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Does the Presence of Immigrants Increase Perceived Threat? An Examination through Experimental Games

Soichiro Kashihara[1,2*], Hiroshi Shimizu[1]

[1]Kwansei Gakuin University, 1-155 Uegahara 1-bancho, Nishinomiya City, Hyogo, 662-8501, Japan

[2]Japan Society for the Promotion of Science, 5-3-1 Kojimachi Business Center, Chiyoda-ku, Tokyo, 102-0083, Japan

[*]Author for correspondence (izs56960@kwansei.ac.jp)

Perceived threats from immigrants have been associated with heightened anti-immigrant attitudes among host country citizens (Esses et al., 2001, 1998). However, most studies have focused on assessing attitudes using scales, with few investigating behavioral responses. This study developed a new experimental game based on the Preemptive Strike Game (Simunovic et al., 2013) to measure reactions to perceived threats of immigrant attacks. A sample of Japanese participants (N = 1,153; pre-registered) was divided into two groups: one group faced a Japanese opponent (Japanese condition), whereas the other faced an immigrant opponent (Immigrant condition). The results did not show a significant increase in defensive behaviors toward immigrants. However, at a descriptive level, the findings suggest the potential for defensive behaviors to arise from perceived threats. The study discusses the implications for future research including the need to accurately identify threat-induced behaviors.

Keywords
anti-immigrant attitude, intergroup conflict, preemptive strike game, aggression, threat

Introduction

Historically, migration has played a crucial role in shaping genetic and cultural evolution (e.g., Bell, 2023). Today, human migration continues, with the global number of migrants increasing from 150 million in 2001 to 281 million in 2024 (International Organization for Migration [IOM], 2024). An "immigrant" is typically defined as "a person who has moved to another country from their birthplace, including temporary moves" (Nagayoshi, 2020). This study focuses on individuals who legally move to another country for an extended period. Although immigrants are often perceived as bringing economic benefits to their host countries (e.g., Dustmann & Frattini, 2014; Esses et al., 2001), they frequently encounter discrimination, particularly in housing and employment (e.g., Esses, 2021). Such discrimination toward immigrants is often not direct aggression but rather defensive responses to perceived threats from outsiders. Why do citizens of host countries exhibit negative behaviors toward immigrants?

Humans have evolved psychological mechanisms to mitigate the costs of dealing with threats from out-groups (Miller et al., 2010; Neuberg et al., 2011). The self-protection system detects potential threats and triggers defensive actions, such as avoidance or aggression, helping individuals respond to harm from others (Neuberg et al., 2011). However, large-scale intergroup conflicts, like wars, do not occur regularly (Ferguson, 2013a, 2013b; Nakao et al., 2016) and are not observed in laboratory experiments (Yamagishi & Mifune, 2016). Therefore, humans may not have evolved to launch unconditional attacks on out-group members. Despite this, conflicts and competition over resources are common in daily life, suggesting that it may have been adaptive to prepare for threats from others (Neuberg & Schaller, 2016). Cesario et al. (2010) suggest that when individuals cannot avoid a threatening out-group, they may resort to aggression, whereas they tend to avoid the threat when distancing is possible. Consequently, while individuals do not attack immigrants unconditionally simply because they are perceived as out-group members, defensive reactions may arise if immigrants are seen as a threat.

Empirical studies demonstrate that perceived threats from out-group members drive anti-immigrant attitudes (Esses et al., 2001, 1998; Stephan et al., 2000). Competition for resources such as money, jobs, and power intensifies the perceived threats posed by immigrants (Esses et al., 2001, 1998; Stephan et al., 2000). Esses et al. (1998) argue that competition for scarce resources with outgroups leads to the perception of immigrants as a threat. The subjective perception of threats from other groups is critical in triggering negative behaviors (Stephan et al., 2000). Research has shown that increases in immigration heighten anti-immigrant sentiments (Igarashi & Laurence, 2021; Laurence et al., 2022). Additionally, zero-sum beliefs about resources, where people believe that one group's gain is another group's loss, are known to influence these attitudes (Kashihara & Shimizu, 2022). However, these findings are based primarily on attitudinal measures, and there is a lack of research examining these dynamics at the behavioral level.

The Preemptive Strike Game (PSG) is an experimental paradigm that measures threat-based aggressive behavior (Simunovic et al., 2013). This game captures abstract in-group and out-group dynamics and aggressive behavior toward foreigners (Jing et al., 2017). In the PSG, two players start with a set amount of points (e.g., 1,500 yen, approximately 10 USD) and can choose to spend a small amount (e.g., 100 yen, approximately US$ 0.75) to

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significantly reduce the opponent's points (e.g., by 1,000 yen, approximately US$ 7.5) within a limited time. The attack is only valid if a player presses the attack button first. If each player has a 50% probability of choosing to attack, mutual attack and non-attack strategies represent Nash equilibria. However, mutual non-attack is the Pareto optimal outcome, implying that a rational individual would avoid attacking to preserve their points. Despite this, participants often use preemptive attacks to prevent potential threats (Simunovic et al., 2013).

Inter-country PSG studies demonstrate that this experimental game may also elicit reactions to perceived immigrant threats. Previous research using the PSG with different countries shows that Japanese participants demonstrate increased aggression toward foreigners, driven by defensive motivations to address perceived threats (Jing et al., 2017). The attack rate was higher when participants faced Americans or Chinese than fellow Japanese participants (Jing et al., 2017). After completing the PSG, participants who chose to attack were offered a defensive option and asked if they wanted to switch to that option (Jing et al., 2017). Many decided to switch, indicating that their attacks were likely driven by defensive reactions to perceived threats (Jing et al., 2017). Additionally, individuals who strongly perceived competition between the nations were more likely to engage in preemptive attacks. This finding further supports the idea that perceived threats can trigger negative behaviors (Jing et al., 2017).

This study aims to investigate whether people feel threatened by immigrants and to observe the behaviors triggered by these perceived threats. We developed a game based on the PSG to measure responses to immigrant-related threats. In the original PSG, attacks were primarily offensive actions meant to neutralize opponents, similar to warfare between nations. However, real-world responses to perceived immigrant threats often include not only aggressive actions but also defensive behaviors, such as exclusion and avoidance (e.g., Esses et al., 1998). As a result, the attack function in the PSG does not fully capture the range of responses triggered by perceived immigrant threats. In the one-shot PSG, attacks can reflect defensive behaviors aimed at avoiding harm and aggressive behaviors intended to reduce the opponent's gains (Horita, 2023), which makes it challenging to determine whether Japanese participants' actions toward Japanese and immigrant opponents are motivated by a desire to harm immigrants or by perceived threats in a single round. Therefore, we introduced two essential changes: adding a defense button and removing the time pressure to decide who acts first.

Firstly, the defense button allows participants to block an opponent's attack, offering a direct alternative to aggression. Previous studies (Jing et al., 2017; Simunovic et al., 2013) asked participants if they would switch to a defense button after attacking, interpreting a switch as evidence that the attack was threat-driven. However, this judgment may not accurately reflect the participants' motivations within the game context because it is retrospective. By adding a defense button to the PSG, we can distinguish more clearly between defensive responses to perceived threats from immigrants and aggressive responses.

Secondly, by removing time pressure and determining the outcomes when both players choose to attack, we can eliminate defensive motivations in the PSG linked to the attack button. Research shows that time pressure influences decision-making (e.g., Rand et al., 2012, 2014), which may also affect behaviors toward immigrants. Therefore, we removed the time pressure and redesigned the game so that both players would be damaged if attacked. This design can help differentiate between motivations for behavior—participants will choose defense if they feel threatened and attack if they intend to harm the opponent. This study investigated the mechanisms of aggression toward immigrants by introducing a "defense" option in the PSG and exploring the outcomes when both parties choose to attack. The study tested the following hypothesis.

Hypothesis

Japanese participants are more likely to choose to be defensive when facing immigrants than Japanese participants.

We pre-registered this study, available at the following URL: https://osf.io/8ryh3. This study hypothesized that aggression would not be statistically detectable due to the absence of a theoretical framework. Consequently, the significance level was adjusted to 2.5% to account for the interpretation of differences in aggression rates in addition to defense rates.

Methods

Participants

We determined the sample size based on a power analysis for multinomial logistic regression, setting the significance level (α) at 0.05 and the power at 0.8. Using data from Jing et al. (2017), we set the odds ratio for defense at 1.623, corresponding to an unstandardized regression coefficient of 0.484. We calculated the odds ratio based on the aggression rates for Japanese participants and American participants in Jing et al. (2017), the latter having the second highest aggression rate after Chinese participants. Based on these parameters, a sample size simulation indicated that we required 481 participants per group and 962 participants across the two groups. We aimed to recruit 500 participants per group to account for potential dropouts. Additionally, we aimed to recruit 50 immigrant participants to pair against the Japanese participants.

After excluding data according to our pre-registered criteria, the final sample consisted of 1,153 participants. Of these, 544 participants were in the "Japanese" condition and 609 in the "Immigrant" condition. The sample included 579 men, 568 women, and 6 participants who did not respond to the gender question (mean age 42.61 years, SD = 10.23).

Experimental design

This study employed a between-subjects design, with the opponent (Japanese vs. Immigrant) as the sole factor. Participants were randomly assigned to one of two conditions: "Japanese" or "Immigrant."

Procedure

After obtaining informed consent to participate in the study, the participants answered questions to verify

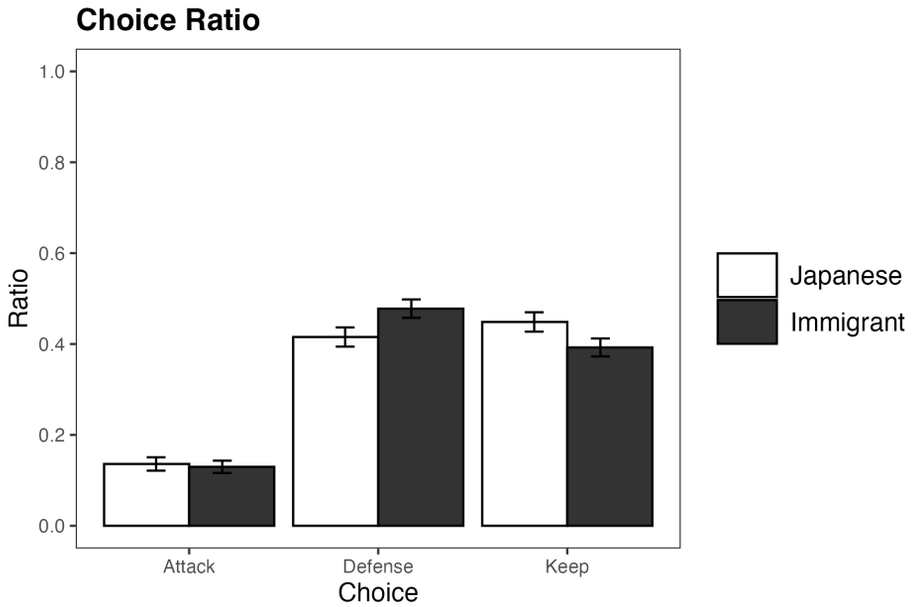

Figure 1. Attack, defense, and keep ratios.

Note. Error bars indicate standard error.

their immigration status or whether they held Japanese citizenship. Then, they responded to a series of scale items before being assigned to the experimental game's conditions: "Japanese" or "Immigrant." To ensure sufficient data collection, we used a post hoc matching approach, similar to the method used by Jing et al. (2017), rather than real-time games. Participants were informed that their decisions and those of their matched partners would affect their rewards, which would be determined after collecting all the data. Before the game began, participants were informed that additional rewards would be determined by matching their responses with those of other participants. To ensure understanding, they answered three questions about the post hoc matching system and two questions about the structure of the experimental game. The correct answers immediately followed the incorrect ones.

Experiment

We developed a game based on the PSG (Simunovic et al., 2013) by adding a defense button, removing time pressure, and ensuring that both players received damages if they both chose to attack. We paired the participants, and each received 500 points, with one point equivalent to 0.2 yen. They had three options: the red button (attack), which cost 100 points and reduced the opponent's points by 400; the blue button (defense), which cost 100 points and prevented point reduction from the opponent's attack; and the green button (keep), which allowed them to maintain their current points without increasing or decreasing them. If both participants chose to attack, both incurred damages and ended the game with zero points. Before the game began, we informed the participants of their opponents' group affiliation, described as either "a Japanese person" or "an immigrant" participating in the same game.

Measures

Participants responded to social preference measures (Mizuno & Shimizu, 2023), the Social Value Orientation (SVO) Slider measure (Murphy et al., 2011), Belief in a Zero-Sum (BZSG; Różycka-Tran et al., 2019). They also provided information about their age and gender, although we did not include it in the analysis.

Results

Figure 1 presents the selection rates for attack, defense, and keep among participants in "Japanese" and "Immigrant" conditions. In the "Japanese" condition, the mean attack rate was 13.6%, the mean defense rate was 41.5%, and the mean keep rate was 44.9%. In the "Immigrant" condition, the mean attack rate was 13%, the mean defense rate was 47.8%, and the mean keep rate was 39.2%.

To test the study hypothesis, we conducted a multinomial logistic regression analysis with attack, defense, and keep as the dependent variables and the condition ("Japanese" / "Immigrant") as the independent variable. The results indicated that the main effect of

Table 1. Multinomial regression analysis.

	Estimate	*SE*	95%CI		
			Lower	Upper	*p*
(Intercept): attack	−1.279	0.295	−1.858	−0.700	< .000
(Intercept): defence	−0.350	0.204	−0.750	0.050	.086
Condition: attack	0.086	0.186	−0.278	0.450	.643
Condition: defence	0.273	0.127	0.024	0.523	.031

defense in the "Immigrant" condition was not significant at the 2.5% α level (β = 0.273, 95% CI [0.024, 0.523], z = 2.153, p = .031), which did not support the hypothesis. Similarly, the effect on attack was also not significant (β = 0.086, 95% CI −0.278, 0.450], z = 0.464, p = .643).

Discussion

This study employed an incentive-based decision-making task based on the PSG to examine the factors influencing defensive and aggressive behaviors toward immigrants. The hypothesis predicted that participants would show a higher tendency to choose defense in the "Immigrants" condition compared to the "Japanese" condition. However, the multinomial logistic regression results did not support this hypothesis. Additionally, the mere presence of an immigrant opponent did not significantly elicit aggressive behavior.

These findings did not confirm the hypothesis that Japanese participants are more likely to choose to be defensive when facing immigrants than Japanese participants. At the numerical level, descriptive results suggest that aggressive responses toward immigrants are unlikely. This study's combination of defensive reactions, small effect sizes, and stringent criteria for detecting attack and defense may have contributed to the lack of significant effects. The tendency to choose defense over attack toward immigrants may stem from activating the self-protection system, which responds to potential harm from immigrants or out-groups (Neuberg et al., 2011). Additionally, the absence of aggressive behavior may be due to the lack of perceptual cues about immigrants that typically trigger disease-avoidance responses or because the term "immigrant" alone did not evoke feelings of disgust among Japanese participants. Future research should focus more specifically on defensive behaviors, re-evaluate the sample size, and further explore the potential effects.

The extent to which participants feel threatened can vary based on how information about immigrants is presented and the demographic characteristics of the participants. Positive information about immigrants reduces hostility toward them (Igarashi & Ono, 2022). Individuals experiencing economic decline tend to perceive immigrants more negatively (Igarashi & Laurence, 2021). This study labeled immigrants as an "immigrant" with no additional contextual information beyond their nationality during the preliminary check. This approach relied on participants' general public perceptions of immigrants. Since perceptions of immigrants may vary, providing specific details about immigrants could help identify the types of immigrants perceived as more threatening.

Finally, the three-choice task (attack, defense, and keep) used in this study has relatively low reliability and requires large sample sizes. Adjustments to the measurement method may be necessary to improve reliability. The original PSG used a time-limited, two-choice task. In contrast, our study utilized a three-choice measurement, but the estimated sample size required to achieve a similar effect size and power as prior research is nearly 1,000 participants. Refining the measurement method is essential to maintain statistical power with a smaller sample size. Future studies should consider using repeated measures or assigning point values to buttons to enhance reliability rather than relying on two or three-choice options.

Conclusion

This study investigated the development of defensive and aggressive behaviors toward immigrants using a new experimental game. The findings indicated that merely labeling someone as an immigrant did not intensify defensive or aggressive behaviors. However, defensive behavior had a larger effect size than aggressive behavior, indicating that focusing exclusively on defense may reveal threat-based defensive responses. The results also highlight a discrepancy between attitudes and behaviors in immigration research––effects observed at the attitudinal level are not replicated in behavioral outcomes. This finding underscores the need for further research to understand the relationship between perceived threats and actual behaviors better.

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Author contribution

SK developed the research plan, collected and analyzed the data, and wrote the manuscript. HS supervised the research plan and manuscript.

Ethical statement

This study was approved by "Kwansei Gakuin University Regulations for Behavioral Research with Human Participant" (No. 2024-26). All participants provided informed consent for participation in the experiment and the sharing of their data, in accordance with the ethical guidelines for behavioral research involving human subjects.

Data accessibility & program code

The experimental data and R code can be downloaded from the following link (https://osf.io/uh5ez).

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