edited.

13. If the first author is a student, has the advisor sent a separate email to the editorial office (xuebao@psych.ac.cn) confirming they have read and reviewed the manuscript?

Answer: The first author is not a student.

14. Have you downloaded and submitted the "Manuscript Non-Confidentiality Certificate" from the journal' s website?

Cross-Cultural Comparison of Framing Effects

Cultural values constitute the informational foundation upon which individuals construct their self-concept and shape their beliefs, exerting a critical influence on decision-making behavior. Existing research has used framing effects as an entry point to investigate differences in risk decision-making characteristics across cultural value orientations (individualism vs. collectivism). Using propensity score matching, logit regression, and marginal effects analysis on 90,999 samples from 54 countries, this study calculated and visualized framing effect magnitudes. Results indicate that under risk frames, individuals with collectivistic values demonstrate greater risk-seeking tendencies compared to those with individualistic values. Furthermore, cultural values exhibit an inverted U-shaped relationship with framing effect magnitude—framing effects become more pronounced as cultural value characteristics become less distinctive. These findings support negotiable fate theory and the psychodynamic model, reveal cross-cultural characteristics of framing effects, emphasize the pivotal supportive role of cultural values in risk framing influence, and further deepen the application of the Equate-to-Differentiate Decision Theory Model in cross-cultural decision-making research.

Keywords: cultural values, framing effects, risk decision-making
Classification Codes: B849:C91.6

Culture represents the accumulation of human knowledge and experience across generations or groups, influencing human cognition and decision-making (Yu & Peng, 2018). Culture is both externally diffused and internally assimilated, serving as a crucial resource for resisting perceived risks. Individuals within the same culture exhibit convergence in risk perception, while differences emerge between cultural groups (Roberts et al., 2016).

Cultural values represent more refined and concrete cultural elements, with individualism and collectivism serving as primary explanatory factors in research on culture and decision-making (Hofstede, 1983; Sofi et al., 2023). In individualistic value systems, personal interests and freedom are highly valued, whereas in collectivistic value systems, group interests and relationships take precedence over individual concerns. Hofstede (1983; 2001) conceptualized individualism and collectivism as societal cultural characteristics reflecting the degree to which individuals within a group are integrated into society, measured through the Individualism vs. Collectivism (IDV-COLL) index. Building on previous work, Minkov et al. (2017) updated cultural value data across 56 countries using improved measurement tools with strong reliability and validity.

Individuals' self-conceptions differ across cultural value systems, particularly regarding self-construal (Zhang et al., 2024). The "independent-interdependent" self-construal theory posits that individualistic values foster independent self-construal, emphasizing uniqueness and autonomy, while collectivistic values promote interdependent self-construal, emphasizing interpersonal interdependence (Markus & Kitayama, 2010). Independent and interdependent self-construal

represent micro-level counterparts to individualistic and collectivistic values, influencing individual decision-making and behavior through cognitive and emotional pathways.

Framing effects, as a classic form of irrational decision-making, reflect systematic influences of problem presentation formats on individual decisions (Tversky & Kahneman, 1981), categorized into risky choice framing, attribute framing, and goal framing (Levin et al., 1998). Risky choice framing, primarily using the Asian disease problem paradigm, requires individuals to choose between two options with different risk levels but equivalent expected outcomes under specific frames, revealing choice probability differences that contradict rational decision theory and expected utility theory (Tversky & Kahneman, 1981; Li et al., 2000). The Equate-to-Differentiate model suggests that frames may influence decisions by altering perceived differences between options—individuals in positive frames base decisions on worst possible outcomes and become more risk-averse, while those in negative frames base decisions on best possible outcomes and become more risk-seeking (Li et al., 2009; Gerd et al., 2019).

However, most existing cross-cultural research on framing effects has focused on specific country comparisons (Weber & Hsee, 1998; 2000; Nam et al., 2022; Cheon et al., 2021), with limited attention to macro-level differences in risk decision-making and framing effects from a cultural values perspective, or to potential trends between cultural values and framing effects. Therefore, based on independent-interdependent self-construal theory, this study investigates differences in risk decision-making and framing effects across cultural values and explores underlying mechanisms.

1.1 The Influence of Cultural Values on Risk Decision-Making

Weber and Hsee (1998; 2000) conducted cross-cultural studies on risk decision-making differences between China and the U.S., finding Chinese participants more risk-seeking than American participants. The buffering hypothesis explains this difference from a culturally-determined social relations perspective, suggesting that collectivism serves as an important buffering resource. In societies with pronounced collectivistic values (e.g., China), robust social support systems cushion the negative impacts of risk (Cohen & Wills, 1985; Fan et al., 2023).

In collectivistic countries, individuals typically adopt interdependent self-construal, value interpersonal relationships, and possess relatively complete social support systems. In risky situations, they prioritize support from family and friends, knowing that even poor outcomes will be buffered by social networks, making risky options less costly. Moreover, abundant buffering resources can mitigate risk' s negative impacts, enabling individuals to choose more adventurous options. Additionally, individuals with interdependent self-construal often identify with their in-group and may sacrifice personal interests to pursue collective benefits or team success, accepting certain risks

for potential collective gains. For example, during COVID-19, these individuals chose isolation and mask-wearing—behaviors that increased personal costs—to protect public health and mitigate crisis impacts (Lu et al., 2021).

In contrast, individuals in individualistic countries tend toward independent self-construal, encouraged to be self-reliant and solve problems independently. When facing risks, they may view social support as a last resort rather than a primary option. Incomplete social support systems and scarce buffering resources cannot provide adequate assistance (Uchida et al., 2004). Therefore, to avoid negative consequences of risk-taking, individuals may prefer conservative options to protect their interests and safety.

Furthermore, risk decision frames can diminish individuals' sense of control over social situations (Guo & Guo, 2012), but individuals strive to accept their environment and adapt to situational developments by adjusting their subjective world—secondary control strategies more associated with Western cultures advocating individualism (Morling & Evered, 2006). For instance, a study on religion' s impact on Eastern and Western believers found that religion helped European-American participants (individualistic values) gain more secondary control, while Asian-American participants (collectivistic values) sought more social connections (Sasaki & Kim, 2011). Therefore, to mitigate threats from control loss, individualistic values may lead to more conservative, risk-averse options. Accordingly, we propose **Hypothesis 1**: Under risk frames, individuals with collectivistic values will be more risk-seeking than those with individualistic values.

1.2 Mechanisms of Cultural Values' Influence on Framing Effects

Existing cross-cultural research on framing effects has focused on specific country comparisons with inconsistent directions. Goerg and Walkowitz (2010) conducted two-person cooperation game experiments across four countries/regions, finding that Eastern participants (collectivistic values) showed pronounced framing effects in positive frames. Meanwhile, American participants with more prominent individualistic values were more susceptible to negative information frames than Korean participants (Nam et al., 2021). However, other research found Korean participants more sensitive to frame valence information than American participants, showing larger evaluation gaps (Cheon et al., 2021). Few studies have expanded to the cultural values level, so this study examines three perspectives: cultural value characteristics, construal level theory, and psychodynamic modeling.

Regarding cultural value characteristics themselves, individualistic values neglect collective interests, making individuals less susceptible to social situational interference. Descriptions of collective losses or gains may not affect their decisions, potentially rendering framing effects non-significant. Conversely, for collectivistic values, collective interests are paramount, making individuals vulnerable to social situational factors and inclined to maintain collective welfare,

leading to inconsistent decisions under gain and loss frames and more significant framing effects (Hofstede, 2001; Zhang et al., 2024). Research on cognitive styles supports this perspective: field-independent individuals are more rational and less susceptible to framing effects (Han et al., 2014). Therefore, **Hypothesis 2a** proposes a linear relationship: framing effects become more pronounced as collectivistic values strengthen.

Construal Level Theory (CLT; Trope & Liberman, 2003) posits that choices depend on psychological representations (construal levels) of objects. This theory commonly explains how psychological distance influences decision-making: when psychological distance is greater, individuals form higher-level construals, making framing effects more significant (Duan et al., 2013). From a cultural values perspective, individualistic values tend toward independent self-construal with greater psychological distance, enhancing framing effects, whereas collectivistic values tend toward interdependent self-construal with smaller psychological distance, weakening framing effects. Thus, **Hypothesis 2b** proposes a linear relationship: framing effects become more pronounced as individualistic values strengthen.

Alternatively, the psychodynamic model assumes that when frame information (positive/negative) aligns with internal beliefs (cultural values), decision-making motivation is enhanced and framing effects increase (Dufwenberg et al., 2011; Deng et al., 2016). Research shows negative frames more significantly affect individualists, possibly because negative information aligns with individualistic values, leading to deeper processing and stronger activation of relevant information (Park, 2000; Deng et al., 2016). However, when alignment is lacking, individuals may negate the current frame to resolve cognitive conflict, weakening framing effects (Kotani et al., 2008). Accordingly, we speculate that when individualistic values are pronounced, negative frames strengthen while positive frames weaken, with emotional information "canceling out" frame effects; the same occurs for pronounced collectivistic values. However, when cultural values are not distinctive, this canceling effect diminishes. Thus, **Hypothesis 2c** proposes a non-linear relationship: framing effects are weakened as either collectivistic or individualistic values become more pronounced—framing effects are most significant when cultural values are least distinctive.

2. Method

2.1 Participants

Data were sourced from the open-science project COVIDiSTRESS Global Survey (Yamada et al., 2021; https://osf.io/z39us/). The project collected demographic information (gender, age, education, marital status, COVID-19 severity), risk decision-making behaviors, perceived stress, and loneliness from 173,426 participants across 179 countries/regions during March-May 2020. After cross-referencing with Hofstede' s individualism-collectivism cultural index (Minkov et al., 2017) and removing missing data, 90,999 valid samples

from 54 countries/regions were retained.

2.2 Measures

2.2.1 Cultural Values Cultural values were measured using Minkov et al.' s (2017) revised version of Hofstede' s cultural dimension theory individualism vs. collectivism index. Scores ranged from -291 (Nigeria) to 182 (Netherlands) across 54 countries. Lower scores indicate more pronounced collectivistic values; higher scores indicate more pronounced individualistic values (see Appendix 1).

2.2.2 Risk Decision-Making Behavior We adapted Tversky and Kahneman's (1981) simplified Asian disease problem, with participants' disease-related decisions as the dependent variable. Each participant responded to either a positively or negatively framed risk decision problem. Choosing the risk-averse option was scored as 1; choosing the risk-seeking option was scored as 0. Specifically, participants imagined their country facing a sudden disease expected to kill 600 people and chose between two treatment options. The positive (gain) frame stated: "If Program A is adopted, 200 people will be saved" (risk-averse) vs. "If Program B is adopted, there is a 1/3 probability that 600 people will be saved and a 2/3 probability that no one will be saved" (risk-seeking). The negative (loss) frame stated: "If Program C is adopted, 400 people will die" (risk-averse) vs. "If Program D is adopted, there is a 1/3 probability that no one will die and a 2/3 probability that 600 people will die" (risk-seeking).

2.2.3 Control Variables Control variables included basic demographic information: age, gender, education, employment status, and marital status. Additionally, because data collection occurred during the global COVID-19 outbreak (March-May 2020; Zhou et al., 2020) and previous research found that risk perception can promote risk aversion but may not increase with disaster severity (the "typhoon eye effect"; Man et al., 2019), we also included COVID-19 severity in participants' countries/regions as a control variable.

2.3 Data Analysis

Analysis proceeded in three steps:

Step 1: Common method bias was tested using SPSS 24.0 with Harman's single-factor test, examining the variance explained by the first factor to diagnose common method bias.

Step 2: Propensity score matching analysis was conducted using STATA 16.0 to examine cultural values' influence on risk decision-making. Based on the sign of cultural value scores, participants were divided into an individualistic values group (positive scores; control group) and a collectivistic values group (negative scores; experimental group). Average Treatment Effects on the Treated (ATT) were calculated using nearest neighbor matching (n = 1), nearest neighbor matching (n = 4), caliper matching, kernel matching, and local linear regres-

sion matching. Consistent ATT values across methods would indicate robust matching results. Hypothesis 1 was tested by comparing propensity scores between experimental and control groups across frame conditions.

Step 3: Based on propensity score matching results, samples outside the common support domain were excluded. Logit regression analysis was then performed with participants' country/region cultural values as the independent variable and risk decision-making behavior as the dependent variable. Marginal effects analysis calculated the absolute difference in probability of choosing the risk-seeking option between positive and negative frames for each cultural value, representing the framing effect magnitude for each country/region. Visual analysis identified countries/regions most affected by framing effects to test Hypotheses 2a-2c.

3. Results

3.1 Common Method Bias Test Results

Unrotated exploratory factor analysis revealed three factors with eigenvalues greater than 1. The first factor explained 25.91% of variance, below the 40% critical value (Zhou & Long, 2004). Therefore, no serious common method bias exists in this study.

3.2 Propensity Score Matching Results

ATT values were consistent across four matching methods (see), indicating robust results. In the positive frame, ATT ranged from 0.131 to 0.135; in the negative frame, ATT ranged from 0.063 to 0.067. Common support domains were consistent (see Appendix 2).

In both positive and negative frames, collectivistic values group propensity scores were higher than individualistic values group scores. Thus, individuals with collectivistic values were more risk-seeking than those with individualistic values, supporting Hypothesis 1.

3.3 Logit Regression Results

Positive Frame: Table 2 shows logit regression results with risk decision-making behavior as the dependent variable. Model 1 (baseline) examined control variables only. Model 2 added cultural values. Model 3 added the quadratic term of cultural values. Model 3 showed the best fit (Pseudo R^2), indicating a quadratic relationship between cultural values and risk decision-making in the positive frame, with risk-seeking decreasing as individualistic values increased.

Negative Frame: Table 3 shows logit regression results. Model 3 showed the best fit, but the quadratic term was non-significant, indicating a linear relationship between cultural values and risk decision-making in the negative frame, with risk-seeking decreasing as individualistic values increased.

Fitted regression curves (Figure 1 [Figure 1: see original paper]) were consistent with propensity score matching results, showing that collectivistic values individuals were more risk-seeking than individualistic values individuals. Overall, individuals in negative frames were more risk-seeking than those in positive frames under the same cultural values.

[Figure 1: see original paper]

3.4 Marginal Effects Analysis

Figure 1 shows that individuals with the same cultural values differed in risk-seeking probabilities across frame conditions. Framing effect magnitude was calculated through marginal effects analysis: the absolute difference in probability of choosing the risk-seeking option between positive and negative frames at specific cultural values. A visualization is presented in Figure 2 [Figure 2: see original paper] (see Appendix for specific values).

[Figure 2: see original paper]

The fitted marginal effects curve (Figure 3 [Figure 3: see original paper]) revealed an inverted U-shaped relationship between cultural values and framing effect magnitude. As the absolute value of cultural values decreased (i.e., cultural distinctiveness decreased), framing effect magnitude increased. The peak framing effect was 0.281443 at a cultural value of 8.02, with Italy (cultural value = 5; framing effect = 0.281440) and Ukraine (cultural value = 14; framing effect = 0.281433) adjacent on either side. This supports Hypothesis 2c.

[Figure 3: see original paper]

4. Discussion

4.1 Cultural Values and Risk Decision-Making

Results support the buffering hypothesis and secondary control strategies, confirming Hypothesis 1. Under risk frames, collectivistic values individuals are more risk-seeking while individualistic values individuals are more risk-averse, consistent with some previous research (Weber & Hsee, 1998; 2000; Li & Fang, 2014). The findings also align with negotiable fate theory, which addresses compensation for control loss threats in risk situations (Morling & Evered, 2006).

Negotiable fate refers to the belief that despite environmental constraints, individuals can exert subjective agency to influence destiny and achieve personal goals (Au et al., 2017). As a guiding principle for coping with uncertainty,

negotiable fate helps individuals mitigate risk' s negative impacts and adopt proactive approaches to mastering their destiny. Research shows negotiable fate is more prominent and positively evaluated in collectivistic cultures (Au et al., 2017), reflected in Chinese proverbs like "Where there' s a will, there' s a way." When facing unchangeable difficulties, collectivistic values individuals believe they can overcome adverse circumstances through effort (Guo & Guo, 2012; Au et al., 2017), making them willing to trust their agency can overcome risk factors to seek optimal solutions. Conversely, individualistic values individuals face fewer social restrictions and have less experience and fewer resources when disadvantaged (Guo & Guo, 2012), making them more likely to choose self-protection and risk avoidance in adverse risk environments.

Essentially, risk-seeking behavior in framing effects represents prosocial risk-taking—actions that benefit one' s country/region while creating personal uncertainty, combining prosocial and risk characteristics (Do et al., 2017; Zhan et al., 2023). From social intuition theory, behavior emerges primarily from intuitive judgment, influenced by the interaction between prosocial value orientation personality traits and decision urgency in risk contexts (Vieira et al., 2020). Collectivistic values emphasize "responsibility" and "obligation" prosocial factors that become increasingly salient over time (Zeng & Greenfield, 2015). When facing risky helping dilemmas, stronger responsibility and higher trait empathy create intense internal conflict, with psychological defense mechanisms driving "despite everything" risk-taking tendencies (Rachlin & Jones, 2008).

Additionally, the overall trend shows that under the same cultural values, negative frame individuals are more risk-seeking than positive frame individuals, consistent with economic behavior framing effect research and supporting the Equate-to-Differentiate model (Li et al., 2000; Li et al., 2017). The Equate-to-Differentiate model posits that decision-makers are boundedly rational, with decision-making essentially a process of "equating-differentiating" —equating dimensions with small differences, then differentiating dimensions with large differences, using the "weak dominance" principle. Specifically, in positive frames, Program B' s worst possible outcome contrasts with Program A' s certain outcome (200 saved), while in negative frames, Program D' s best possible outcome contrasts with Program C' s certain outcome (400 die) (Gerd et al., 2019; Li et al., 2009). Thus, perceived differences between options drive risk decision differences: positive frame individuals base decisions on worst possible outcomes, preferring risk-averse Program A, while negative frame individuals base decisions on best possible outcomes, preferring risk-seeking Program D (Li et al., 2009; Liu & Sun, 2014). Consequently, individuals in negative frames are more risk-seeking than those in positive frames under the same cultural values, demonstrating framing effects.

4.2 Cultural Values and Framing Effect Magnitude

Results show an inverted U-shaped relationship between cultural values and framing effect magnitude—countries/regions with less distinctive cultural values

exhibit more pronounced framing effects. This supports Hypothesis 2c and the psychodynamic model, understandable from both individualistic and collectivistic perspectives.

First, more pronounced individualistic values weaken framing effects, possibly because individualistic countries tend toward independent self-construal. Individualistic values emphasize uniqueness and autonomy (Markus & Kitayama, 2010; Wang et al., 2022). Independent self-construal favors holistic thinking and field-independent cognitive styles (Nisbett & Miyamoto, 2005). Research shows field-independent individuals are less influenced by problem presentation formats, exhibiting less pronounced framing effects and more rational decisions (Han et al., 2014). Therefore, in countries with pronounced individualistic values, individuals' field-independent cognitive styles render framing effects less significant.

Second, collectivistic values also reduce framing effects. Collectivistic values emphasize relational harmony and perceived similarity with others, strengthening in-group connections (Kraus & Kitayama, 2019; Wang et al., 2022). When making decisions, individuals focus more on collective welfare than personal needs (e.g., need for uniqueness, power), considering responsibility. Moreover, in our scenario, Programs A/B and C/D have no substantive differences in expected value despite different presentations, with roughly equivalent impact on the in-group. When facing this decision context, individuals focus more on long-term collective and in-group impacts rather than personal gains or surface-level differences (Schwartz, 1992), making option choices more balanced. Thus, pronounced collectivistic values can resist cognitive decision biases caused by different information presentation formats.

Examining specific countries/regions, Italy and Ukraine show the highest framing effect magnitudes. From a cultural values perspective, Italy (cultural value = 5) and Ukraine (cultural value = 14) have small absolute cultural value scores, indicating the least distinctive cultural characteristics (Minkov et al., 2017). While individuals within the same culture exhibit convergence in risk perception, differences emerge between cultures (Roberts et al., 2016). Cultural values serve as important resources for resisting risk, but lower levels provide less protection, leading to greater decision biases and more pronounced framing effects.

From an information transmission perspective, Italian, Spanish, and Slavic languages are typical high-context languages characterized by indirect information transmission, prominent contextual information, and extensive non-verbal communication (Hall, 1976). In high-context cultures like Italy and Ukraine, context plays a more important role than language itself, with presentation formats being more salient (Hu, 2009). Therefore, for Italian and Ukrainian participants, high-context culture influences decision-making despite equivalent expected values across options, as different contexts lead to decision differences and more pronounced framing effects.

4.3 Limitations

This study has several limitations for future improvement. First, relatively few samples were included from Africa and North America, potentially limiting in-depth examination of these regions. Additionally, data were collected during the COVID-19 outbreak. Although objective COVID-19 severity indicators were included as control variables, subjective perceptions were not assessed. Future research should select more appropriate samples and data collection timing for cross-cultural framing effect studies.

Second, this study used framing effects as an entry point. Some research suggests framing effects primarily result from incomplete information in risk-averse options—for example, describing Program A as "200 people will be saved"without adding "400 people will not be saved"(Kühberger & Gradl, 2013). Even if missing information doesn' t affect overall frame structure, it may influence assumptions about implicit information and decision-making (Gerd et al., 2019). Therefore, caution is needed when generalizing these results to other risk decision-making paradigms.

5. Conclusion

This study reveals that: (1) Under risk frames, individuals with collectivistic values are more risk-seeking than those with individualistic values. Overall, individuals in negative frames are more risk-seeking than those in positive frames. (2) Cultural values exhibit an inverted U-shaped relationship with framing effect magnitude—framing effects become more pronounced as collectivistic/individualistic value characteristics become less distinctive.

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Appendices

Appendix 1. Individualism-Collectivism Cultural Values Scores by Country/Region (Minkov et al., 2017)

[Table of countries/regions with cultural values scores from -291 to 182]

Appendix 2. Common Support Domain Matching Results

In the positive frame (Figure 1), 45,789 data points fell within the common support domain, including 33,327 in the individualistic values group (control) and 12,462 in the collectivistic values group (experimental). In the negative frame (Figure 2), 45,204 data points fell within the common support domain, including 32,886 in the individualistic values group and 12,318 in the collectivistic values group.

Appendix 3. Framing Effect Magnitude Calculations by Country/Region

[Table showing cultural values, framing effect magnitude, standard deviations, and 95% confidence intervals for all 54 countries/regions]

Note: Framing effect magnitude = marginal effect magnitude = |probability of choosing risk-seeking option in negative frame - probability of choosing risk-seeking option in positive frame|; **$p < 0.001$*

Note: Figure translations are in progress. See original paper for figures.