# Exposure, Emotion, and Empathy, A Theory Informed Approach to Misinformation and Disinformation Behavior Change through Games

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## Abstract

*A growing collection of game based educational tools work to improve player resilience to misinformation and disinformation. The threat of such misleading information continues to threaten the foundation on which a myriad of high-impact decisions are made. This research aims to understand how to optimize the design of such game-based interventions. By conducting an analysis through the lens of two behavior change theories, the work to seeks to identify game characteristics for successful interventions in this domain.*

*Using excitation and transportation theory, the work observes and recommends characteristics to improve efficacy for existing and future playable media in this behavior change domain. The conclusion is that an optimal theory informed game, may expose players to small doses of misleading information, elicit a negative emotional response to its appearance or a positive emotional response to its detection and align player empathies against creators and spreaders of misleading information.*

**Keywords:** communication theory, disinformation games, misinformation games, game design, fake news

## 1. Introduction

The threat of misinformation and disinformation to wide swaths of society continues to grow. The ease with which misleading content can be produced is aided by the advent of generative artificial intelligence (Ahmed et al., 2022) , adding to an already problematic situation in which misleading information is easily amplified (Forbes, 2002). The result is mass confusion about even the most basic of facts (Kata, 2010). It is generally understood that helping information consumers readily identify unreliable sources can help slow the spread.

Harmful or misleading information is typically divided into two categories, misinformation or disinformation. Disinformation describes sources that aim to provide inaccurate or misleading information by design. As Nemr and Gangware demonstrate, disinformation and its research trajectory are often linked to political propaganda and military strategies aimed at disrupting societies, communities, and morale (2019). Disinformation is initially broadcast to intentionally mislead and strengthened by rebroadcasting by those who may or may not have intended to mislead. Misinformation, alternatively, is focused on the misinterpretation of accurate information or the unintentional spread of unreliable sources or data. Where disinformation is focused on intent, misinformation is focused on interpretation. Disinformation is designed to mislead, and misinformation can be a product of design, misunderstanding, or incorrect interpretation of reliable information.

It is generally understood that identifying the characteristics of either is expected to decrease their impact on society (Verstraete, Bambauer, & Bambauer, 2021). Hence, education-focused solutions aim not to identify sources for disinformation and misinformation but instead to provide people the ability to adapt to a changing media environment to understand their characteristics. Such work aims to improve identification to lessen the impact of both misinformation and disinformation on society.

Game based tools designed as interventions have been created to help address this need. While an effective address to the endemic problems of misleading information is multipronged, many researchers aim to educate information consumers to diminish its effect. As a result, investigations, and investments in combatting disinformation and misinformation have increased (Biloš, 2019). The fundamental dilemma is that while access to information is at an unprecedented level, the ability to discern good information from bad has not kept pace. If misleading information is increasingly easy to produce, the hope is that educating people about how it is produced, spread, and made effective may limit its detrimental impact on society. The result is a myriad of theories and playful interventions that aim to

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improve media and allied literacies (Literat, Chang, Eisman, & Gardner, 2021).

Prior research indicates that inoculation theory is the prevailing communication theory for games-based interventions in this domain. Inoculation theory's core premise in this context is that exposure to small doses of misinformation or disinformation, including the ways in which it is produced or spread, should help increase a player's resilience to it beyond the game world. Although several studies by theory champions (Traberg, Roozenbeek, & van der Linden, 2022) and others (Iyengar, Gupta, & Priya, 2023) demonstrate generally favorable results, some replication studies debate its efficacy (Modirrousta-Galian & Higham, 2023). Given that inoculation theory may not work for all contexts and designs, this work set out to identify additional theoretical behavior change models that may offer alternative or compliment to prevailing approaches. It also provides an analysis of the ways in which these game designs employ these theories.

Complimentary work has been done in content analysis generally (Dejong 2023) and in examining psychological aims (Roozenbeek, et al, 2022) in existing games. This work extends the potential efficacy of such research by offering a fresh lens on the communication theories that have proven effective in non-game contexts and may offer similar efficacies to those witnessed through inoculation theory.

The societal risks of confusing good information from bad abound. They range from large-scale political radicalization (Bennett & Livingston, 2020; Piazza, 2022; Johnson, 2018) to poor decision-making for personal health (Swire-Thompson & Lazer, 2019). Current approaches aim more widely at addressing general information competencies that can be applied to a variety of domains. Essentially, these efforts focus on helping their users develop persistent skills in distinguishing useful information from the myriad of poor information sources.

## 2. Methodology

Communication theories abound on the pragmatic approaches to solicit healthy behavior change. These theories serve as a critical lens to examine the theoretical aims of persuasive media content. By examining and applying these theories, it is hoped the lessons learned from previous work can be applied to game design. While many of these theories were not developed specifically for games, they offer proven perspectives on behavior change for media consumers. Hence the researchers chose two communication theories commonly applied to behavior change interventions, these are transportation theory and excitation transfer theory. These theories are the most commonly researched in both a behavior change and games context.

This work extends the research team's prior work (Grace and Liang, 2023) in comparing transportation theory and inoculation theory. Where the prior work contrasted the storytelling focus of transportation theory with the repeated exposure theory in inoculation theory, this new work aims to analyze a set of games from the lens of two narrative focused theories. Both transportation theory and excitation transfer theory are widely published and applied theories in behavior change through communication. A review of literature across relevant domains indicates limited analysis of either theory to the design and implementation of game-based interventions.

Instead of treating each game as a discrete design uniquely tailored to the goal of eliciting change, this paper aims to examine how these games intersect with previous research in applying communication-driven change. It is hoped that by identifying the ways in which these games adopt elements of common communication theory, a collection of generalizable observations may result in further effective development. The method here is thus synthesis through comparison, yielding a kind of Venn diagram at the intersection of existing implementations, design intention and communication theory. This methodological approach is more common to field studies like film and game studies than traditional sciences. It is used as an approach to creating new theory from observation. Such a method combines the key elements of user interface heuristic evaluation (Nielsen, 1992) with close readings commonly referred to as well-played analyses (Bizocchi and Tanenbaum, 2011). Doing such close readings of games as texts supports narrative structural analysis, where heuristic evaluation supports evaluation of interactions and their design.

This effort is particularly instrumental in helping to unify somewhat disparate efforts in addressing a large-scale systemic problem. Given that disinformation and misinformation pervade the worlds' most significant problems, from climate change to health, seeking generalizable patterns from the effective design and development of such games seems valuable. It is a way of interpreting a variety of individualized efforts toward the singular goal of identifying patterns for continued, generalizable success for future developers. This mixed methods approach, applies theoretical frames to existing, popular game designs offering patterns from the lens of each. In the least, a foundational examination of the overlap of theoretical frames and game design intention should prove useful for future development.

## 2.1 Excitation Transfer Theory:

Excitation-Transfer Theory (Zillmann, 2008) focuses on emotional response and multiple media exposures. The theory explains how the emotions generated from one exposure to a media experience may transfer to another exposure, resulting in an amplified emotional response. The notion employs the concept of amplified emotional response, where each subsequent exposure, informed by prior responses, elicits greater response. By analogy inoculation theory is based on small dose exposure similar to biological inoculation. Excitation theory is more akin to classical conditioning (Kehoe & Macrae, 2002), spread across multiple media exposers and across multiple emotional responses. In the context of games, the theory suggests that the anger of being thwarted by an in-game enemy, may solicit a heightened emotional response in later analogous positive or negative situations. If that in-game enemy beats the player they may feel more anger, if they see that enemy lose, they may feel more excited at the enemy's lost. The core notion is simply that the emotional response is transferred not only immediately following the experience, but upon similar contexts that elicit comparison from the player. In this context, if misinformation or disinformation is the in-game enemy, the emotions associated with them may transfer to real world positive and negative media experience.

Unique to excitation transfer theory is this notion of emotional transference. Most interestingly, the initial emotional response may not be of the same character as the first. A player, in this context, may feel heightened joy by doing better in a round similar to what had previously angered them. It's further evidenced by the perceived familiarity of emotional transference and analog experienced in widely disparate narratives and mediums. The theory implies that an experience need not emulate the mis/disinformation environment to trigger appropriate emotional response in the player, only that the transference is aligned.

Essential to the successful application of this theory is the notion of an excitation threshold. This threshold is understood by a single rule, the subsequent exposure to excitation-transfer stimuli must not be so great that the initial excitation has failed to resonate. That is, if the emotion of gameplay is too far removed from the everyday experience, the opportunity for a second, greater excitation may be lost. Generally, excitation thresholds are roughly structured into matriculation schedules like many leveling systems common in many digital games. Such leveling systems offer the player increased challenge upon success are one element of the excitation structure. In the context of this work, its important is the facility of those leveling systems to offer increasing positive or negative emotional response tethered to an excitation threshold. For this delicate balance in games, positive psychology's flow theory (Nakamura & Csikszentmihalyi, 2002) may prove useful as demonstrated previously (Chen, 2007).

## 2.2 Transportation Theory Overview

Transportation theory, or sometimes Narrative Transport Theory, is a widely used approach in communication to modify behavior. The fundamental principles of transportation theory underscore the influence of a captivating narrative situation on the attitudes and interests of individuals consuming media (Green, Brock & Kaufman, 2004). It is commonly presented as a means of instilling a set of conforming values. According to this theory, employing empathetic storytelling as a basis can elicit persuasive emotions towards the relatable subject depicted in the media. Essentially, the audience, player, or observer of the media can be transported into the values, preferences, and aversions presented in the story. These experiences are generally classified as either empathetic or involving mental imagery. Compelling examples of transportation theory in media research range from the specifics of sun safety (Andersen et al. 2017) to the general efficacy of using emoji in text messages (Willoughby & Liu, 2018).

Transportation theory provides a theoretical framework to understand the persuasive effects of entertainment media (Green et al, 2004). The notion of transportation involves enabling individuals to immerse themselves completely in a single narrative or story, experiencing intense cognitive and emotional engagement. This immersive experience can subsequently lead to changes in people's real-world values, beliefs, attitudes, and behaviors, aligning with those portrayed by the media products they consume (Green et al, 2004). In theory, people are more likely to change their opinions when transported into a compelling story because of the narrative's power to persuade implicitly or explicitly. The effect of transportation has been determined in health communication, social issues, and consumer contexts (Van Laer et al., 2014). For instance, narrative videos have been identified as playing a significant role in encouraging viewers to take breast cancer screening and smoking cessation (Williams et al, 2011). Given some video games' narrative emphasis and high visual appeal, transportation effects are worthy of further examination.

Furthering this foundation, Van Ler et al. (2021) adds that an individual must empathize with the characters and that the story must be imaginative to engage its audiences. While little has been discussed about this theory formally applied to game design in academic literature, the core concepts are evident in designer intentions. In many games, including the ones analyzed in this context, players are either assigned an empathetic role to embody or presented with a narrative framework that contextualizes the in-game challenges within a story. Common narrative situations in this context might include being a fake news detective (Junior, 2020), working as a reporter balancing sensationalism with appeal (Trial Day, 2020) or even creating a fictitious town with characters who are subject to the player's fake news (Roozenbeek & van der Linden, 2020). It is also worth noting that while not all games offer a narrative frame, it has been argued that narratives are innately constructed as part of play (Grace, 2019).

## 2.3 Game Selection and Analysis:

For this iteration of the work, the researchers identified 25 playful interventions, produced between 2017 and 2023, specifically focused on misinformation or disinformation that were analyzed by 5 trained content coders. 10 of the games were primarily produced in the United States, 5 in the United Kingdom, 2 in Australia with one each in Austria, German, India, Japan, Romania and South Korea. 20 of the games were available in English, five were not available in English. These games were available in 18 different languages. 17 of the games were produced with affiliation of a college or university researcher. The remainder were produced primarily by a governmental organization (e.g., the US Department of State's Harmony Square and Cat Park), media organizations (e.g., Canadian Broadcasting Corporation's Reporting 101: Minecraft mod ) and even an individual (e.g., Amanda Warner's Fake It To Make It). A subset of these had at least one peer-reviewed publication outlining design decisions and media intervention strategies by the producing team.

The list was further narrowed for games, lacking a wide release, publicly playable versions, or produced as a student thesis. The five remaining games were chosen as a one-fifth representative sample of the remaining balance of goal, format, and structure. This includes an analog game, LAMBOOZLED! (Literat et al, 2021), a game by a government agency, Breaking Harmony Square (aka Harmony Square), a non-US derived game, FakeYou! (Clever et al, 2020), an independent developer game , Fake It To Make It (2017), and an academic research game, Factitious (Grace.L. & Hone, B, 2019). Only one game, Harmony Square, explicitly references a communication theory in its design (inoculation theory). All games had at least one peer-reviewed article published by the creator, while the exception, Fake It To Make It, had at least one peer-reviewed paper assessing its design (Urban et al, 2018) and provides ample documentation on design motivation and frame on its website. The complete list of games reviewed links to the play and their instructions are available at a website maintained by the researchers at https://journalismgames.org/.

To conduct the review, three researchers analyzed the games independently after being trained to identify 35 attributes. These attributes included simple observations like the number of players required, the length of each game round, and the presence of sound effects to more complex design observations like detecting the presence of integrated performance assessment (e.g., presence of a pretest-posttest), identifying feedback systems (e.g. is the player provided both negative and positive feedback) , and the key game verb (e.g. match, remove, etc.). For this research the most salient attributes by recording number are game goal (12), game initial instructions (13), primary game intent (17), secondary intent (18), game verb (20), increasing challenge (25), positive feedback (27), negative feedback (28) length of round (30) and number of rounds in complete game (31). These analyses were conducted independently by each researcher then aggregated to produce the following qualitative observations.

## 3. Game Observations by Theory: Excitation Transfer Theory

### 3.1 Excitation Transfer Theory: Harmony Square

Harmony Square is explicitly designed around the narrative fiction of the player as Chief Disinformation Officer. The player's goal, to create chaos in the fictitious town of Harmony, is the central player objective. It is witnessed through the responses of a variety of non-player characters (NPC) who both provide game feedback and progress the narrative. Breaking Harmony Square offers four different levels through which the player matriculates: trolling, emotion, amplification, and escalation. Successful completion is designed to create a favorable (aka positive) emotional response to the work the player has completed. Players level from one dimension of mis/disinformation campaigns to the next (e.g., from amplification to escalation).

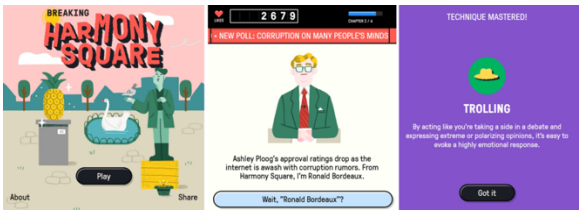


**Figure 1: Harmony Square game screens.**

By positive feedback system rewards players for creating fake news. Hence the player may feel excited to create fake news. The positive affect of an exciting game experience may lead to more favorable attitudes about the activity of sowing discord. This outcome is opposite the game's intention. Alternatively, the positive attitude created might also inspire player interest in media literacy education, which may support the game's intention.

From the frame of excitation transfer theory, structurally the 4 levels of game play each have an emotional threshold. The excitation response in the final phases is best tied to the theory's sense of increasing threshold. If the player's emotions are related to the scale of their impact, amplification and escalation are likely to provide the greatest amount of excitation transfer. The trolling and emotion response levels also support emotional response, but from the theory the ideal would be negative emotional experience, not positive. Inverting the emotions from positive to negative, or from the joy of breaking Harmony Square, to repairing it might result in more useful excitation transfer.

## 3.2 Excitation Transfer Theory: Fake It to Make It

Fake It to Make It, uses common strategies to motivate people to continue playing, including offering quicker, more poignant feedback, greater emphasis on in-game goals, and increased sense of progress. The game uses a set of relatively common feedback and progress indicators including a goal orientation which serves as a challenge mode selector (e.g., $200 USD, $400 or $1000 financial goals mapping to easy, medium, and hard) and score system expressed as credibility.

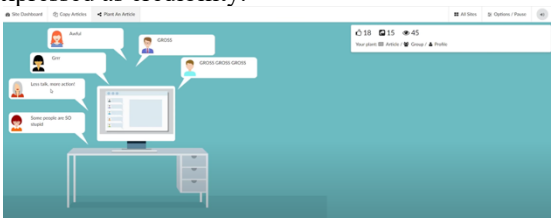

**Figure 2. Fake It To Make It game**

The value of emotional engagement for these common conventions in games has been widely interpreted. Instead, the opportunity to excitation transfer needs to be examined. As is common to games in which the player's positive emotional response is tied to furthering the problem, Fake It To Make It places positive emotion with perhaps the wrong task. It can be argued that from an excitation-transfer theory frame, the game may inspire positive emotions toward learning more about the industry of misinformation production. That is, it may be more effective at inspiring emotional curiosity about the way such industries work than inspiring detection of real-world misinformation.

## 3.3 Excitation Transfer Theory: FakeYou!

FakeYou! is an image-based game that aims to strengthen consumers' resilience toward fake news. In this game, players are tasked with creating believable headlines for newspaper article images. Participants must identify the correct headline among three options, one of which is the original headline while the others are provided by two opponents (Clever et al., 2020). The researchers refer to this as a "learning by doing" or "learning by playing" strategy.

Given that the game designs two primary goals for a player in the game, including creating a trustworthy fake headline for a given newspaper article image and identifying the correct headline of one image by choosing one of three options. The game allows people to be exposed to media stimuli in both textual and image formats. With a higher visual appeal of the image, the game can enhance players' emotional reactions during the gameplay. As case study in excitation, FakeYou!'s unique image and emotion loop are particularly novel for analysis. This is because the players' emotions can evolve upon subsequent exposers to the same image. The emotional threshold can be adjusted with the same basic stimuli, especially with increased emotional tension added to headline text.

**Figure 3. FakeYou! game**

Likewise, the game asks players to shift their roles from creating headlines of fake news to identifying

correct headlines in a short period. Consequently, players' emotions may shift according to the sequence of levels and the player's role of creating or identifying misleading information. This means that the player receives a two-sided set of emotions, one related to positive emotions as producer and as person detecting them. The negative emotions are also designed with the same symmetry, leaving players upset in failing to produce believable content and failing to recognize it. For controlled study, this game structure provides fertile ground for replicating efficacy analysis

The game three player setup for simultaneous competition may also encourage players to increase their level of cognitive and emotional engagement. FakeYou! is highly likely to expose players to both enjoyment and hostility, which can be heightened or diluted depending on the player's performance in the previous round of the game. The structure of the game works well for adjusting excitation thresholds.

### 3.4 Excitation Transfer Theory: LAMBOOZLED!

LAMBOOZLED! is a news literacy education game designed for middle school and high school students. It employs the self-described "learning by playing" strategy by encouraging students to think comprehensively and critically about fake news, which triggers pleasurable emotions. Such an approach can make students more willing to get a media literacy education than traditional lectures. Students are rewarded when detecting more fake news in the game. Through multiple rounds of gameplay, players learn how to appraise authorial bias and apply Evidence Cards to deploy both declarative and procedural knowledge, which can enhance its persuasive effects (Literat et al, 2021).

However, the game creates a fictional environment (i.e., the sheep town of Green Meadows) as the setting of the game, in which fictional sheep news, rather than real-world news stories, have been adopted as learning materials. The game's developers argue that it allows players to focus on key features and skills without the distractions of politicized and objectively true or false real-world news (Literat et al, 2021). This is important in positioning such work for use in classrooms, where the politics may trump educational goals. From an excitation transfer perspective, the important attribute is not realism perse, but the relatability of the transfer intended content. While many of the games in this context aim to provide realistic or literal portrayals of the problem, LAMBOOZLED!'s frame is fiction by analogy. With a younger demographic aim than most of the games in this domain, there may be tension in converting the relatively unabstracted fiction to the real world, but excitation transfer theory emphasizes the associated emotion response over the narrative analogy. The design of the game's straightforward notion of fake news as the enemy to which the player's emotions are tied, links well to excitation transfer theory.


**Figure 4. LAMBOOZLED! card game photographs**

### 3.5 Excitation Transfer Theory: Factitious

The simple design of Factitious offers some complication when evaluating the game relative to any narrative focused communication theory. The goal of Factitious is simply for players to immediately discard news they consider fake or keep news they really believe. They complete these actions with a left (discard) or right (keep) swipe for each article presented. The game offers no narrative or characterizations, and instead simple tasks the player with this challenge. excitation transfer theory.

Structurally, the game tasks the player with the same basic decision repeatedly, much like a test. This means that the excitation threshold is likely relatively flat through all 30 rounds of the game. The only antagonist in the game is the game system, which may operate well as an analogy to the on slot of misleading information provided by the Internet.

However, from an excitation transfer theory perspective, the game would actively adjust the ambiguity of articles based on player performance. This adaptive strategy, responding to threshold by player performance is an obvious opportunity to improve the likely efficacy of this intervention. If for example, players decide quickly, the amount of time they are offered for the next decision may be lowered to shape excitation threshold. Likewise, the difficulty in identifying the article could be adjusted based on real time performance. If a player does well, the game could provide easier or harder articles to maintain threshold.

Likewise, from the theory's perspective, the game could benefit from characterization, perhaps framing the game's tasks as a job role (e.g., being a newspaper fact-checker) and providing narrative frame or

characterizations (e.g., thwart the boss of fake news production).

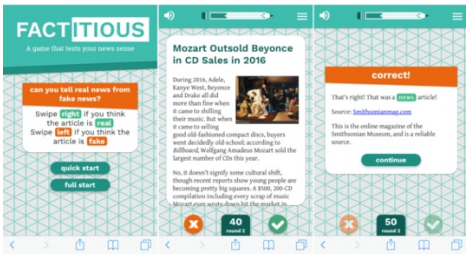


**Figure 5. Factitious game**

## 4 Game Analysis by Theory: Transportation Theory

### 4.1 Transportation Theory: Harmony Square

Breaking Harmony Square's reliance on role play as the Chief Disinformation Officer and the evolving narrative about disrupting the town of Harmony help support its potential efficacy via transportation theory. The design meets the fundamental characteristics of a transportation theory-informed design. There is a straightforward narrative, characters with which to experience the narrative, and an effort toward engaging story. This, in theory, should increase transportation through accessibility and involvement. Players are not only given a role, but they are also given a scenario that contains narrative elements familiar to them. It is reasonable to interpret, and as evidenced in their own research (Roozenbeek & Van Der Linden, 2020), that players are engaged emotionally and cognitively in the game's fiction.

However, there is one complication. The player's empathies are set opposite the researcher's goals. Instead of aligning the protagonist of Harmony Square to thwarting the spread of disinformation, the player practices the behavior of disrupting democracy through disinformation. This runs contrary to the empathetic elements of transportation theory. Since empathies are not aligned with the citizens of the town being shaped by the player, the game is better structured to align empathies with disinformation spreaders through the narrative, its characters, and the player's role. This is further emphasized by the feedback loop of successful play. The humor of the game's experience, including the reactions of NPC characters and scoring as positive feedback, increases. The better the player spreads disinformation, the more they are rewarded and the more narrative they receive.

Notably, the empathetic attachment necessary for transportation theory is toward those who share disinformation, not those who are adversely affected by it. The player's role is not one of burden but instead one of honor and a source of joy. No negative repercussions are associated with assuming the roles and responsibilities of spreading disinformation.

This is particularly important when considered in the context of transportation theory's reliance for counter arguing. At the start of the game, had players been offered roles on either side of the disinformation dichotomy, the game may have supported counter-arguing more completely. A negative relationship to the player's goals could also be followed by employing other narrative techniques like negative consequence or backstory. Lucas Pope's Republia Times (2011), for example, tasks the player with a somewhat similar responsibility, but indicates that the player is doing this work because their family will suffer otherwise. The entertainment of spreading false information is thus backgrounded with negative associations and dissociated from innocent fun.

From observation, this game might better meet its design goal by tasking the player with protecting the fictious town from the threat of disinformation instead of creating it. It might also benefit from opportunities to discuss the game experience among players as other games employ. Whether facilitated or encouraged through reflective community conversation, such discussions may assist its counter-argument deficiencies. This should allow players to engage more consistently in the narrative, allowing more overlap between the game's fiction and the real world. Multiple episodes of the experience encouraging more profound character development and further investment in the game's narrative may assist transportation.

### 4.2 Transportation Theory: Fake It to Make It

Fake It To Make It begins with character selection and matching those characters to a goal. It attempts to visualize progress and personify the creation of misinformation source. Like other games, the player's empathies and goals are aligned with the producers of misinformation and other fakes sources. In the game success and failure are tied to financial success and little of the discord produced through the player's actions are shown. Hence one side of the fiction is perpetually apparent to the player – the side of the producer. What's missing is the narrative of the effect on the world consuming the media produced. For these reasons the game does well to affirm transportation theory through empathies for misinformation content producers. The player's role play is both an emotional and logical journey toward acquiring money. However, this simulation develops an understanding

entirely focused on the production and leaves little space for understanding the effect of content consumers. It helps players understand the elements of fake news production but requires them to invert this understand to convert the knowledge into consumption habits. As is common with some games, the experience is like sharing a recipe for poison and then asking those who learned the recipe to detect it in the non-game world.

### 4.3 Transportation Theory: FakeYou!

With FakeYou! game players are expected to create a credible headline for the provided newspaper article image. In addition, players are tasked with should identifying the correct headline of an image by choosing one of three options, where one headline is the original headline of the newspaper article, and the others are given by two opponents (Clever et al, 2020).

Players can construct narratives among themselves or through the sequential fake headlines they produce. This supports transportation theory, where a player can create a series of themed headlines that tell a story or follow a narrative arc. Skilled players may use this strategy to blend truth and lies, enhancing the potential for transportation theory. Ultimately however, without rules guiding such behavior, such a trajectory does not obviously align the game with the benefits of transportation theory.

### 4.4 Transportation Theory: Lamboozled!

As an analog card game, the game primarily relies on an imagined narrative rather than character development. The main storytelling element revolves around a fictional backstory that shapes the game's world. This narrative serves as a captivating aspect to enhance the gaming experience. The game designers describe it as a "deck-building card game set in the fictional sheep town of Green Meadows, where some news stories aim to deceive you!" (Literat, 2021).

The objective for players is to help the sheep citizens of Green Meadows distinguish between truth and falsehood by presenting compelling evidence. The game maintains its fictional aspect through the mental images players create as they engage in the evidence-building process and observe the illustrations on the cards. Once the game's the personifications and light fictions are removed, the core scenario remains a simulation designed to impart the various layers of journalism and news literacy strategies. This core is a clear linear adaptation of the real world, one that should translate well to the requirements of effective transportation theory.

### 4.5 Transportation Theory: Factitious

Unlike the aforementioned games, Factitious is relatively bereft of elements for transportation theory. The game offers neither narrative nor character. This obvious lack of narrative precludes the games from inclusion. Just as Lamboozled is the only analog game in this analysis, Factitious is the only game that evades narrative entirely. Players are only given feedback on their progress and the ratio of correct and incorrect decisions. Unlike the other games, players are not given any backstory to the task. Experientially, this is also the shortest gameplay experience of the set. Games of Factitious last 2-3 minutes, where the other games are often 20 or more minutes.

Where Factitious could effectively embrace transportation theory is in the implied narrative of social media. Beyond adding a narrative layer which would likely lengthen the game, there's an opportunity to involve real-world social media to increase empathy response. If the game allowed players to compete against user generated content, it might support a better sense of transportation theory empathy like both LAMBOOZLED! and FakeYou!. However, such content generation also works contrary to excitation transfer theory.

## 5. Conclusion and Discussion

The core goal of this work was to understand how examining games through a communication theory lens might shape an understanding of design efficacy, focus design decisions, and improve impact. This work furthers prior published work on the intersection of media theory for behavior change. Other than an increasing focus on inoculation theory in this context, there remains little research examining prevailing communication theory in the context of games, education, and intervention to prevent the spread of misinformation and disinformation.

From this analysis it becomes clear that there is perhaps a dichotomy of intention. From both excitation transfer theory and transportation theory, two games seem better aligned to inspiring empathies and emotions that favor misleading information producers. These two games, Fake It Take Make It and Harmony Square, could perhaps be perceived as having more potential impact in inspiring interested in the topic than in creating resilience to their strategies. This is because from an excitation-transfer frame, the emotional responses designed in both games frames the victims of misleading information as obstacles not allies. From a transportation theory perspective, the empathies inspired are not for those combatting

misleading information, but instead for those masterfully producing it.

Two of the games, FakeYOU! and LAMBOOZLED have elements considered appropriately abiding by excitation theory and transportation theory. Both games explicitly describe their approach as a learning by playing or doing modality, which is contrasted with games in which the playing or doing is not what the designers want players to do (e.g., make more misleading content). This clear aligned of task is likely why the narratives map well to the theories. Factitious, lacks the narrative or emotion depth to meet the needs of either theory well. In all cases, the players are exposed to small doses of mis/disinformation, but the distinction is with their adherence to excitation transfer and transportation theory.

The Venn diagram of the intersection of all three theories, may then be at the intersection of a game that exposes players to doses of misinformation (inoculation theory), at which they are increasingly emotionally averse (excitation transfer theory) and for which their empathies are oriented against those who spread or create such information (transportation theory).

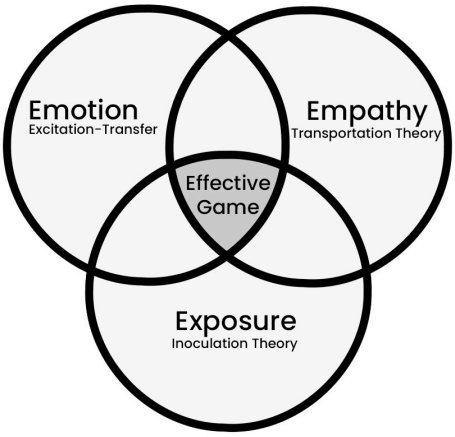


**Figure 6. The Intersection of 3 dominant behavior change communication theories to create effective game interventions**

Such a game seems to fit well within the intersection of all three theories, proving an experience for which all three theories are in alignment. As figure 6 diagrams, the intersection of the theory informed game implementation would include the dimensions of emotion, empathy alignment and exposure that other media strategies have employed.

While the specifics of these designs are best left to the creative practice of game design, the aim is to provide a theory and observationally informed model from which other researchers may both design future work and perhaps evaluate it. The research determined that this is at the apex of exposure to mis/disinformation, creating an appropriate emotional response to it and fostering empathy toward its effects. This study is admittedly limited in scope and could benefit from a larger data set, more formal content analysis, designer interviews and efficacy analysis among users experience variously tuned versions of these games. Future work would clearly benefit from broader empirical analysis and heuristic evidence through production of games explicitly designed using these intersections.

## References


Ahmed, M., Dov Bachmann, S. D., Martin, C., Walker, T., Van Rooyen, J., & Barkat, A. (2022). False information as a threat to modern society: A systematic review of false information, its impact on society, and current remedies.

Andersen, P. A., Buller, D. B., Walkosz, B. J., Scott, M. D., Beck, L., Liu, X., ... & Cutter, G. (2017). A randomized trial of an advanced sun safety intervention for Vacationers at 41 North American Resorts. *Journal of health communication*, *22*(12), 951-963.

Bennett, W. L., & Livingston, S. (Eds.). (2020). *The disinformation age: Politics, technology, and disruptive communication in the United States*. Cambridge University Press.

Biloš, A. (2019). Emerging focus on fake news issues in scientific research: a preliminary meta-analysis approach. *Interdisciplinary Management Research*, *15*, 1139-1150.

Bizzocchi, Jim, and Joshua Tanenbaum. "Well read: Applying close reading techniques to gameplay experiences." *Well played 3.0: Video games, value and meaning* 3 (2011): 289-316.

Breaking Harmony Square [Computer Software]. (2019). https://harmonysquare.game/en

Chen, J. (2007). Flow in games (and everything else). *Communications of the ACM*, *50*(4), 31-34.

Clever, L., Assenmacher, D., Müller, K., Seiler, M. V., Riehle, D. M., Preuss, M., & Grimme, C. (2020, October). FakeYou!-a gamified approach for building and evaluating resilience against fake news. In *Multidisciplinary International Symposium on Disinformation in Open Online Media* (pp. 218-232). Springer, Cham.

DeJong, S. (2023). Playing With Fake News: State Of Fake News Video Games. *The International Journal of Games and Social Impact*, *1*(1), 94-111.

Fake it To Make It [Computer Software]. (2017). https://www.fakeittomakeitgame.com/

Factitious [Computer Software]. (2020). http://factitious-pandemic.augamestudio.com/#/

Forbes, S. (2002). *Web of deception: Misinformation on the Internet*. Information Today, Inc..

Grace, L. (2019, July). Hauntalogy, the Penumbra, and the Narratives of Play Experience. In *25th International Symposium of Electronic Art (ISEA), Gwangju, South Korea*.

Grace, L., & Hone, B. (2019). Factitious: Large scale computer game to fight fake news and improve news literacy. In *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1-8).

Grace, L., & Liang, S. (2023). Examining Misinformation and Disinformation Games Through Inoculation Theory and Transportation Theory. Proceedings of the 56th Hawaii International Conference on System Sciences (pp 4691-4700).

Green, M. C., Brock, T. C., & Kaufman, G. F. (2004). Understanding media enjoyment: The role of transportation into narrative worlds. *Communication theory*, *14*(4), 311-327.

Iyengar, A., Gupta, P., & Priya, N. (2023). Inoculation against conspiracy theories: A consumer side approach to India's fake news problem. *Applied Cognitive Psychology*, *37*(2), 290-303.

Johnson, J. (2018). The self-radicalization of white men:"Fake news" and the affective networking of paranoia. *Communication Culture & Critique*, *11*(1), 100-115.

Junior, R. B. (2020). The Fake News Detective: A Game to Learn Busting Fake News as Fact Checkers using Pedagogy for Critical Thinking.

Kata, A. (2010). A postmodern Pandora's box: anti-vaccination misinformation on the Internet. *Vaccine*, *28*(7), 1709-1716.

Kehoe, E. J., & Macrae, M. (2002). Fundamental behavioral methods and findings in classical conditioning. *A neuroscientist's guide to classical conditioning*, 171-231.

Literat, I., Chang, Y. K., Eisman, J., & Gardner, J. (2021). LAMBOOZLED!: The design and development of a game-based approach to news literacy education. *Journal of Media Literacy Education*, *13*(1), 56-66.

Modirrousta-Galian, A., & Higham, P. A. (2023). Gamified inoculation interventions do not improve discrimination between true and fake news: Reanalyzing existing research with receiver operating characteristic analysis. *Journal of Experimental Psychology: General*.

Nemr, C., & Gangware, W. (2019). *Weapons of mass distraction: Foreign state-sponsored disinformation in the digital age*. Park Advisors. https://www.state.gov/wp-content/uploads/2019/05/Weapons-of-Mass-Distraction-Foreign-State-Sponsored-Disinformation-in-the-Digital-Age.pdf

Nielsen, J. (1992, June). Finding usability problems through heuristic evaluation. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 373-380).

Piazza, J. A. (2022). Fake news: the effects of social media disinformation on domestic terrorism. *Dynamics of Asymmetric Conflict*, *15*(1), 55-77.

Pope, Lucas. Republia Times [Computer Software]. (2012). https://dukope.com/trt/play.html

Roozenbeek, J., Suiter, J., & Culloty, E. (2022). Countering misinformation: Evidence, knowledge gaps, and implications of current interventions.

Roozenbeek, J., & Van Der Linden, S. (2019). The fake news game: actively inoculating against the risk of misinformation. *Journal of risk research*, *22*(5), 570-580.

Roozenbeek, J., & van der Linden, S. (2020). Breaking Harmony Square: A game that "inoculates" against political misinformation. *The Harvard Kennedy School Misinformation Review*.

Swire-Thompson, B., & Lazer, D. (2019). Public health and online misinformation: challenges and recommendations. *Annual review of public health*, *41*, 433-451.

Traberg, C. S., Roozenbeek, J., & van der Linden, S. (2022). Psychological inoculation against misinformation: Current evidence and future directions. *The ANNALS of the American Academy of Political and Social Science*, *700*(1), 136-151.

Trial Day [Computer Software]. (2020). https://erencaylak.itch.io/trial-day

Urban, A., Hewitt, C., & Moore, J. (2018). Fake it to make it, media literacy, and persuasive design: Using the functional triad as a tool for investigating persuasive elements in a fake news simulator. *Proceedings of the Association for Information Science and Technology*, *55*(1), 915-916.

Van Laer, T., De Ruyter, K., Visconti, L. M., & Wetzels, M. (2014). The extended transportation-imagery model: A meta-analysis of the antecedents and consequences of consumers' narrative transportation. *Journal of Consumer research*, *40*(5), 797-817.

Verstraete, M., Bambauer, D. E., & Bambauer, J. R. (2021). Identifying and countering fake news. *Hastings Law Journal*, *73*.

Williams, J. H., Green, M. C., Kohler, C., Allison, J. J., & Houston, T. K. (2011). Stories to communicate risks about tobacco: Development of a brief scale to measure transportation into a video story–The ACCE Project. *Health Education Journal*, *70*(2), 184-191.

Willoughby, J. F., & Liu, S. (2018). Do pictures help tell the story? An experimental test of narrative and emojis in a health text message intervention. *Computers in Human Behavior*, *79*, 75-82.

Zillmann, D. (2008). Excitation transfer theory. *The international encyclopedia of communication*. Wiley