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Elaborating the role of narrative and Self Determination Theory (SDT) in video game design research

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Abstract:

Narratives, defined as stories involving two or more events arranged in a chronological or causal sequence, are fundamental and ubiquitous characteristics of human communication and serve as an integral feature of many video games. Moreover, narratives can be understood in nuanced ways through the lens of Self Determination Theory (SDT). Yet, the intersection of SDT and video game narratives has been surprisingly underexplored. This article reviews research on narrative media and examines how narratives can be integrated into games from the perspective of SDT and potential boundary conditions. We then explore how concepts from narrative theories and SDT can be integrated. The goal of this integration is to help guide future game design and identify new questions for future research related to: (1) the integration of parable narratives in video games, specifically parable narratives featuring characters' personal transformation and growth, and (2) predicting which video games people choose and prefer. We argue that scholars working with narrative theories and SDT can collaborate to advance video game research.

Research Highlights:

- Narratives in video games can directly support or thwart basic psychological needs, thereby influencing players' motivation and emotion.
- Parable narratives featuring characters' personal transformation and growth, especially when well-integrated into video games (e.g., using avatars players identify with), may help promote healthy human development and well-being.
- Models that integrate narrative theories and SDT may help explain which video games people choose and prefer to play.

1. Introduction

Video games have transcended their relatively simple, entertainment origins and evolved into a powerful and complex medium capable of captivating and inspiring players on profound levels (Paul, 2023). In the burgeoning landscape of video game design and HCI research, the quest for creating more engaging and meaningful player experiences increasingly benefits from adopting an interdisciplinary approach. Although application of Self-Determination Theory (SDT) has become prevalent in HCI and video game research (Ryan & Deci, 2000), the intersection of SDT and *narratives* – one of the most ubiquitous and fundamental aspects of human communication (Barthes, 1982) and an integral feature of many games – remains a relatively understudied area. This article reviews the limited extant literature on SDT and narratives, and then explores ways further integration could significantly expand the field of HCI, particularly within video game design and research. After reviewing how these different perspectives align, we offer several specific points of new integration that could help inform ways that video games can serve as catalysts for promoting intrinsic motivation and well-being at multiple levels, for individual gamers and society (i.e., adopting a well-being supportive design perspective; Peters & Calvo, 2023).

2. Narrative Theories, Concepts, & Research

2-1: Definitions and Mechanisms:

Narratives are pervasive across media forms, encompassing a wide range of expressions from ancient fables to modern video game stories. At its core, a narrative is defined as two or more events arranged in a chronological or causal sequence, which together weave a coherent story. The principal components of any narrative are its characters and plot. Character development goes beyond the mere presence or naming of participants within a story. It includes narrative structural properties (Jacobs, 2002) (i.e., related to the overall architecture of a story) and becomes the driving force of a narrative (Surmelian, 1969). Character development can also serve multiple roles, both as internalized sources of information and beliefs (Green & Brock, 2000) (e.g., when players or audience members identify with a character), or as external sources of information (e.g., when players interact with characters via social modeling, a concept supported by Social Cognitive Theory (Bandura, 1991)). The plot, also referred to as the narrative discourse, is the mechanism through which the story is conveyed (Abbott, 2020). Plot organizes events into a logically unfolding series (Labov, 1972), guiding the audience through the narrative's complexities and nuances. Through this structure, narratives achieve their impact, drawing audiences into a story world and facilitating deeper engagement with video games.

Narratives possess a profound capacity to change cognition, attitude, and behavior. However, it is important to acknowledge that narratives, especially in the context of persuasion, have been employed for both positive and negative ends. While well-designed narratives have the potential to foster positive change and promote well-being, they can also be used for nefarious purposes. Extreme examples include government-sponsored narrative media designed to promote dehumanization, hate, and even violence toward outgroup members. Less than a century ago, the Nazi regime's use of persuasive narrative media to build solidarity and cooperation highlights the potential for media narratives to support human atrocities to an extreme

degree(O'Shaughnessy, 2017). As such, ethical designers of video game narratives carefully consider the potential for both positive and negative effects, including risks for inadvertently or unintended negative impacts, directly for players' well-being and indirectly for others(Sauer et al., 2015). By carefully considering the ethical implications at multiple-levels, game designers can strive to harness the power of narratives for good(Hillenbrand & Verrina, 2022).

Recent years have seen an uptick in theoretical exploration of narratives in pro-social interventions aiming to modify various attitudes and behaviors(Hwang & Lu, 2018; Lu et al., 2016; Lu et al., 2023; Murphy et al., 2015; Sousa et al., 2020). Among the multiple mechanisms helping to explain narrative persuasion effects, the concept of "*narrative transportation*" stands out as the most widely-supported(Green & Brock, 2000). This term describes the mental process by which individuals are absorbed into the story world, undergoing transformative experiences that can lead to lasting attitudinal and behavioral changes. Narrative transportation is a highly involving and integrative process that mobilizes both cognitive and affective resources. *Hellblade: Senua's Sacrifice* (Ninja Theory, 2017) serves as a powerful example of how video games can harness narrative transportation to deeply influence cognition, affect, and behavior. In this game, players embark on a dark and emotional journey with Senua, a Celtic warrior who battles psychosis to save the soul of her deceased lover. The narrative intricately weaves together Norse mythology and the protagonist's psychological experiences related to mental illness, creating a story that is both engaging, educational, and prosocial. Subsequently, research revealed that increased transportation into this game resulted in a reduced desire for social distance from individuals with mental illness.(Ferchaud et al., 2020)

To date, the assessment of narrative transportation has predominantly utilized survey methodologies, either as population-based survey research projects or as quantitative measurement instruments in experimental research projects. Self-report measures of narrative transportation were initially developed for college student populations before being adapted for a wider range of populations and contexts. For example, although the study of narrative transportation began with textual media and college age participants(Green & Brock, 2000), it has since expanded to encompass more diverse media formats, including video games, and for audiences at all developmental stages, from infants to seniors. The interactive and immersive nature of video games, in particular, has led to the adaptation of this concept from "*narrative transportation*" into "*narrative immersion*" to more specifically describe the experience of being immersed in the narrative world of video games, especially among children(Sousa et al., 2020). This evolution highlights the broad applicability and significance of both narrative transportation and immersion in shaping the experiential impact of narratives across different media, including the uniquely interactive environments of video games. To illustrate, a recently validated measure developed to assess players' experiences of video games (the Game Experience Questionnaire) includes narrative immersion as one of several standard components or aspects of game experiences(IJsselsteijn et al., 2013).

Another aspect of game experiences identified as a mechanism for narrative effect is *narrative engagement*, which is closely related to narrative transportation and encompasses four additional dimensions critical to narrative processing: narrative understanding, attentional focus, emotional engagement, and narrative presence(Busselle & Bilandzic, 2009). These four dimensions each relate to individual experiences with a narrative, going beyond transportation to include a more

comprehensive engagement with both a story and its characters. For example, *Final Fantasy VII* (Square, 1997) immerses players in a meticulously detailed fantasy world where they encounter complex characters. One such character, Sephiroth, experiences personal struggles and victories that greatly enhance the game's intriguing and emotionally engaging narrative for many players. This deep engagement is facilitated by the game's ability to seamlessly integrate the four dimensions of narrative engagement, allowing players to experience the story world as if they were a part of it themselves. Sephiroth's character arc, from a celebrated war hero to the game's primary antagonist or villain, is a good example of how video games can use narrative engagement to draw players into an evolving story, encouraging them to explore complex characters, fostering a connection that goes beyond the surface level. The game encourages players to empathize with these characters, deeply contemplate the narrative's themes, and, in some cases, incorporate aspects of the story into their own understanding of themselves and the world they inhabit outside of the game.

Other experiences associated with narrative engagement, such as suspension of disbelief, reduction of counterarguing (Slater & Rouner, 2002), and a decreased resistance to persuasion (Moyer-Gusé, 2008) represent additional mechanisms through which narratives impact adult audiences in general and gamers specifically (Moyer-Gusé & Nabi, 2010; Slater & Rouner, 2002). According to this line of research, when individuals set aside skepticism about story elements, more cognitive capacity becomes available for deep engagement with unfolding events. This deep engagement leaves less room for counterarguments or resistance to persuasive attempts embedded within the narrative. Essentially, narrative engagement consumes cognitive resources that might otherwise be used to scrutinize or challenge a narrative, leading to deeper absorption in the story and increased openness to persuasion. This absorption can result in the formation of ideas and beliefs consistent with the narrative, even after the transportation experience concludes. Such processes deepen narrative immersion, enabling individuals to engage with the story unfettered by doubt or mental resistance, thereby enhancing the narrative's persuasive potential. For example, the video game *Life is Strange* (Dontnod Entertainment, 2015) encourages players to become emotionally invested in the life of Max Caulfield, a photography student who finds out that she can rewind time. The game's episodic structure, combined with its focus on choice and consequence, encourages players to fully engage with the narrative, suspending disbelief and reducing counterarguments to the story's more fantastical elements. The game helps players navigate through Max's dilemmas and draws them into a web of emotional engagement and narrative presence so potent that, for many players, the distinction between game and reality blurs, leaving a lasting impact on their thoughts and beliefs consistent with the narrative experience.

Two more aspects of game experiences that have been identified as mechanisms for narrative effect are *enjoyment* and *flow*. Enjoyment, an affective quality of intrinsic motivation, is defined as pleasure or positive affect experienced during an activity that is derived directly or inherently from doing the activity itself (Moller & Deci, 2023). Flow is defined as a state of being fully immersed and involved in an activity. It has been referred to as an especially intense experience of intrinsic motivation, often associated with peak levels of performance (Jackson, 2023). It's worth noting that some video games that lack narrative, such as *Tetris* (Alexey Pajitnov, 1985), have reliably been shown to induce flow states, primarily by providing individually tailored optimal challenge (Moller et al., 2010). However, when video games do include narrative, despite

the nuanced conceptual differences between flow, narrative engagement, and enjoyment, empirical studies employing survey methodologies have often struggled to differentiate among these concepts. For example, narrative engagement and enjoyment are so interconnected that they often become indistinguishable when assessed through survey questionnaires (Sherrick, 2021). Similarly, researchers have reported very high correlations between scales designed to measure narrative transportation and narrative engagement, suggesting these constructs may explain overlapping variance in how individuals experience narratives (Lu, 2023). The choice between using the transportation scale and narrative engagement scales in research depends on the specific dimensions of the narrative experience that researchers aim to assess. For example, when consideration of participant burden requires reducing the length of a survey, scale choice might be guided by researchers' interest in understanding of audience responses to different narrative elements. Future research using longer, more comprehensive surveys, larger samples, and more sophisticated methods (e.g., computer adaptive testing and item response theory) could help dissect these subtle conceptual distinctions more effectively. Advances in neuroscience also offer promising avenues for exploring the differential impacts of narrative engagement, transportation, and flow on the brain, e.g., identifying distinct neural correlates associated with each (a strategy that has already been successfully employed to distinguish concepts from SDT) (Gold & Ciorciari, 2020; Vaccaro et al., 2021). By employing new methods and measures, game researchers could gain deeper insights into the cognitive and emotional processes underpinning narrative experiences, moving beyond self-reported data to uncover the unique contributions of each construct to the narrative experience, enriching our understanding of games and narrative psychology.

Another persuasive element of narrative involves the potential for deep bonds some players form with game characters, rendering the story more personally meaningful through interactions between the audience and characters. As previously discussed, various forms of engaging with characters exist, influenced by how much an audience member identifies with characters in a narrative. The degree to which players recognize and embrace a shared social identity with a character will vary among individuals, potentially amplifying or diminishing the process of narrative transportation. Moreover, other related factors that enhance a narrative's impact include making a character's experience more personal and fostering positive affect towards characters. This can be achieved through processes like interpersonal attraction, likeability, identification, and parasocial interaction (where individuals form one-sided relationships with characters as if they were real people). These elements contribute to a more engaging and emotionally rich narrative experience. *Persona 5* (P-Studio, 2016) is a great example of a video game where these elements contribute to a narrative experience that is both more engaging and emotionally profound. Psychologists propose that individuals' self-concept may temporarily align with that of characters within a narrative (Gergen & Gergen, 1988; McAdams, 2013; Polkinghorne, 1991; Talaifar & Swann, 2018). Consequently, it is plausible that audience members might oscillate their self-perception between their own and that of the characters in the story. For instance, in *Red Dead Redemption 2* (Rockstar Games, 2018), players might make choices that reflect their own values or explore decisions within the game's own moral framework. As they navigate Arthur Morgan's challenges and witness his development, they may see their morals and choices temporarily aligning with Arthur Morgan's character before switching back, leading to a profound personal connection. This dynamic engagement between the player's self-concept and

the narrative arcs of characters enriches the depth and emotional resonance of the gaming experience.

Among the various affordances of digital media, video games uniquely enable players to engage deeply with narratives through both character identification and creation. This process can transform the narrative experience into a personal journey by allowing players to select and/or craft their own *avatars* to be deployed in game worlds. Even more than inhabiting or roleplaying a character created by someone else, players who create their own character or avatar to resemble themselves or a desired self-image become co-authors of narratives, leading to a stronger sense of presence and connection (Yee & Bailenson, 2007). Avatar selection may also influence players' motivation and emotion. For example, research by Fox and Bailenson (Fox & Bailenson, 2009) showed that participants who embodied attractive avatars reported higher self-esteem and confidence. Research by Kim et al. (Kim et al., 2015), guided by SDT, found that offering players opportunities to customize their avatars in a video game (both in terms of the avatars' function and aesthetics) enhanced players' experiences of autonomy, control, and attachment to the avatar, experiences that helped explain immersion and enjoyment of those games. However, it is important to note that the influence of avatar selection or customization extends beyond narrative elements; that is, games can include avatar options without including a narrative. The studies cited above did not exclusively pertain to the narrative experience. This distinction underscores the need for future research that more clearly delineates which aspects of game design are directly driven by narrative, specifically, and which apply more broadly to gameplay, in general.

Relatable characters and avatars, whether customizable or not, often transform narrative experiences into a *personal journey*, especially within role playing games (RPGs). When players feel as though they have personally lived through the events depicted in a narrative, their perspectives on related events tend to align more closely with the narrative's portrayal. For instance, *The Last of Us* (Naughty Dog, 2013) encourages players to deeply engage with the story of Joel and Ellie, experiencing their survival and emotional challenges in a post-apocalyptic world. The game's narrative, enriched with vivid details and a compelling plot, has the power to blur the lines between game and reality. Themes of survival, loss, and human connection resonate deeply with players' real-life experiences. Players might relate to Joel's protective instincts and grief, or Ellie's struggle for identity and belonging, reflecting similar challenges in their own lives. This connection can make the narrative journey feel personal, as players see aspects of their experiences reflected in the characters' trials and growth, creating a more profound and emotionally engaging experience. This immersive experience enables individuals to engage deeply with the game's events by going through intense emotional experiences and actions that help form strong relationships with the characters (Grizzard & Francemone, 2018), potentially mirroring the impact of direct experiences.

2-2: Moderators of narrative influence:

One of the primary forms of narrative influence is *persuasion*; that is, to intentionally change an audience's attitudes or behaviors. Like any form of persuasive communication, narratives do not influence people uniformly. Multiple moderating factors can affect the strength and even the direction of narrative persuasion, particularly factors concerning the audience's individual characteristics. In fact, while narratives can be an impactful persuasive tool, the magnitude of

their effect can vary substantially depending on specific moderators (Oschatz & Marker, 2020; Shen et al., 2015; van Laer et al., 2019; Zebregs et al., 2015). Consideration of potential moderator effects, such as individual and contextual differences, is thus crucial for understanding the nuanced ways narratives influence audiences. Among these, four individual characteristics of audiences have been extensively investigated in narrative psychology. Their theoretical interactions with concepts from SDT are discussed to highlight their relevance and implications within the gaming context, especially. However, it is worth mentioning that most of these individual characteristics have not been empirically tested as moderators of game experiences, specifically, and SDT offers no explicit propositions (yet) on how these individual characteristics from narrative psychology relate to intrinsic motivation and well-being. The hypotheses we outlined below represent our attempt to conceptually integrate narrative psychology with SDT in the context of game design, but future empirical studies are needed to further explore these and other points of potentially fruitful integration.

Transportability refers to an individual's propensity to become deeply immersed in a narrative (Dal Cin et al., 2004), making narrative persuasion more potent for those naturally more transportable (Dal Cin et al., 2004; Mazzocco et al., 2010). In relation to SDT, players high in transportability can potentially satisfy their basic psychological needs more easily to the extent this individual characteristic allows them to become more deeply immersed and feel a deeper connection to the game's characters and world. For example, games like *The Elder Scrolls V: Skyrim* (Bethesda Game Studios, 2011) excel in offering vast, immersive worlds that can potentially captivate those with high transportability, especially, inviting them into full engagement with the narrative and environment. Conversely, players low in transportability may feel overwhelmed or disconnected from the game's expansive world, potentially leading to frustration of their basic psychological needs.

Need for Affect reflects an individual's inclination towards experiencing emotions, acting as the affective counterpart to the Need for Cognition (Maio & Esses, 2001). Those high in need for affect are often more susceptible to narrative transportation and, consequently, more influenced by the narrative's persuasive effects (Appel & Richter, 2010). Games that feature emotional storytelling, such as *To the Moon* (Freebird Games, 2011), are likely to resonate particularly well with players who possess a high need for affect. This type of enhanced engagement aligns with SDT and supports the need for relatedness, as players more easily develop emotional connections with characters and the narrative, enhancing empathy and bonding. On the other hand, players with a low need for affect may experience less profound emotional connections, potentially leading to more superficial relationships with characters and the narrative, and less relatedness need satisfaction.

Need for Cognition has been defined as an individual's tendency to seek, engage in, and enjoy cognitive effort (Cacioppo et al., 1984). Despite expectations, research from narrative psychology has found the relationship between need for cognition and susceptibility to narrative transportation to be inconclusive, highlighting the complex dynamics related to cognitive engagement with narratives (Green & Jenkins, 2020). Studies assessing the need for cognition alongside measures from SDT have primarily been conducted in traditional classroom settings. For instance, Neigel and colleagues assessed over 400 students' need for cognition and its relation to standardized test performance, classroom GPA, and intrinsic motivation for pursuing

an education. They concluded that need for cognition was related to standardized test performance only, suggesting it may be distinct from the enjoyment of thinking and motivation toward challenge (Neigel et al., 2017). Conversely, a study involving over 3,000 Flemish adolescent students conducted by Lavrijsen and colleagues found a robust association between need for cognition and classroom performance, beyond students' cognitive ability (Lavrijsen & Verschueren, 2023). Both studies found modest correlations between students' need for cognition and enjoyment for classroom learning.

Extrapolating hypotheses from classroom education to video games is speculative but may still be instructive. Specifically, work in educational contexts suggests need for cognition may be differentially related to video game selection, enjoyment, and performance. More concretely, strategy games with complex narratives and steep learning curves, such as *Portal* (Valve, 2007), may be particularly appealing and easier for those high in need for cognition. Engaging with complex narratives may help satisfy the need for competence for those high in need for cognition by intellectually challenging players and providing a greater sense of accomplishment. By contrast, players with low need for cognition may prefer casual games with simpler mechanics, a gentler learning curve, and less demanding narrative structures.

Pre-Existing Knowledge. Finally, an audience's pre-existing knowledge and familiarity with narrative content can significantly enhance the transportation effect (Green, 2004). Fans of the *Star Wars* franchise engaging with *Star Wars Jedi: Fallen Order* (Respawn Entertainment, 2019) may experience a more profound transportation into the narrative, bolstered by their background knowledge and investment in the *Star Wars* universe. Similarly, longtime fans of the Pokémon franchise engaging with the augmented reality mobile game *Pokémon Go* (Niantic, 2016) likely experienced narrative transportation more easily and deeply relative to players new to the franchise, who may not experience the same level of immersion. Within the SDT framework, this familiarity can support satisfaction of the needs for competence and relatedness, as players feel more familiar and connected to the story and characters with which they already know. Conversely, players with less background knowledge of a game's narrative may be more easily overwhelmed and find fewer points of connection, potentially leading to a less enjoyable experience. The massive success of *Pokémon Go* relative to its predecessor, *Ingress* (Niantic, 2013), which had similar game mechanics but a novel game narrative, speaks to the power of pre-existing knowledge and familiarity with narrative content.

In addition to audience factors, several other contextual elements can impact a narrative's effects, including persuasive power. *Higher narrative quality*, characterized by enhanced production values, seamless transitions between cutscenes and gameplay, minimal bugs, and cutting-edge technology for improved usability, can significantly bolster the transportation effect (Kreuter et al., 2007). Visual enhancements, such as less pixelation and more refined graphics, play a crucial role here. *Co-viewing or co-playing* with someone enthusiastic about the narrative content tends to amplify this effect (Tal-Or, 2016). Furthermore, narratives that employ a first-person perspective, a staple of many role-playing games, can heighten persuasive impact (Hinyard & Kreuter, 2007). Similarly, perspective-taking, when players are given access to character's emotions and inner thoughts, help support relatedness needs (Grasse et al., 2022). These elements align with SDT by creating an immersive environment that supports the three basic needs, thereby enhancing overall player engagement and satisfaction. Specifically, high-

quality production values and seamless gameplay transitions contribute to a sense of competence as players feel more skilled and effective within the game world. Minimal bugs and improved usability ensure that players can navigate the game without frustration, further supporting their sense of competence. Visual enhancements and refined graphics can make a game world more believable and engaging, which can help players feel more connected to the characters and story, thus satisfying the need for relatedness. Co-viewing or co-playing enhances social interaction and shared experiences, reinforcing the sense of relatedness. Finally, first-person perspectives allow players to experience the game world directly through the eyes of their character, or at least forming some so-called alignment or allegiance (Smith, 1994), supporting satisfaction of players' need for autonomy as they make choices and take actions that impact the game's outcome. By supporting basic psychological needs, these design elements enhance game narrative and contribute to a richer, more satisfying gaming experience.

3. Integrating narrative concepts into SDT-guided research on video games

Despite significant contributions from SDT and HCI scholars towards incorporating SDT principles into video game design (Deterding, 2016; Przybylski et al., 2012; Rigby & Ryan, 2011), a recent systematic review revealed that HCI game research, particularly studies published in CHI and CHI Play, has often engaged with SDT and its subsidiary theories at a relatively superficial level (Tyack & Mekler, 2020). The extant literature is characterized by a lack of depth in the application of SDT to game design, with few efforts made to connect SDT concepts with other media theories within the HCI domain. This oversight has been especially evident in the realm of narrative theories, which offer rich potential for enhancing both game design and player experience. Narrative theories have been largely sidelined by researchers using SDT, acknowledged by only a scant number of studies (Bowey & Mandryk, 2017; Domínguez et al., 2016). Furthermore, those attempts that have sought to integrate SDT with narrative theories frequently overlook important aspects, such as the investigation of players' objectively assessed behaviors and the fulfillment of psychological needs during gameplay (Lu et al., 2012). This oversight highlights a pervasive challenge for game designers and researchers; that is, advances in theoretical understanding, research method, and design methods are interrelated. Co-developing more sophisticated approaches to each has the potential to produce richer, more engaging gaming experience.

This deficiency in integration and application may stem partly from the complex taxonomies that pervade across narrative theories and SDT. Complex taxonomies used in narrative theories have historically caused confusion fueled controversy in game studies, often without consideration of SDT (see M-L Ryan (Ryan, 2023): "*The controversy has now died down, and the possibility for games to tell stories is widely accepted*"). It's not surprising that relatively siloed communities of scholars using different complex languages find it challenging to collaborate. To address this issue, we review below some of the leading narrative taxonomies while addressing their potential intersections with SDT.

3-1: Taxonomy of Narratives in Video Games in the context of SDT:

One of several leading taxonomies of narrative types in video games was developed by Adrian Hon (Hon, 2008). Hon's taxonomy identified at least six ways that stories are told via video

games. Firstly, stories can serve as an (intangible) *reward* for the players. For instance, many role-playing games, such as the *Final Fantasy* series, require the players to finish some preprogrammed gaming activities before the game displays prerecorded computer-generated movie clips that deliver new installments of narrative content. He argues this approach is prevalent in most modern video games. The provision of narrative as an intangible reward may support the need for competence by acknowledging player achievements and providing a signal of progression and mastery. Secondly, stories can be told through gameplay as an immersive *experience*, and players' input on how the story should develop is solicited or invited without making players feel overly directed or controlled. An example of this experience type narrative form is *Half-Life* (Valve, 1998), where the story is seamlessly integrated into the gameplay. This integration supports SDT's need for autonomy by allowing players to influence the story through their choices, fostering a sense of personal control and freedom within the game world. Thirdly, the *branching* narrative, or "interactive story," resembles the format of traditional *Choose Your Own Adventure* book series, allowing players some choice in the game's direction, constrained by a limited number of preset plots lines. This structure enhances autonomy by providing meaningful choices that affect the game's outcome, and it can also support relatedness if the narrative involves other characters and moral dilemmas that affect interpersonal relationships. Fourthly, pseudo-artificial intelligence games like *Façade* (Procedural Arts, 2005) employ natural language processing to involve players directly in shaping the narrative through textual commands. Recent years have also seen generative AI being used to provide players with unique ecosystems, as seen in games like *No Man's Sky* (Hello Games, 2016). This approach can greatly enhance autonomy and competence, as players feel their input has a significant and unique impact on the game environment and story evolution. Fifthly, *sandbox games*, or open-world games like *Minecraft* (Mojang Studios, 2011), usually eschew an established narrative sequence, giving players maximal freedom to explore and influence the game world by employing various strategies for progress or even invite players to set up the game world before playing. This highly autonomous setting supports SDT's need for autonomy and competence, as players are free to set personal goals and engage creatively with the game world. Lastly, *alternative reality* games like *Year Zero* (42 Entertainment, 2007) start with a preset narrative but develop it in response to the player's real-world actions and input. This format can foster strong relatedness, as players often collaborate with others to solve puzzles and advance the story, alongside supporting autonomy by involving players in real-world narrative-driven tasks. To recap, Hon's narrative taxonomy or framework highlights increasing levels of player agency and engagement. Each narrative type offers different ways to engage players, making them feel connected, capable, and in control, features SDT would associate with supporting need satisfaction and intrinsic motivation.

Another leading taxonomy of narrative types in video games was developed by Barry Ip (Ip, 2011). Ip identified different forms of narrative by empirically analyzing ten video games. These ten games were carefully selected given their sales, popularity, availability, appropriateness, and rankings to provide a relatively broad coverage (titles included *Fable*, *The Godfather*, and *Halo 3*). That analysis focused on the use of cut scenes, on-screen text, prompts, and other narration techniques, leading to their categorization into 12 distinct forms. These ranged from narratives presented as passive game screen, on-screen text, cutscenes, cutscenes combined with on-screen text, combination of gameplay, cut scenes, and on-screen text, combination of gameplay, sound, and textual cues to short game prompts presented as on-screen text, as cut scenes, simultaneously as cut scene and on-screen text, an integral part of game play, a combination of game play,

sound, and textual cues, or simply as credit roll and/or ending sequence.

These technique-based forms can be further grouped into linear and non-linear (branching) narratives. Linear narratives, echoing Hon's concept of "story as reward," unfold along a preset path from beginning to end without significant alterations based on players' actions. These forms can enhance the SDT need for competence by providing clear feedback on player actions through narrative outcomes, thus contextualizing a player's achievements or failures within the game's story. In contrast, nonlinear narratives offer branching storylines and multiple endings, providing flexibility and player agency, which significantly enhances their sense of autonomy and promotes relatedness through engaging storylines that involve complex character interactions and moral choices. Ryan and colleagues (Ryan et al., 2015) later introduced the concept of emergent narratives, marking a distinct departure from the nonlinear structure. They defined the emergent narratives as stories emerging bottom-up from the richness of underlying simulations featuring autonomous characters. *Tetris* (Alexey Pajitnov, 1985) is considered a good example of emergent narrative, offering a unique way to satisfy competence and autonomy as players create their own stories through interactions within the game environment, leading to a highly personalized experience. This perspective highlights how emergent narratives can be recognized even in games not traditionally viewed for their storytelling, showcasing the dynamic creation of stories through gameplay mechanics and player interaction. This view suggests the possibility that humans inherently experience the world through narratives, challenging the very existence of "non-narrative games" as a category. However, the uniqueness of narrative advantages could become moot without a clear comparator. Ultimately, specific qualities of a game's story, plot, and character design will inevitably explain more variance in players' experience of games compared to crude binary distinctions, such as the presence or absence of a narrative.

Carstensdottir and colleagues (Carstensdottir et al., 2019) delved into game narratives through the lens of computational story structures, categorizing them into six distinct types. This categorization encompasses *linear* narratives, which follow a single trajectory from start to finish, and *branching* narratives, which introduce variability through multiple diverging paths, allowing for different narrative events based on player choices. Linear narratives, similar to the 'cutscene as reward' model, provide a sense of predictability and security that can help satisfy the need for competence, as players are likely to understand and anticipate the game's demands and rewards. In contrast, branching narratives enhance autonomy by allowing players to influence the direction and outcomes of the story based on their decisions, fostering a sense of personal agency and impact. *Foldback* stories offer a unique twist by allowing events to branch out in response to player actions but ultimately converge back to a central storyline. *Broom* narratives maintain a primarily linear structure but feature multiple branching endings, offering varied conclusions based on the player's decisions towards the story's climax. Both foldback and broom narratives cater to the need for autonomy and competence by providing players with meaningful choices that have visible consequences yet ensure that all paths are somewhat rewarding and contribute to a coherent narrative development, enhancing engagement and satisfaction. *Hidden* or dispersed narratives scatter story elements throughout the game, requiring players to piece together the narrative. This approach caters to the need for competence by challenging players to uncover and reconstruct the narrative, promoting exploration and discovery. Lastly, *opportunistic* stories dynamically generate narrative content based on in-game processes, creating a flexible storytelling experience that adapts to player actions. This type of

narrative is particularly effective at supporting autonomy, as it allows the game environment and story to evolve in response to player decisions, making each player's experience unique and deeply personal. This can significantly enhance the sense of relatedness as players feel that their interactions have a meaningful impact on the game world and its characters. Overall, Carstensdottir and colleagues' approach not only complements the earlier taxonomies discussed but also expands the understanding of narrative structures in video games, highlighting the rich diversity of storytelling mechanics and their potential to create immersive and engaging player experiences.

Departing from previously discussed models, Aarseth's Ludo Narrative Variable Model (LNVM)(Aarseth, 2012) provides a framework for analyzing game narratives through four ontological dimensions: *world*, *events*, *objects*, and *agents*, which intersect with a range from the narrative to ludic poles without a hierarchical scale. This variable model highlights the balance between authorial control and gameplay agency, a conceptualization that parallels SDT's idea of optimal challenge as supportive of both autonomy and competence need satisfaction. LNVM explains how objects in a game can range from non-interactable to inventible, increasing opportunities for choice and the complexity of a game's narrative, but also the degree of challenge. Agents, or characters, in games can vary from richly detailed characters with complex backstories to simplistic bots that serve as mere gameplay mechanics. More complex agents likely support players' relatedness need satisfaction, with detailed characters enhancing emotional engagement and simpler characters focusing on gameplay dynamics. At one end of the spectrum, the narrative pole emphasizes strong author agency, which can limit player interaction but enrich the storytelling depth, potentially enhancing the player's intrinsic motivation by providing a rich, engaging story. Conversely, the ludic pole favors gameplay agency, which might sacrifice narrative depth but increases autonomy, allowing players more freedom to influence their game environment and outcomes. The *world* dimension encompasses physical or virtual structures that can be directly explored by players, ranging from an inaccessible space into five topological structures, from a single room to a completely open landscape, offering a measurable, concrete environment that players can explore. This exploration often challenges players to navigate and master new territories, enhancing their sense of competence. *Objects* vary from non-interactable elements, purely observational within the game environment, to inventible items that players can create or modify, perhaps through in-game programming tools. This range allows players to interact with their environment in varying degrees, directly affecting their gameplay experience and sense of agency. *Agents*, or characters, range from characters with rich backstories and motivations to simplistic bots with no individual identity, like generic enemies. Richly detailed characters enhance the narrative depth and foster a sense of relatedness and emotional engagement among players, while simpler characters may focus more on enhancing gameplay mechanics. *Events* range from tightly controlled, fully plotted stories to open-ended playable stories and multipath or quest games that offer varying degrees of player choice and narrative flexibility. This spectrum provides players with opportunities to experience both autonomy and competence need satisfaction, as their decisions influence the outcome of the story. Of the four dimensions, Agents/characters and Events are especially tied to narrative elements. Agents/characters are crucial for storytelling and should be effectively utilized to create engaging ludo-narrative content. They play a significant role in fulfilling players' need for relatedness by connecting them emotionally to the game's narrative. LNVM underscores the importance of balancing narrative depth with player autonomy.

To summarize, future game researchers investigating potential associations between video game narratives and player outcomes (e.g., game selection, engagement, enjoyment, and performance) may be guided by consideration of how different types of game narrative can simultaneously either support or thwart different basic psychological needs. In general, autonomy is likely to be supported by nonlinear types of narrative that provide meaningful choices and control within the game environment, allowing players to influence the game's narratives. Competence is likely supported by narrative-driven challenges that match players skills and promote growth. Relatedness is likely supported through dynamic interactions with game characters and other players, creating deeper, more meaningful and potentially enduring social connections. While these theoretical alignments suggest potential for narrative structures to satisfy psychological needs, future empirical research is needed to directly test these SDT-guided hypotheses.

3-2: Extant Video Games literature that linked SDT and narratives:

Despite challenges that include different terminology and the lack of a single, consensus taxonomy of narrative types for video games, game research that integrates concepts from SDT and narrative theories has received some attention and may be gaining traction. Much of this extant research literature has involved a particular sub-theory (or “mini theory”) of SDT, referred to as basic psychological need theory (BPNT). The BPNT sub-theory, among the most foundational and well-developed sub-theories of SDT (Ryan & Deci, 2019; Ryan et al., 2021), posits that the satisfaction of three basic psychological needs – autonomy, competence, and relatedness – not only produces intrinsic motivation but is also critical for optimal human functioning and well-being, while frustration of these needs undermines intrinsic motivation and well-being (Ryan et al., 2016).

Our review of the extant game studies literature revealed a number of studies that speak to how games can help support SDT's basic psychological needs for autonomy, competence, and relatedness, although many of these studies either do not exclusively pertain to narratives or explicitly reference SDT. As mentioned previously, most of these studies did not exclusively pertain to narratives. The purpose of reviewing them in this section is to draw parallels to how narrative effects in games may operate and to call for further studies and discussions that focus specifically on narrative elements within games using an SDT lens. For example, SDT-guided research conducted by Kim et al. (Kim et al., 2015), referenced earlier, explored the impact of in-game customization of avatars. Across two studies, the ability to customize an avatar enhanced players' experiences of autonomy, control, and attachment to their customized avatar, which in turn contributed to immersion and enjoyment while playing. Features of games that encourage players to customize avatars, especially in ways that allow players to express their true or aspirational identities and preferences, tend to support the satisfaction of players' psychological need for autonomy. Similarly, interactive narrative design (another way to encourage player customization of games) inherently supports players autonomy by offering choices that significantly alter the game's story and outcome. Based on SDT, interactive narrative design features that encourage players to make decisions about a game's story or narrative arc reflecting their personal values, especially intrinsic values, are more autonomy supportive and enjoyable. Peng's research (Peng, 2008) on the role of identification in video games emphasizes how embodying certain character types through enactive role-playing can support the satisfaction of

player's need for competence. Identification with characters not only enriches the narrative experience but also bolsters players' confidence in their abilities. Research by Tyack and Wyeth (Tyack & Wyeth, 2017) into single-player video game dynamics sheds light on how game narratives can cultivate parasocial relationships with characters, where players form connections or attachments akin to real-life social bonds. This work illustrates how narrative game design can help support the satisfaction of players' need for relatedness.

The studies above highlight some of the ways video game narratives and design choices can be understood using an SDT framework, especially BPNT, even when not explicitly guided by SDT or identified using SDT terminology. Specifically, these studies on parasocial relationships, avatar customization, interactive narrative design, and character identification offer a robust foundation for deeper integration of SDT principles into video game research. By making more explicit connections between these elements of game narrative and SDT's concepts of basic psychological need satisfaction and frustration, many new and testable hypotheses become apparent. Pursuing this integrative approach to hypothesis generation promises to provide invaluable insights for both game designers and researchers, fostering a more nuanced understanding of how video games can support enjoyment and well-being.

3-3: Proposed opportunities and questions for future research

Here we propose that there are significant opportunities to be gained from a multi-level integration of narrative theories and SDT in game design research – identifying points of agreement/overlap, tension, and complementarity. Specifically, we focus on two major areas of integration of narrative theories and SDT in video game design and user research: First, integrating specific *parable narratives* to promote positive motivational outcomes and growth, and second, integrating narrative theories and SDT to provide explanations of video game *preferences*. Next, we explore each area for proposed future research, in turn.

3-3-1: Integrating Parable Narratives into Games to Promote Positive Outcomes

In their seminal book on SDT and game design, *Glued to Games*, Rigby and Ryan (Rigby & Ryan, 2011) described the potential for fiction, especially in the context of games, to promote positive outcomes, including personal growth. Citing the work of literary scholar John Gardner, Rigby and Ryan posited that (p. 81): “*We learn from the failures and successes of particular modes of action [when immersed in narrative fiction] and learn from them... exactly as we learn from life. That despite the fictional nature of the content, a good story can be as meaningful as ‘real’ experiences and used as a vehicle for growth.*” In the following section, we explore how game designers might thoughtfully and ethically develop or select and apply different parable narratives, guided by SDT, to promote positive outcomes.

Basic Psychological Need Theory (BPNT), referenced above, is arguably the most foundational and well-developed sub-theories of SDT (Ryan & Deci, 2019; Ryan et al., 2021). Consequently, BPNT is the sub-theory of SDT that has been most frequently and directly applied in the context of game design research. BPNT has also been applied to understand healthy lifespan development, supported by findings that the satisfaction of basic psychological needs predicts healthy psychosocial growth (Soenens & Vansteenkiste, 2023). SDT research on psychosocial

development could help inform how game designers craft narratives that track characters' life course and psychosocial development in games. Narratives intended to be instructional, often referred to as *parables*, have a long history in both secular and scriptural education and include many of the most enduring and widely enjoyed narratives across all types and genres. BPNT-informed narratives that illustrate the consequences of basic need satisfaction and frustration for characters' lifespan development could serve as powerfully instructive lessons for players.

It is noteworthy that traditionally, parables have tended to follow a single linear structure. However, single linear structures are characteristics of nearly all traditional narratives. Relatively recent advances in technologies applied to video games (and other media) have greatly expanded the potential for designing nonlinear narratives (e.g., using branching logic or generative AI). Given that narratives are defined by an intention to instruct, we posit that game designers could conceivably provide instruction on lessons using nonlinear narratives that deliver consequences for players' choices consistent with SDT-guided research findings. For example, SDT-guided research has consistently found that prioritizing extrinsic goals (pursuing money, fame, and image) over intrinsic goals (pursuing personal growth, close relationships, community involvement, and physical health) is negatively related to well-being (see the recent meta-analysis by Bradshaw and colleagues (Bradshaw et al., 2023)); this is a foundational tenant of Goal Contents Theory (GCT), another sub-theory of SDT. Longitudinal studies have demonstrated that associations between pursuing these different goals and well-being are mediated by basic need satisfaction (Hope et al., 2019), and further that *attaining* different goals is also differentially associated with well-being (Niemic et al., 2009). Niemic and colleagues found that while attainment of intrinsic goals was related positively to well-being one year later, attainment of extrinsic goals was not; in fact, attainment of extrinsic aspirations was positively related to ill-being. Based on GCT and these SDT-guided research findings, it is relatively straightforward to imagine a parable-style, nonlinear game narrative that delivers positive consequences for player (and non-player character) choices aligned with pursuing intrinsic goals and negative consequences for choices aligned with pursuing extrinsic goals.

When it comes to considering the value of different parables about lifespan development within video games, we believe another of SDT's sub-theories could also be helpful; that is, Organismic Integration Theory (OIT) (Pelletier & Rocchi, 2023), a sub-theory that centers the concept of *internalization*. A key component of OIT is that people naturally tend to internalize values that are endorsed by those closest to us. As we mature from children into adults, the institutions, social groups, and authorities around us encourage us to adopt values such as cultural norms, desired behaviors, ideal activities, and appropriate social practices. However, those values may be internalized to varying degrees. Healthy development is characterized by a process of either internalizing and integrating these values, or alternatively casting them aside and adopting new values that can be more easily internalized and integrated. This process of internalization can sometimes be facilitated by leaving home and exploring new contexts where individuals are confronted by those who hold alternative values, with effortful reflection, and especially in contexts that are autonomy supportive.

To illustrate, one well-developed line of SDT-guided research speaks to the experience of closeted lesbian, gay, and bisexual (LGB) individuals with high levels of internalized homophobia, a result of earlier socialization that was less than autonomy supportive. (Ryan et al.,

2017) While homophobic values can be internalized in a narrow sense, OIT holds that there will necessarily be tension between those values and parts of the self that experience same sex attraction, limiting integration, self-concordance, authenticity, and ultimately well-being (Ryan & Ryan, 2019). Ryan and colleagues showed that when LGB individuals with high levels of homophobia entered new contexts with high autonomy support, rates of disclosure (outness) increased, as did their well-being. Related to this, a number of video games include parable-type narratives involving the process of “coming out,” i.e., disclosing a marginalized sexual orientation (Hart, 2021), including: *New Found Courage* (Cafe Empty, 2018), *Zen: A Gay Sequel* (bobcgames, 2021), *If Found...* (Dreamfeel, 2020), *Coming Out Simulator* (Nicky Case, 2014), and *Gone Home* (The Fullbright Company, 2013). Research guided by OIT suggests that games like these could help facilitate the process of internalization and integration for some players, such as those struggling to accept or disclose their sexual orientation. Extending this further, video games that feature alternative parable narratives involving simulated disclosures of other counter normative or concealable stigmatized identities may benefit players in similar ways (e.g., by simulating the disclosure of a mental illness, a gender nonconforming identity, or even a political or religious affiliation). Narrative formats that offer opportunities for simulating multiple paths or branching storylines with multiple endings may be especially well-suited for promoting internalization and integration related to disclosures, promoting well-being, and healthy psychosocial development.

The Hero's Journey. Among the most famous parable narratives about lifespan development is the *Hero's Journey*, a narrative structure identified by Joseph Campbell (Campbell, 2003), characterized by a cycle of departure, initiation, and return, where the protagonist ventures from the ordinary world into the realm of adventure and challenge, undergoing personal transformation before returning home. Some scholars have critiqued Campbell's claims about the “universality” of this structure across history and cultures (Lefkowitz, 1990), including scholars in game studies (Tyack & Mekler, 2020). However, the potential for this narrative to resonate deeply for many has been well documented and it has been intentionally adapted into countless cultural stories and media, including many video games (Schell, 2008). In *Glued to Games*, Rigby and Ryan (Rigby & Ryan, 2011) relate the use of Campbell's hero archetype and Hero's Journey narrative in video games to facilitating players' competence need satisfaction. They write that: “*persevering through to an ultimate victory is a core thread in heroic narratives and provides a framework for the incremental progress of game challenges that optimally satisfy a player's need for competence* (p. 33).” Further, Rigby and Ryan assert that “*when video games put players in heroic circumstances, they are implicitly communicating a belief that the player can rise to the tasks ahead* (p. 33),” thereby further supporting competence need satisfaction. Given its influence, we believe the Hero's Journey narrative in video games offers an especially interesting example for analysis using SDT and its sub-theories (Rigby & Ryan, 2016). As such, we next discuss more ways this influential narrative structure may be associated with satisfying all three basic needs and with organismic integration, using updated examples from video games released since the 2011 publication of *Glued to Games*.

In terms of autonomy need support and satisfaction, the Hero's Journey in video games starts with an invitation or call to adventure, leading the player-character into a world filled with unknowns to be explored. This initial step is crucial in establishing autonomy, as players must choose whether and how to engage with the journey ahead. For instance, in *The Legend of Zelda*:

Breath of the Wild (Nintendo EPD, 2017), players are empowered to explore the vast world of Hyrule at their own pace, tackle challenges in multiple ways, and make choices that influence their journey. (Moran, 2023) Over the narrative development, they are presented with an expansive world full of choices and paths about the past history that diverge from the central narrative arc. Indeed, the autonomy afforded by narrative video games empowers players to become the architects of their own adventures. This sense of freedom, where players' decisions carry significant weight and consequence, not only has the potential to immerse them more deeply into their unique narrative arcs but also fulfills their need for control over their in-game destinies. Such engagement in shaping outcomes supports players' autonomy need satisfaction. In addition to offering opportunities for exploration and meaningful choices, the Hero's Journey and other game narratives may support players autonomy by offering a meaningful, internalizable *rationale* for engagement. In hero narratives, that rationale often takes the form of an epic or romanticized quest (e.g., save one's home, the world, or a loved one from certain death or destruction). For instance, in the *Legend of Zelda: Breath of the Wild*, players embody the character Link as they set out to save Princess Zelda and prevent Calamity Ganon from destroying the world.

In terms of competence need support and satisfaction, as noted by Rigby and Ryan (Rigby & Ryan, 2011), the initiation phase of the Hero's Journey, filled with trials, challenges, and growth, is directly relevant. Games that employ the Hero's Journey narrative structure follow a cycle of effort, feedback, and improvement, and implicitly communicate confidence in players' heroic ability to meet challenges, supporting competence need satisfaction. In *Celeste* (Maddymakesgames, 2020), players encounter challenging platforming sections that require precision and timing. Through repeated attempts, they gradually improve their skills, with each successful attempt contributing to their understanding and mastery of the game mechanics. As they continue through the game, they acquire new abilities and strategies, allowing them to tackle progressively difficult challenges. This process mirrors the hero's internal growth through trials, satisfying players' competence by symbolically communicating progress toward mastery within the game world (Hefkaluk et al., 2024).

With regard to relatedness need support and satisfaction, while the Hero's Journey might superficially seem like a solitary journey, it is often relationships formed during the journey that imbue these narratives with depth and meaning. The journey of the hero often involves interactions with a variety of non-player characters (NPCs), some of whom become allies, mentors, or friends. Additionally, some online games provide opportunities to interact with other players. Games that leverage these social aspects of the Hero's Journey can support a sense of camaraderie and belonging among players and the NPCs they interact with. In terms of single player games, the *Mass Effect* (BioWare, 2007-2021) series stands out for its complex character development and narrative choices driven by the player. These choices influence relationships with NPC team members, creating a strong sense of relatedness as players build bonds with characters and make decisions that impact the group's dynamics. On the other hand, massively multiplayer online role-playing games (MMORPGs) such as *World of Warcraft* (Blizzard Entertainment, 2004) provides another notable example. The game facilitates collective engagement in storylines, which can enhance social bonds through shared experiences and active participation in the online game world. Additionally, the game emphasizes cooperation among players to collaborate, especially in raids, which helps to strengthen relationships and meet the

need for relatedness. This process allows players to create and share their own “emergent stories” in the game universe. As players navigate the story, the interactions between these characters and with other players create a sense of shared destiny and emotional depth, reinforcing the player’s sense of connection to the game world and its inhabitants. This not only enriches the narrative experience but also aligns with SDT’s assertion that fulfilling the need for relatedness is crucial for intrinsic motivation and well-being.

As noted earlier, the Hero’s Journey narrative archetype belongs to a genre of narrative intended to be instructive examples or lessons, i.e., *parables*. When interwoven with the principles of SDT, parable narratives can offer a robust framework for understanding and enhancing the psychological benefits of video gaming. SDT, rooted in organismic meta-theory, offers testable and empirically supported predictions with respect to healthy human development over time and what constitutes a “life well-lived.” Specifically, more autonomously oriented personality development and integration is posited to be both an innate tendency and optimal for achieving eudemonic well-being. Thus, when life goals are shifted away from extrinsic aspirations toward intrinsic aspirations, SDT posits this is more likely to lead to a life well lived (Kasser et al., 2014; Niemiec et al., 2009). By facilitating autonomy through meaningful choices, fostering competence through challenging yet achievable trials, and nurturing relatedness through deep, character-driven narratives, video games can transcend mere entertainment. The Hero’s Journey can also be a conduit for satisfying fundamental psychological needs, promoting not only engagement and enjoyment but also contributing to the player’s overall sense of well-being. This synergy between narrative and psychological theory not only underscores the potential of video games as a medium for personal growth but also highlights the importance of thoughtful narrative integration in game design.

Moderators such as transportability, need for affect, need for cognition, and prior knowledge significantly influence how players experience the Hero’s Journey through the lens of SDT. Designing video games for players with varying levels of these moderators involves tailoring game elements to meet diverse psychological needs, ensuring a wide spectrum of psychological needs are catered to, enhancing overall player experience and well-being. Easily transported players with a heightened need for affect connect deeply with the emotional trajectory of the character’s journey, fulfilling relatedness needs. Those with a high need for cognition find satisfaction in strategic decision-making, catering to competence. Prior knowledge of the Hero’s Journey increases engagement and relevance, making the game more satisfying. High-quality narratives that integrate the Hero’s Journey with player choices boost autonomy and competence. Sharing this journey with others enriches the experience, enhancing relatedness. Immersing players in the Hero’s Journey from a first-person perspective deepens narrative connection, meeting autonomy, competence, and relatedness needs. Recent studies suggest interpreting one’s life as a Hero’s Journey leads to psychological benefits, implying that narrative video games could amplify these effects (Rogers et al., 2023).

Hero narratives in serious games and other gamified activities. Although our primary focus has been on narratives in games designed for entertainment, it is worth noting that these principles can also be applied by designers developing serious games or gamified activities intended to promote well-being-related outcomes, such as learning or health behavior change. In educational and training contexts, game designers have successfully integrated SDT and game narratives,

including parables like the Hero's Journey and the concept of "the learner hero" (Grasse et al., 2022; Rigby & Przybylski, 2009). For example, a recent study by Lu and colleagues (Lu et al., 2023) demonstrated that players of the popular active video game, *Beat Saber* (Oculus VR, 2019), increased their relative time spent in moderate-to-vigorous physical activity when randomly assigned to watch a 5-minute clip from the film, *Star Wars*, before playing. This intervention presumably prompted players to think of themselves as a Jedi (hero). George Lucas, the writer and director of the original *Star Wars* films, has famously credited Joseph Campbell as a major creative influence, with the Hero's Journey serving as the basis for *Star Wars*' narrative structure (Vogler, 2017).

It is important to acknowledge limitations and boundary conditions of the Hero's Journey in game design (Tyack & Mekler, 2020). For example, while many points raised focus on narrative content, aspects like interactive narratives offering choice could pertain more generally to game mechanical structures. Therefore, instead of universally applying the Hero's Journey theme, game designers are encouraged to select the most effective elements of both narrative and game mechanical structures for enhancing well-being on a case-by-case basis. This nuanced approach ensures that both narrative and gameplay mechanics are effectively leveraged to support players' psychological needs and potential for organismic integration.

We encourage game researchers to join us in directly investigating the empirical questions and speculative hypotheses related to SDT and parable game narratives outlined here in future research. Given the potential for well-designed narrative video games to immerse players in the Hero's Journey, could such games be particularly beneficial for promoting players' well-being and life satisfaction? Beyond the Hero's Journey, might video games that include other parable narratives consistent with SDT and its mini theories (BPNT, GCT, and OIT) be especially advantageous for players? To what extent does engaging with these parable narratives lead to healthy changes in players' lives outside of games? Addressing these questions, in line with well-being supportive design principles, could help expand the role of video games from pure entertainment to tools that also promote personal development and life satisfaction (Oliver et al., 2016), a meaningful extension of the *games for health* movement.

3-3-2: Choosing between Video Games: Integrating Narrative and SDT accounts for Game Preferences

Given the extensive variety of video game narratives available, another area of interest concerns predicting individual and group preferences. However, few SDT-guided studies have focused on predicting people's preferences for different game genres, and to the best of our knowledge, none of those studies have considered narrative features. SDT-guided studies that have been run have focused on past basic psychological need satisfaction and frustration as predictors of game preferences. For example, Ryan, Rigby, and Przybylski (Ryan et al., 2006) found that within-game satisfactions of autonomy and competence was related to preferences for future play when participants were given four video games to play in a lab experiment (Study 3), and within-game satisfactions of all three needs were independently associated with intended future play among participants recruited from a Massive Multiplayer Online (MMO) game community. In a 2016 chapter, Rigby and Ryan (Rigby & Ryan, 2016) wrote: "the theory (SDT) suggests that people's intrinsic motivation for sustained engagement in any media entertainment will be a function of

the need satisfactions it affords (p. 36)” and that “need satisfaction should thus explain variability in media preferences and enjoyment (p. 36).” Additionally, they assert that some preferences for games can be related to satisfying psychological needs that have been frustrated or unmet in their lives outside of gaming (i.e., a form of compensation). Rigby and Ryan caution that: “because of the strong capacity of some media to satisfy psychological needs in the virtual context, some individuals overuse media (p. 36).” Their *need density hypothesis* holds that players who have need-satisfying gaming experiences that contrast with need depriving or need thwarting in other important domains of life are especially at risk of overusing those video games.

Thus far, a potential limitation of SDT-guided accounts of video game preferences involves a failure to account for many factors other than basic psychology needs (e.g., cultural differences, personal and social identities, temperament). In addressing this limitation, it may be helpful to integrate other theories, including those from narrative psychology. Future empirical studies examining these intersections could help game scholars build a more comprehensive understanding of game preferences. To begin, we propose the possibility that further integrating ideas from SDT and the Temporarily Expanding Boundaries of the Self (TEBOTS) model (Johnson et al., 2015) may improve understanding of game preferences, especially among games with strong narrative features.

The Temporarily Expanding Boundaries of the Self (TEBOTS) model (Johnson et al., 2015; Johnson et al., 2021a; Slater et al., 2014) was developed to explain why narratives appeal to people. TEBOTS posits that because the human self-concept is to some degree universally experienced as burdensome and restrictive, people frequently seek narratives as a way to temporarily expand the self and experience relief. Narratives offer relief from the task of self-regulating and adhering to multiple identity-defined roles that make up our self-concept, as well as from the limitations or constraints necessarily associated with adopting some identities and not others (the limitations of being an individual self).

Authors of the TEBOTS model explicitly connect the universality of human motivation for entering narrative worlds with SDT and the universality of basic psychological needs. They posit that the premise of basic psychological needs creates a universal conundrum, inherent to the human experience when confronted with the limits of reality. Johnson and colleagues (Johnson et al., 2021b) summarized this universal conundrum as such (p. 253):

By this conundrum we refer to the fact that any given human being can develop competence or agency in only a narrow set of skills, limited by available time, opportunity, and inherent capacity; that any individual’s autonomy is not only socially constrained, but inherently constrained: we cannot be other than who we are, living in the time we are in; and our relationships and affiliations even under the best of circumstances are constrained by time, space, social role, and the relational commitments we have made. So, even for that enviable individual who is multitalented, with a substantial scope of choice, and with deeply satisfying relationships—these drives are imperfectly satisfied.

In other words, the relief audiences experience when enter narrative worlds may be especially

satisfying when stories offer opportunities for vicariously experiencing forms of autonomy, competence, and relatedness need satisfactions that reality denies us. During transcendent narrative engagement, individuals can expand their self-concept, an experience called boundary expansion, by extending their self into the story world. Through this process, basic psychological needs can be satisfied vicariously, as individuals feel autonomy through characters' choices, competence through their achievements, and relatedness through characters' relationships within fictional worlds.

The authors of TEBOTS have also hypothesized that, while the appeal of narratives may be universal, their appeal is particularly strong when the self is especially burdened. Johnson and colleagues (Johnson et al., 2021b) posited (p. 254-255) that: *“In particular, one would expect that there would be greater enjoyment and immersion in stories when the self is under stress and strain, and less when it is affirmed. It is also likely that stories might be particularly valued at points in life when identity is under strain, such as adolescence, divorce, or retirement.”* Two speculative hypotheses follow from an extended integration of TEBOTS and SDT. First, individuals who experience *specific* personal and social identities (parts of themselves) as especially burdensome may be especially drawn to video games with narratives that afford them opportunities to escape those specific identities. Second, SDT could help explain when and why specific personal and social identities are more burdensome than others. Research guided by SDT and its sub-theory OIT has found that less internalized, less authentic identities tend to feel more burdensome. (Pelletier & Rocchi, 2023) Social environments and socializing agents that thwart psychological needs are associated with adopting identities that are less internalized, integrated, and authentic. Integrating concepts from TEBOTS and SDT can help us better understand not only narrative game preferences and in-game enjoyment, but also the potential for games to help people achieve positive personal growth and well-being long after gameplay has ended.

Most media effects theories propose that conditional media effects arise from both selective exposure and selective processing. TEBOTS applies to both game selection and the satisfaction of psychological needs. Players may choose games that offer opportunities for boundary expansion and relief from burdensome self-concepts. These game choices may be influenced by effective marketing that highlights particular boundary expanding opportunities, or alternatively, by past experiences with similar games (e.g., games from the same publisher, franchise, or genre). Over time, the satisfaction of psychological needs through particular game narrative experiences can reinforce players' approach to future game selection. Johnson and colleagues (Johnson et al., 2021b) primarily focused on need satisfaction, rather than game choices directly.

Slater's Reinforcing Spirals Model (Slater, 2007; Slater et al.) offers a complementary account for this second path, directly explaining how players often choose games that meet their basic psychological needs. According to this model, players select games that satisfy their psychological needs, and continued engagement with these games further reinforces their preferences for similar types. This cyclical process illustrates the mutual reinforcement of game choice and need satisfaction. While TEBOTS explains the depth of engagement within the narrative, Slater's model accounts for how these experiences lead to repeated choices of similar games, reinforcing players' intrinsic motivation. In this feedback loop, expanding the self

through narratives leads to greater psychological satisfaction, which encourages repeated game selection. Players choose games based on their likelihood to satisfy unmet needs, creating a cycle of media selection and need satisfaction.

Leading SDT game scholars have suggested that games can act as contexts by providing a space for embodying the “ideal self” (Przybylski et al., 2012). Games like *Journey* (Thatgamecompany, 2012), which emphasizes personal growth and overcoming mental and physical challenges, may act as mediums for players to explore and embody their “ideal self,” aligning with SDT’s core needs. The intersection of self-concept and game design represents a key opportunity for cross-pollination between SDT and narrative research. New SDT and narrative theory-guided models could be tested using rigorous research designs to predict changes in people’s game selection and usage over the trajectory of their entire life course, as well as the consequences of engaging with different game genres and narratives for life course changes in moral and social development, health, and well-being.

To illustrate, video games such as *The Witcher 3: Wild Hunt* (CD Projekt Red, 2015) allow players to explore different facets of their identity and moral compass as the protagonist, Geralt. When their play character responds to various dilemmas, players experiment with actions and consequences that may be far removed from their real-life experiences. This autonomy in decision-making is not just about controlling the game’s outcome; it also includes exploring hypothetical scenarios that may expand players’ understanding of themselves and their values. Another video game, *Dark Souls* (FromSoftware, 2011), offers opportunities for developing perseverance and resilience. As players overcome seemingly insurmountable challenges, they not only develop skills within the game but also gain a sense of personal achievement and growth that may extend to other contexts. Finally, games like *Fire Emblem: Three Houses* (Intelligent Systems, 2019) center opportunities for building relationships between the player’s character and other characters. These virtual relationships, aside from affecting the gameplay and unlocking additional storylines, can have profound emotional resonance, allowing players to explore aspects of friendship, loyalty, and sacrifice. Through these interactions, the game encourages players to expand their sense of self to include these virtual relationships, potentially fulfilling their need for relatedness in ways that are unavailable or unexplored in their everyday lives, while also preparing them for exploring relationships outside of this fictional game world. More research using rigorous experimental and longitudinal designs is needed to test these and other TEBOOTS and SDT-guided hypotheses. In studies using the Reinforcing Spirals Model, (Slater, 2007; Slater et al.) both dynamics—how game choices influence the self and how the self influences media choice—can be explored concurrently to examine how they mutually reinforce each other.

4. Conclusion

To advance empirical research that integrates SDT and narrative theories within HCI and video game research (Rigby & Ryan, 2011; Ryan & Deci, 2017; Ryan et al., 2006), we propose several recommendations. First, we encourage exploring the influence of SDT-guided parable narratives, particularly the Hero’s Journey, as a means to promote well-being and personal growth. Second, we recommend further integration of SDT with the TEBOOTS model, along with introducing the Reinforcing Spiral Model (Slater, 2007; Slater et al.) to help predict video game preferences and

choice as a cyclical process. These theoretical integrations have the potential to deepen our understanding of players' experiences both within and beyond game environments and contribute to designing video games that not only entertain but also foster personal growth and well-being.

SDT and narrative theories have many underexplored intersections relevant to informing HCI generally, and especially for video game design and research. Integrating these complementary theoretical traditions offers a more comprehensive framework and a promising avenue for understanding and enhancing video game experiences. Game designers who consider these intersecting lines of scholarship can contribute to the creating video games that not only entertain but also support personal growth and well-being, for individuals and collectively for society.

We hope that HCI scholars will challenge each other to advance greater integration of these complementary perspectives, motivating each other and collaborating to push the boundaries of excellent game design together. This interdisciplinary approach enriches our understanding of how video games can serve as powerful tools for positive change, paving the way for future innovations in game design and research.

References

- Aarseth, E. (2012). A narrative theory of games. Proceedings of the international conference on the foundations of digital games,
- Abbott, H. P. (2020). *The Cambridge introduction to narrative*. Cambridge University Press.
- Appel, M., & Richter, T. (2010). Transportation and Need for Affect in Narrative Persuasion: A Mediated Moderation Model. *Media Psychology*, 13(2), 101-135.
<https://doi.org/10.1080/15213261003799847>
- Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes*, 50, 248-287.
- Barthes, R. (1982). Introduction to the structural analysis of narratives. In S. Sontag (Ed.), *A Barthes reader* (pp. 265-269). Hill and Wang.
- Bowey, J. T., & Mandryk, R. L. (2017). *Those are not the Stories you are Looking For: Using Text Prototypes to Evaluate Game Narratives Early* Proceedings of the Annual Symposium on Computer-Human Interaction in Play, Amsterdam, The Netherlands.
<https://doi.org/10.1145/3116595.3116636>
- Bradshaw, E. L., Conigrave, J. H., Steward, B. A., Ferber, K. A., Parker, P. D., & Ryan, R. M. (2023). A meta-analysis of the dark side of the American dream: Evidence for the universal wellness costs of prioritizing extrinsic over intrinsic goals. *Journal of Personality and Social Psychology*, 124(4), 873-899.
<https://doi.org/10.1037/pspp0000431>
- Busselle, R., & Bilandzic, H. (2009). Measuring Narrative Engagement. *Media Psychology*, 12(4), 321 - 347. <http://www.informaworld.com/10.1080/15213260903287259>
- Cacioppo, J. T., Petty, R. E., & Feng Kao, C. (1984). The Efficient Assessment of Need for Cognition. *Journal of Personality Assessment*, 48(3), 306-307.
https://doi.org/10.1207/s15327752jpa4803_13
- Campbell, J. (2003). *The hero's journey: Joseph Campbell on his life and work* (Vol. 7). New World Library.
- Carstensdottir, E., Kleinman, E., & El-Nasr, M. S. (2019). *Player interaction in narrative games: structure and narrative progression mechanics* Proceedings of the 14th International Conference on the Foundations of Digital Games, San Luis Obispo, California, USA.
<https://doi.org/10.1145/3337722.3337730>
- Dal Cin, S., Zanna, M. P., & Fong, G. T. (2004). Narrative Persuasion and Overcoming Resistance. In *Resistance and persuasion*. (pp. 175-191). Lawrence Erlbaum Associates Publishers.
- Deterding, S. (2016). Contextual autonomy support in video game play: a grounded theory. Proceedings of the 2016 chi conference on human factors in computing systems,
- Domínguez, I. X., Cardona-Rivera, R. E., Vance, J. K., & Roberts, D. L. (2016). *The Mimesis Effect: The Effect of Roles on Player Choice in Interactive Narrative Role-Playing Games* Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, San Jose, California, USA. <https://doi.org/10.1145/2858036.2858141>
- Ferchaud, A., Seibert, J., Sellers, N., & Escobar Salazar, N. (2020). Reducing Mental Health Stigma Through Identification With Video Game Avatars With Mental Illness [Original Research]. *Frontiers in psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.02240>
- Fox, J., & Bailenson, J. N. (2009). Virtual self-modeling: The effects of vicarious reinforcement and identification on exercise behaviors. *Media Psychology*, 12(1), 1-25.

- Gergen, K. J., & Gergen, M. M. (1988). Narrative and the Self as Relationship. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 21, pp. 17-56). Academic Press. [https://doi.org/https://doi.org/10.1016/S0065-2601\(08\)60223-3](https://doi.org/https://doi.org/10.1016/S0065-2601(08)60223-3)
- Gold, J., & Ciorciari, J. (2020). A Review on the Role of the Neuroscience of Flow States in the Modern World. *Behavioral Sciences*, 10(9), 137. <https://www.mdpi.com/2076-328X/10/9/137>
- Grasse, K. M., Kreminski, M., Wardrip-Fruin, N., Mateas, M., & Melcer, E. F. (2022). Using Self-Determination Theory to Explore Enjoyment of Educational Interactive Narrative Games: A Case Study of Academical [Original Research]. *Frontiers in Virtual Reality*, 3. <https://doi.org/10.3389/frvir.2022.847120>
- Green, M. C. (2004). Transportation Into Narrative Worlds: The Role of Prior Knowledge and Perceived Realism. *Discourse Processes*, 38(2), 247-266. https://doi.org/10.1207/s15326950dp3802_5
- Green, M. C., & Brock, T. C. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology*, 79(5), 701-721. <https://doi.org/10.1037//0022-3514.79.5.701>
- Green, M. C., & Jenkins, K. M. (2020). Need for Cognition, Transportability, and Engagement with Interactive Narratives. *Games for health journal*, 9(3), 182-186. <https://doi.org/10.1089/g4h.2019.0095>
- Grizzard, M., & Francemone, C. J. (2018). Research on the emotions caused by video games demands integration. In N. D. Bowman (Ed.), *Video Games: A Medium That Demands Our Attention* (pp. 60-73). Routledge.
- Hart, A. (2021). *5 games perfect for National Coming Out Day*. Retrieved March 28 from <https://gaymingmag.com/2021/10/5-games-perfect-for-national-coming-out-day/>
- Hefkaluk, N., Linehan, C., & Trace, A. (2024). Fail, fail again, fail better: How players who enjoy challenging games persist after failure in “Celeste”. *International Journal of Human-Computer Studies*, 183, 103199. <https://doi.org/https://doi.org/10.1016/j.ijhcs.2023.103199>
- Hillenbrand, A., & Verrina, E. (2022). The asymmetric effect of narratives on prosocial behavior. *Games and Economic Behavior*, 135, 241-270. <https://doi.org/https://doi.org/10.1016/j.geb.2022.06.008>
- Hinyard, L. J., & Kreuter, M. W. (2007). Using narrative communication as a tool for health behavior change: A conceptual, theoretical, and empirical overview. *Health Education & Behavior*, 34(5), 777-792. <http://heb.sagepub.com/cgi/content/abstract/34/5/777>
- Hon, A. (2008). *Games and stories*. Retrieved July 15 from <http://www.theguardian.com/technology/gamesblog/2008/mar/19/gamesandstories>
- Hope, N. H., Holding, A. C., Verner-Filion, J., Sheldon, K. M., & Koestner, R. (2019). The path from intrinsic aspirations to subjective well-being is mediated by changes in basic psychological need satisfaction and autonomous motivation: A large prospective test. *Motivation and Emotion*, 43(2), 232-241. <https://doi.org/10.1007/s11031-018-9733-z>
- Hwang, J., & Lu, A. S. (2018). Narrative and active video game in separate and additive effects of physical activity and cognitive function among young adults. *Scientific Reports*, 8(1), 11020.
- IJsselsteijn, W. A., de Kort, Y. A., & Poels, K. (2013). The game experience questionnaire. *Eindhoven: Technische Universiteit Eindhoven*, 3-9.

- Ip, B. (2011). Narrative Structures in Computer and Video Games: Part 1: Context, Definitions, and Initial Findings. *Games and Culture*, 6(2), 103-134.
<https://doi.org/10.1177/1555412010364982>
- Jackson, S. A. (2023). Flow Scales. In F. Maggino (Ed.), *Encyclopedia of Quality of Life and Well-Being Research* (pp. 2535-2538). Springer International Publishing.
https://doi.org/10.1007/978-3-031-17299-1_1065
- Jacobs, R. N. (2002). The narrative integration of personal and collective identity in social movements. In M. C. Green, J. J. Strange, & T. C. Brock (Eds.), *Narrative impact: Social and cognitive foundations*. (pp. 205-228). Lawrence Erlbaum Associates.
<http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=2003-04381-007&site=ehost-live>
- Johnson, B. K., Ewoldsen, D. R., & Slater, M. D. (2015). Self-Control Depletion and Narrative: Testing a Prediction of the TEBOTS Model. *Media Psychology*, 18(2), 196-220.
<https://doi.org/10.1080/15213269.2014.978872>
- Johnson, B. K., Slater, M. D., Silver, N. A., & Ewoldsen, D. R. (2021a). 250251Stories Enlarge the Experience of Self: Evidence for the Temporarily Expanded Boundaries of the Self (TEBOTS) Model. In P. Vorderer & C. Klimmt (Eds.), *The Oxford Handbook of Entertainment Theory* (pp. 0). Oxford University Press.
<https://doi.org/10.1093/oxfordhb/9780190072216.013.14>
- Johnson, B. K., Slater, M. D., Silver, N. A., & Ewoldsen, D. R. (2021b). Stories Enlarge the Experience of Self: Evidence for the Temporarily Expanded Boundaries of the Self (TEBOTS) Model. In P. Vorderer & C. Klimmt (Eds.), *The Oxford Handbook of Entertainment Theory* (pp. 0). Oxford University Press.
<https://doi.org/10.1093/oxfordhb/9780190072216.013.14>
- Kasser, T., Rosenblum, K. L., Sameroff, A. J., Deci, E. L., Niemiec, C. P., Ryan, R. M., Árnadóttir, O., Bond, R., Dittmar, H., Dungan, N., & Hawks, S. (2014). Changes in materialism, changes in psychological well-being: Evidence from three longitudinal studies and an intervention experiment. *Motivation and Emotion*, 38(1), 1-22.
<https://doi.org/10.1007/s11031-013-9371-4>
- Kim, K., Schmierbach, M. G., Bellur, S., Chung, M.-Y., Fraustino, J. D., Dardis, F., & Ahern, L. (2015). Is it a sense of autonomy, control, or attachment? Exploring the effects of in-game customization on game enjoyment. *Computers in Human Behavior*, 48, 695-705.
<https://doi.org/https://doi.org/10.1016/j.chb.2015.02.011>
- Kreuter, M. W., Green, M. C., Cappella, J. N., Slater, M. D., Wise, M. E., Storey, D., Clark, E. M., O'Keefe, D. J., Erwin, D., & Holmes, K. (2007). Narrative communication in cancer prevention and control: A framework to guide research and application. *Annals of Behavioral Medicine*, 33(3), 221-235. <https://doi.org/10.1007/BF02879904>
- Labov, W. (1972). The transformation of experience in narrative syntax. In W. Labov (Ed.), *Language in the inner city: Studies in Black English vernacular* (pp. 354-396). University of Philadelphia Press.
- Lavrijsen, J., & Verschueren, K. (2023). High Cognitive Ability and Mental Health: Findings from a Large Community Sample of Adolescents. *Journal of Intelligence*, 11(2), 38.
<https://www.mdpi.com/2079-3200/11/2/38>
- Lefkowitz, M. R. (1990). Mythology: The Myth of Joseph Campbell. *The American Scholar*, 59(3), 429-434.

- Lu, A. S. (2023). Narrative appeals. *The international encyclopedia of health communication*. Hoboken, NJ, USA: Wiley, 1-8.
- Lu, A. S., Baranowski, T., Hong, S. L., Buday, R., Thompson, D., Beltran, A., Dadabhoy, H., & Chen, T. (2016). The narrative impact of active video games on physical activity among children: A feasibility study. *Journal of Medical Internet Research*, 18(10), e272. <https://doi.org/10.2196/jmir.6538>
- Lu, A. S., Baranowski, T., Thompson, D., & Buday, R. (2012). Story immersion of videogames for youth health promotion: A review of literature. *Games for health journal*, 1(3), 199-204. <https://doi.org/10.1089/g4h.2011.0012>
- Lu, A. S., Pelarski, V., Alon, D., Baran, A., McGarrity, E., Swaminathan, N., & Sousa, C. V. (2023). The effect of narrative element incorporation on physical activity and game experience in active and sedentary virtual reality games. *Virtual Reality*. <https://doi.org/10.1007/s10055-023-00754-7>
- Maio, G. R., & Esses, V. M. (2001). The need for affect: Individual differences in the motivation to approach or avoid emotions. *Journal of Personality*, 69(4), 583-615. <https://doi.org/10.1111/1467-6494.694156>
- Mazzocco, P. J., Green, M. C., Sasota, J. A., & Jones, N. W. (2010). This Story Is Not for Everyone: Transportability and Narrative Persuasion. *Social Psychological and Personality Science*, 1(4), 361-368. <https://doi.org/10.1177/1948550610376600>
- McAdams, D. P. (2013). The Psychological Self as Actor, Agent, and Author. *Perspectives on Psychological Science*, 8(3), 272-295. <https://doi.org/10.1177/1745691612464657>
- Moller, A. C., & Deci, E. L. (2023). Intrinsic Motivation. In F. Maggino (Ed.), *Encyclopedia of Quality of Life and Well-Being Research* (pp. 3654-3657). Springer International Publishing. https://doi.org/10.1007/978-3-031-17299-1_1532
- Moller, A. C., Meier, B. P., & Wall, R. D. (2010). Developing an experimental induction of flow: Effortless action in the lab. In *Effortless attention: A new perspective in the cognitive science of attention and action*. (pp. 191-204). Boston Review. <https://doi.org/10.7551/mitpress/9780262013840.003.0010>
- Moran, J. (2023). Interpretative Phenomenological Analysis of Hero's Journeys in Zelda: Opportunities & Issues for Games Studies. *Game studies*, 23(2).
- Moyer-Gusé, E. (2008). Toward a Theory of Entertainment Persuasion: Explaining the Persuasive Effects of Entertainment-Education Messages. *Communication Theory*, 18(3), 407-425. <https://doi.org/10.1111/j.1468-2885.2008.00328.x>
- Moyer-Gusé, E., & Nabi, R. L. (2010). Explaining the effects of narrative in an entertainment television program: Overcoming resistance to persuasion. *Human Communication Research*, 36(1), 26-52.
- Murphy, S. T., Frank, L. B., Chatterjee, J. S., Moran, M. B., Zhao, N., Amezola de Herrera, P., & Baezconde-Garbanati, L. A. (2015). Comparing the Relative Efficacy of Narrative vs Nonnarrative Health Messages in Reducing Health Disparities Using a Randomized Trial. *American Journal of Public Health*, 105(10), e1-e7. <https://doi.org/10.2105/AJPH.2014.302332>
- Neigel, A. R., Behairy, S., & Szalma, J. L. (2017). Need for cognition and motivation differentially contribute to student performance. *Journal of Cognitive Education and Psychology*, 16(2), 144-156. <https://doi.org/10.1891/1945-8959.16.2.144>

- Niemiec, C. P., Ryan, R. M., & Deci, E. L. (2009). The path taken: Consequences of attaining intrinsic and extrinsic aspirations in post-college life. *Journal of Research in Personality*, 43(3), 291-306.
- O'Shaughnessy, N. (2017). *Marketing the Third Reich: Persuasion, packaging and propaganda*. Routledge.
- Oliver, M. B., Bowman, N. D., Woolley, J. K., Rogers, R., Sherrick, B. I., & Chung, M.-Y. (2016). Video games as meaningful entertainment experiences. *Psychology of Popular Media Culture*, 5(4), 390-405. <https://doi.org/10.1037/ppm0000066>
- Oschatz, C., & Marker, C. (2020). Long-term Persuasive Effects in Narrative Communication Research: A Meta-Analysis. *Journal of communication*, 70(4), 473-496. <https://doi.org/10.1093/joc/jqaa017>
- Paul, C. A. (2023). Meaning. In *The Routledge Companion to Video Game Studies* (pp. 572-578). Routledge.
- Pelletier, L. G., & Rocchi, M. (2023). Organismic Integration Theory: A Theory of Regulatory Styles, Internalization, Integration, and Human Functioning in Society. In R. M. Ryan (Ed.), *The Oxford Handbook of Self-Determination Theory* (pp. 0). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780197600047.013.4>
- Peng, W. (2008). The mediational role of identification in the relationship between experience mode and self-efficacy: Enactive role-playing versus passive observation. *CyberPsychology & Behavior*, 11(6), 649-652.
- Peters, D., & Calvo, R. A. (2023). 978Self-Determination Theory and Technology Design. In R. M. Ryan (Ed.), *The Oxford Handbook of Self-Determination Theory* (pp. 0). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780197600047.013.49>
- Polkinghorne, D. E. (1991). Narrative and Self-Concept. *Journal of Narrative and Life History*, 1(2-3), 135-153. <https://doi.org/https://doi.org/10.1075/jnlh.1.2-3.04nar>
- Przybylski, A. K., Weinstein, N., Murayama, K., Lynch, M. F., & Ryan, R. M. (2012). The ideal self at play: The appeal of video games that let you be all you can be. *Psychol Sci*, 23(1), 69-76.
- Rigby, C. S., & Przybylski, A. K. (2009). Virtual worlds and the learner hero: How today's video games can inform tomorrow's digital learning environments. *Theory and Research in Education*, 7(2), 214-223. <https://doi.org/10.1177/1477878509104326>
- Rigby, C. S., & Ryan, R. M. (2016). Time well-spent? Motivation for entertainment media and its eudaimonic aspects through the lens of self-determination theory. In *The Routledge handbook of media use and well-being: International perspectives on theory and research on positive media effects*. (pp. 34-48). Routledge/Taylor & Francis Group.
- Rigby, S., & Ryan, R. M. (2011). *Glued to games: How video games draw us in and hold us spellbound: How video games draw us in and hold us spellbound*. AbC-CLIo.
- Rogers, B. A., Chicas, H., Kelly, J. M., Kubin, E., Christian, M. S., Kachanoff, F. J., Berger, J., Puryear, C., McAdams, D. P., & Gray, K. (2023). Seeing your life story as a Hero's Journey increases meaning in life. *J Pers Soc Psychol*. <https://doi.org/10.1037/pspa0000341>
- Ryan, J. O., Mateas, M., & Wardrip-Fruin, N. (2015). Open Design Challenges for Interactive Emergent Narrative. In H. Schoenau-Fog, L. E. Bruni, S. Louchart, & S. Baceviciute, *Interactive Storytelling* Cham.
- Ryan, M.-L. (2023). Narratology for Game Studies. In P. Grabarczyk (Ed.), *The Encyclopedia of Ludic Terms* (pp. <https://eolt.org/articles/narratology>).

- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78. <https://doi.org/10.1037//0003-066x.55.1.68>
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness* [doi:10.1521/978.14625/28806]. The Guilford Press. <https://doi.org/10.1521/978.14625/28806>
- Ryan, R. M., & Deci, E. L. (2019). Chapter Four - Brick by Brick: The Origins, Development, and Future of Self-Determination Theory. In A. J. Elliot (Ed.), *Advances in Motivation Science* (Vol. 6, pp. 111-156). Elsevier. <https://doi.org/https://doi.org/10.1016/bs.adms.2019.01.001>
- Ryan, R. M., Deci, E. L., & Vansteenkiste, M. (2016). Autonomy and Autonomy Disturbances in Self-Development and Psychopathology: Research on Motivation, Attachment, and Clinical Process. In *Developmental Psychopathology* (pp. 1-54). <https://doi.org/https://doi.org/10.1002/9781119125556.devpsy109>
- Ryan, R. M., Deci, E. L., Vansteenkiste, M., & Soenens, B. (2021). Building a science of motivated persons: Self-determination theory's empirical approach to human experience and the regulation of behavior. *Motivation Science*, 7, 97-110. <https://doi.org/10.1037/mot0000194>
- Ryan, R. M., Rigby, C. S., & Przybylski, A. K. (2006). The Motivational Pull of Video Games: A Self-Determination Theory Approach [journal article]. *Motivation and Emotion*, 30(4), 344-360. <https://doi.org/10.1007/s11031-006-9051-8>
- Ryan, W. S., Legate, N., Weinstein, N., & Rahman, Q. (2017). Autonomy Support Fosters Lesbian, Gay, and Bisexual Identity Disclosure and Wellness, Especially for Those with Internalized Homophobia. *Journal of Social Issues*, 73(2), 289-306. <https://doi.org/https://doi.org/10.1111/josi.12217>
- Ryan, W. S., & Ryan, R. M. (2019). Toward a Social Psychology of Authenticity: Exploring Within-Person Variation in Autonomy, Congruence, and Genuineness Using Self-Determination Theory. *Review of General Psychology*, 23(1), 99-112. <https://doi.org/10.1037/gpr0000162>
- Sauer, J. D., Drummond, A., & Nova, N. (2015). Violent video games: The effects of narrative context and reward structure on in-game and postgame aggression. *Journal of experimental psychology: applied*, 21(3), 205.
- Schell, J. (2008). *The Art of Game Design: A book of lenses*. CRC press.
- Shen, F., Sheer, V. C., & Li, R. (2015). Impact of Narratives on Persuasion in Health Communication: A Meta-Analysis. *Journal of Advertising*, 44(2), 105-113. <https://doi.org/10.1080/00913367.2015.1018467>
- Sherrick, B. (2021). Empirically comparing flow, narrative engagement, and enjoyment as responses to a computer game. *Atlantic Journal of Communication*, 29(4), 230-245. <https://doi.org/10.1080/15456870.2020.1755289>
- Slater, M. D. (2007). Reinforcing Spirals: The Mutual Influence of Media Selectivity and Media Effects and Their Impact on Individual Behavior and Social Identity. *Communication Theory*, 17(3), 281-303. <https://doi.org/https://doi.org/10.1111/j.1468-2885.2007.00296.x>
- Slater, M. D., Johnson, B. K., Cohen, J., Comello, M. L. G., & Ewoldsen, D. R. (2014). Temporarily Expanding the Boundaries of the Self: Motivations for Entering the Story World and Implications for Narrative Effects. *Journal of communication*, 64(3), 439-455. <https://doi.org/https://doi.org/10.1111/jcom.12100>

- Slater, M. D., & Rouner, D. (2002). Entertainment-Education and Elaboration Likelihood: Understanding the processing of narrative persuasion. *Communication Theory*, 12(2), 173-191. <http://dx.doi.org/10.1111/j.1468-2885.2002.tb00265.x>
- Slater, M. D., Shehata, A., & Strömbäck, J. Reinforcing Spirals Model. In *The International Encyclopedia of Media Psychology* (pp. 1-11). <https://doi.org/https://doi.org/10.1002/9781119011071.iemp0134>
- Smith, M. (1994). Altered states: character and emotional response in the cinema. *Cinema Journal*, 33(4), 34-56.
- Soenens, B., & Vansteenkiste, M. (2023). A lifespan perspective on the importance of the basic psychological needs for psychosocial development. In *The Oxford handbook of self-determination theory*. (pp. 457-490). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780197600047.013.25>
- Sousa, C. V., Fernandez, A. M., Hwang, J., & Lu, A. S. (2020). The Effect of Narrative on Physical Activity via Immersion During Active Video Game Play in Children: Mediation Analysis. *Journal of Medical Internet Research*, 22(3), e17994. <https://doi.org/10.2196/17994>
- Surmelian, L. (1969). *Techniques of fiction writing*. Anchor Books.
- Tal-Or, N. (2016). How Co-Viewing Affects Attitudes: The Mediating Roles of Transportation and Identification. *Media Psychology*, 19(3), 381-405. <https://doi.org/10.1080/15213269.2015.1082918>
- Talaifar, S., & Swann, W. (2018). Self and Identity. In: Oxford University Press.
- Tyack, A., & Mekler, E. D. (2020). Self-Determination Theory in HCI Games Research: Current Uses and Open Questions. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (pp. 1–22). Association for Computing Machinery. <https://doi.org/10.1145/3313831.3376723>
- Tyack, A., & Wyeth, P. (2017). *Exploring relatedness in single-player video game play* Proceedings of the 29th Australian Conference on Computer-Human Interaction, Brisbane, Queensland, Australia. <https://doi.org/10.1145/3152771.3156149>
- Vaccaro, A. G., Scott, B., Gimbel, S. I., & Kaplan, J. T. (2021). Functional Brain Connectivity During Narrative Processing Relates to Transportation and Story Influence [Original Research]. *Frontiers in Human Neuroscience*, 15. <https://doi.org/10.3389/fnhum.2021.665319>
- van Laer, T., Feiereisen, S., & Visconti, L. M. (2019). Storytelling in the digital era: A meta-analysis of relevant moderators of the narrative transportation effect. *Journal of Business Research*, 96, 135-146. <https://doi.org/https://doi.org/10.1016/j.jbusres.2018.10.053>
- Vogler, C. (2017). Joseph Campbell goes to the movies: The influence of the hero's journey in film narrative. *Journal of Genius and Eminence*, 2(2), 9-23.
- Yee, N., & Bailenson, J. (2007). The Proteus effect: The effect of transformed self-representation on behavior. *Human Communication Research*, 33(3), 271-290.
- Zebregs, S., van den Putte, B., Neijens, P., & de Graaf, A. (2015). The Differential Impact of Statistical and Narrative Evidence on Beliefs, Attitude, and Intention: A Meta-Analysis. *Health Communication*, 30(3), 282-289. <https://doi.org/10.1080/10410236.2013.842528>

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