"Take Eight Bits and Call Me in the Morning"

Video Games, Well-Being, and the Psychology of Nostalgia

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For nearly 60 years, video games have arrested the attention of players, inviting us to interact and interface with on-screen content. More than just short-term entertainment experiences, video games are part of a broader cultural milieu—they are the most profitable media entertainment sector (global revenues nearly $400 billion USD in 2023) with more than 3.5 billion players globally (Clement, 2023). Similar to other entertainment media, some video game intellectual properties have transcended generations and, in many cases, grown beyond the medium itself: common cultural touchstones include Super Mario Bros. and Sonic the Hedgehog, along with seemingly endless subcultures of devoted fans of specific games and gaming properties (Jenkins, 2006). Unique from other entertainment media, video games present as "digital time machines" that allow players to directly revisit personally relevant and highly familiar worlds from the past in which those worlds remain unchanged (Robinson & Bowman, 2021; Wulf et al., 2018).

Among the many outcomes of this revisiting is nostalgia, understood broadly as a past-oriented, idiosyncratic, social, and bittersweet-but-overall-positive emotion that spans cultures (Sedikides & Wildschut, 2022). From a media psychological perspective, video game-induced nostalgia is especially compelling insofar as nostalgia can have therapeutic and analgesic properties—a comforting experience that has psychological and potentially even physical well-being benefits (Sedikides & Wildschut, 2018; Kersten et al., 2023).

The current chapter will provide an overview of the emerging psychological scholarship on nostalgia as induced by video games. Accordingly, much of the theory and research presented here is rooted in media psychology and mass communication scholarship, as these perspectives comprise our expertise and inform our understanding of nostalgia in video games. First, we provide a brief discussion of how one defines and specifies the types of games expected to elicit nostalgia (such as defining retrogames, Aycock, 2016; BBC, n.d.) as well as a summary of cultural and economic forces involved in gaming nostalgia (such as the preservation and/or remanufacture of seemingly classic games, Allen, 2021; Dyson, 2017). Next, we define nostalgia and discuss more specific definitions of nostalgia, such as the

distinction between personal nostalgia (for one's own autobiographical memories) and historical nostalgia (as an impression or a sensemaking of prior eras; Natterer, 2014) and how this relates to nostalgia as a meaningful mediated experience (Bowman et al., 2023b; Daneels et al., 2021). Following, we present evidence from scholarship on the correlations between nostalgic video game experiences and short-term subjective well-being (summarized in Bowman & Wulf, 2023), and identify areas of future research and development necessary to further explore the robustness and stability of these relationships. We conclude with a discussion about the myriad psychological implications of gaming-induced nostalgia, from boosting entertainment as well as for improving subjective well-being. We extract from this research implications for game design—both on how to purposefully elicit nostalgia for current gaming experiences, and for how current gaming experiences might be expected to foster nostalgia far into the future.

A brief note on defining retrogames

As noted in the introduction, video games have been a popular form of entertainment media since at least the mid-20th century. That said, defining what we consider what is or is not a retrogame is not so straightforward, given that the notion of "retro" is always relative to a point in time. As Gee (2019) argued:

> Does a game become retro after a certain number of years are passed? Is it when the game's hardware is no longer supported or produced? Or is it when its aesthetics are no longer mainstream? (p. 57).

Aycock (2018) further argues that another barrier to defining retrogames is that gaming technologies coexist and overlap with each other—we can see this for example in the release dates of home gaming consoles, such as the so-called 4th generation of consoles (e.g., Super Famicom/SNES and Sega Mega Drive/Genesis) surviving well into the 1990s, while 5th generation consoles (e.g., Sony's PlayStation) already released as of 1995 (BBC, n.d.). The shift from cartridge-based to CD-based game software brought with it fundamental shifts in the gaming experience, yet on consoles for which gamers of the time would have had equal access to.

That said, Gee (2019) provides a useful framework for considering retrogaming in terms of specific markers that could typify bygone gaming experiences. Examples could be games providing "three lives and health bar" and "high score" displays, both mechanics held over from coin-operated arcade games (also see Bowman et al., 2023b). In a similar vein, we can turn to Lewin's (2023) reporting that as of this writing, as many as 89% of all video games ever developed can no longer be played in their original form, thus suggesting that retrogames could be those that are endangered

or even extinct. As it will become apparent later in this chapter, modern incarnations of retrogames might engage a "pastness" or flavor of these former experiences (see Grainge, 2000), perhaps as a way to preserve their essence, or to celebrate their unique mechanics when contrasted with modern gaming experiences.

All said, there is clear interest in retrogaming experiences–from the more than 30 million subscribers to the Nintendo Switch Online service that allows gamers access to historical games from the Nintendo catalogue (Allen, 2021) to the recent re-release of the Atari 2600+ game console capable of paying original Atari game cartridges (Atari, 2023). Others such as Dyson (2017) write about ongoing efforts to collect and preserve electronic games—perhaps as an effort to engage with a cultural memory of and appreciation for video games (Bowman et al., 2023b; Seremetakis, 1994).

Nostalgia as a psychological phenomenon

Definitions of nostalgia are manifold and closely connected to the perspective that deals with the phenomenon. Etymologically, the word nostalgia derives from the Greek words for homecoming (νόστος; nostos) and pain (άλγος; algos). Most prominently, Homer's Odysseus was suffering ten years on his Odyssey to get home to his wife Penelope after the Trojan War. His memories of his wife, son, and homeland Ithaka, however, motivated him to keep fighting and continuing his journey to finally return home. From the perspective of (media) psychology, the definition of nostalgia derived by social psychologists appears essential for its application on gaming and (potential) well-being effects. In fact, Sedikides and colleagues (2015) define nostalgia as a "self-conscious, bittersweet but predominantly positive and fundamentally social emotion" (p. 190) that is triggered by reflection of fond memories.[1] Social psychological research following Sedikides and colleagues' (2015) definition of

1 Note that some theorists suggest the bittersweet nature reflects a negative consequence of nostalgia. For example, Impert and Rubin (2011) demonstrated a correlation between nostalgia and grief when remembering someone who has passed. However, others have shown how nostalgia can support the grieving process, suggesting the complexity of nostalgia as something that can be both positive and negative (Reid et al., 2021). Specific to video games, Yang & Liu (2017) found that escapism and nostalgia were negatively correlated with subjective well-being, which could be related to companion scholarship on time perspective in which past negative individuals could see nostalgic reverie as a painful experience (in contrast to past positive people; see Jankowski et al., 2020). Finally, from a sociological perspective, there is a tradition of scholarship on the negative and politically insidious implications of nostalgia–for example, those invoking a nostalgic mood (Grainge, 2000) to glorify the past (such as *Making [Thing] Great Again*). An overview of these arguments applied to media scholarship is presented in Kalinina (2016).

nostalgia has uncovered its manifold functions since the early 2000s. Thereby, this view entails a paradigm shift, as nostalgia was previously dismissed for a long time as a predominantly neg-ative state, as kind of "homesickness," and was even classified as a disease in the 17th century (Hofer, 1688/1934; Sedikides et al., 2004).

Nostalgia is a so-called mixed emotion. While on the one hand, people look through symbolic rose-tinted glasses and valorize the memories as particularly positive, they also experience a certain melancholy in the certainty that things will never be the same again. Following Frijda's (2007) classification of emotions, Hepper and colleagues (2012) therefore argue that nostalgia should be understood as a mixed emotion due to the co-activation of positive and negative affect. Another comparable mixed emotion is poignancy, an emotional response to personally significant events (e.g., Ersner-Hershfield et al., 2008). Finally, Hepper and colleagues conduct a prototype analysis. In a series of seven studies in total, they ask participants about the features of nostalgia, categorize them, rank the importance of the features, and finally recategorize the features into central and peripheral features of nostalgia. Core features of nostalgia are personally meaningful memories of places, things, and people; positive affect such as happiness, and (rather peripheral) negative affect such as loss and fear. This prototype was validated across various cultural backgrounds (Hepper et al., 2014).

Existing research on nostalgia as a psychological phenomenon and mixed emotion has uncovered three fundamental psychological functions (cf. Sedikides et al., 2015): First, nostalgia takes on a meaning-making function (also referred to as existential function). Nostalgic people perceive more meaningfulness in their own lives and, at the same time, search less for meaning in their own lives (Routledge et al., 2011; 2012). In a 2010 study, Juhl and colleagues show that nostalgia can reduce the existential threat that is triggered when confronted with one's own mortality in the context of terror management theory.[2] Second, nostalgia fulfils a self-oriented function that supports the self. Nostalgic people have better access to their intrinsic self-concept, and have a better idea of what they are really like (Baldwin et al., 2015). They are more optimistic (Cheung et al., 2013), more confident, and more aware of their positive attributes (Baldwin & Landau, 2014, Vess et al., 2012). Finally, nostalgia's social function is mirrored in research suggesting that nostalgic people feel more connected to other people in their lives and, overall, less lonely (Wildschut et al., 2006; Zhou et al., 2008).

Most of the studies demonstrating these three functions of nostalgia have been researched using the so-called Event Reflection Task (ERT, Sedikides et al., 2015).

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2 Terror management theory (Greenberg et al., 1986) argues that when people are made aware of their own mortality, they cope with this anxiety by engaging and sustaining cultural beliefs, and finding other ways to boost self-esteem. Nostalgia could function as a buffer by reminding people of their broader life's meaning (also see Greenberg & Arndt, 2012).

Following this approach, there are two experimental groups: While one group is asked to write an essay about a common everyday situation, the other is instructed to recall an experience that makes them nostalgic. While ERT is a methodologically clean way to investigate these kinds of effects, nostalgia in everyday life is rarely triggered via such an artificial instruction. Thus, Wulf and colleagues (2018) argue that media content that reminds people of individual and fond memories can trigger similar effects. Such media can be, for example, specific songs that were playing at a certain, meaningful event (a wedding, anniversary, graduation party, first kiss, etc.) or movies that are connected to meaningful memories (the first movie you went to with parents, a franchise of beloved superheroes or cartoon characters from one's childhood). Indeed, many studies attest that a wide range of (media) stimuli can trigger nostalgia, ranging from visual (photos and objects, Holbrook & Schindler, 1996) and auditory (songs; Barrett et al., 2010), olfactory (smells; Reid, Green, Wildschut, & Sedikides, 2014) and gustatory stimuli (tastes; Supski, 2013). Initial studies have also attempted to elicit nostalgia via haptic stimuli, such as the specific shape of video game controllers (Bowman et al., 2023a; 2023b).

Video games, nostalgia, and well-being

Through a rose-tinted heads-up display, video games, like other forms of media content, have the propensity to trigger nostalgia (Neimeyer, 2014) by transporting gamers back in time, serving as "[digital] time machines" (Wulf et al., 2018, p. 61). Literature has identified ways in which nostalgia can be triggered through video games. One way nostalgia can be triggered is through recall of an individual's own memories. This can be prompted after watching a video game trailer from one's childhood (Natterer, 2014), or writing about a memorable gaming experience from a bygone era (Wulf et al. 2020). Research has also demonstrated that nostalgia can be triggered through game play of either a modern version of nostalgic content (e.g., playing Pokémon GO (Niantic, 2016); Bonus et al., 2018) or nostalgia can be induced by playing older nostalgic content (e.g., playing Super Mario Bros. (Nintendo, 1985) on the NES Classic; Bowman et al., 2023a). The prior citations are examples of an individual's own personal (nostalgic) experiences (Bowman et al., 2023b); and playing nostalgic content allows individuals to connect with their past and play games from their childhood (Harborth & Pape, 2020). However, other forms of nostalgic memories may not be linked to an individual's personal lived experiences, rather a preference for media of a certain historical (nostalgic) time period (Natterer, 2014).

Historical nostalgia may be induced by referring to the culture and media of a different time period. This concept is represented in a variety of video game titles, where the design and narrative captures these bygone eras. The Beatles: Rock

Band (Harmonix, 2009) is one example of a documentary type game, which references the romanticized pop culture of the 1960s (Hodson, 2012). Others include Far Cry 3: Blood Dragon (Ubisoft Montreal, 2013), which borrows a "nostalgic mode" from 1980s science fiction action films (Sloan, 2015), and Gone Home (The Fullbright Company, 2013), set in the 1990s in the US and using with period-accurate foods, soda cans, and clothing (Sloan, 2015). Video games offer a unique opportunity for individuals with no prior gameplay experience to feel a part of a prior generation (Bowman et al., 2022). This illustrates the diversity in which developers utilize nostalgia, as it can be used as a tool to reach a wider audience (Pearce, 2008). Using Super Mario Bros. as an example, individuals will dedicate their resources to the demanding nature of video games (Bowman, 2018; 2021) to reconnect with their past (personal nostalgia) or to connect with a prior generation of gamers (historical nostalgia).

A synonymous finding between the aforementioned literature on personal and historical nostalgia is the positive influence that nostalgic content has on an individual, with regard to psychological well-being and subjective well-being. These positive effects on well-being are highlighted in the media-induced nostalgic contributions to the well-being model (MINCoW; Wulf et al., 2018) which stipulates that:

- Nostalgia has a direct influence on media experiences and outcomes, such as enjoyment and appreciation
- Nostalgia contributes directly to well-being through self-oriented, existential, and social functions
- Entertainment outcomes mediate the indirect effect nostalgia has on well-being

Video games research has tested some assumptions presented in the MINCoW model. Addressing the first assumption, Yang and Liu (2017) found a significant correlation between game play and enjoyment in Pokémon Go. Ghazali et al. (2018) also discovered that enjoyment of Pokémon GO influenced continued play. Research by Bonus et al. (2018) found that playing Pokémon GO was associated with nostalgic feelings as well as friendship formation and intensification, which addresses the second assumption. Regarding the third assumption, research found that playing a nostalgic video game, such as Pokémon Go, predicted eudaemonic (personally meaningful) entertainment experiences, which had an indirect effect on psychological well-being (such as personal flourishing; Wulf & Baldwin, 2020).

Previous research has identified a strong association between gaming-induced nostalgia and social connectedness. It has been found that individuals who played with guild members in World of Warcraft (Blizzard, 2004), would experience less loneliness and social anxiety online compared to the real world (Martončik & Lokša, 2016). Furthermore, individuals who played World of Warcraft Classic had stronger feelings of nostalgia when they felt a higher sense of social presence

(Robinson & Bowman, 2021), which demonstrates the social role that nostalgia plays. Wulf et al. (2020) found that when participants recalled a personally nostalgic video gaming experience, memories often included time spent with family members or friends, which resulted in higher levels of optimism, self-esteem, and vitality. This demonstrated the positive effect of past social gaming memories, which increased levels of nostalgia, which in turn resulted in higher psychological and subjective well-being.

Designing games with nostalgia in mind

To date, research into nostalgia in video games is comparatively light when we consider the 60-plus year history of the gaming medium, and the wealth of anecdotal evidence suggesting the cultural and economic appeal of retrogaming. Intuitively, it is clear that the audience for video games has aged along with the medium, and we can find a combination of seasoned gamers eager to replay their boards, screens, and worlds of yesterday. Just as well, we see newer gamers equally as eager to engage those seemingly bygone gaming experiences–to get a sense for earlier "eras" of video games as a way to more deeply engage with and experience the medium. From this nascent body of scholarship, we can already see paths forward that have implications for how games are imagined, engaged, experienced and enjoyed.

Nostalgic mode and retrogaming design

Conversations around nostalgia in video games tend to focus solely on either bygone games and gaming technologies (such as the aforementioned *NES* home game console) or on releases of familiar and established gaming properties (such as the aforementioned Pokémon and Super Mario Bros.). These intellectual properties and trademarks have followings stemming from decades of gaming experience, and their re-releases serve as proxy indicators of their legacies–both for video games and for pop culture broadly. That said, there are numerous releases that engage with various features and attributes of older video games, while being based on entirely new characters, narratives, and intellectual properties. Grainge (2000) involves the notion of *nostalgic mode*—borrowing from Jameson's (1991) notes on postmodernism—to explain an aesthetic engagement with nostalgic content. Here, it is possible for the "look and feel" of older video games to be engaged by recreating elements common to the medium. Schrey (2014) talks specifically about how media cultures might celebrate the uniqueness of engaging with the limitations of media technologies–in older video games, this might include pixel art and animation (Makai, 2018) as well as chiptune music from 8-bit and 16-bit processors

(Driscoll & Diaz, 2009). Such animations and sounds were standard for their eras, but when used in modern video games evoke a sense of "pastness" for video games as a medium. For Grainge, (2000), such engagement can be understood as "an increasing semiotic awareness of the textuality of the past." To this end, we can consider the popularity of the aptly named "Metroidvania" genre of video games.[3] Such games borrow mechanics from a seemingly bygone genre of video games in the two-dimensional action platformer, often featuring pixel graphics and similar music while encouraging players to explore and "board by board"—often visiting older parts of the game map once newer abilities and skills are discovered (see Figure 1). Such a game genre is somewhat outdated in the era of sensory immersive and persistent online three-dimensional worlds, in which gamers can move in near-complete 360-degree space to navigate crafted environments from a first-person perspective. Games such as 9 Years of Shadows (Halberd Studios, 2023) engage the "nostalgic mode" of games from the late 1980s and early 1990s, while presenting game content that is wholly original.[4] The game was highly regarded as a "bright spot among Metroidvanias" (Cart, 2023), with a statement somewhat suggesting a potential market saturation of the genre. In a similar vein, Oliveira et al. (2020) noted that Metroidvania games are an increasingly popular focus of indie game developers. Among many reasons for this could be a combination of the experiences of these developers (many of whom "grew up" on Metroidvania-type games) to a broader cultural appreciation for a style of gaming paradoxically novel and unique to contemporary gamers.

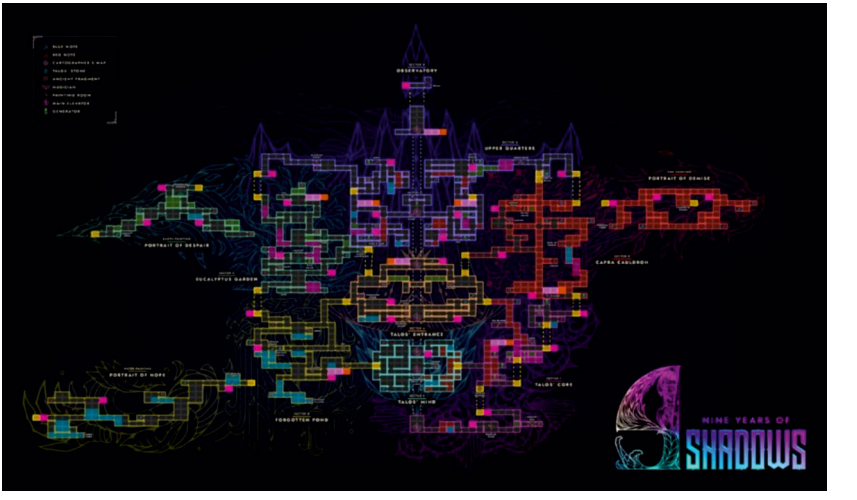
It is clear that Metroidvania games are popular, yet it is less clear as to whether and how these games might be experienced as *nostalgic* video games experiences. Open questions to consider might be the extent to which established gamers experience a sense of personal nostalgia for the nostalgic mode presented in these games—perhaps being reminded of bygone gaming experiences. Likewise, we could further investigate the extent to which younger gamers experience historical nostalgia for these games—perhaps engaging them with a sense of appreciation for the gaming as a whole (somewhat replicating Bowman et al., 2023b). Moreover, it could be that other gameplay mechanisms of "older" video games are likely to be engaged via nostalgic modes, given that retrogames are a relative categorization that

3 The namesake of this genre of games is a portmanteau of two classic video game properties in Metroid (Nintendo, 1987) and Castlevania (Konami, 1986); see Oliveira et al. (2020).

4 Notably, games such as 9 Years of Shadows are also representative of more diverse and inclusive voices not commonly featured in the history of video game development. For this game, the developer Halberd Studios is based in the Zapopan district of Guadalajara, Jalisco, Mexico (more information: https://www.halberdstudios.com/). The game's aesthetics were further inspired by anime programs such as Sailor Moon and Saint Seiya (for more details, see https://steamcommunity.com/app/1402120/discussions/0/3825284962834862035/).

depends on the player's own experiences. Developers and researchers alike are encouraged to consider defining and delineating between various nostalgic notes, as understanding how engaging a nostalgic mode positively or negatively influences player experiences would be useful for developers who might seek out other "bygone" gaming aesthetics to emulate (also noted by Gee, 2019).

Figure 1: The game map from 9 Years of Shadows (Halberd Studios, 2023). This level design is a standard feature of classic video games from the 1980s and early 1990s, when the technology did not allow for extensive and sensory immersive three-dimensional worlds. Instead, players navigated interconnected "rooms" with an end goal of unlocking all rooms and finding various objects and skills



Map used with permission of Halberd Studios

Video games and parent-child relationships

In prior research on video games and nostalgia, Wulf et al. (2020) came across the following comment shared by one of their survey participants: "My dad died when I was 10, so [playing Mario Kart with him] is one of my best memories of him." Although the quote was unique in terms of its sombreness, it was typical of more than 25% of the nostalgic memories shared by players (and nearly half of the memories which individuals were asked to discuss were social memories). These data reflect recent industry reports. In the United States, for example, the Entertainment Software Association has consistently reported a high degree of parent-child gaming,

from around 67% in their 2017 report (ESA, 2017) to 76% as of their 2023 report (ESA, 2023). Active parental mediation strategies in which parents help their children understand and engage with on-screen content through the co-play of video games are correlated with more positive and effective family communication (Jiow et al., 2017; Wang et al., 2018). Likewise, research into nostalgia as an autobiographical notion suggests that connecting and engaging with meaningful others, such as family, is especially relevant for memories that trigger nostalgia (Abeyta et al., 2015, also see Hepper et al., 2012). Taken as a whole, this research suggests that, along with the short-term benefits of parent-child video gaming for encouraging healthy family communication styles, these shared social entertainment experiences are precisely the sort that parents and their children are likely to cherish later in life.

Related to this, we can also consider other ways in which parents might share their own prior gaming experiences with their children. In writing about nostalgia and well-being, Bowman and Wulf (2023) came across a social media post in a retrogames-focused subreddit in which a person discussed the experience of stumbling across their parent's old video game save file from Legend of Zelda: Ocarina of Time (Nintendo, 1998).[5] The post kicked off several threads of conversation about the curiosity and novelty of engaging in what could be perceived as a highly personal and private experience–video game files could be seen as an extension of one's self in digital worlds, for many of the reasons previously stated. Media broadly can serve an important part of self-identity (for example, music and adolescent identity; North & Hargreaves, 2006) and likewise, sharing those self-relevant artefacts is yet another way that parents engage children, and how children might make sense of their parents' experience and identities. Game developer Jesse Schell has written about the notion of "persistent avatars" that might follow a player throughout the lifetime (MCV Staff, 2010), and already we can see this in games such as World of Warcraft, where some players have had active avatars (and the associated save files with those characters' progress) for nearly 30 years since the game's release in 2005. The paucity of research on sharing these potentially deep, meaningful, and idiosyncratic personal save files across generations is ripe for future study.

Sense of place and digital locations

Another area ripe for exploration would be how players might form attachments to the various locations from their own video game history. Borrowing from cultural geography, the concept of *sense of place* (SoP) explains the idiosyncratic and interpersonal connections that one feels for self-referential locations. As defined by Tuan

5 The post is shared with permission of the original poster: https://www.reddit.com/r/n64/comments/y70da7/using_my_dads_old_ocarina_save_file/

(1975), "to know a place fully means both to understand it in an abstract way and to know it as one person knows another" (Tuan, 1975, p. 152). Relph (1976) followed in suggesting that sense of place forms as a combination of our familiarity with, experiences in, and *genius loci* that we feel for spaces; Hauge (2007) further argues that sense of place is critical to our sense of identity.

Although SoP has been studied extensively with respect to physical locations, there is emerging evidence that digital places can also facilitate SoP in ways that are associated with nostalgic memories. Turner and Turner (2006) recreated museum exhibits in virtual reality systems, and participants remarked how their engagement with those exhibits reminded them of childhood visits to museums and other cultural exhibits with family and friends. Directly in video games, Bowman et al. (2020) found that after two months playing Fallout 76, players began to foster SoP for West Virginia (the US state rendered digitally in-game)–in particular, players not from West Virginia saw a steady increase in SoP on par with those players native to the region. Later work by Bowman, Vanderwelle et al. (2023) examined Assassin's Creed games and again found that engaging with those games fostered SoP for various historical locations (such as London and Paris). Few studies have looked at the relationships between video game locations and nostalgia (cf. Robinson & Bowman, 2021), but it would stand to reason that part of the appeal of retrogames would be a yearning to re-engage important and self-referential game locations for which players might well have spent 10s to 100s of hours of their formative years engaging with.

Conclusion and future directions

Video games are a global economic and cultural mainstay, with a nearly 60-year history of engaging and delighting players by taxing their cognitive, emotional, physical, and social resources. Games are played across cultures and across the lifespan, and bygone gaming experiences leave lasting impressions–the games of yesterday serve as wellsprings of nostalgic reverie today, and the games of today have the potential to serve as nostalgic referents for tomorrow.

References

Abeyta, A. A., Routledge, C., Roylance, C., Wildschut, T., & Sedikides, C. (2015). Attachment-related avoidance and the social and agentic content of nostalgic memories. *Journal of Social and Personal Relationships*, 32, 406–413 http://dx.doi.org/10.1177/0265407514533770

Allen, J. (2021, November 8). *Nintendo Switch Online has 32 million subscribers according to Nintendo*. NME. Retrieved from https://www.nme.com/news/gaming-news/

nintendo-switch-online-has-32million-subscribers-according-to-nintendo-3090023

Atari. (2023). Atari 2600+. *Atari*. Retrieved from https://atari.com/products/atari-2600-plus

Aycock, J. (2016). *Retrogame archeology: Exploring old computer games*. Springer. https://doi.org/10.1007/978-3-319-30004-7

Barrett, F. S., Grimm, K. J., Robins, R. W., Wildschut, T., Sedikides, C., & Janata, P. (2010). Music-evoked nostalgia: affect, memory, and personality. Emotion, 10, 390–403. https://doi.org/10.1037/a0019006

BBC (n. d.). The 8 generations of video game consoles. BBC. Retrieved from https://www.bbc.co.uk/archive/the-8-generations-of-video-game-consoles/zvcjkty

Baldwin, M., Biernat, M., & Landau, M. J. (2015). Remembering the real me: Nostalgia offers a window to the intrinsic self. Journal of Personality and Social Psychology, 108, 128–147. https://doi.org/10.1037/a0038033

Baldwin, M., & Landau, M. J. (2014). Exploring nostalgia's influence on psychological growth. *Self and Identity*, 13, 162–177. https://doi.org/10.1080/15298868.2013.772320

Blizzard Entertainment. (2004). World of Warcraft [Microsoft Windows and macOS]. Blizzard Entertainment.

Bonus, J. A., Peebles, A., Mares, M.-L., & Sarmiento, I. G. (2018). Look on the Bright Side (of Media Effects): Pokémon Go as a Catalyst for Positive Life Experiences. *Media Psychology, 21*(2), 263–287. https://doi.org/10.1080/15213269.2017.1305280

Bowman, N. D. (2018). The demanding nature of video game play. In N.D. Bowman (Ed.), *Video games: A medium that demands our attention* (pp. 1–24). Routledge.

Bowman, N. D. (2021). Interactivity as demand: Implications for interactive media entertainment. In C. Klimmt & P. Vorderer (Eds.), *Oxford handbook of media entertainment*. Oxford University Press.

Bowman, N. D., Banks. J., Rittenour, C. (2020). Country roads through 1s and 0s: Sense of place for and recollection of West Virginia following long-term engagement with Fallout 76. *Technology, Mind, and Behavior*, 1(1). https://psycnet.apa.org/doi/10.1037/tmb0000001

Bowman, N. D., & Wulf, T. (2023). Nostalgia in video games. *Current Opinions in Psychology, 49*. https://doi.org/10.1016/j.copsyc.2022.101544

Bowman, N. D., Vandewelle, A., Daneels, R., Lee, Y., & Chen. S. (2023). Animating a plausible past: Perceived realism and sense of place influence entertainment of and tourism intentions from historical video games. *Games & Culture*. https://doi.org/10.1177/15554120231162428

Bowman, N. D., Velez, J., Wulf, T., Breuer, J., Yoshimura, K., & Resignato, L. J. (2023a). That bygone feeling: Controller ergonomics and nostalgia in video game play. *Psychology of Popular Media, 12*(2), 147–158. https://doi.org/10.1037/ppm0000382

Bowman, N. D., Yoshimura, K., Bohaty, E., & Condis, M. (2023b). "Makes me feel like I was born in the wrong era": Gamer self-efficacy and appreciation, rather than controller type, correlate with historical nostalgia when playing a retrogame. *Psychology of Popular Media*. https://doi.org/10.1037/ppm0000492

Cart, B. (2023, April 21). '9 Years of Shadows' review: Symphony of light. *NPR*. Retrieved from https://www.npr.org/2023/04/21/1170862559/9-years-of-shadows-review-symphony-of-the-light-castlevania-metroidvania

Cheung, W.-Y., Wildschut, T., Sedikides, C., Hepper, E. G., Arndt, J., & Vingerhoets, J. J. M. (2013). Back to the future: nostalgia increases optimism. *Personality & Social Psychology Bulletin, 39*, 1484–1496. https://doi.org/10.1177/0146167213499187

Clement, J. (2023, June 15). Video game industry – statistics & facts. *Statista*. Retrieved from https://www.statista.com/topics/868/video-games/#topicOverview

Crogan, P., & Kennedy, H. (2009). Technologies between games and culture. *Games & Culture, 4*(2), 107–114. https://doi.org/10.1177/1555412008325482

Daneels. R., Bowman, N. D., Possler, D., & Mekler, E. (2021). The 'eudaimonic experience': A scoping review of the concept in digital games research. *Media & Communication, 9*(2). https://doi.org/10.17645/mac.v9i2.3824

Driscoll, K. & Diaz, J. (2009). Endless loop: A brief history of chiptunes. *Transformative Works and Cultures. 2*(1). https://doi.org/10.3983/twc.2009.096

Dyson, J. P. C. (2017). Collecting, preserving, and interpreting the history of electronic games. *American Journal of Play, 10*(1). Retrieved from https://eric.ed.gov/?id=EJ1166783

Entertainment Software Association (2017). *Essential facts about the computer and video game industry.* ESA. Retrieved from https://www.theesa.com/wp-content/uploads/2021/03/ESA_EssentialFacts_2017.pdf

Entertainment Software Association (2023). *Essential facts about the U.S. video game industry.* ESA. Retrieved from https://www.theesa.com/2023-essential-facts/

Ersner-Hershfield, H., Mikels, J. A., & Sullivan, S. J. (2010). Poingnancy: mixed emotions in meaningful endings. *Journal of Personality, 94*, 158–167. https://doi.org/10.1037/0022-3514.94.1.158

Frijda, N. H. (2007). *The laws of emotion*. LEA.

Gee, D. (2019). Remixing retro: Preserving the "classic feeling". *Journal of the Japanese Association for Digital Humanities, 4*(1), 54–71. https://doi.org/10.17928/jjadh.4.1_54

Ghazali, E., Mutum, D. S., & Woon, M.-Y. (2019). Exploring player behavior and motivations to continue playing Pokémon GO. *Information Technology & People, 32*(3), 646–667. https://doi.org/10.1108/ITP-07-2017-0216

Grainge, P. (2000) Nostalgia and style in retro America: Moods, modes, and media recycling. *Journal of American Culture, 23*(1), 27–34. https://doi.org/10.1111/j.1537-4726.2000.2301_27.x

Greenberg, J., & Arndt, J. (2012). Terror management theory. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (pp. 398–415). Sage. https://doi.org/10.4135/9781446249215.n20

Greenberg, J., Pyszczynski, T., & Solomon, S. (1986). The causes of and consequences of a need for self-esteem: A terror management theory. In R. F. Baumeister (Ed.), *Public self and private self* (pp. 189–212). Springer-Verlag.

Halberd Studios. (2023). 9 Years of Shadows. [Steam]. Halberd Studios.

Harborth, D., & Pape, S. (2020). How nostalgic feelings impact Pokémon Go players – integrating childhood brand nostalgia into the technology acceptance theory. *Behaviour & Information Technology, 39*(12), 1276–1296. https://doi.org/10.1080/0144929X.2019.1662486

Harmonix. (2009). The Beatles: Rock Band [Sony Playstation 3, Nintendo Wii, and Microsoft Xbox 360]. MTV Games.

Hauge, Å. L. (2007). Identity and place: A critical comparison of three identity theories. *Architectural Science Review, 50*(1), 44–51. https://doi.org/10.3763/asre.2007.5007

Hepper, E. G., Ritchie, T. D., Sedikides, C., & Wildschut, T. (2012). Odyssey's end: lay conceptions of nostalgia reflect its original Homeric meaning. *Emotion, 12*, 102–119. https://doi.org/10.1037/a0025167

Hepper, E. G., Wildschut, T., Sedikides, C., Ritchie, T., Yung, Y.-F., Hansen, N., Zhou, X. (2014). Pancultural nostalgia: Prototypical conceptions across cultures. *Emotion, 14*, 733–747. https://doi.org/10.1037/a0036790

History of Medicine, 2, 376–391 (Original work published 1688)

Hodson, J. (2021). *"When I'm sixty-four:" Beatles Rock Band and the commodification of nostalgia* [Other]. https://doi.org/10.32920/ryerson.14637966.v1

Holbrook, M. B., & Schindler, R. M. (1996). Market segmentation based on age and attitude toward the past: Concepts, methods, and findings concerning nostalgic influences on customer tastes. *Journal of Business Research, 37*, 27–39. https://doi.org/10.1016/0148-2963(96)00023-9

Impert, L., & Rubin, M. (2011). The mother at the glen: The relationship between mourning and nostalgia. *Psychoanalytic Dialogues, 21*(6), 691–706. https://doi.org10.1080/10481885.2011.629567/

Jameson, F. (1991). *Postmodernism, or the cultural logic of late capitalism*. Verso.

Jankowski, K. S., Zajenkowski, M., & Stolarski, M. (2020). What are the optimal levels of time perspectives? Deviation from the balanced time perspective-revisited (DBTP-r). *Psychological Belgica, 60*(1). https://doi.org/10.5334%2Fpb.487

Jenkins, H. (2006). Fans, bloggers, and gamers: Exploring participatory culture. *NYU Press*. http://dx.doi.org/10.18574/nyu/9780814743690.001.0001

Jiow H. J., Lim S.S., & Lin J. (2017). Level up! Refreshing parental mediation theory for our digital media landscape. *Communication Theory, 27*(3), 309–328. https://doi.org/10.1111/comt.12109

Juhl, J., Routledge, C., Arndt, J., Sedikides, C., & Wildschut, T. (2010). Fighting the future with the past: Nostalgia buffers existential threat. *Journal of Research in Personality, 44*, 309–314. https://doi.org/10.1016/j.jrp.2010.02.006

Kalinina, E. (2016). What do we talk about when we talk about media and nostalgia? *Medien & Zeit, 4*. Retrieved from https://medienundzeit.at/wp-content/uploads/2017/02/MZ-2016-4-online-ed.pdf#page=8

Kersten, M., & Cox, C. R. (2023). The past promotes the picture of health: Nostalgia as a resource for physical well-being. *Current Opinion in Psychology, 49*. https://doi.org/10.1016/j.copsyc.2022.101522

Konami. (1986). Castlevania. [Nintendo Entertainment System]. Konami.

Lewin, K. (2023, July 10). 87% missing: The disappearance of classic video games. *Video Game History Foundation*. Retrieved from https://gamehistory.org/87percent/

Makai, P. K. (2019). Video games as objects and vehicles of nostalgia. *Humanities, 7*(4), https://doi.org/10.3390/h7040123

Martončik, M., & Lokša, J. (2016). Do World of Warcraft (MMORPG) players experience less loneliness and social anxiety in online world (virtual environment) than in real world (offline)? *Computers in Human Behavior, 56*, 127–134. https://doi.org/10.1016/j.chb.2015.11.035

MCV Staff. (2010, November 10). Jesse Schell's persistent avatar vision. *MCV UK*. Retrieved from https://mcvuk.com/development-news/jesse-schells-persistent-avatar-vision/

Natterer, K. (2014). How and why to measure personal and historical nostalgic responses through entertainment media. *International Journal on Media Management, 16*(3), 161–180. https://doi.org/10.1080/14241277.2014.989567

Niantic. (2016). Pokémon GO [iOS, Android]. Niantic.

Niemeyer, K. (2014). Introduction: Media and nostalgia. In K. Niemeyer (Ed.), *Media and nostalgia* (pp. 1–23). Palgrave Macmillan UK. https://doi.org/10.1057/9781137375889_1

Nintendo. (1985). Super Mario Bros. [Nintendo Entertainment System]. Nintendo.

Nintendo. (1987). Metroid. [Nintendo Entertainment System]. Nintendo.

Nintendo. (1998). Legend of Zelda: Ocarina of Time. [Nintendo 64]. Nintendo.

North, A. C., & Hargreaves, D. J. (2006). Music and adolescent identity. *Music Education Research, 1*(1), 75–92. https://doi.org/10.1080/1461380990010107

Oliveira, B. P., da Rocha Franco, A. dO., Franco de Silva, J. W., de Carvalho Gomes, F. A., & Rodrigues Maia, J. G. (2020). A framework for Metroidvania games. In *Proceedings of SBGames 2020*. Retrieved from https://www.researchgate.net/profile/Jose-Maia-4/publication/346540910_A_Framework_for_Metroidvania_Games/links/5fc67deda6fdccfea3f0770d/A-Framework-for-Metroidvania-Games.pdf

Pearce, C. (2008). The Truth About Baby Boomer Gamers: A Study of Over-Forty Computer Game Players. *Games and Culture, 3*(2), 142–174. https://doi.org/10.1177/1555412008314132

Reid, C. A., Green, J. D., Wildschut, T., & Sedikides, C. (2014). Scent-evoked nostalgia. *Memory, 23*, 157–166. https://doi.org/10.1080/09658211.2013.876048

Reid, C. A., Green, J. D., Short, S. D., Willis, K. D., Moloney, J. M., Collison, E. A., Wildschut, T. Sedikides, C. & Gramling, S. (2021). The past as a resource for the bereaved: Nostalgia predicts declines in distress. *Cognition and Emotion, 35*(2), 256–268. https://doi.org/10.1080/02699931.2020.1825339

Robinson, J. A., & Bowman, N. D. (2021). Returning to Azeroth: Nostalgia, sense of place, and social presence in World of Warcraft Classic. *Games & Culture, 17*(3), 421–444. https://doi.org/10.1177/15554120211034759

Routledge, C., Arndt, J., Wildschut, T., Sedikides, C., Hart, C., Juhl, J., Scholtz, W. (2011). The past makes the present meaningful: Nostalgia as an existential resource. Journal of *Personality and Social Psychology, 101*, 638–652. https://doi.org/10.1037/a0024292

Routledge, C., Wildschut, T., Sedikides, C., Juhl, J., & Arndt, J. (2012). The power of the past: nostalgia as a meaning-making resource. *Memory, 20*, 452–60. https://doi.org/10.1080/09658211.2012.677452

Schrey, D. (2014). Analogue nostalgia and the aesthetics of digital remediation. In K. Niemeyer (Ed.), *Media and nostalgia*. Palgrave Macmillan. https://doi.org/10.1057/9781137375889_2

Sedikides, C., & Wildschut, T. (2018). Finding meaning in nostalgia. *Review of General Psychology, 22*, 48–61. https://doi.org/10.1037/gpr0000109

Sedikides, C., & Wildschut, T. (2022). Nostalgia across cultures. *Journal of Pacific Rim Psychology*, *16*. https://doi.org/10.1177/18344909221091649

Sedikides, C., Wildschut, T., & Baden, D. (2004). Nostalgia: Conceptual issues and existential functions. In J. Greenberg, S. Koole, & T. Pyszczynski (Hrsg.), *Handbook of experimental existential psychology* (S. 200–214). Guilford Press.

Sedikides, C., Wildschut, T., Routledge, C., Arndt, J., Hepper, E. G., & Zhou, X. (2015). To nostalgize: Mixing memory with affect and desire. *Advances in Experimental Social Psychology, 51*, 189–273. https://doi.org/10.1016/bs.aesp.2014.10.001

Seremetakis, C. N. (1994). *The memory of the senses, part 1: Marks of the transitory.* Routledge.

Sloan, R. J. S. (2015). Videogames as remediated memories: Commodified nostalgia and hyperreality in Far Cry 3: Blood Dragon and Gone Home. *Games and Culture, 10*(6), 525–550. https://doi.org/10.1177/1555412014565641

Supski, S. (2013). Aunty Sylvie's sponge: Food making, cookbooks and nostalgia. *Cultural Studies Review, 19*, 28–49. Retrieved from http://epress.lib.uts.edu.au/journals/index.php/csrj/article/viewFile/3074/3419

The Fullbright Company. (2013). Gone Home [Microsoft Windows]. The Fullbright Company

Tuan, Y.-F. (1975). Place: An experiential perspective. *The Geographical Review, 65*(2), 151–165. https://doi.org/10.2307/213970

Turner, P., & Turner, S. (2006). Place, sense of place, and presence. *Presence, 15*(2), 204–217. https://doi.org/10.1162/pres.2006.15.2.204

Ubisoft Montreal. (2013). Far Cry 3: Blood Dragon [Sony PlayStation 3, Microsoft Windows, and Microsoft Xbox 360]. Ubisoft.

Vess, M., Arndt, J., Routledge, C., Sedikides, C., & Wildschut, T. (2012). Nostalgia as a resource for the self. *Self and Identity, 11*, 273–284. https://doi.org/10.1080/15298868.2010.521452

Wang, B., Taylor, L., & Sun Q. (2018). Families that play together stay together: Investigating family bonding through video games. *New Media & Society, 20*(11), 4074–4094. https://doi.org/10.1177%2F1461444818767667

Wildschut, T., Sedikides, C., Arndt, J., & Routledge, C. (2006). Nostalgia: content, triggers, functions. *Journal of Personality and Social Psychology, 91*, 975–93. https://doi.org/10.1037/0022-3514.91.5.975

Wulf, T., & Baldwin, M. (2020). Being a kid again: Playing Pokémon Go contributes to wellbeing through nostalgia. *Studies in Communication and Media, 9*(2), 241–263. https://doi.org/10.5771/2192-4007-2020-2-241

Wulf, T., Bowman, N. D., Rieger, D., Velez, J. A., & Breuer, J. (2018). Video games as time machines: Video game nostalgia and retro gaming. *Media & Communication, 6*(2), 60–60. https://doi.og/10.17645/mac.v6i2.1317

Wulf, T., Bowman, N. D., Velez, J. A., & Breuer, J. (2020). Once upon a game: Exploring video game nostalgia and its impact on well-being. *Psychology of Popular Media, 9*(1), 83–95. https://doi.org/10.1037/ppm0000208

Wulf, T., Rieger, D., & Schmitt, J. B. (2018). Blissed by the past: Theorizing media-induced nostalgia as an audience response factor for entertainment and well-being. *Poetics, 69*, 70–80. https://doi.org/10.1016/j.poetic.2018.04.001

Yang, C., & Liu, D. (2017). Motives matter: Motives for playing Pokémon Go and implications for well-being. *Cyberpsychology, Behavior, and Social Networking, 20*(1), 52–57. https://doi.org/10.1089/cyber.2016.0562

Zhou, X., Sedikides, C., Wildschut, T., & Gao, D.-G. (2008). Counteracting loneliness. On the restorative function of nostalgia. *Psychological Science, 19*, 1023–1029. https://doi.org/10.1111/j.1467-9280.2008.02194.x