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Explaining the formation of eudaimonic gaming experiences: a theoretical overview and systemization based on interactivity and game elements

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Over the past years, scholars have explored eudaimonic video game experiences—profound entertainment responses that include meaningfulness, reflection, and others. In a comparatively short time, a plethora of explanations for the formation of such eudaimonic gaming experiences has been developed across multiple disciplines, making it difficult to keep track of the state of theory development. Hence, we present a theoretical overview of these explanations. We first provide a working definition of eudaimonic gaming experiences (i.e., experiences that reflect human virtues and encourage players to develop their potential as human beings fully) and outline four layers of video games—agency, narrative, sociality, and aesthetics—that form the basis for theorizing. Subsequently, we provide an overview of the theoretical approaches, categorizing them based on which of the four game layers their explanation mainly rests upon. Finally, we suggest the contingency of the different theoretical approaches for explaining eudaimonic experiences by describing how their usefulness varies as a function of interactivity. As different types of games offer players various levels of interactivity, our overview suggests which theories and which game layers should be considered when examining eudaimonic experiences for specific game types.

KEYWORDS

video games, interactivity, eudaimonia, theory, game layers

1. Introduction

Like media entertainment in general (Bosshart and Macconi, 1998), video game entertainment has traditionally been conceptualized as a *hedonic* experience—enjoyment (Sherry, 2004; Mekler et al., 2014). However, studies have demonstrated that contemporary games may also elicit more profound entertainment responses such as meaningfulness related to "contemplating, introspecting, and experiencing greater understanding of essential values, fundamental beliefs, and important life lessons" (Oliver et al., 2016, p. 396). These profound responses have been defined as *eudaimonic* experiences (Daneels et al., 2021a).

Over the past decade, research on eudaimonia has become a prosperous area of game scholarship (Daneels et al., 2023). Initially, scholars examined the multifaceted nature of these profound states to clarify what eudaimonic gaming experiences are (for a conceptual review see Daneels et al., 2021a). More recently, substantial progress has been made in theorizing how eudaimonic gaming experiences emerge—either by drawing on established theories (e.g., *Self-Determination Theory*; Oliver et al., 2016), or by (further) developing new perspectives (e.g., *Poetic Gameplay*; Chew and Mitchell, 2020).

Despite this encouraging progress, we observe three limitations in current theorizing. Firstly, keeping track of the theoretical approaches can be challenging, given the rapid growth of related literature and its spread across multiple disciplines (e.g., communication, psychology, computer science: Daneels et al., 2023). As a result, theory development may suffer as scholars may be less likely to take note of and advance existing explanations from other areas of scholarship. Secondly, game characteristics (e.g., story, graphics) have often been regarded as antecedents of eudaimonic gaming experiences (Daneels et al., 2023). Yet, scholars lack a comprehensive overview of which theoretical approaches attribute the formation of eudaimonic gaming experiences to which characteristic. Without such an overview, it is difficult to identify which explanations complement, contradict, or interact with each other because they rely on (dis)similar game characteristics. Thirdly, games differ largely in their characteristics (Klimmt and Possler, 2021) and thus, the usefulness of each theoretical approach likely varies by game/situation.

In a first attempt to address these limitations, a recent systematic review (Daneels et al., 2023) provided a list of the theoretical frameworks applied and antecedents of eudaimonic experiences discussed in gaming research on eudaimonia. However, the review falls short of explaining how each approach explicates the formation of eudaimonic experiences, what specific game characteristics are pertinent in each approach, and for which games/situations each explanation seems most useful. The present paper builds on the systematic review by Daneels et al. (2023) but extends it considerably by addressing all three above-mentioned limitations. First, we provide a *theoretical overview* (DeAndrea and Holbert, 2017) that illustrates how the formation of eudaimonic gaming experiences is explained by each theoretical approach. Second, we categorize the approaches based on the game characteristics they argue are crucial for the formation of eudaimonic experiences, drawing on a framework of game layers [Agency, Narrative, Sociality and Aesthetics (ANSA) model, Klimmt and Possler, 2021]. Third, we illustrate the *contingency* of the approaches (DeAndrea and Holbert, 2017) by discussing how the explanatory power of the approaches varies depending on a game's degree of interactivity as a key defining feature of video games (e.g., Grodal, 2000; Juul, 2005; Weber et al., 2014).

2. Cornerstones of theorizing the formation of eudaimonic gaming experiences

In their systematic review, Daneels et al. (2023) showed that game characteristics are the most frequently considered antecedents of eudaimonic gaming experiences. Thus, explanations for the formation of these experiences predominantly focus on *active play* as a form of engagement with the medium. Conversely, other ways of engaging with games and gaming culture are mostly overlooked—for example, watching gaming live streams or talking about games (for an overview of such additional ways of engagement see Meriläinen, 2023). Rather, most approaches to studying eudaimonic gaming experiences seem to analyze game characteristics and link them to players' eudaimonic experiences via some explanatory mechanism—a common logic of theory development in game entertainment research (Klimmt and Possler, 2019). The cornerstones of such theorizing are (1) the phenomenon to be explained (i.e., eudaimonic gaming experiences) and (2) the preconditions on which the mechanisms operate (i.e., characteristics of gaming; see Figure 1).

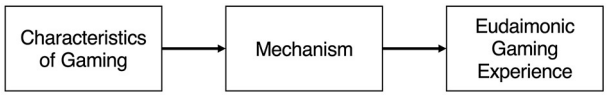

FIGURE 1
Key elements of explanations for the formation of eudaimonic gaming experiences.

2.1. Defining eudaimonic gaming experiences

A frequently applied basic first step for defining eudaimonic gaming experiences is to contrast them with hedonic gaming responses (e.g., Oliver et al., 2016), as the latter have long been the main focus of game entertainment research (Klimmt and Possler, 2019). *Hedonic gaming experiences* have often been described as enjoyment (Mekler et al., 2014)—a "'pleasant' experiential state [...] which includes physiological, cognitive, or affective components" (Vorderer et al., 2004, p. 393). Enjoyment seems to manifest in various ways (Vorderer et al., 2004). For example, emotions such as fun or pride or flow states have been considered "enjoyable" (Mekler et al., 2014). In contrast, *eudaimonic gaming experiences* are thought to reach beyond enjoyment (Possler et al., 2020) and are characterized as "more complex, fundamental" (Daneels et al., 2021a, p. 179), "meaningful and reflective" (Oliver et al., 2016, p. 391), or "serious" (Bowman et al., 2016, p. 84).

Beyond such metaphors, we identified four broad patterns in a recent scoping review of conceptualizations of eudaimonic gaming experiences (Daneels et al., 2021a): First, scholars used the overarching term appreciation (introduced by Oliver and Bartsch, 2010) to characterize eudaimonic outcomes of gaming (e.g., Wulf and Baldwin, 2020). Second, eudaimonic gaming responses have been characterized by three states that often seem to covary: meaningfulness (i.e., players connecting game elements to meaningful aspects outside of the game; e.g., Daneels et al., 2020), being emotionally moved or challenged (Bopp et al., 2016, 2018), and self-reflection (i.e., players seeking a better understanding of themselves; e.g., Mekler et al., 2018). Third, some scholars conceptualize eudaimonic gaming experiences as deep social connectedness and bonding with fellow players or in-game characters (e.g., Colder Carras et al., 2018; Coanda and Aupers, 2021). Fourth, we identified conceptualizations that are not as commonly used in the gaming literature, such as nostalgia (Wulf et al., 2020), awe (Possler et al., 2018), or elevation (Daneels et al., 2020).

Expanding from this apparent multifaceted nature of eudaimonia, it is fruitful to differentiate an extensional definition

from an intensional definition of eudaimonic gaming experiences. An *extensional definition* describes the broad theoretical scope of a given concept (Häder, 2022)—for example, a complete or saturated list of eudaimonic video game states. The overview provided by Daneels et al. (2021a) is a good starting point for such an extensional definition of eudaimonic gaming experiences, although we note a common limitation of extensional approaches is that they are bound by existing observations (i.e., they cannot account for "unknown unknowns"). In contrast, an *intensional definition* describes a concept's deeper meaning (Häder, 2022)—in this case, the properties necessary for a gaming experience to be understood as eudaimonic. A useful starting point for developing such an intensional definition may lie in the philosophical underpinnings of eudaimonia. The concept originates from Aristotelian philosophy (Tiberius and Mason, 2009; Kraut, 2022), and is defined by Huta and Waterman (2014) as activities or experiences "reflecting virtue, excellence, the best within us, and the full development of our potentials" (p. 1427). Applying this definition to games, we can understand gaming experiences that reflect human virtues and encourage players to fully develop their potential as human beings as eudaimonic.

Table 1 presents an intensional and extensional working definition of eudaimonic gaming experiences that will serve as the conceptual foundation in subsequent sections of this manuscript. We acknowledge that this definition may not be consensual among all game, eudaimonia, and eudaimonic gaming scholars. We invite researchers to criticize and further develop this definition in the future.

2.2. The characteristics and layers of video games

Generally, the preconditions for explaining the formation of game experiences via active video game use include properties of the player (e.g., motives, moods, or dispositions), as well as the message and medium (i.e., game's content and mechanics), and the context (e.g., the situation of game use; Vorderer et al., 2004; Elson et al., 2014). As mentioned above, characteristics of the message and medium have most often been regarded as antecedents of eudaimonic gaming experiences in the literature (Daneels et al., 2023). While video gaming shares many characteristics with other media, *interactivity* is a key characteristic that is shared by all games and distinguishes them from other entertainment (Grodal, 2000; Juul, 2005; Bowman, 2018; Melzer and Holl, 2021)—Weber et al. (2014) even call interactivity the "hallmark of the medium" (p. 79). Little consensus exists about the definition or nature of interactivity in video games (Stang, 2019), but a useful, integrative approach is offered by Weber et al. (2014) as the "possibility for users to manipulate the content and form of communication and/or the possibility of information exchange processes between users or between users and a medium." (p. 82). However, games do not only enable but also require players to actively interact with the medium (Klimmt, 2003; Jansz, 2005), although this demand can vary between and within gaming sessions, as discussed later (also see Bowman, 2018).

Interactivity manifests itself in various ways and shapes many other characteristics of video gaming, including those that are not necessarily unique to gaming (Elson et al., 2014; Klimmt and Possler, 2021). To exemplify this, Klimmt and Possler (2021) argued that video games present narratives similar to books or movies. However, the way in which stories are told and unfold is highly different in games due to interactivity which enables players to affect the narrative structure (e.g., speed), sequence (e.g., order of events), or even the content (e.g., choosing between endings, Lee et al., 2006; Ip, 2011; Aarseth, 2012).

To further indicate the specificities of games shaped by interactivity, many authors have proposed to distinguish different "layers" of games (e.g., Hunicke et al., 2004; Elson et al., 2014; Klimmt and Possler, 2021). These layers can be understood as pragmatic categories of game characteristics that help scholars to identify and describe the factors underlying the formation of gaming experiences. While different frameworks of such layers have been suggested (e.g., Hunicke et al., 2004; Elson et al., 2014), we draw on the ANSA framework (Klimmt and Possler, 2021) in the present manuscript, as it describes game characteristics from a psychological, user-centered perspective and considers the often-neglected aesthetic dimension of games [relevant for eudaimonic experiences such as awe (Possler et al., 2018; Possler, 2021), and nostalgia (Makai, 2019)]. The model suggests that agency, narrative, sociality, and aesthetics are especially relevant to gaming experiences. As defined:

1. **Agency**: Interactivity *enables* players to influence the game according to its rules and mechanics (Elson et al., 2014; Klimmt and Possler, 2021). Moreover, games also often *demand* player activity: Video games present scenarios that require players to monitor the game state, make decisions, and implement those (Klimmt, 2003). The output of such scenarios and the progression of the game as a whole depends on the activity of the player (Grodal, 2000; Jansz, 2005; Bowman, 2018).
2. **Narrative**: As mentioned above, video games often present narratives (Lee et al., 2006). The complexity of these stories can vary substantially, ranging from 'Save the Princess' in *Donkey Kong* to complex, morally loaded, multi-chapter,

TABLE 1 Intensional and extensional definition of eudaimonic gaming experiences.

	Eudaimonic gaming experiences
Intensional definition	Eudaimonic gaming experiences are those experiences caused by playing that reflect "virtue, excellence, the best within us, and the full development of our potentials" (Huta and Waterman, 2014, p. 1427)
Extensional definition	Eudaimonic gaming experiences may manifest in various forms, e.g., appreciation, meaning, being emotionally moved or challenged, self-reflection, deep social bonds, nostalgia, awe, elevation (Daneels et al., 2021a)

and multi-protagonist narratives in games such as *Heavy Rain* (Klimmt and Possler, 2021). Players play an active role in shaping the trajectory of these narratives (Wellenreiter, 2015), although the extent of this influence varies greatly, as discussed later.

3. **Sociality**: Like many other media (e.g., movies, television, and radio), video games can be used together with other people. However, social interaction is often "deeply woven" (Klimmt and Possler, 2021, p. 626) into a video game due to their interactive nature (Klimmt and Hartmann, 2008). Players can frequently communicate via games, for example, in text and voice chats (Klimmt and Hartmann, 2008; Wadley et al., 2015). Moreover, playing with or against others is central to many video games (Schmierbach et al., 2012; Peña, 2015), including otherwise single-player games (Consalvo et al., 2018). That means, players collectively influence the state of the game (Steinkuehler and Williams, 2006).
4. **Aesthetics**: Video games are aesthetic artifacts that combine a subject matter and a style or form (Possler and Klimmt, 2023). The style refers to how the "physical/sensory qualities [of games] are organized and affect sensory experiences" (Cupchik and Kemp, 2000, p. 249). Hence, video games address players' sensory modalities—vision, hearing, and haptics—"in a specific and organized manner" (Possler and Klimmt, 2023, p. 143). Due to interactivity, players are often able to shape game aesthetics—either deliberately (e.g., turning off background music) or indirectly (e.g., by triggering music when entering a particular location in the game world; Possler, 2021).

3. Systematization of existing theoretical approaches based on game layers

After discussing the cornerstones of theorizing the formation of eudaimonic gaming experiences, we now turn to these different explanations. To systemize the approaches, we consider existing scholarship through the lens of the ANSA framework (Klimmt and Possler, 2021), categorizing extant theoretical approaches based on the layer to which the formation of a eudaimonic experience is attributed. We did a secondary analysis of 39 manuscripts from Daneels et al.'s (2023) recent systematic review of eudaimonia in digital games research. We only focused on those manuscripts that Daneels et al. coded as (a) having a theoretical framework and (b) dealing with eudaimonic experiences, and we additionally incorporated manuscripts of relevance to the current manuscript but not included in the prior work's more stringent inclusion criteria.[1,2] These papers were then categorized based on: (1) the specific eudaimonic experience(s) the study focused on (i.e., the specific manifestation of eudaimonia; see Section 2.1), (2) the theory or framework that the study employed, (3) the underlying assumption or explanation the theoretical framework offered in the study connected to the focal eudaimonic experience(s), and (4) the specific game layer(s) that elicited the eudaimonic experience.

3.1. Theoretical perspectives transcending the four game layers

Several theoretical approaches involve multiple ANSA layers to explain the formation of eudaimonic gaming experiences (e.g., Elson et al., 2014; Argenton et al., 2016; Possler et al., 2020; Phillips et al., 2021; Williams, 2021). Among these approaches, the most commonly employed one is the *self-determination theory* (SDT, Ryan and Deci, 2000). SDT being this prominent is unsurprising, given SDT's extensive use in prior games research (Tyack and Mekler, 2020). Broadly, this research argues that video games are adept at satisfying intrinsic human needs of competence (i.e., the need to master a demanding task), autonomy (i.e., the need to act voluntarily and self-determined), and relatedness (i.e., the need to have close and meaningful social relationships). Critically, these needs are also key to the formation of eudaimonic experiences (e.g., Ryan and Martela, 2016). In eudaimonic gaming research, studies have shown how game layers identified in the ANSA model can fulfill these needs, in turn leading to eudaimonic responses. *Agency* is related to players feeling invested in and having autonomy over the path of their gameplay, as players shape their own adventures (see Oliver et al., 2016; Rogers et al., 2017; Wang and Hang, 2021). Moreover, very intense or cooperative challenges on the agency layer can result in meaningful achievement (Rogers et al., 2017) or mastery experiences (Seaborn et al., 2019). Complex and emotionally intense *narratives* have often been associated with satisfying needs of relatedness and insight into existential issues, fueling players' experiences of appreciation of the game (Oliver et al., 2016; Rogers et al., 2017). Strong or close social connections to in-game characters (i.e., narrative layer: Kümpel and Unkel, 2017; Tyack and Wyeth, 2017; Conway and Elphinstone, 2019) or to other human players (i.e., the *sociality* layer: De Schutter and Brown, 2016; Vahlo, 2018; Daneels et al., 2020; Wang and Hang, 2021) also satisfy players' need for relatedness, in turn leading to eudaimonic experiences of meaningfulness, personal growth, and social bonding. Studies linking SDT to *aesthetics* are less clear, although Possler et al. (2018) argue aesthetics can evoke awe which promotes a sense of being connected to something larger (e.g., "nature," "all gamers"), potentially satisfying relatedness needs (Possler, 2021). Moreover, Wang and Hang (2021) argue that buying aesthetic in-game goods (e.g., skins) facilitates autonomy via self-expression (buying goods for oneself) or relatedness (buying goods for others). As such, the SDT provides a valuable framework for explaining how gaming forms eudaimonic experiences: through the satisfaction of players' basic needs.

Beyond SDT, explanations for eudaimonic experiences that involve multiple game layers are often less well studied. For

1 These $N = 39$ manuscripts are included in our references list marked with an asterisk, following standard practices in systematic reviews and meta-analytic scholarship.

2 A noted limitation of the review by Daneels et al. (2023) is that manuscripts were only included if they explicitly specified a theoretical framework (required for their analyses). This would have excluded manuscripts that briefly summarized theories, which is common in published manuscripts with shorter literature reviews.

example, Possler et al. (2020) draw on evidence from *uses and gratifications* research (Scharkow et al., 2015) to argue that gaming facilitates specific gratifications that influence appreciation. These gaming gratifications can be linked with most of the four layers. For example, a game's *narrative* and its characters can facilitate the gratification of assuming a different identity, the *agency* layer can evoke a sense of meaningful accomplishments and the *sociality* layer may result in deep social connections. Following a similar logic but relying on *means-end theory* (Olson and Reynolds, 2001), Vanden Abeele et al. (2020) illustrate that the immediate functional consequences of playing games influence how meaningful players perceive a game to be. These functional consequences seem to result from the *agency* layer (i.e., ease of control, progress feedback, goals and rules, and challenge) and the *aesthetic* layer (i.e., audiovisual appeal). Applying this approach to learning games, a study by Verkuyl et al. (2022) suggested that functional consequences affecting meaningfulness may also result from the *sociality* layer (i.e., the richness of the simulated social interactions). To give yet another example, Elson et al. (2014) proposed the *integrated model of player experience* to explain how the *narrative*, game mechanics (i.e., *agency* layer), and the playing context (esp., social interactions; *sociality*) contribute to eudaimonic responses.

3.2. Agency

One prominent concept relevant to agency and eudaimonic gaming experiences can be found in *poetic gameplay*. This perspective describes how intentionally breaking players' gameplay expectations facilitates reflection about the form of the game as well as on broader societal topics games might address (Mitchell, 2016)—notions also suggested in scholarship on time perception in slowly paced games (Alvarez Igarzábal, 2020) and on disorienting dilemmas (Murray, 1997; also see Bowman et al., 2020 as applied to gaming). Here, game mechanics and goals within a game are altered to defamiliarize players' expectations, for instance, regarding interaction possibilities (e.g., unexpected controls, speed of user input) or when winning the game is either impossible or undesirable. In close readings of different games, Chew and Mitchell (2020) and Mitchell et al. (2020) identified a variety of possible alterations to games' mechanics and alienations of agentic possibilities that may lead to players' eudaimonic reflective experiences. Wong et al. (2021) showed how these techniques can be used in a serious game to promote contemplation about health issues.

3.3. Narrative

Provided that the narrative has been discussed and identified as a key game element to elicit eudaimonic responses among players (e.g., Roth and Koenitz, 2016; Rogers et al., 2017; Daneels et al., 2020; Jacobs, 2021; Stenseng et al., 2021), it is unsurprising that much prior theorizing has focused on this specific game layer. For example, Fleck and Fitzpatrick's (2010) theory of *transformative reflection* argues that people's reflections occur on a continuum from superficial to transformative, and this has been used to categorize different levels of reflective experiences when playing video games. Prior research showed that most players reflect rather superficially on aspects related to the game itself, while few make reflections that change players' own behavior or which provide them with new insights on broader social issues outside of the game (Mekler et al., 2018; Whitby et al., 2019). Both studies focused mostly on game narratives to explain the elicitation of reflective experiences (although explanations were also made on the agency and sociality layers).

Green and Jenkins' (2014) *framework on interactive narratives* has been used to explain how an interactive narrative can improve people's prosocial behavior, mediated by the eudaimonic notion of appreciation (Steinemann et al., 2017). The model explains how interactivity allows users or players to control and change the course of a narrative according to their personal preferences. These changes, in turn, lead to more engagement (e.g., in terms of identification and transportation) and the possibility to explore different roles of the self (e.g., in terms of feeling responsibility toward game characters or trying out different possible selves). In the end, these elements will elicit entertainment experiences of enjoyment and appreciation as well as attitudinal or behavioral change.

We can also consider models of moral psychology relevant to narratives in video games (e.g., Holl, 2019). For example, Melzer and Holl (2021) draw on moral psychology theories such as *moral foundations theory* (Haidt and Joseph, 2004) and the *model of intuitive morality and exemplars* (Tamborini, 2011), suggesting that moral decision-making is a key to fostering eudaimonic game experiences.

Beyond these perspectives, some studies used broader political or psychological theories that were relevant given the specific context of the study's topic. De Angeli et al. (2018) used the notion of *agonism* (i.e., a theory that emphasizes the positive aspects of conflict) to demonstrate how game narratives related to war can lead to players' reflective eudaimonic experiences when these games show the perspectives of all actors involved—perpetrators, victims, and bystanders. Another example is the game analysis of Tavares et al. (2021), which used concepts of *Jung's analytical psychology* (e.g., the individual's psyche, unwanted aspects of the self) to argue that games with narratives that include characters' weaknesses or characters fighting their inner demons can trigger players reflecting about their own personal weaknesses and, in turn, lead to personal growth key to eudaimonia.

Focusing more closely on narrative protagonists, models of *player-avatar relationships*, Banks and Bowman (2016) argue that gamers can and do form deep and meaningful social interactions with their on-screen avatars, leading to deeper emotional connections key to eudaimonic experiences. Moreover, drawing on *character attachment* (Lewis et al., 2008) and *identification theory* (Klimmt et al., 2009), it was argued that players can identify as their avatars relevant to the foundation of eudaimonic gaming experiences (Bowman et al., 2016; Kartsanis and Murzyn, 2016). For example, assuming the identity of an avatar may allow self-exploration and self-expression (Kartsanis and Murzyn, 2016). Finally, close or even intimate relationships may also occur between players

and believable non-player characters (Coanda and Aupers, 2021).

3.4. Sociality

Scholars have also described the social context of playing with others as a relevant basis for the formation of eudaimonic gaming experiences (e.g., Bonus et al., 2018; Comello et al., 2019; Daneels et al., 2020; Phillips et al., 2021; Pearce et al., 2022). For example, adolescent players in Daneels et al. (2020) mentioned that working together toward a common goal led to socially bonding experiences, while Bonus et al. (2018) found that playing *Pokémon GO* with others led to friendship initiation and intensification and Pearce et al. (2022) found that playing *Animal Crossing: New Horizons* during COVID-19 lockdowns helped parents to feel a sense of connection with others. However, most of this research did not *a priori* theorize about the role of socializing in eudaimonic experience but rather, these emerged as unexpected findings.

Broadly, theorizing about the role of the social layer in the formation of eudaimonic gaming experiences is scarce (at least outside SDT-based research; see above), which is surprising given the relative importance of socializing in video games (e.g., Williams et al., 2006). For example, Steinkuehler and Williams (2006) suggested that video games serve as digital third spaces, borrowing from Oldenburg's (1989) sociological research on *third places* key to how humans engage with each other and grow. Likewise, the notion of *tandem play* (Consalvo et al., 2018) argues that even when players are not actively engaging each other on-screen—such as the case in single-player games or when viewing game streams—there are still critical social bonds being formed. As alluded to in Elson et al. (2014), social dynamics around video gaming can leave lasting impressions on players, including providing memorable experiences key to feelings of self-relevance and nostalgia later in life (Wulf et al., 2020; Bowman and Wulf, 2023).

3.5. Aesthetics

Finally, we can see scholarship into the aesthetics of gameplay as relevant to the elicitation of eudaimonic experiences. For example, Bopp et al. (2021) discussed how players can have artistic experiences from playing games using insights from *empirical aesthetics* (see Tinio and Smith, 2014), which led to several emotional and eudaimonic reactions, including feelings of beauty, awe, feeling moved, and nostalgia. Possler and Klimmt (2023) also theorized how the aesthetics of games lead to eudaimonic experiences. Building on the *model of aesthetic appreciation and aesthetic judgments* (Leder et al., 2004), Possler and Klimmt (2023) argued that under certain circumstances (e.g., feelings of safety, no strong game demands), players may reflect on the form of a game rather than just its content. In such situations, appreciation can arise when players recognize symbolic references in the game's aesthetic to their own meaningful experiences, and awe and admiration may occur as a response to the developers' aesthetic achievements.

4. Exploring the interplay of interactivity and game layers in theories of eudaimonic gaming experiences

As discussed in Section 2.2, interactivity is a key characteristic of video games. As we will demonstrate below, the degree of interactivity can vary considerably between and within gaming sessions (Section 4.1) which likely affects how eudaimonic gaming experiences can emerge (Section 4.2). Against this background, we develop a heuristic framework that suggests on what level of interactivity the explanatory power of the theoretical approaches identified in Section 3 should be highest (Section 4.3).

4.1. The dynamic variability of game interactivity

Video games enable and demand players to actively shape the game (Bowman, 2018, 2021), inviting gamers to co-author the experience unfolding (Wellenreiter, 2015). That said, interactivity is hardly a monolithic concept, and players' degrees of freedom in this co-creation vary significantly both between different types of video games and dynamically within any given gaming session.

Regarding different levels of interactivity *between games*, we can understand some attempts to classify video games into unique genres as a representation and recognition of the known variability of interactivity between games.[3] For example, first-person shooting and fighting games could be understood as *action video games* (Green, 2018): A common gameplay element among them is a very high level of near-constant interactivity—players needing to quickly and constantly engage with an ever-changing and rapid-paced on-screen environment. Such games would sit at a high level of interactivity, requiring a great deal of cognitive and physical demand (see Bowman, 2018, 2021). In contrast, *interactive drama games* are quite limited in how often they ask for or allow players to engage with the on-screen content, usually limiting these interactions to synchronized and timed button-pressing for characters otherwise engaging action automatically.

Dynamic shifts of interactivity *within a gaming session* can be illustrated by basic principles of game design. For example, a classic learning mechanism in many video games is to present players with different abilities or options and immediately let them test these out (Bowman et al., 2015). Consider first-person shooters that provide players new weapons and then immediately afterwards, waves of enemies to practice using the new weapons. Moreover, games with

3 We acknowledge that recent research suggests that genre conventions may not be as well suited to explain the variance in gameplay in modern video games, which often combine multiple game elements (see Green, 2018). Nonetheless, we believe that interactivity is a key discriminating factor between games of different types, with some game genres marked by having higher levels of interactivity than others.

focal narrative content and character development often employ cinematic cut-scenes at key moments (Ip, 2011), forcing players to temporarily relinquish nearly all control over the content.

In both cases, the notion of action affordances provides a useful framework for us to understand interactivity variability. We can consider the various "behaviors" that video games allow their players to engage with in terms of the *affordances* allowed by a given system (see Gibson, 1979; Gaver, 1991). Eden et al. (2018) considered the latitude of on-screen behaviors that were granted to the player, noting that players might not always be aware of their agentic potential—or at times, might misinterpret or overestimate their relative agency over in-game actions (see also Stang, 2019). That said, we can still focus on the action affordances provided by video games to understand their variable interactivity. Similarly, Wolf (2006) argues that the degree of interactivity of a game can be understood in terms of what actions a game affords as a consequence of the number of possible player decisions, the options available per decision, the speed with which the decision is required, and the extent of its consequences. As such, video game interactivity can be understood as a continuum (Vorderer, 2000) ranging from "no player control" (scenarios in which the system is in full control over manifest on-screen content, such as cut-scenes) to "total player control" (scenarios in which the player is in full control over the manifest on-screen content, such as with level editors or sandbox games). Games falling in the middle of this continuum might include interactive drama games at the lower end and open-world games that encourage player activity within the confines of a given game world at the higher end. Figure 2 illustrates this continuum.

4.2. Eudaimonic game experiences at endpoints of the interactivity continuum

As shown above, a game's degree of interactivity closely aligns with how it can and must be used. This interactivity, in turn, shapes the psychological processes of playing, for example, the degree of cognitive resources strained (e.g., Bowman, 2018, 2021) or the immersive experiences resulting from playing (e.g., Wirth et al., 2007). Consistently, prior research has demonstrated that some game entertainment mechanisms only work at certain degrees of interactivity (e.g., entertaining distractions from stress arise primarily with higher interactivity and associated higher demands: Bowman and Tamborini, 2012). We argue that the mechanisms of how eudaimonia arises also vary between different levels of interactivity. This is most striking at the extreme points of the interactivity continuum (see Figure 3).

When games take most or full control (e.g., in long cut scenes), they essentially revert to a "lean back" medium (Jansz, 2005, p. 222). Here, players are left with no influence over what happens on screen and are not responsible for the game's progression. In such situations, eudaimonic experiences may result from mechanisms already identified in the literature on non-interactive media, such as film (see Raney et al., 2019). This research suggests that in the absence of interactivity, narrative is relevant for the formation of eudaimonic experience—especially stories that convey lessons about life and provide insights into values, virtues, and existential issues (e.g., Oliver and Hartmann, 2010). Such content is typically characterized as cognitively or affectively challenging, for example, due to illustrating moral dilemmas (Bartsch and Hartmann, 2017). Eudaimonic experiences such as a sense of meaning are usually thought to arise when audience members are willing to carefully process these narratives and successfully deal with the emotional and cognitive challenges (e.g., making sense of the portrayed hardships, coping with negative affect; e.g., Lewis et al., 2014; Bartsch and Hartmann, 2017). This explanation seems to extend well to games: cognitive and affective challenges (Kümpel and Unkel, 2017; Bopp et al., 2018), insights resulting from narration (Oliver et al., 2016), and reflection on the narrative (e.g., Whitby et al., 2019) are all pertinent factors in the formation of eudaimonic gaming experiences, and might be most effective when players can fully focus on the narrative due to reduced interactivity.

At the other end of the spectrum, games offer players a great deal of control. For example, level editors or sandbox games allow players to freely "engage in almost any way they choose" (Bowman et al., 2015, p. 46). An often-studied example is *Minecraft,* a game in which players can design a whole world based entirely on their imagination (Rahimi and Shute, 2021). Arguably such titles are not typical games (for a definition see Juul, 2005), as they lack a predefined winning state, rely less on fixed rules, and allow higher flexibility in how gameplay can unfold.[4] Indeed, *Minecraft* seems to be closer to 'open-ended play' (De Valk et al., 2013)

4 This should not imply that sandbox games do not rely on rules. Every game is built on mechanics and, thus, possesses rules for (and constraints on; Stang, 2019) how the interaction between player and game proceeds. However, sandbox games offer high degrees of freedom in how the mechanics can be used and combined, allowing flexibility and improvisation. This can be seen for example in the discussion of affordances (Eden et al., 2018): Sandbox games encourage players to discover myriad affordances of in-game objects, while other games might intentionally restrict 'player degrees of freedom' to focus instead on mastering specific mechanics and actions.

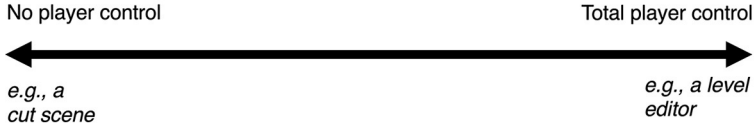

FIGURE 2
Continuum of video game interactivity.

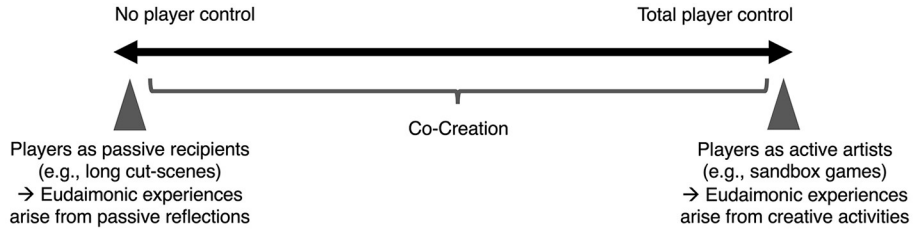

FIGURE 3
Continuum of video game interactivity and eudaimonia-inducing mechanisms at its endpoints.

than to a classical game. In this form of video game, eudaimonic experiences are likely to result from mechanisms identified in the research on creativity (see Bowman et al., 2015). While play is always a creative process (Gee, 2005), sandbox games were found to hold a particularly rich potential to foster creativity due to their open-ended nature (for a recent review: Rahimi and Shute, 2021). For example, studies have shown that playing *Minecraft* can promote creativity (e.g., Checa-Romero and Pascual Gómez, 2018; Blanco-Herrera et al., 2019; but see Moffat et al., 2017). Pursuing creative activities, in turn, has often been associated with eudaimonic experiences such as growth and self-realization (e.g., Cropley, 1990; Forgeard and Eichner, 2014). For example, creating visual artworks, music, or literature has been associated *inter alia* with sense-making (i.e., finding meaning for one's existence) or bonding with others (Lomas, 2016), and daily creative behavior was found to promote flourishing (i.e., feeling a sense of meaning in life, engagement, and social connectedness; Conner et al., 2018).

Applied to video games, we argue that when interactivity is maximal, players become "artists": They can play by their own rules (i.e., agency), tell their own stories (i.e., narrative), design their own forms of competition or cooperation (i.e., sociality), and create their own aesthetics. This creative form of gameplay has been linked in prior research to eudaimonic experiences such as reflection and meaningfulness (Hall et al., 2020).

4.3. Between the poles: the relevance of the game layers for eudaimonic experiences

The discussion above suggests that the mechanisms underlying the formation of eudaimonic gaming experiences likely differ between the endpoints of the interactivity continuum. However, as a medium that is co-authored by developers and players (Wellenreiter, 2015), video games should often operate between these extremes. For these intermediate conditions, the theoretical approaches described in section 3 should provide practical explanations for the emergence of eudaimonic gaming experiences. Yet, we argue that their explanatory power also differs at relative levels of interactivity. It is beyond the scope of this manuscript to review how interactivity affects the precise explanatory power of each theoretical approach. Instead, we draw on the ANSA model (see Section 2.2) to focus our discussion on those theoretical approaches that are most useful for explaining eudaimonic gaming experiences at various levels of interactivity. Put another way, we present an "interactivity sweet spot" for each group of theoretical approaches on the formation of eudaimonic experiences identified in Section 3. Moreover, to aid in our discussion, we heuristically divide the interactivity continuum into rough levels ranging from "very low" to "very high" (see Figure 4), serving as an organizing framework to guide future research. Finally, we note that a limitation of our approach is that we do not explicitly incorporate individual differences in gameplay preferences and motivations (for such differences see Vahlo, 2018). Instead, we focus on how game features *vis-a-vis* ANSA layers combined with interactive affordances make some theoretical approaches more relevant than others.

First, we argue that theoretical explanations that attribute the formation of eudaimonic gaming experiences to the *agency* layer of video games have the highest explanatory power at lower to higher levels of interactivity (see Figure 4). Some of these approaches assume that players have certain expectations about gameplay mechanics or established patterns of agency in the game, which are then disrupted or defamiliarized and ultimately evoke eudaimonic reflection (e.g., Elson et al., 2014; Whitby et al., 2019; Chew and Mitchell, 2020; Mitchell et al., 2020). Yet for players to realize such defamiliarization, a basic level of control over the game must be possessed beforehand (and sometimes even during the defamiliarization process). For example, unexpected gameplay patterns (i.e., "winning is impossible", Mitchell et al., 2020, p. 890) in the game *September 12th: A Toy World* (a serious game on terrorism; Whitby et al., 2019) can only be observed when players leverage agency within the game world. Furthermore, other approaches suggest that significant achievements (Rogers et al., 2017), competence experiences (Possler et al., 2020), or mastery experiences (Seaborn et al., 2019) contribute to meaningful eudaimonic experiences for players. The formation of such experiences likely also requires players to have a basic level of control over the game so that a challenging interplay of inputs and game outputs can emerge (Klimmt, 2003).

However, at very high levels of interactivity, the agency-related mechanisms in our model might become less useful for explaining the formation of eudaimonic experiences. Especially, *predefined* challenges and moments of defamiliarization should occur less frequently, as developers are less able to plan such effects when players' control is very high (as it is unclear how the game will be used, broadly and in the service of those eudaimonic experiences). Yet, under such conditions, players may still set their own goals and rules (De Valk et al., 2013), so meaningful mastery experiences could occur even in very highly interactive games. However, this

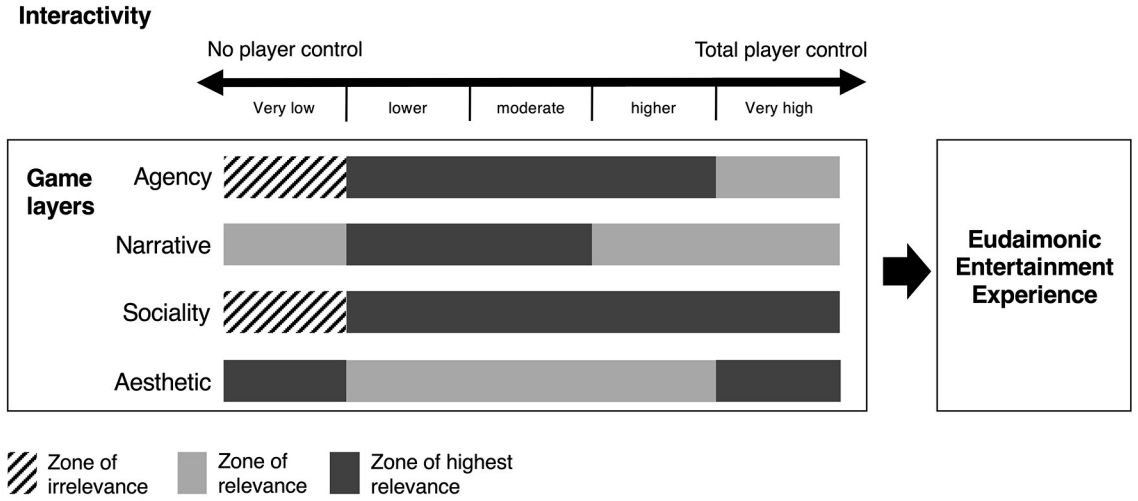

FIGURE 4
Heuristic model of the relevance of the game layers and associated theoretical approaches for the formation of eudaimonic experiences depending on the degree of interactivity.

requires consideration of additional factors beyond the game itself (such as player motivations). Moreover, although players could use a sandbox game as a canvas for artistic expression or for setting and conquering their own challenges, neither are de facto outcomes of highly interactive games. For these reasons, we would maintain that agency-based approaches are mostly likely to consistently explain eudaimonic experiences at lower to higher levels of interactivity, as this would represent scenarios in which gameplay itself, rather than meaning injected into that gameplay by players (see headcanon via McKnight, 2018) is likely to elicit outcomes.

Second, the ***narrative*** mechanisms underlying eudaimonic gaming experiences are likely to be most useful at lower to moderate levels of interactivity (see Figure 4). As noted in Section 4.2, game narratives can elicit eudaimonic experiences absent interactivity, similar to mechanisms from non-interactive media such as film. However, most theoretical approaches assume that interactivity facilitates the formation of eudaimonic gaming experiences through the narrative. This is often attributed to three reasons (see also Green and Jenkins, 2014). First, interactivity can facilitate the formation of immersive experiences such as identification (Klimmt et al., 2009) or presence (Wirth et al., 2007), which engage players and cause them to react to events in the story as they would to events outside the game (e.g., Oliver et al., 2016; Holl et al., 2020; Bowman et al., 2021) so that game narratives feel more "real" and "meaningful." Second, interactivity allows players to make decisions that heighten their responsibility for narrative consequences (e.g., Elson et al., 2014; Steinemann et al., 2017; Melzer and Holl, 2021). For example, Holl (2019) demonstrated that player decisions in *Detroit: Become Human* (a narrative-focused game) largely determine the fate of the protagonists in the story. This makes players highly responsible for the outcome of the narrative and drives self-reflection when facing in-game dilemmas (Daneels et al., 2020) or emotionally moving and elevating experiences (Daneels et al., 2021b). Third, some approaches attribute the formation of eudaimonic experiences to players' forming close connections to in-game characters (e.g., Conway and Elphinstone, 2019). These close relationships are partly attributed to the (simulated) reciprocity of interactions with characters enabled by interactivity (e.g., Tyack and Wyeth, 2017; Coanda and Aupers, 2021). Too much interactivity, in turn, may be detrimental to the narrative induction of eudaimonic experiences as, under this condition, the presentation of a pre-planned, well-timed, eudaimonia-themed narrative is hardly possible (Ip, 2011). As explained above (Section 4.2), players can presumably narrate their own story in highly interactive games (see also Jenkins, 2004). However, this requires players to take on the role of creators instead of co-creators (which likely depends on their motivations). Thus, while a game's narrative can likely evoke eudaimonic experiences at any level of interactivity (see Figure 4), these mechanisms should work best and without further preconditions at lower to moderate levels of interactivity.

Third, approaches attributing the formation of eudaimonic experiences to a game's *sociality* are likely to have their highest explanatory power at lower to very high levels of interactivity (see Figure 4). The formation of eudaimonic experiences based on social interaction requires that players can play with or against other humans (Elson et al., 2014; De Schutter and Brown, 2016; Bonus et al., 2018; Possler et al., 2020; Pearce et al., 2022). A nominal level of interactivity seems required for these social interactions to occur: Players must be able to influence the game together (Steinkuehler and Williams, 2006). This can even be seen in single-player games, in which players form social bonds while co-influencing on-screen content, even if only one person interacts with the content at any given point in time (Consalvo et al., 2018). Moreover, it is not to be expected that too much interactivity impedes the sociality-induced formation of eudaimonic experiences, as complex social dynamics may even occur in many highly interactive games, such as massively multiplayer online games (e.g., Williams et al., 2006).

Fourth, we hypothesize that the *aesthetic* induction of eudaimonia works best at either very low or very high levels of interactivity (see Figure 4). Typically, approaches resting on this layer assume that eudaimonic experiences arise when players respond directly to the sensory sensations of the game (e.g., with awe: Possler et al., 2018; Possler, 2021) or intellectually reflect on the aesthetic components of the game (Bopp et al., 2021; Possler and Klimmt, 2023). In both cases, a prerequisite for the optimal functioning of the aesthetic pathways to eudaimonia is that players experience sufficient time and "safety" to engage with the aesthetic layer (Possler et al., 2018; Possler and Klimmt, 2023). In contrast, if the game demands are too high, players may lack the mindfulness required for aesthetic responses to arise. For example, in a fighting game, in which players need to closely monitor what is happening on the screen and respond by pressing buttons in a fast-paced manner, it is unlikely that they still have sufficient cognitive resources available to appreciate the aesthetics.[5] In contrast, when interactivity is very high or very low, players either relinquish responsibility for the game (low interactivity) or set their own pace (high interactivity), which should leave them with sufficient resources for experiencing eudaimonic aesthetic responses.

However, this should not imply that the aesthetic level can only elicit eudaimonic responses on the extreme levels of interactivity. For example, a very demanding, flow-inducing moment in a game may hold an aesthetic value on its own (e.g., the elegance of a perfect rhythm in a challenging music game; Atkinson and Parsayi, 2020). At the same time, for such a moment to evoke an aesthetic response, players must attend to the aesthetic properties of the experience (Atkinson and Parsayi, 2020, p. 530). It is unlikely that players fully acknowledge these aesthetic qualities in the moment of playing due to the high demands of the situation (indeed flow states are partly defined by a loss of awareness; Sherry, 2004).

5. Discussion

Our theoretical overview illustrates the innovation potential of eudaimonic gaming experience research: Although some approaches rest on theories that have frequently been used in games research (e.g., *self-determination theory*, see Tyack and Mekler, 2020), a variety of new frameworks have been developed (e.g., integrative model of moral processing: Melzer and Holl, 2021; the model on the entertaining effects of game aesthetics: Possler and Klimmt, 2023). These new models often apply theoretical foundations from other disciplines (e.g., moral psychology, empirical aesthetics) to games, substantially expanding the theoretical background of game research.

By categorizing the theoretical approaches according to focal game elements, it became apparent that all levels of video games—Agency, Narrative, Sociality, and Aesthetics—offer a rich potential for the formation of eudaimonia. At the same time, we revealed some gaps in current theorizing: While many approaches attribute the formation of eudaimonic experiences to games' agency and narrative layer, only a few explanations rest on the social and aesthetic layer. This is remarkable, as studies demonstrated the high relevance of both social interactions among players and game aesthetics for eudaimonic responses (Daneels et al., 2020; Bopp et al., 2021). Hence, we hope our overview encourages scholars to focus more on these layers in theory development.

In general, we see a major limitation of current theory development in the focus on *active play* as the form of engagement with games and in mostly considering game characteristics as antecedents of eudaimonic experiences (see Daneels et al., 2023). Engagement with video games and gaming culture beyond active playing (see Meriläinen, 2023) is rarely considered. However, we believe that these forms of engagement could be highly important for explaining the emergence of eudaimonic experiences—especially for highly involved gamers (for an overview of gamer mentalities, see Kallio et al., 2011). For example, deep social connections can likely also arise in gaming communities or from watching Let's Play videos (e.g., Kreissl et al., 2021), and the impact of meaningful narratives and characters is likely to be deepened through transmedia storytelling (e.g., books about a game) or further engagement in a game's lore (e.g., cosplay).

Finally, we developed assumptions about the relevance of the four game layers—and the theories that rest upon them—to the formation of eudaimonic experiences depending on heuristic levels of a game's interactivity. Although our goal was not to offer precise estimates of interactivity levels, our assumptions in marking these heuristic levels provide scholars with some initial guidance on which group of theories is particularly useful for explaining eudaimonic game experiences under specific conditions: as different types of games offer players different levels of interactivity, our overview suggests which theories and which game layer need to be considered when examining specific game types. Moreover, our assumptions also provide a first step in developing an overarching framework integrating the diverse theoretical approaches. Specifically, our overview allows identifying which approaches are complementary, contradictory, or might interact with each other based on the game layers they focus upon.

Despite this promising potential, we need to consider the limitations of our overview. Although our work was informed by a systematic literature review (Daneels et al., 2023), it cannot be ruled out that we overlooked relevant literature. Especially as Daneels et al. coded the presence of a theoretical background in a study only when it was explicitly mentioned. Next to this, future work should consider the relationship between interactivity and the usefulness of the theoretical approaches not only at the level of the layers but of the theories themselves. This may prove fruitful, as interactivity-related differences in usefulness can be expected in theories of one and the same layer. For example, while reflection may also occur in linear narratives (Whitby et al., 2019), moral decision-making (Melzer and Holl, 2021) necessarily requires some degree of interactivity. Finally, by analyzing the literature based on the ANSA model, we did not focus on antecedents of eudaimonic gaming experiences beyond game characteristics. Particularly, we did not identify individual differences in players that may result in differential susceptibilities (Valkenburg and Peter, 2013) to eudaimonic experiences (e.g., player dispositions, motives, or situational characteristics). While

5 However, we acknowledge that these processes are likely contingent on player skill, as skilled players may have more cognitive resources available that could be used to recognize aesthetic qualities, even in highly interactive games (Possler et al., 2018).

these additional characteristics have been considered less frequently in the literature (Daneels et al., 2023; for a notable exception see Wulf and Baldwin, 2020), they seem highly relevant for gaining a broader perspective on the emergence of eudaimonic experiences. For example, Vahlo (2018) has shown that players' individual gameplay preferences are critical in determining how much and what kinds of meaningful experiences arise from playing.

Overall, our overview highlights the potential of the existing theoretical approaches for understanding how eudaimonic experiences form when playing games. We hope that our work will prove a heuristic provocativeness (see DeAndrea and Holbert, 2017) for the further development of these theories, the filling of gaps in theorizing, and the integration of existing approaches.

Data availability statement

Publicly available datasets were analyzed in this study. This data can be found here: https://osf.io/fhxqw.

Author contributions

DP developed the working definition of eudaimonia and conceptualized the game layers and took the lead in writing these sections. RD conducted the literature overview. NB and DP conceptualized the interactivity continuum. All authors developed the assumptions of how interactivity shapes the theoretical approaches and discussed and commented on the manuscript. All authors contributed to the article and approved the submitted version.

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