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Matthew Facciani, Qian Huang & Tim Weninger

Cross-Cultural Media Literacy Interventions: Comparing *Gali Fakta* and *Harmony Square* in Indonesia and the United States

Abstract

Media literacy and prebunking interventions have shown promise in enhancing individuals' ability to identify false information; however, cross-cultural research in this area is limited. This study investigates the effectiveness of two media literacy prebunking games, *Gali Fakta* and *Harmony Square*, in improving misinformation discernment among Indonesian and American participants. *Gali Fakta*, designed specifically for Indonesia, and *Harmony Square*, aimed at Western audiences, were compared against a *Tetris* control group. We assessed participants' ability to evaluate and share news headlines, alongside their subjective engagement levels. The results revealed that *Gali Fakta* significantly improved sharing discernment among Indonesian participants, though it did not significantly enhance accuracy discernment. In contrast, *Harmony Square* showed no impact in Indonesia, while both games effectively improved sharing and accuracy discernment in the U.S. Engagement emerged as a critical factor, with higher levels correlating with better discernment across both groups. These findings highlight the significance of cultural relevance and engagement in media literacy interventions, suggesting that tailored prebunking approaches are essential for enhancing misinformation detection across diverse populations.

Introduction

Media literacy and prebunking are emerging tools to combat the spread of hoaxes and false information in an increasingly digital world. Media literacy, defined as the ability to critically analyze, evaluate, and create media, has shown promise in helping individuals distinguish credible sources from falsehoods (Aufderheide, 1993; Livingstone, 2014). For example, higher levels of media literacy have been associated with a reduced vulnerability to false information, such as misinformation related to COVID-19 (Austin et al 2021). However, traditional media literacy education can be resource-intensive, prompting the need for scalable solutions like interactive games.

Prebunking, rooted in William McGuire's *inoculation theory*, is a proactive strategy that prepares individuals to refute false claims before encountering them (McGuire, 1964). By exposing users to a weakened form of misinformation, prebunking builds resistance, reducing susceptibility to future falsehoods. This technique has grown beyond McGuire's foundational paper, and recent work demonstrates how prebunking has proven effective across various domains, including correcting misleading information regarding biotechnology, vaccinations, and animal research (Compton et al 2021; Kim, et al 2022). Prebunking differs than debunking because the goal is to teach individuals how to identify common misinformation and manipulation tactics proactively instead of fact-checking a claim after exposure.

Interactive prebunking tools, such as the *Bad News* game and *Harmony Square*, teach users to recognize misinformation strategies through role-playing, where participants act as fake news creators (Basol, Roozenbeek, and van der Linden, 2020; Roozenbeek & van der Linden, 2020) Although the literature supports the effectiveness of prebunking, there is a notable cultural and linguistic bias. Much of the research focuses on Western, English-speaking populations, overlooking diverse media ecosystems worldwide (Badrinathan & Chauchard, 2023). Some research has demonstrated that prebunking interventions can be adapted for international audiences (Guess et al 2022), while other research has shown null effects (Harjani et al 2022). In this paper, we define media literacy and prebunking interventions as any structured effort designed to improve individuals' efforts to recognize and resist false information. The main outcome variable of media literacy we focus on for this study is the ability to discern factual versus false news headlines.

The present study addresses these gaps by comparing the effectiveness of two media literacy games in different cultural contexts: *Gali Fakta*, developed for Indonesian audiences, and *Harmony Square*, a game developed initially for Western and English-speaking audiences. Both games aim to enhance media literacy by improving users' ability to detect hoaxes and false information. This study seeks to replicate prior findings in Indonesia (Facciani, Apriliawati, & Weninger 2024) and the United States (Roozenbeek, & van der Linden. 2020) and evaluate how these games perform in different cultural contexts. Additionally, we examine whether user engagement correlates with the ability to discern misinformation, predicting that each game will be more effective in the cultural context it was designed for.

Media literacy and Prebunking

Media literacy involves one ability to critically analyze, evaluate, and create media (Aufderheide, 1993, Livingstone, 2014). Higher media literacy levels help individuals distinguish credible sources from falsehoods, reducing vulnerability to misinformation. Research has shown that people with higher media literacy skills are less vulnerable to believing false information about COVID-19 (Singh & Banga 2022) and are better able to evaluate the accuracy of political claims (Kahne and Bowyer 2017). Media literacy education can be successfully taught through coursework (Duran et al 2008) but taking a multiple-week or monthly course is a resource-intensive approach. This need for scalable solutions has driven researchers to explore innovative approaches, such as interactive games and prebunking.

Prebunking is an emerging technique to combat misinformation by equipping individuals with the tools to recognize and refute false claims before encountering them (Basol et al., 2020. Rooted in *inoculation theory*, developed by William McGuire in the 1960s, prebunking introduces a *weakened* version of a persuasive argument to build resistance to misleading or false information that will likely be encountered later (Compton et al., 2021; McGuire 1964). This proactive approach varies from traditional debunking, which addresses falsehoods after they

have spread. Prebunking games have been shown to significantly improve the ability to recognize misinformation techniques and identify false news headlines (Basol, Roozenbeek, and van der Linden, 2020; Roozenbeek & van der Linden, 2019; Roozenbeek, Traberg, van der Linden 2022).

Harmony Square is a short, interactive online prebunking game designed to teach players about common tactics used in the spread of political misinformation (Roozenbeek & van der Linden, 2020). In the game, players assume the role of a "Chief Disinformation Officer" and are guided through four narrative-driven episodes that involve manipulating public opinion in a fictional town. Each episode focuses on a specific manipulation technique, such as trolling, fearmongering, spreading conspiracy theories, and amplifying polarizing content using bots, allowing players to experience the logic of disinformation from the inside. This approach, grounded in inoculation theory, aims to build psychological resistance by exposing players to weakened doses of manipulation tactics in a controlled environment.

Playing *Harmony Square* has been shown to reduce the likelihood of sharing misinformation and increase the ability to identify falsehoods (Leder et al., 2024). These effects have been demonstrated primarily in Western, English-speaking contexts. While one study involving a highly educated, international (mostly European) English-speaking sample also found positive outcomes (Roozenbeek & van der Linden, 2020), the game's satirical tone, political framing, and cultural references are distinctly rooted in Western democratic discourse. It remains unclear whether this format resonates equally across non-Western or non-English-speaking populations. Although media literacy and prebunking interventions have shown promise globally, the cultural adaptability of satirical and politically themed prebunking games like *Harmony Square* remains an open question.

In addition to media literacy, research suggests that cultural norms, technological infrastructures, and trust in institutions shape how people interpret and respond to misinformation (Mihailidis, 2018). A cross-cultural study of Sweden and Lithuania further supports this, showing that country-level factors like socio-economic status, education systems, and digital access create distinct media literacy gaps, with older adults in Lithuania and marginalized groups in Sweden facing the most challenges (Liubinienė, & Thunqvist, 2015). This underscores the importance of designing media literacy interventions that account for the unique digital landscapes and socio-cultural contexts of different countries.

International Prebunking

Prebunking's potential is further complicated by cultural and linguistic biases. Most research and interventions are centered on English-speaking, Western populations, overlooking the diverse media landscapes and information dynamics in other regions (Badrinathan & Chauchard, 2023; Henrich, Heine & Norenzayan, 2010). For instance, while Facebook is widely used in the United States, its prevalence is much lower in African countries like Nigeria, Kenya, and Cameroon

(Auxier, 2021, World Population Review, 2024). Conversely, WhatsApp is more popular in countries like Indonesia, India, and Brazil, which exposes users to different information and media dynamics due to direct messaging (Statista, 2023).

There have been several studies that show promise for using prebunking games to teach media literacy skills to international audiences. Guess and colleagues (2022) administered a media literacy intervention to participants from the United States and India. This intervention improved participants' ability to discern true from false headlines in both countries, demonstrating the scalability and adaptability of prebunking techniques.

Iyengar, Gupta, and Priya (2022) found that Indian participants improved their ability to detect misinformation after playing the Western-based media literacy intervention, *Bad News*. However, the sample was not representative of India's general population, as it consisted of English-speaking, highly educated individuals. It may also be difficult to find equal levels of media literacy when across different countries as research has shown that the neighboring countries of Indonesia and Malaysia (Facciani, Idris, & Weninger 2023) still had significant differences in how they consume media and their news literacy. These differences may add to the difficulty of designing effective prebunking games across different audiences.

Other cultural differences, such as trust in government and media, may impact the cross-cultural effectiveness of prebunking games. For example, a 2023 study by Wong & Wu found that a translated *Bad News* game was not as effective for a sample of participants from Singapore. The authors conclude that prebunking interventions may not work as well in countries that have higher levels of trust in the government and mainstream media. Additionally, Harjani and colleagues (2022) created a media literacy game specifically for participants in north India but found it did not enhance their ability to evaluate misinformation or reduce their likelihood of sharing it. The authors suggest future interventions should collaborate with local researchers and universities and consider the digital literacy challenges of rural audiences, which could limit the effectiveness of online media literacy games. Given these global differences in misinformation susceptibility and media environments, it is critical to examine how prebunking interventions function across diverse populations.

The United States and Indonesia were selected for this study because they represent distinct media ecosystems and misinformation landscapes, providing an opportunity to examine the cross-cultural effectiveness of prebunking games. While both countries experience high rates of misinformation, they differ in media consumption patterns, political polarization, and institutional trust, all of which influence how prebunking interventions function.

The Present Study

The present study compares the effectiveness of two different styles of prebunking games: *Gali Fakta* and *Harmony Square*. Both games aim to increase media literacy by prebunking; however,

the two platforms differ significantly in format, tone, and potential cultural fit. *Gali Fakta* is a mobile-friendly, WhatsApp-inspired game developed by Indonesian organizations to address misinformation in local online environments. The game simulates a realistic group chat interface, where players receive messages from fictional friends and family members. These contacts share posts, links, or forwarded images that may be true or misleading. Players are prompted to identify which pieces of content are potentially false and select how they would respond depending on whether they find it credible or not. After each choice, the game provides feedback explaining the reasoning behind the correct response. The gameplay is organized into three thematic categories (health, news, and finance), each of which addresses four misinformation strategies: fake accounts, confirmation bias, untrustworthy sources, and algorithmic filter bubbles. *Gali Fakta* uses a conversational tone, embedded social cues, and a prosocial framing that encourages players to help protect their communities. This format reflects everyday digital habits in Indonesia, where WhatsApp is the dominant platform and misinformation often spreads through peer networks (Wendratama & Yusuf, 2023). Previous research has shown that *Gali Fakta* significantly improves headline discernment and reduces misinformation sharing without undermining trust in accurate information (Facciani, Apriliawati, & Weninger, 2024).

By contrast, *Harmony Square* is a game designed in the West and structured as a four-chapter satirical narrative where players take on the role of a "Chief Disinformation Officer." Unlike *Gali Fakta's* direct questions and peer-to-peer framing, *Harmony Square* uses irony and role reversal to teach through satire. Players are not asked to evaluate factual claims, but instead to actively participate in spreading misinformation, which helps them recognize these techniques later. While prior studies have shown *Harmony Square* improves misinformation detection in U.S. and European samples (Roozenbeek & van der Linden, 2020; Leder et al., 2024), its design and tone may not transfer easily to contexts like Indonesia, where spreading misinformation is not only culturally discouraged but can also have legal consequences (Lamb & Teresia, 2022).

Despite their differences, both games draw on inoculation theory (Compton et al., 2021; McGuire, 1964), exposing players to misinformation strategies in a safe, guided environment to build resistance. This study compares how the two platforms perform across U.S. and Indonesian audiences, offering insight into whether cultural tailoring, platform familiarity, or design simplicity affects prebunking effectiveness.

Beyond the difference in laws regarding false information, Indonesia and the United States also differ in several meaningful relevant ways. As noted above WhatsApp is a much more popular social media platform in Indonesia compared to the United States (Statista, 2023), and research has found Indonesians are exposed to significant political misinformation on this platform (Neyazi et al., 2022). Indonesia is also a more recent digital arrival compared to the United States with 77% of the Indonesian population currently connected online (Kemp, 2023; Nurhayati-Wolff, 2023). Political polarization exists in both countries, but the United States has a clear partisan divide between its two major political parties, while Indonesia's polarization is spread

out across ethnic and religious attitudes (Soderborg & Muhtadi, 2023). Thus, *Gali Fakta's* WhatsApp-inspired approach may resonate more with an Indonesian audience that is more familiar with that platform, and *Harmony Square's* focus on partisanship may resonate more with an American audience.

The U.S. has a highly polarized media environment, where political ideology shapes trust in news sources and fact-checking efforts (Guess et al., 2019) and trust in institutions is relatively low (Gallup, 2024). In contrast, Indonesia has relatively higher trust in strong public confidence in institutions like business, government, media, and NGOs (Edelman, 2025). Additionally, while both countries report similar levels of trust in science (Cologna et al., 2025), the U.S. exhibits higher science-related populism, where skepticism toward scientific institutions undermines engagement with fact-based interventions. These differences suggest that Harmony Square's satire and focus on the manipulation techniques from political misinformation align more with the U.S. context, while Gali Fakta's peer-driven chat simulation is better suited for Indonesia's social media-driven misinformation environment. Despite these contrasts, both nations share challenges in misinformation resilience, making them ideal for examining how culturally tailored versus more universally designed prebunking games perform across audiences.

Misinformation is a widespread problem in both Indonesia and the United States and Americans and Indonesians struggle to discern fact from fiction across many different domains (Facciani, 2025; McRae et al., 2022; Mujani & Kuipers 2020; Nasir & Nurmansyah, 2020; Syam & Nurrahmi, 2020; Theisen et al., 2021). Media literacy programs have the potential to help individuals from both countries reduce their susceptibility to false information (Austin et al 2021; Jalli & Idris, 2019; Livingstone, 2014). The differences between the United States and Indonesia highlight the importance of evaluating the effectiveness of different prebunking interventions more tailored to each country's unique media landscape. The shared challenges of misinformation and media literacy suggest that comparing *Gali Fakta* and *Harmony Square* can offer valuable insights into how prebunking games can be adapted for different cultural and digital contexts.

The present study aims to first replicate previous research that shows how *Gali Fakta* and *Harmony Square* improve the ability to detect misinformation in Indonesia and the US, respectively. Our study also investigates how each game performs in a population that it was not designed for. We predict that *Gali Fakta* will improve discernment within an Indonesian sample and *Harmony Square* will improve discernment within an American sample, replicating previous research. **We also explore whether Gali Fakta's simple, peer-driven approach is successful in boosting discernment across both countries and if *Harmony Square's*** **W**estern satire and political examples reduce its effectiveness for an Indonesian sample. We also evaluate if better performance (discernment of factual vs false headlines) is predicted by higher levels of engagement for each game.

Hypotheses for the Present Study

We predict that *Gali Fakta* will improve both sharing and accuracy discernment in our study, as previously shown by Facciani, Apriliawati, & Weninger (2024). While not highly satirical or culturally dense like *Harmony Square*, *Gali Fakta's* simplicity and tone are grounded in Indonesian digital culture and audience expectations. Accordingly, we hypothesize that these culturally resonant design elements will improve both engagement and effectiveness among Indonesian users.

Specifically, we expect that Indonesian participants will rate *Gali Fakta* as more engaging than *Harmony Square* and demonstrate improved misinformation discernment after playing. Thus, our hypotheses are as follows: (H1a) *Gali Fakta* will improve accuracy discernment in an Indonesian sample, and (H1b) *Gali Fakta* will improve sharing discernment in an Indonesian sample. We also ask: (H2) *Gali Fakta* will be rated as more engaging than Harmony Square in Indonesia.

We will also evaluate whether *Harmony Square* improves discernment in an Indonesian sample. While a translated version of the game may yield some benefits, it is possible that Harmony Square's cultural framing, particularly its use of political satire, Western-centric political narratives, and ironic role-play, may not resonate with Indonesian players. Although prior research supports the game's effectiveness in English-speaking countries, it remains unclear whether this kind of satire translates well across cultural and linguistic boundaries. The game's multitasking demands, character subplots, and unfamiliar political cues may also create confusion or disengagement when played in translation. This leads to our first research question:
(RQ1) Will *Harmony Square* improve discernment in an Indonesian sample?

We will also collect data in a U.S. sample, and we predict that *Harmony Square* will replicate previous findings of improving accuracy and sharing discernment. The game has been shown to be effective in prior Western populations using both behavioral and self-report measures of misinformation detection. In addition, we predict that U.S. participants will find Harmony Square more engaging than *Gali Fakta*, which has a simpler interface and a more straightforward, peer-helping approach.
(H3a) *Harmony Square* will improve accuracy discernment in a U.S. sample, **(H3b)** *Harmony Square* will improve sharing discernment in a U.S. sample, and (H4) *Harmony Square* will be rated as more engaging than *Gali Fakta* for the U.S. sample.

We will also translate *Gali Fakta* into English and assess whether it improves discernment in a U.S. sample. While *Gali Fakta* was originally developed for Indonesian audiences, its design is not saturated with region-specific political satire or insider references. Instead, it uses a universally familiar format—WhatsApp-style group chats—and prosocial, peer-based messaging that encourages players to help friends and family members assess potentially misleading information. Although some meaning could be lost in translation, we expect that *Gali Fakta's*

direct, linear gameplay and relatable format may appeal to users in other cultural contexts as well. This leads to our second research question: **(RQ2)** Will *Gali Fakta* improve discernment in a U.S. sample?

Finally, we examine whether engagement mediates discernment outcomes. Given that *Gali Fakta* presents a socially supportive and familiar format for digital communication, it may increase player engagement, especially for audiences who frequently use chat-based apps. Likewise, *Harmony Square's* narrative complexity may appeal more to users accustomed to satire and gamified political commentary. Thus, we explore whether engagement plays a predictive role in the effectiveness of both games: **(RQ3)** Higher engagement for both games predict having higher discernment scores in both the U.S. and Indonesia.

Methods

Participants

Table 1: Demographic Data of Indonesian and American Participants

Variable	**Indonesia** (n=799)	**United States** (n=790)
Sample Size	799	790
Male (%)	45.60%	45.90%
College Degree or Higher (%)	75%	80%
Average Annual Income	359,000,000 IDR (4.24E+09)	72,252 USD (73,526)
Average Age (SD)	34.82 (9.01)	44.11 (13.05)
Self-Reported Media Literacy (1-5, SD)	4.07 (0.53)	3.89 (0.78)
Political Orientation (1-5, SD)	3.09 (0.92)	2.87 (1.20)
Social Media Use (1-5, SD)	4.91 (0.35)	3.50 (0.95)

Note: Means presented with standard deviations in parentheses

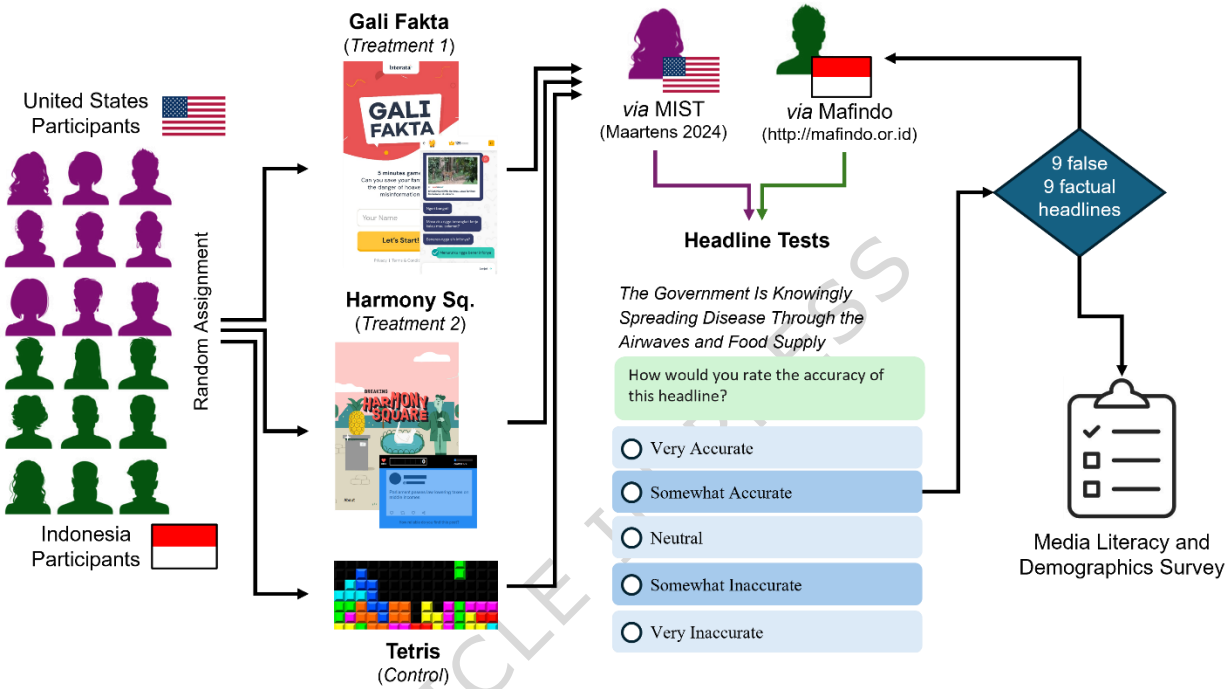
Data was collected from online surveys administered via the social research company *Belindi and Respondi*. Our study included a total of 1570 participants, with 790 from the United States and 799 from Indonesia (see Table 1). In our Indonesian sample, 45.6% were male, 75% had a college degree or higher, an average annual income of 359,000,000 IDR (~22,000 USD), and an average age of 34.82 (*SD*= 9.01). Overall, participants scored fairly high on self-reported media literacy with an average of 4.07 on a scale from 1-5, (*SD* = 0.53), were slightly conservative on a political scale of 1-5 (Mean [*M*] = 3.09; *SD* = 0.92), and were heavy users of social media with an average of 4.91 (*SD* = 0.35).

In our US sample, 45.9% were male, 80% had a college degree or higher, an average annual income of 72,252 USD (*SD* = 73,526), and an average age of 44.11 (*SD* = 13.05). Overall, participants scored fairly high on self-reported media literacy with an average score of 3.89 (*SD*

= 0.78), were slightly conservative (*M* = 2.87; *SD* = 1.20), and were moderate users of social media with an average of 3.50 (*SD* = 0.95). Full descriptive statistics of participants and correlation tables of our variables are available in the online supplementary material.

Procedure

Figure 1: Illustration of Experimental Design for Indonesian and American Participants



Participants were randomly assigned to one of three conditions: playing *Gali Fakta*, *Harmony Square*, or *Tetris* (as a control). The purpose of these assignments was to evaluate the impact of different games on participants' abilities to discern real from false information. See Figure 1 for an illustration of our study's procedure. Participants evaluated the accuracy of 18 headlines, composed of 9 real and 9 false headlines. The real and false headlines were sourced from the Misinformation Susceptibility Test (Maertens et al 2024) for the US sample or from the fact-checking organization *Mafindo* for the Indonesian sample. Participants also indicated their intention to share each headline.

Directly after playing each game, participants provided subjective evaluations of the game they played, including measures of enjoyment, fatigue, and their willingness to share the game with others on a Likert scale (1-5). We combined and averaged these variables into a single measure of engagement (with fatigue being reverse-coded). We also included a measure of both identity-motivated skepticism as well as accuracy-motivated skepticism from Li (2023). Finally, data was collected on various demographic variables including age, gender, education level, urban or rural residence, income, religion, political orientation, and media literacy via Austin and colleagues (2021). The complete list of survey questions for both countries is available in the online supplementary material.

Analytic procedure

We conducted a series of regression analyses to evaluate our hypotheses while controlling for significant demographic differences between participants from the United States and Indonesia. Hypotheses H1a, H1b, H2, and RQ1 were specifically analyzed using data from our Indonesian participants. For H1a and H1b, our primary independent variable was a binary variable, where participants in the *Gali Fakta* condition were coded as 1 and those in the control condition as 0. This coding allowed us to assess whether participation in the *Gali Fakta* condition significantly improved sharing and accuracy discernment, while controlling for the effects of various demographic variables. For RQ1, participants in the Harmony Square condition were coded as 1, with the control condition coded as 0. For H2, we maintained the same demographic controls and included a binary variable for *Gali Fakta* (coded as 1) and Harmony Square (coded as 0). Additionally, we incorporated our measure of engagement as a key dependent variable.

Hypotheses H3a, H3b, H4, and RQ2 were analyzed using data from our US participants. For H3a and H3b, we employed the same analytic procedure as for the Indonesian dataset, coding Harmony Square as 1 and the control group as 0. For RQ2, we coded *Gali Fakta* as 1 and the control condition as 0. For H4, we utilized the same measure of engagement as our dependent variable, coding Harmony Square as 1 and *Gali Fakta* as 0. Lastly, RQ3 incorporated data from both countries, using sharing and accuracy discernment scores as dependent variables. In this case, engagement level served as the independent variable, while we controlled for the same demographic variables. We conducted separate regression analyses for participants in the *Gali Fakta* and Harmony Square conditions within each country. All statistical analysis was conducted using STATA software version 17.0 MP.

We calculated an *a priori* power analysis using GPower software (Faul et al., 2009) for the OLS regressions used in this study. Our power analysis included 10 variables at an alpha level of .05. Our 10 variables include all of our demographic variables along with the comparisons between Gali Fakta, Harmony Square, and our control group. According to Cohen's (1988) guidelines, effect sizes of 0.02 are considered small, 0.15 are medium, and 0.35 are large. In order to achieve .95 power with a medium (.15) effect size, we would need at least 172 participants according to our power analysis. Our sample size exceeded 172 in every regression test performed, making our sample size sufficiently large for our analyses.

Results

Indonesian Results

Table 2: *Gali Fakta* Improves Sharing Discernment Among Indonesian Participants

(*Indonesian Sample*)	*Gali Fakta*		*Harmony Square*	
	Accuracy Discernment vs Control	**Sharing Discernment vs Control**	**Accuracy Discernment vs Control**	**Sharing Discernment vs Control**
Education	0.123*	0.128*	0.0478	0.0536
	(0.0673)	(0.0662)	(0.0836)	(0.0789)
Income	-2.27e-12	-3.26e-12	5.89e-13	-1.29e-11
	(6.71e-12)	(6.58e-12)	(1.11e-11)	(1.04e-11)
Urban vs Rural	-0.0198	-0.0174	-0.0135	0.0103
	(0.0493)	(0.0487)	(0.0597)	(0.0562)
Age	0.00788**	0.00215	0.00893**	0.00297
	(0.00337)	(0.00330)	(0.00393)	(0.00369)
Conservativism	-0.0250	-0.0232	0.0170	-0.000610
	(0.0342)	(0.0335)	(0.0369)	(0.0348)
Male	0.0716	-0.0150	-0.139**	-0.0947
	(0.0616)	(0.0604)	(0.0702)	(0.0660)
Religiosity	0.0192	0.0807*	-0.0154	0.0153
	(0.0453)	(0.0444)	(0.0540)	(0.0508)
Media Literacy	0.454***	0.335***	0.448***	0.295***
	(0.0591)	(0.0582)	(0.0627)	(0.0590)
Social Media Use	0.152*	0.117	0.313***	0.227**
	(0.0912)	(0.0894)	(0.0962)	(0.0904)
Gali Fakta vs Control	0.0815	0.126**		
	(0.0598)	(0.0586)		
Harmony Square vs Control			0.0852	0.102
			(0.0685)	(0.0645)
Constant	-2.446***	-2.155***	-2.922***	-2.189***
	(0.589)	(0.577)	(0.639)	(0.601)
Observations	554	555	448	447
R-squared	0.134	0.091	0.135	0.081

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We conducted a series of OLS regression analyses to evaluate (**H1a**) *Gali Fakta* will improve accuracy discernment in an Indonesian sample and (**H1b**) *Gali Fakta* will improve sharing discernment in an Indonesian sample (see Table 2). We did not find that those in the *Gali Fakta* condition significantly improved their headline accuracy discernment. However, we did find that playing *Gali Fakta* did significantly improve sharing discernment compared to the control group (p <.05). Thus, we do not find support for H1a but do find support for H1b. *Gali Fakta* improved participants' ability to share more accurate headlines, but playing the game did not significantly improve their ability to rate these headlines with greater accuracy. We also found that participants with higher levels of media literacy consistently scored higher on both forms of discernment (p <.01).

Next, we ran OLS regressions to determine if Harmony Square would increase sharing and accuracy discernment among participants to address **RQ1**. We did not find that Harmony Square significantly improved sharing or accuracy discernment. Thus, while *Gali Fakta* only improved participants' ability in their self-reported sharing behavior, playing *Harmony Square* had a completely null effect among our Indonesian participants.

Table 3: Indonesian Participants Rate *Gali Fakta* as Significantly More Engaging Than Harmony Square

(*Indonesian Sample*)	**Engagement**
Education	0.0758
	(0.0590)
Income	1.22e-12
	(4.91e-12)
Urban vs Rural	0.0598
	(0.0394)
Age	-0.00833***
	(0.00283)
Conservativism	0.0325
	(0.0270)
Male	0.0132
	(0.0502)
Religiosity	0.00708
	(0.0399)
Media Literacy	0.484***
	(0.0472)
Social Media Use	0.156**
	(0.0725)
Gali Fakta vs Harmony Square	0.331***
	(0.0507)
Constant	0.593
	(0.461)
Observations	521
R-squared	0.259

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Because *Gali Fakta* was specifically designed for an Indonesian audience, we predicted it would be more engaging to participants compared to *Harmony Square*. Our regression analysis found that being in the *Gali Fakta* condition predicted significantly higher engagement scores than those in the Harmony Square condition (p <.01) (see Table 3). Thus, we find support for (**H2**) *Gali Fakta* will be rated as more engaging than *Harmony Square* in Indonesia. One interesting result among our control variables was that younger participants rated the prebunking games as significantly more engaging (p <.01).

American Results

Table 4. Both Harmony Square and *Gali Fakta* improve both accuracy and sharing discernment in US population

(*US Sample*)	***Harmony Square***		***Gali Fakta***	
	Accuracy Discernment vs Control	**Sharing Discernment vs Control**	**Accuracy Discernment vs Control**	**Sharing Discernment vs Control**
Education	0.0764*	0.00840	0.142***	0.0211
	(0.0463)	(0.0320)	(0.0425)	(0.0315)
Income	3.02e-07	4.75e-08	2.66e-07	-1.72e-07
	(6.81e-07)	(4.72e-07)	(5.02e-07)	(3.74e-07)
Urban vs Rural	0.0433	0.0611	0.0925*	0.0422
	(0.0616)	(0.0426)	(0.0545)	(0.0405)
Age	0.0160***	0.00181	0.0193***	0.00187
	(0.00340)	(0.00235)	(0.00305)	(0.00226)
Conservativism	-0.238***	-0.149***	-0.256***	-0.123***
	(0.0373)	(0.0260)	(0.0329)	(0.0246)
Male	-0.0679	-0.0538	-0.172**	0.0625
	(0.0868)	(0.0601)	(0.0748)	(0.0557)
Religiosity	-0.210***	-0.0463	-0.218***	-0.0305
	(0.0422)	(0.0293)	(0.0355)	(0.0266)
Media Literacy	0.123**	0.0460	0.163***	0.0314
	(0.0543)	(0.0376)	(0.0491)	(0.0365)
Social Media Use	0.0515	-0.0116	0.0159	0.00284
	(0.0475)	(0.0329)	(0.0406)	(0.0302)
Harmony Square vs Control	0.215**	0.177***		
	(0.0894)	(0.0619)		
Gali Fakta vs Control			0.264***	0.155***
			(0.0786)	(0.0585)
Constant	0.281	0.350	-0.0327	0.202
	(0.331)	(0.229)	(0.293)	(0.217)
Observations	463	462	474	473
R-squared	0.235	0.121	0.330	0.085

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Moving to our US sample, we predicted that (**H3a**) Harmony Square will improve accuracy discernment and (**H3b**) Harmony Square will improve sharing discernment. Our OLS regression results revealed that playing Harmony Square did significantly improve both accuracy discernment (p<.05) and sharing discernment (p <.01) in our US sample (see Table 4). Interestingly, media literacy scores were only significant in predicting discernment in two of our regression analyses (p <.05) and higher levels of conservatism predicted lower accuracy and sharing discernment in each regression model (p <.01).

We also tested the English version of *Gali Fakta* to answer (**RQ2**) Will *Gali Fakta* improve discernment in a US population? We did find that playing *Gali Fakta* significantly improved both sharing (p <.01) and accuracy (p <.01) discernment in our US sample. Thus, *Gali Fakta*

partially replicates previous work showing its effectiveness in discernment for an Indonesian sample and our data showcases how the English version of *Gali Fakta* significantly improves accuracy and sharing discernment in our US sample. In comparison, Harmony Square only improved accuracy and sharing discernment in the US sample, and had null effects in the Indonesian sample.

Table 5: Harmony Square was not rated as more engaging than *Gali Fakta* for US sample

(*US Sample*)	**Engagement**
Education	-0.132***
	(0.0366)
Income	-3.93e-07
	(4.49e-07)
Urban vs Rural	-0.0332
	(0.0470)
Age	-0.00520**
	(0.00253)
Conservativism	-0.0665**
	(0.0301)
Male	0.0548
	(0.0657)
Religiosity	0.0258
	(0.0318)
Media Literacy	0.281***
	(0.0420)
Social Media	0.00293
	(0.0357)
Harmony Square vs *Gali Fakta*	-0.0337
	(0.0646)
Constant	3.174***
	(0.238)
Observations	619
R-squared	0.097

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Both Harmony Square and *Gali Fakta* improved discernment in our US sample, but we also predicted (**H4**) Harmony Square will be rated as more engaging than *Gali Fakta* for the US sample (see Table 5). However, we did not find that Harmony Square was more engaging than *Gali Fakta*. Thus, because both games were effective in this sample, it could explain why neither was also more engaging. Consistent with our Indonesian sample, we found that younger participants significantly found the prebunking games more engaging ($p < .05$).

Table 6: Higher Engagement predicted higher discernment only for *Gali Fakta* in the Indonesian sample

	Harmony Square	***Gali Fakta***

(*Indonesian Sample*)	**Accuracy Discernment vs Control**	**Sharing Discernment vs Control**	**Accuracy Discernment vs Control**	**Sharing Discernment vs Control**
Education	-0.0553	0.0131	0.106	0.123
	(0.146)	(0.133)	(0.0879)	(0.0878)
Income	-5.95e-12	-1.74e-11	-2.69e-12	-2.50e-12
	(1.31e-11)	(1.17e-11)	(6.79e-12)	(6.76e-12)
Urban vs Rural	0.0148	0.0380	-0.0339	-0.0250
	(0.0884)	(0.0797)	(0.0598)	(0.0600)
Age	0.00912	0.00139	0.00960**	0.00242
	(0.00641)	(0.00576)	(0.00437)	(0.00434)
Conservativism	0.492***	0.250***	0.334***	0.204**
	(0.103)	(0.0928)	(0.0876)	(0.0875)
Male	0.0844	0.0225	-0.00211	-0.0223
	(0.0551)	(0.0498)	(0.0449)	(0.0444)
Religiosity	-0.193*	-0.129	0.222***	0.0522
	(0.108)	(0.0972)	(0.0789)	(0.0786)
Media Literacy	-0.0441	0.000317	0.00938	0.117**
	(0.0920)	(0.0827)	(0.0595)	(0.0591)
Social Media	0.239*	0.243*	-0.0944	-0.00270
	(0.143)	(0.129)	(0.122)	(0.122)
Engagement	0.0257	0.0951	0.350***	0.343***
	(0.0906)	(0.0815)	(0.0717)	(0.0710)
Constant	-2.518**	-2.185**	-2.113***	-2.365***
	(0.982)	(0.885)	(0.759)	(0.754)
Observations	200	199	308	309
R-squared	0.178	0.115	0.240	0.179

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Higher engagement predicted higher discernment for both *Gali Fakta* and Harmony Square in the US sample

	Harmony Square		***Gali Fakta***	
(*US Sample*)	**Accuracy Discernment vs Control**	**Sharing Discernment vs Control**	**Accuracy Discernment vs Control**	**Sharing Discernment vs Control**
Education	0.0448	0.00561	0.153***	0.0603
	(0.0591)	(0.0420)	(0.0542)	(0.0423)
Income	-9.76e-08	1.86e-08	2.33e-07	-2.74e-07
	(8.66e-07)	(6.16e-07)	(5.67e-07)	(4.43e-07)
Urban vs Rural	-0.0158	0.0945*	0.0639	0.0583
	(0.0783)	(0.0557)	(0.0655)	(0.0511)
Age	0.0160***	0.00306	0.0189***	0.00200
	(0.00422)	(0.00300)	(0.00357)	(0.00279)
Conservativism	0.141**	0.0362	0.223***	0.0222
	(0.0717)	(0.0510)	(0.0612)	(0.0478)
Male	-0.246***	-0.174***	-0.279***	-0.144***
	(0.0505)	(0.0359)	(0.0417)	(0.0328)

Religiosity	-0.00277	0.0160	-0.152*	0.161**
	(0.111)	(0.0793)	(0.0898)	(0.0704)
Media Literacy	-0.150***	-0.0343	-0.190***	-0.0370
	(0.0558)	(0.0397)	(0.0432)	(0.0339)
Social Media	0.0850	-0.0285	0.0251	-0.0155
	(0.0613)	(0.0436)	(0.0487)	(0.0380)
Engagement	0.136**	0.180***	0.0804	0.192***
	(0.0679)	(0.0483)	(0.0567)	(0.0444)
Constant	-0.0926	-0.0942	-0.283	-0.314
	(0.456)	(0.324)	(0.371)	(0.290)
Observations	303	303	315	315
R-squared	0.221	0.176	0.337	0.149

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In our final set of analyses, we addressed (**RQ3**) Higher engagement for both games predicts having higher discernment scores in both countries (see Table 6 and 7). For our Indonesian sample, we found that higher engagement predicted higher accuracy ($p < .01$) and sharing discernment ($p < .01$) only for *Gali Fakta*. For our US sample, we found that higher engagement for both games predicted having higher accuracy discernment ($p < .05$). However, engagement for *Gali Fakta* only significantly predicted sharing discernment ($p < .01$). Thus, engagement does seem to play a key role in predicting the effectiveness of prebunking games. Harmony Square had significantly lower engagement in our Indonesian sample and also did not improve any aspect of discernment.

Discussion

The findings of this study provide valuable insights into the effectiveness of two media literacy prebunking games, *Gali Fakta* and *Harmony Square*, across Indonesian and US samples. While both games were developed to improve participants' ability to detect and share accurate information, their performance varied depending on the audience and engagement levels.

For the Indonesian sample, *Gali Fakta* showed partial success in improving discernment. Although it did not significantly enhance participants' ability to accurately evaluate headlines (H1a), it did improve their sharing discernment, supporting H1b. Additionally, participants with higher media literacy performed better in both discernment tasks, highlighting the importance of foundational media literacy skills in this sample. Conversely, Harmony Square did not yield significant improvements in either sharing or accuracy discernment in this sample, which supports the hypothesis that culturally resonant designs like Gali Fakta may be more effective in certain contexts (H2). Gali Fakta's higher engagement in Indonesia suggests that its design, modeled after WhatsApp group chats and framed around helping friends and family, better aligns with Indonesian digital habits and collectivist social norms.

At the same time, Gali Fakta also improved discernment in the U.S., indicating that some features (e.g., its straightforward messaging and peer-support structure) may appeal broadly across cultures. This does not contradict its culturally informed design, but rather suggests that certain culturally inspired elements, such as familiar communication formats and a prosocial tone, can succeed across contexts when they tap into shared cognitive and emotional drivers. These findings suggest that cultural tailoring need not rely on region-specific satire or dense political commentary. Instead, scalable prebunking interventions may benefit from identifying globally relevant formats (e.g., chat-based interactivity) and values (e.g., helping others) while avoiding overly complex or culturally exclusive storytelling. This insight is particularly useful for designing effective misinformation interventions in diverse or under-researched regions.

The role of engagement in predicting the effectiveness of prebunking games was particularly notable. Higher engagement with *Gali Fakta* predicted greater discernment for the Indonesian sample, supporting the notion that a culturally relevant and engaging design enhances learning outcomes. In the US sample, both *Gali Fakta* and *Harmony Square* demonstrated that higher engagement was associated with better discernment, further emphasizing the importance of user experience in media literacy interventions (RQ3). Results suggest that user engagement plays a crucial role in the effectiveness of prebunking strategies, aligning with research indicating that user-friendliness and instructional clarity enhance learning outcomes in educational games (Iten & Petko, 2016). Educational games have also been shown to be more engaging than traditional approaches, and this increased engagement can directly contribute to improved learning outcomes (McLaren et al., 2017). One key implication is that future interventions should focus on creating engaging, user-friendly, and culturally relevant experiences to maximize their impact.

This study highlights the potential importance of public trust in government, media, and institutions when assessing the cross-cultural effectiveness of prebunking games. As Wong and Wu (2023) found, the *Bad News* game was less effective in Singapore, where institutional trust is high, suggesting that interventions promoting skepticism may be less impactful in such contexts. Similarly, in Indonesia, also characterized by relatively high trust, Gali Fakta's peer-based, socially embedded design proved more engaging and effective than the satirical, politically charged Harmony Square game. These findings suggest that media literacy interventions may benefit from being culturally tailored to reflect local trust dynamics and norms around information, rather than applying a one-size-fits-all approach.

Limitations and Future Directions

Our study is not without several notable limitations. First off, we used a different set of headlines for our Indonesian and US sample. Our US sample evaluated headlines from the Misinformation Susceptibility Test (Maertens et al 2024) and our Indonesian sample saw real headlines fact-checked by *Mafindo* for the Indonesian sample. The MIST headlines were more carefully curated

for academic study than the real-world headlines from *Mafindo*, which could introduce more errors. Importantly, the *Mafindo* headlines used in this study differ from those that yielded significant accuracy discernment effects in Facciani, Apriliawati, and Weninger (2024). It is possible that *Gali Fakta's* prosocial framing heightened participants' sensitivity to the social consequences of sharing, making it more effective at influencing sharing behavior than accuracy judgments. However, given prior findings of effects on both outcomes and the non-significant but expected direction of our accuracy results, we interpret this finding with caution.

Each game emphasized different aspects of media literacy, and previous research shows that "cross-protection" of inoculation can occur where participants apply what they learn to broader aspects of misinformation (Parker, Rains, & Ivanov 2015). Future research can investigate how certain lessons may resonate more with certain types of misinformation. Media literacy mattered more while evaluating Indonesian headlines and political ideology mattered more while evaluating US headlines, which also suggests potential differences in how each set of headlines were perceived by each sample. Despite this limitation, there was still significant improvement in sharing discernment while Harmony Square did not come close to approaching significance in improving either sharing or accuracy discernment. Furthermore, while we worked with local media experts to translate *Harmony Square* into Indonesian and *Gali Fakta* into English, there may still be nuances in the games that are lost in translation. The humor in Harmony Square that makes it engaging for a Western, English-speaking audience may be missed in an Indonesian audience. We also acknowledge that it is difficult to disentangle whether *Gali Fakta's* effectiveness stems from its culturally specific design or from its simple and straightforward format. A final critical and broader limitation is that prebunking games may primarily attract individuals already interested in misinformation, limiting their reach to those most vulnerable. Future research should explore ways to engage a more diverse audience and test different framing and incentives to attract those less aware of misinformation risks.

Beyond limitations with our games and headlines, the study design itself only measures subjective evaluation of the games. Future work could include more objective measures of attention and engagement such as eye-tracking or brain imaging during play. We also found that younger participants in both countries rated the prebunking games as more engaging, which suggests prebunking interventions could also be tailored to better resonate with certain demographic groups. Future qualitative research could explore how different cultures process information and assess the effectiveness of media literacy interventions. While this study focused on the direct effects of independent variables on discernment, future research could explore whether interaction effects (e.g. the relationship between engagement levels and different demographic factors) play a role in shaping misinformation discernment. We also only have an immediate measure of accuracy and sharing discernment. Future studies should explore the long-term effects of these interventions and how regular reinforcement could mitigate the observed decline in effectiveness over time (Maertens et al 2023). Additionally, as noted above by Harjani and colleagues (2022), collaboration with local researchers and the development of more region-

specific interventions could further enhance the success of media literacy programs globally. Finally, prebunking strategies themselves have limitations. They require motivation to engage, and their effects diminish over time without regular reinforcement (Bronstein and Vinogradoc 2021; Maertens et al 2024). These interventions may inadvertently increase skepticism toward both factual and false information (Hoes et al 2024).

The findings of our study contribute to the growing body of literature on media literacy and prebunking by highlighting the importance of cultural tailoring in game design and the significant role of user engagement in improving media discernment. Our study also underscores the need for further research into how different populations respond to various media literacy tools and how engagement can be optimized to enhance learning outcomes.

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Author Contributions

[Author 1]: Conceptualization, Methodology, Data Collection, Statistical Analysis, Writing – original draft. **[Author 2]**: Methodology, Statistical Analysis, Writing – review & editing. **[Author 3]**: Project administration, Funding acquisition, Writing – review & editing. All authors have read and agreed to the published version of the manuscript.

Data Availability

The full survey questions, descriptive statistics, and correlation table of all variables are available on our article's Open Science page. Contact the corresponding author for additional data

requests. Access is available at: https://osf.io/e84zu/?view_only=25cf44d75b2948ab9f2552f8cea1758d.

Ethical Approval

Ethical approval was obtained from the Institutional Review Board at the University of Notre Dame (United States) on July 7, 2023 (Ethics Approval Number: #23-06-7934). The approved protocol specifically included international online survey recruitment. This study recruited participants from the United States and Indonesia through online survey platforms (Belindi and Respondi), without collaborative partnerships with foreign institutions. All participants completed identical procedures remotely through the same commercial survey platforms. The University of Notre Dame IRB reviewed and approved all study procedures for international participant populations in accordance with U.S. federal regulations and the ethical principles of the Declaration of Helsinki.

Informed Consent

Informed consent was obtained from all individual participants included in the study. Consent was obtained digitally (written) via the survey platforms Belindi and Respondi prior to the commencement of data collection in January 2024. Participants were fully informed that their anonymity is assured, why the research was being conducted, and how their data would be utilized for academic purposes. Full informed consent can be viewed on our Open Science page: https://osf.io/e84zu/?view_only=25cf44d75b2948ab9f2552f8cea1758d.

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Competing Interests

The authors declare no competing interests.