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Questions without Answers: Enjoyment of Irresolution in Mystery Player Experience

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Mysteries are an engaging form of fiction, capturing audiences with curiosity, uncertainty, and ambiguity. However, mysteries in games have presented a challenge for research since the word mystery may be understood as 1) detective mysteries with clear-cut answers or 2) as mysteries which are unsolvable and incomprehensible. This paper focuses on the latter kind of mysteries. To investigate what constitutes a mystery player experience, in what ways mystery games provide answers to players and how to design these games, we inspected five mystery games through a formalist game analysis by a player-researcher. We discovered (1) how the mystery player experience was characterised by enjoyment of irresolution, state of not receiving clear-cut answers to a mystery, (2) how a mystery condition, a state of wonder and fascination, promoted openness, and (3) how interpretation management represented the doing in the mystery player experience. To our surprise, although the player was driven to find answers to mysteries, the eventual irresolution was an enjoyable experience to the player. We conclude that all mysteries need not be answered during the game, and the experience can be enjoyable *because* of this.

CCS Concepts: • **Human-centered computing** → **Empirical studies in HCI**.

Additional Key Words and Phrases: mystery, player experience, game design, ambiguity

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1 Introduction

Mysteries are an engaging form of fiction, regardless of entertainment format. People seem innately drawn towards challenges mysteries present [16], taking great enjoyment in unraveling their hidden answers [16, 29, 44, 89]. The fundamental constructs for mystery enjoyment, such as uncertainty [44, 89] and curiosity[44, 89] play a large part also in the ways players become fascinated to explore game worlds [21, 31, 48, 83] and themselves through reflection [11, 41, 74]. Despite the attraction of mysteries in the entertainment media, no previous study has inspected the play experience of mystery.

Understanding the play experience of mysteries has much to offer. First, a well-written mystery plot compels its reader to actively form interpretations [29], just as games which give players ”minimal narrative framework” [11, p.13] by leaving narrative gaps for the players to fill [18, 82]. In mysteries, audiences are expected to take an active role in interpreting the right solution [29].

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Supporting multiple interpretations of the user has been considered an important aspect also in human-computer interaction (HCI) [67, 78]. Whereas games research within HCI has lately began to recognize the importance of ambiguity and interpretation for player experiences that are eudaimonic [12], emotionally challenging [10, 18], or reflective [41, 57], little has been discussed regarding mystery experiences in games.

Second, mysteries are known to use uncertainty effectively. Heightened uncertainty about the mystery solution has been shown to add enjoyment of mystery, especially when the plot is sufficiently challenging [44]. Similarly, uncertainty is a generally recognised as a core component of games [13, 21, 48]. Players seek out games to absorb themselves in uncertainty [21], as do the readers of mystery fiction [44, 89].

Finally, as audiences show an unrelenting attitude to solve mysteries both in games and entertainment in general [33], mysteries are a promising genre for supporting learning due to their power to incite curiosity [26, 87]. Mystery games are already used to enhance audience engagement, and different organisations connected to learning have created mysteries into museum exhibitions [7, 43, 75], libraries [24], and education environments [38, 42]. However, despite the parallels shared by mysteries and games through curiosity, uncertainty, ambiguity, and interpretations, no related research in HCI exists on them.

The past games research has treated the term “mystery” mainly in its more colloquial meaning: that is, detective fiction that deals with the solution to a puzzling crime [51]. As such, the discussion has disregarded the parallel definition: mysteries as something inherently incomprehensible, beyond the scope of understanding [60, 89]. The overloaded and contradicting meaning has made mysteries difficult to unpack for the use of games research, especially from the vantage point of mysteries that are inherently ambiguous and open to interpretation.

A better understanding of mystery play experience could provide valuable knowledge about the utilization of ambiguity in games. Ambiguity bears many connotations to incomprehensibility but has so far been used as a descriptive yet elusive concept to characterize player experiences in which the game offers no ”clear-cut, singular solutions” [41, p.22]. While interaction design has already considered it fruitful to use ambiguity purposefully as a design resource [27] and to design for the possibility of multiple interpretations [67, 78], so far only little attention has been paid to such approaches in games. Previous related player experience studies have inspected ambiguity and interpretation from the players’ [11] and designers’ perspectives [18] but have not aimed to capture the lived experience and aesthetic characteristics of ambiguity and player interpretations, particularly from the contextually-specific vantage point [36] of mystery games. In addition, it remains unclear how the mutual concurrence and interplay of uncertainty, curiosity, and suspense affect player experience [48].

In particular, it remains unclear *how* to design for ambiguity and openness for interpretation in games. While games tend to raise questions in players’ minds [74, 76, 83] to the extent that games can be considered ”reflection machines” for their power to invite player reflection [41, p.6], there are no applicable, research-based road maps for game designers to use when concerning ambiguity and multiple interpretations [18]. For example, it is unclear to what extent a game should provide perplexing versus clear-cut answers to players, how the resoluteness of answers distinctively contributes to player enjoyment, and what emotional and perceptual qualities characterize mystery player experiences. Consequently, studying mystery player experiences offers a fertile setting to study all these questions.

In response to these gaps in knowledge, our study asks the following research questions (RQs):

1) *What constitutes the mystery player experience?*

2) *How should the interplay between concepts such as uncertainty, curiosity and ambiguity be understood in relation to player enjoyment in mystery games?*
3) *Which design considerations afford mystery player experiences?*

To address these questions, we conducted a formalist game analysis [59] on five acclaimed mystery games to inspect the more immediate aspects of lived gameplay experience. Our findings help unpack the broad category of mystery games. To characterize the play experience of mystery, we present the concept of *irresolution* to illustrate our main findings. Irresolution depicts mysteries that provide no clear-cut solutions to players, but rather remain somewhat open-ended or perplexing [2]. Through this concept, we depict mystery games that remain ambiguous and incomprehensible, and for this reason, have different qualities than detective mysteries. The research contributions involve three themes and associated design guidelines, from which we draw the following main findings:

1) Irresolution is a central feature in mystery player experience. All questions need not be answered or be clear-cut for the player to enjoy the mystery experience. Not having all the uncertainty resolved at the end of the game can be an enjoyable state for the player.
2) A precursor to accept irresolution or ambiguity of answers is what we refer to as the mystery condition: a state of wonder and fascination which makes players more open to reflection and meaningful emotional experiences.
3) Interpretation management is central to mystery play experience since mystery games stem from interpretative challenge. Interpretative challenge in mystery player experience builds from players sense of doing well amid uncertainty, especially in terms of ambiguity.
4) By intentionally leaving gaps of information, manipulating cognitive need for closure, building suspicion and withholding answers, designers are better able to encourage players to ask questions, form interpretations and enter mystery condition.

2 Related Work

This section illustrates the relevant previous research work on mysteries. First, the section describes different definitions of mystery. Then, it outlines prior literature on the appeal of mystery fiction, in the context of linear entertainment media. Next, we highlight how mysteries have been understood in the context of games. Finally, we describe the relevance of player interpretation and ambiguity for the design of mystery games.

2.1 Different Mysteries

The term mystery is commonly associated in literature with detective fiction that involves the solving of puzzling crimes. However, a parallel and perhaps less frequently considered definition connects mystery to something incomprehensible that cannot be completely understood [89]. Zillmann [89] argues that while detective mysteries tend to involve logical deduction and can be solved, mysteries outside of this definition connect to bewildering explanations of irrational realities, which potentially involve magical imaginations, relating them closer to sci-fi and Gothic fiction. Distinctively, mystery fiction comprising world-building and atmosphere is different from detective fiction, as argued by Reilly [71]. Additionally, the use of words *solve* and *resolve* brings out nuances in the definitions, since Zillmann [89, p.295] refers to detective mysteries as ”problem-solving”, whereas ”an emotional affai”, such as uncertainty, can be resolved in mystery and suspense. While detective games have been studied [51], atmospheric mystery games, which depict ”an unconceivable and obscure event or occurrence, which leaves the observer wondering about its deeper meanings and implications” [60, p.30] have gained scant attention. We define this emerging parallel outside of the detective genre as *aesthetic mystery games* for their specific emphasis on

the atmosphere of game worlds. With this working definition, we investigate aesthetics mystery games as games which are inherently unsolvable, incomprehensible and ambiguous.

The Oxford companion to crime and mystery writing guidebook classifies the reader's state of not receiving clear-cut answers to a mystery as *irresolution* [2]. Irresolution occurs when a mystery plot stays somewhat open or perplexing till the end of a story [2]. In comparison, the feeling of finality from having all the answers adheres to a conventional resolution, which relates to narrative closure [58]. Previous literature posits mystery resolution or confirmation forming a distinct part of readers' mystery enjoyment. In mystery resolution, those uncertainties a reader might have about mysterious situations, come to a close [44, 89]. Up to this point, the unresolved uncertainty has developed through narrative anticipation and consequent suspense for the reader [44]. When the surprising solution confirms the suspicions of readers, they can experience mystery resolution enjoyment, coined by Knobloch-Westerwich and Keplinger [44]. In a way, reaching a solution in a story is almost a type of "mental catharsi" [16, p.30], which associates to a sense of relief from suspense [89]. Relief, in turn, relates to the enjoyment of mystery fiction.

2.2 Mystery Enjoyment in Linear Media

Overall, mystery fiction is an established research topic in the field of linear media (often referred to as *non-interactive*), including areas of media research concerning literature and movies. Previous research on this field has explored the appeal of mystery [29], recognised the effects of uncertainty and different types of resolutions that influence mystery enjoyment [44], and outlined different models of mystery enjoyment [89]. For instance, well-written mystery novels challenge readers to interpret the correct solution as stories proceed, making mysteries "an intellectual puzzle or enjoyable game played between author and reader" [29, p.266]. Another study showed how a suitably challenging mystery can increase reader's enjoyment and vice versa [44]. Surprisingly, some readers have shown dislike when their suspicions were proven right at the end of a mystery plot [44]. Hence, mystery enjoyment seems to involve varying prerequisites of sufficient challenges.

Indeed, the enjoyment derived from reading mystery literature, i.e., *mystery enjoyment* [44], can take many forms and distinctly comprises two theories. In the first theory, Zillmann [89] proposed uncertainty, surprise, and confirmation of doubts as different models to describe mystery enjoyment. In Zillman's [89] definition, the *uncertainty model* refers to thrill-seekers who appreciate encountering problems more than solving them. Also, Zillman [89] proposes that the *surprise and confirmation models* forecast enjoyment of people who like unraveling unexpected events, particularly at the end of a mystery plot. In the second theory, Knobloch-Westerwick and Keplinger [44] distinguish mystery enjoyment is terms of *reception enjoyment* and *resolution enjoyment*. The authors consider mystery reception enjoyment to take place during the development of the plot, whereas resolution enjoyment occurs during the outcome [44]. Knobloch-Westerwick and Keplinger [44] suggest that Zillmann's [89] surprise and confirmation models adhere to resolution enjoyment, while the uncertainty model explains mystery enjoyment during plot development. While these two theories help characterize mystery enjoyment, their focus is limited to linear media.

2.3 Understanding the Player Experience of Mysteries

In contrast to mystery enjoyment in linear media, there is much less information about mystery enjoyment in play experiences. Linear media, such as books and movies, employ traditional storytelling forms and structures which have beginnings, middles, and endings, whereas game narrative structures can work with or against the traditional structures [63]. For this reason, the aforementioned mystery enjoyment theories do not entirely capture mystery play experiences. There is little consensus on what creates mystery enjoyment in games, since the existing knowledge is disjointed, especially between practice and research. For example, a recent experiment by

Delatorre et al. [17] implied that information structures of interactive suspense stories need to be more complex than in non-interactive experiences in order to sustain pleasurable challenges for players. On the other hand, narrative designer Hannah Nicklin [63] advises mystery game writers to provide more clues to the players in quantity and quality, since the players may have less means to return to the previous events in the game than readers of mystery books. While these two points create understanding of mystery games, they underline how mystery game experiences work in a different manner than linear media. Additionally, the existing knowledge on mystery games does not depict what constitutes a mystery play experience and the fundamental associated constructs, such as uncertainty and curiosity.

Traditionally, games research has considered mystery and curiosity as interchangeable concepts. The most prevailing understanding of mystery in games originates from the study of educational games, in which Wilson et al. [87] defined mysteries as gaps in knowledge, i.e., in similar way as curiosity has been defined in psychology [53]. While curiosity is a part of player's perceptual experience, mystery can be seen as a quality of the game itself [26], thus motivating the player to close the perceived gaps in knowledge [26, 53]. Wilson et al. [87] proposed that the level of mystery in games positively relates to learner's motivation, since a gap in knowledge engages learners in the learning process and creates a reason to search for information or solve problems. While reading mystery fiction, the heightened perception of curiosity can result in even greater mystery reception enjoyment [44]. Although mystery has at times even been considered one of the six characteristics of games (other ones being fantasy, rules/goals, sensory stimuli, challenge, and control [26]), mystery has recently been a rarely investigated concept in games research. In terms of curiosity, games research identifies mystery as an important part of game experiences [76, 83], along with another identified mystery enjoyment construct, uncertainty.

Unlike curiosity, uncertainty is rarely a sought out experience in everyday life. However, in the context of mysteries and games, uncertainty is a common and welcomed element; arguably, one of the most foundational components in games [13, 21, 48], even a substantial one to player motivation [21, 48]. To date, a few studies have investigated the combining effect of curiosity and uncertainty [48, 83], but they have not addressed the relationship between curiosity, uncertainty, and suspense [48], whereas mystery research has done so in the context of linear media. Zillmann [89] originally outlined suspense as an experience of uncertainty, which varies by its properties from anxiety, doubt and indecision to pleasant anticipation. The perceived complexity, probability, and ambiguity of experienced uncertainty all add to the intensity of an experience [34]. Nevertheless, mysteries and games both create situations in which uncertainty is to certain extent enjoyable. For example, high uncertainty about the culprit in mystery crime literature promotes enjoyment and can, therefore, make uncertainty a pleasurable condition [44]. The *pleasure of uncertainty theory* in psychology posits how "predictable events evoke less intense emotions than unpredicted ones" [88, p.5]. Because of this pleasure paradox, people who resolve their uncertainty can end up reducing the enjoyment of the outcome [88]. Likewise, enjoyment and competence work in a similar manner during game challenges as the pleasure paradox. While playing games, the uncertainty of success creates possibilities for competence, i.e., a sense of *doing better than expected*, which makes uncertainty a desired state in games [21]. Considering that uncertainty is paramount for both mysteries and games, it is safe to assume that uncertainty is also a major contributing factor in the mystery player experience.

As discussed earlier, Zillmann's [89] uncertainty model suggests that some readers of mystery fiction enjoy confronting the problem rather than finding an answer, i.e., they prefer "questions over answers", as phrased by Khaled [41] in the context of serious games. Khaled [41] has pointed out how the tendency to provide clear-cut answers potentially diminishes the effect that games could have on player reflection. Reflection is established as an inherently pleasurable and meaningful

activity for the players [57], and games offer an innate possibility to be ”reflection machines” [41, p.6]. Khaled [41] emphasized how games with philosophical and subjective narrative underpinnings potentially invite players to explore and reflect on the experience since they do not provide players definitive answers. Similarly, Rusch [74, p.101] drew a distinction between games that aim to convey a specific message explicitly and games that focus on ”evoking ideas, prompting self-exploration, and allowing the players to find his or her own meaning”. Rusch's [74] and Khaled's [41] depictions resemble the *need for cognition*, i.e., people's ”tendency to engage in and enjoy thinking” [8, p.116], which is a type of enjoyment associated with mystery reading [44, 45]. A similar trait was associated with the audiences of eudaimonic entertainment [66]. Eudaimonic game play experiences have gained increasing attention when considering play experiences beyond mere ”fun” [12, 14]; likewise, the importance of reflection has been increasingly investigated in terms of player experience [57]. To summarize, readers of mystery fiction enjoy the engagement in the thinking process in a similar manner as players enjoy reflection. Therefore, understanding how to design for player interpretation could be an important element in designing for engaging and enjoyable mystery games.

2.4 Designing for Player Interpretation

Game design literature has identified two design challenges which relate to design of player interpretation. In terms of available game design knowledge on mysteries, *Making Deep Games* [74] by Doris Rusch is one of the few sources offering insight on the topic. The book title, *deep games*, refers to games where player has to ”dive below surface to discover the hidden meaning” [74, p.100]. The depth of game is defined by multiple hidden layers of meanings, which can be understood through metaphors [74]. As one way to design deep games, Rusch [74] suggests using *metaphor as a mystery approach*, where the designer treats the hidden metaphor of the game as a mystery the player aims to uncover. Here, Rusch mentions the design challenge to leverage between players' fascination and frustration, when they try to unravel the hidden meaning of a game [74]. Another observed design challenge has been proposed by Denisova et al. [18, p.8], who identified how designers struggle to ”assess whether the game leaves enough space for players to have a personal experience and interpretation”. While both of these design challenges identify the designer challenge to understand how many answers should the player be offered in game, they do so in different levels of granularity. In short, Rusch [74] proposed a more precise approach, while Denisova et al. [18] presented a more general one.

Among the above-mentioned two design challenges, Rusch's [74] ”fascination versus frustration” serves as a promising design guideline for mystery games. Related to the metaphor as a mystery approach, Rusch [74] encourages designers to mitigate the player's frustration by placing the game narrative inside a bigger mystery, i.e., the game metaphor, tying the experience into a coherent whole. In similar manner as Aisenberg characterised irresolution [2], Rusch [74] mentioned that different interpretations players make are not arbitrary because finding the game's metaphor is not about finding the ultimate truth. Rather, Rusch [74] believes that unlocking the game meaning is not crucial for the enjoyment of a game.

Allowing openness for interpretation has been an established design consideration in interaction design, relating more closely to the deliberate use of ambiguity [27, 67, 78]. Ambiguity, as Gaver et al. [27] describe, refers to multiple meanings that a perceiver allocates on an object in terms of information, context and interaction. Especially in the *ambiguity of information*, the design is purposefully imprecise with the information it conveys to the user, i.e., by leaving gaps to fill [27]. Similarly, Denisova et al. [18] noted how game designers of emotionally compelling indie games deliberately aimed to leave space for the players' own interpretations. As Sengers and Gaver [78] postulated in the context of interaction design, openness for interpretation potentially leads to

higher engagement, since users are in charge of deciding their own meaning for the interaction, thus increasing their engagement with the experience.

One potential approach to elicit interpretations in players is making them pose questions. The game design pioneer Jesse Schell [76] suggested that designers can stimulate curiosity by inspiring questions in players' minds through the game design, whereas Rusch [74] encouraged to cultivate vagueness in design to create spaces for players to self-reflect and develop personal insights. Similarly, Gaver et al. [27] considered that ambiguity can be intentionally used in design. Games that are purposefully mystery games, therefore, share the same characteristic: they intentionally leave information gaps for the players to fill with their own interpretations and invite the players to be curious and ask questions.

Another potential approach for the design of interpretative mystery games is the narrative design concepts of *gaps*. As Ian Thomas [82], the narrative designer and writer of *Amnesia: Rebirth* [G2] described: "there are all sorts of spaces in writing which, if you leave with content un-specified, your audience fills in". Thomas Grip [30], another designer, later expanded this distinction to include gaps both contained within game writing and as gaps of agency, causality and information. Gaps as a concept originates from the realm of comics, where the use of *closure* is a much more common storytelling practice than in digital media [54].

With regards to closure, the concept of closure relates to the psychological concept of a *need for cognitive closure*, which characterises the need of individuals for clear-cut knowledge [47]. A high need to reduce the experienced uncertainty and ambiguity of a situation motivates swift decision-making and can make decisions more rigid and less creative [22, 47, 85]. Previously, the need for closure has been been associated with the desire to repeat play experiences [58] and to player interpretation formation [18]. Since the need for cognitive closure is both a personality trait and a state caused by a situation [47, 85], it seems potentially connected to the mystery play experience. While the need for closure has apparent connection to seeking answers, there is little knowledge on its effect on the enjoyment of mystery games.

2.5 Summary of Related Work

To summarize, mystery fiction is regarded as a promising genre for audience engagement. Prior research in linear media has established different forms of mystery enjoyment, which include uncertainty, curiosity and confirmation enjoyment, as well as reception and resolution enjoyment. Additionally, some mysteries are known to provide irresolution for their readers and thus stay perplexing during the end of a mystery plot. Games research has previously investigated mysteries specifically through curiosity and indirectly through uncertainty. Furthermore, player experience research concerning reflection and eudaimonic experience considers both the openness for interpretation and use of ambiguity as promising avenues for further research. However, little is known to what extent a game should provide perplexing versus clear-cut answers to players, what constitutes mystery player experience and how concepts such as uncertainty, curiosity and ambiguity contribute to player enjoyment in mystery games. Additionally, how to design them is an open question.

3 Method

We selected formalist game analysis as the data collection method for this work and further processed the data with collaborative thematic analysis. According to Mitchel and van Vugh [59], formalist game analysis aims to study a game by playing it, while inspecting its form and aesthetic game experience. Formalist game analysis is a relatively new methodological analysis toolkit with a special emphasis to study *how* video games trigger player experience [59].

To answer the research questions, we opted for a data collection method which allows capturing and analyzing the more immediate aspects of player experiences. Our work regards player experience as a mix of cognitive and affective responses to external stimuli and players' lived experience [59]. Particularly, we are interested in players' *aesthetic* experience, encompassing complex patterns of feelings, emotions, and meaning-making processes elicited by the game [64]. Within games research in HCI, player experience has typically been assessed through summative, post-hoc accounts where players describe their remembered experience of a past gameplay session [48, 86]. Such retrospective accounts, however, may not accurately represent the "fresh, lived experience" [86, p.4] of gameplay, due to memory bias and post-hoc rationalization [35]. Although there are recent examples in HCI games research of data collection methods which focus on the immediate aspects of gameplay experience (see [48, 86]), formalist game analysis offers a special advantage to inspect the subjective player experience through the researcher themselves [59]. A benefit of this approach is that it allows access to particularly rich qualitative data capturing the nuances, complexities, and context of subjective player experience [59].

Formalist game analysis [59] may be considered a form of so-called *first-person* research, which "allows researchers to investigate the lived experience from within, generating deep, evocative, and rich insights" [19, p.754]. First-person research has its roots in sociology and anthropology, but its benefits are increasingly recognized within HCI because of its capacity to access intimate perspectives on subjective phenomena, which would be difficult to attain through other methods[19, 20]. One first-person method that has gained traction within HCI in recent years is autoethnography [37]; we have recently seen autoethnographic inquiries on how games can elicit aesthetic experiences that transform players' perspectives on life [84] or how games can sensitize players to nature [81]. However, since we were not strictly concerned with tracking game experiences that persist far beyond gameplay [e.g., 84], we chose to adopt formalist game analysis as a method for its potential to create applicable design knowledge [59].

Whereas game analyses are still relative rare within HCI, game analysis is a well-established method in the more culture-anthropologically driven field of games studies [1, 15, 23], particularly when concerning the study of aesthetic player experiences [59] and design structures [50]. Although HCI researchers have used game analysis to inspect singular game features in co-operative games [77], multiplayer games [49], custom avatars [25], and players returning to a game after a long time [32], our focus is aimed towards the form of the whole game to understand the aesthetic player experience.

3.1 Formalist Game Analysis - Data Gathering

To analyse the aesthetic player experience in formalist game analysis, it is recommended that researchers choose a *dominant* as a strategy to inspect games [59]. The dominant acts as the guiding principle to highlight the important and to subordinate the irrelevant features in the player experience, suggesting that elements that stand out are worthy of inspection [59]. Mitchel and van Vught[p.106] [59] provide an example how to achieve this in *Shadow of the Colossus* [G4], where "the illusion of control forms the dominant and is the focus of the player's aesthetic experience". In our research, we place mystery as the dominant for formalist analysis.

Inspecting solely mystery games through formalist analysis can be considered a *contextually-specific* approach, where the aim is to understand which features specifically draw players to play mystery games [36]. A contextually-specific approach helps to highlight features across a game genre, which in turn attract the players and thus merge to facilitate the player experience [36]. By specifically inspecting mystery games, the first author (i.e., player-researcher, abbreviated as PR) familiarized themselves with the chosen game titles through extensive play [15, 50]. PR has a

background in game design, game design research and HCI, but also several years of expertise in the design of mystery games. This positionality motivated a design-driven approach for this study.

During the first phase of research, we constructed the initial codebook based on previous research on mystery and potentially related concepts into a framework. With the framework as a base, we chose a diverse selection of relevant single-player mystery games for formalist game analysis. While playing the games, the PR collected self-observational and self-reflective data with methods favored by first-person research [9, 59]. This included on-site recordings in the form of written field notes, which aimed "to capture immediate emotion, provide a less tampered-with perspective, and record vivid memories" of one's lived experience [9, p.93]. These written accounts were complemented by video recordings of the gameplay. Additionally, these on-site recordings were supplemented by self-reflective data [9]. The PR recorded these accounts in the form of reflective journals written immediately after each play session, capturing reflections of the gameplay experiences within a broader context [59]. This thorough recording of the sessions with both screen recordings and written accounts enabled the PR to return to the "fresh, lived" [86, p.4] play experience as accurately as possible. The PR recorded the data in their own native language, which all the authors shared. The data gathering accounted for 71 hours of game-play time and 15000 words in written text during August-November of 2023.

We acknowledge that Mitchell and van Vught [59] recommend using multiple playthroughs for formalist game analysis. However, first impressions provide a heightened significance in mystery games. The unique combination of uncertainty, curiosity and surprise in mysteries create a gameplay situation in which the second playthrough significantly differs from the first. This is because unknowns cannot be unknowns after learning them once; therefore, knowing the answers is irreversible. For this reason, the first play sessions for each game were considered the primary ones, and secondary sessions were not done. In order to preserve the first-glance perspective on the game titles, the PR limited themselves to as little knowledge about the game contents as possible before playing the game.

3.2 Game Selection

The selected games portrayed a wide variety of narrative single-player games involving mystery. All the titles were initially identified from Steam's listing of games tagged as *mystery* (as of 29.5.2023) and then narrowed down to single-player games with most positive reviews. The selection was further refined by researching online discussions recommending best mystery games (Youtube, Reddit), favorable reviews by critics, and from authors' personal experiences with the titles and their makers, in the same manner as Denisova et al. [18] did with their work. To better understand the aesthetic experience of mystery, we focused our attention to popular and appraised mystery games. The intention was to select a wide variety of mystery games in order to contrast different types of mysteries. Because of this, the diversity of the games in terms of their genre was eventually the determining factor for the final game selection. The genre categorisation was informed by Steam and the How Long to Beat website. With this process we ended up in selecting five mystery games to the formalist analysis. The full list of the played games is provided in Table 1.

In addition to Table 1, the following section briefly describes the main mystery in each game experience to provide necessary context to the reader. The descriptions are given in the same order as the games were played. The reader is advised that the following game descriptions contain spoilers of the main mysteries.

3.3 Brief Summary of the Played Mystery Games

3.3.1 Return of the Obra Dinn (Obra). Return of the Obra Dinn [G5] is a historical adventure puzzle game, where detective mystery takes place at sea. The player's goal is to find out the fates of 66

Table 1. List of selected games

Selected games					
Abbreviation	Title	Year	Developer	Play time	Genre
Obra	Return of the Obra Dinn	2018	Lucas Pope	11h	Detective, puzzle
Edith	What Remains of Edith Finch	2017	Giant Sparrow	3h	Walking simulator
Dredge	Dredge	2023	Black Salt Games	14h	Adventure, horror
City	Forgotten City	2021	Modern Storyteller	10h	Role-playing game
Outer	Outer Wilds	2019	Mobius Digital	33h	Exploration

crew members during the fatal voyage of the Obra Dinn ship. Determining the fates is the main mystery of the game. The involvement of deadly monsters and sea people proves to be the cause for the disastrous journey, as well as poor leadership and social clashes among the crew members. The game explains everything in the end.

3.3.2 What Remains of Edith Finch (Edith). What Remains of Edith Finch [G3] is a walking simulator which describes the dramatic fate of the Finch family. As the last remaining member of the family, the player arrives to her abandoned childhood home to unravel the past event. The main mystery investigates if a curse was a source of the misfortune of the family members. Eventually, the player learns of all the fates but does not receive a clear answer if the curse was the explanation. Thus, the game provides a sense of irresolution for the player.

3.3.3 Dredge (Dredge). Dredge [G1] is an horror, fishing management game, where the player explores an island region in search of peculiar fish and sunken treasures. The main mystery of the game involves finding out how the islanders are connected to the mysterious purple light, which creates terrors to the night-time sea. While the player uncovers the human influence in the end, the reason for purple light is not explicitly explained. The game provides irresolution in this regard.

3.3.4 Forgotten City (City). Forgotten City [G7] is a role-playing game (RPG) in the context of historical time travel. The player finds themselves trapped in an old Roman city where the citizens live under a law called Golden Rule, which makes them turn into statues if they commit any crime. The main mystery questions who is behind the Golden Rule, and to determine this, the player interrogates each citizen during the game. Eventually, the player discovers that a certain god is behind everything, and the Golden Rule was cast to test the city and the morals of its citizens. The game explains everything in the end.

3.3.5 Outer Wilds (Outer). Outer Wilds [G6] is an open-world space-exploration game where the player navigates a small galaxy to find out what became of the mysterious alien race called the Nomai and how the mysterious, astronomical Eye of the Universe connects to them. Flying the space ship in the perilous landscapes adds a degree of difficulty when the player tries to unravel information about the Nomai. Eventually, the player learns what happened to the alien race, but information connected to the Eye of the Universe remains ambiguous. Thus, Outer Wilds provides a sense of irresolution to the player.

3.4 Thematic Analysis

The first three authors conducted a thematic analysis on the dataset using a codebook approach [5]. We adopted a codebook approach, which combines the qualitative research values of reflexive thematic analysis with a more structured approach to coding, to help organize and map the developing analysis and to facilitate teamwork between the researchers [5, 6]. In contrast to more deductive coding reliability approaches where the use of a codebook and multiple coders is based on the idea of "ensuring 'accurate' and 'reliable' coding" [6, p.333], we conceptualize researcher subjectivity as "a *resource* for knowledge production" [6, p.333-334]. Thus, the aim of the codebook and coding was not to produce some all-encompassing or objective picture of the data. Rather, the aim was to stimulate further analysis in which underlying patterns of shared meanings are identified and developed into more complex, overarching themes that reflect various facets of a particular experience or phenomenon [6].

To mitigate challenges associated with working in team environments, we conducted collaborative coding in accordance with the approach of Richards and Hemphill [72]. Additionally, the coders consulted a peer debriefer (a researcher not involved in coding) and recorded an audit trail through a collaborative research journal to document the coding process [72]. Since the aim of the coding process was to discover new emergent themes and welcome differing coder interpretations to incite discussion and iterations in the analysis, inter-rater reliability or coding agreement were not used [6, 55].

As per the recommendation by Ritchie et al. [73], we employed a self-made framework that acted as a base structure of data management. For this, a small-scale literature review was conducted to identify prominent concepts in previous research surrounding mysteries, which helped to build a framing for data management. From prior literature, a few key sources [44, 87, 89] formed the backbone of the framework, which we further supplemented with game research knowledge potentially related to the mystery play experience [10, 18, 48, 83]. Concepts such as curiosity [44, 89], uncertainty [44, 89], suspense [89], and gap in knowledge [87] comprised the original 31 codes in the initial codebook.

After the player-researcher had finished playing the first two games (Obra and Edith), the authors coded the produced material with the guidance of the initial codebook in Atlas.ti [28]. This resulted in 250 new inductively generated codes. At this stage, all codes and coding protocol were reviewed based on their breadth, frequency, relevance, and complexity. Some codes were elevated to categories, whereas other codes were subsumed under above-mentioned code categories. As a result, the second iteration of the codebook contained 19 code categories. After this, the peer debriefer reviewed the codebook [72].

Next, the player-researcher continued to play the remainder of games. We tested the final codebook once more with a small dataset, reiterated, and decided that the codebook was ready to be used for rest of the data. The codebook helped authors to organise their work in a manner that made comparing results easier, while not limiting the inductive generation of new codes. After all the data was coded with the codebook in a consensus manner [72], the authors convened to review the generated 511 codes. The removal of duplicate codes resulted in 20 code categories and 437 codes in total. During this discussion, the group already had reached a consensus on a few notable overarching patterns. At this time, one of the authors came across the concept of irresolution [71] in related research, which conveniently offered a contextual framing to depict some of the played mystery game experiences.

After this point, the first author continued the thematic analysis process by organizing the codes based on their subject matter and relationships under 16 code topics, or *domains* [6]. The domains represented summaries of shared topics, around which there were often divergent and disparate

characterizations [6]. The whole research group then iterated over the domains. Ultimately, as a result of the analysis process, we developed three overarching and multifaceted themes to depict mystery play experience.

4 Findings

In this section, we present our findings structured around the three themes: (1) *Journeying from questioning mode to mystery condition*, (2) *Managing interpretations in uncertainty and suspicion*, and (3) *Irresolution as the core of the mystery play experience*. We will denote the player-researcher as PR.

4.1 Journeying from Questioning Mode to Mystery Condition

The first theme, *journeying from questioning mode to mystery condition*, depicts how curiosity played a significant role as the instigator for mystery solving by making the player continuously ask questions. We call this inquisitive mindset *questioning mode*, an active mental process persisting throughout all the recorded gameplay experiences. The questioning mode aroused countless questions in the player, most of which related to in-game events that were more trivial by nature, inquiring why an occurrence took place, who certain character was, or how some consequence came to be. At times, the questions also included deeper reflections related to the player identity in and out of the game. Reflections on morality and consequence made the player ponder *"who am I to summon the dead and the past"* (PR, Obra) and occasionally spend time figuring out what the games were about. The myriad of questions aimed to unveil the actual main question, the main mystery of the game. The player expressed this by reflecting how *"I seem to be looking for repeating patterns from my surroundings and combining them in a liberal manner, hoping to answer the main mystery, which seems to be 'what happened to the Nomai?* (PR, Outer), or how *"amid all of these mysteries this particularly mystery story seems to be the most important one"* (PR, Dredge).

The data indicated that the player hoped that there was some kind of a bigger picture, hiding beneath scattered information. The player frequently likened this to a puzzle or *"a canvas that has started to form in background almost subconsciously"* (PR, Obra). With the hope to unveil the main mystery, some gaps of information started to become more distinct to the player: *"the clearest mystery in the game is the fate of the people turned to statues"* (PR, City). Identifying clear information gaps made the player start filling the gaps in with their own interpretations. However, maintaining these threads of interpretations required to find supporting information.

In order to sustain the formed interpretations, the player needed to identify the relevant information in the game. The potential for uncovering some novel, significant information often seemed to be signalled by a perception of *strangeness*. Strangeness meant that the player payed attention to things that stood out somehow from the surroundings, i.e., anomalies: *"I fished a peculiar, spiked fish"* (PR, Dredge); *"I arrived on an empty ship, in the middle of the sea. I consider this odd"* (PR, Obra); or *"there is something strange in me as a character"* (PR, City). Detecting anomalies from the environment led the player to create a *baseline of strangeness*, which meant establishing what is strange in the context of the game world: *"The hanged person is probably significant for the unfolding events. - - He stood out as somehow different."* (PR, Obra);*"First, clearly abnormal thing was a door in the hallway. However, the player character did not even comment of this?"* (PR, Edith). However, establishing a baseline for strangeness only once was insufficient. The player experience indicated that the baseline of strangeness had to be constantly renegotiated, since eventually something that was unfitting in the beginning became quickly familiar, until some novel strangeness stood out from the background of the established game world:

> *"The game breaks down the normal with a small chisel, piece by piece. First, it was the door closed with urethane, which was a completely normal thing for the main character. Her mother wanted to close them down. Next I'm being told that those doors belong to the deceased family members, gone for decades. A new normal is presented."* (PR, Edith)

Within the questioning mode, we found evidence of a state we describe from now on as *the mystery condition*, a state that was most apparent from the recorded experiences with Edith Finch, Dredge and Outer Wilds. Mystery condition is a state of wonder and fascination which makes players more open to reflection and meaningful emotional experiences. From the start, the player expressed the need to understand the logic of the game, not only in a rule-based level but also in narrative sense. The player addressed the need by contemplating by which logic different mystery-inducing features functioned in the game: *"People have been disappearing, even though there is no way out of the city. There is a mystery*" (PR, City). The player was left wondering whether there was a natural, rationalistic explanation behind the mysteries, or if the explanation was something irrational, outside of every day world, involving form of magic. The player often depicted these experiences as *"supernatural, since I can't come up with any natural explanation*" (PR, Dredge). Determining the incomprehensible as a possible explanation for mysteries allowed the player to inspect the game logic from a wider possibility space, from mystery condition. In this state, the player was mesmerized by the game world:

> *"This place (the island region) seems to stretch the possibility space."(*PR, Dredge)

> *"When the deathly sea monsters were introduced to the picture, the space between normal and magical was truly blasted open. For some reason this felt like the final acceptance of the supernatural compared to the previous monsters.*" (PR, Obra)

Thus, these negotiations of the irrational made the quest to solve the mystery more than the process of understanding the normal, everyday world, but also about understanding the world beyond rationality, riddled with incomprehensible and unanswered questions.

As mentioned, curiosity played an important role for questioning mode, thus also creating the need to explore. The need pulled the player forward, which they often characterized with enthusiasm: *"The doors belong to the deceased family members, wow! How strange and intriguing"* (PR, Edith). Being in the mystery condition made the player also express wonder and fascination: *"At the moment the vastness of the search amazes me, since the world and the islands in it feel large and faraway, while I know that beneath my ship there is a vast and deep ocean, full of peculiar fish."* (PR, Dredge). Interestingly, strangeness and wonder sometimes co-occurred, particularly with Edith Finch and Dredge when the player was reflecting how *"mystery seems to seep from every single thing in this world. Nearly every person is strange, the fish are strange, the wrecks are strange, and especially the night is strange"* (PR, Dredge), sometimes even causing the feeling of being *"exhausted. What a wonderful and a strange game. I don't know what is happening, but I love it."* (PR, Edith). The fascination seemed to give the player a sense of extended space of possibilities, feeling that *"possibility space stayed vast constantly"* (PR, Dredge);*"It is like someone told for a fraction of a second that everything is possible. Something that you hope to find when you solve mysteries. You hope to find what you are looking for"* (PR, Edith). Being mesmerized by the mystery condition seemed to be a particularly enjoyable state for the player, a state they wanted to linger on:

> *"It feels like I've stepped on a new continent and I'd prefer not to leave it after two hours, as I know the game will last."* (PR, Edith)

The need to explore appeared particularly strong when the player faced clear information gaps in the game, which made them experience heightened need for answers, i.e., closure: *"I'm bothered that I won't find out until the next play session about the big sea shell hanging above the deck, shooting*

the crew" (PR, Obra). The pull of curiosity was occasionally deemed so strong that the player dared themselves to explore, despite being scared and sensing *"that small, unpleasant feeling of being on the edge and daring to venture into the 'scary' site in hopes of treasure and information"* (PR, Dredge). However, this exploration required managing the felt uncertainty.

4.2 Managing Interpretations in Uncertainty and Suspicion

The second theme, *managing interpretations in uncertainty and suspicion*, describes how the player actively managed their interpretations, i.e., unraveled mysteries to accommodate the felt uncertainty and suspicion. Sustaining the interpretation threads acted as the *doing* of the mystery play experiences. Forming interpretations made the player adopt different strategies, involving speculation, theorizing, drawing conclusions, gathering evidence, predicting events, detecting causality, presuming, and connecting the dots – filling in the gaps by interpreting. These different methods of interpretation forming were associated with varying degrees of certainty:

> *"I started to doubt that the lighthouse keeper lady might reveal to be the other half of the married couple. For now this is only a hunch."* (PR, Dredge)

> "*Three planets have now so far had a similar, serpentine construction. I'm starting to believe that there something peculiar underneath, but what, I cannot tell yet.*" (PR, Outer).

The player actively considered whether their newly acquired information provided evidence that supported their prior interpretations and acted accordingly. Overall, this type of *interpretation management* was a way to compile, handle, dissolve and confirm interpretations. By finding and confirming new information into facts, the player aimed to abolish or diminish the gaps of information, which in turn helped to appease the felt uncertainty. By confirming a fact, the player was able to continue building their interpretations on a more stable ground.

The player adopted multiple strategies to interpretation management, of which we highlight two in particular. First, the player parsed information gaps by quantification: i.e., by associating perceived information gaps with some countable, measurable characteristics. For example, the player described: *"it feels like I can count the unknowns of the game with the fingers of two hands"* (PR, Outer), or *"during this round I got two relics, which means there is only one left"* (PR, Dredge). The player managed to quantify the progress by recognising repeating patterns in the information gaps, such as the deceased family members in Edith Finch. This was yet another example of how the player started to perceive missing information distinguishable and manageable. Secondly, the player used real-world information to solve some open questions. The player encountered numerous situations across the games where the use of outside information was necessary because the required information was extraneous to the game world itself. Either the player had to possess the real-world knowledge beforehand or look for the information from external sources, such as Google: *"I resorted to google ship vocabulary. It only now occurred to me that high-ranking people wore a specific hat"* (PR, Obra). Although lacking this type of information was in most cases merely a hindrance to the progress, not knowing something contributed to experienced uncertainty. Another recurring phenomenon related to interpretation management was when the player did not know what to do with the new but apparently important information: *"information does not automatically mean that you know how to do something. I know exactly that the conditions have to be the right kind, but the game does not tell how to apply this knowledge"* (PR, Outer). Since interpretation management usually involved sparse, ambiguous, or incomplete arrays of information, the player constantly scrutinized them with suspicion.

As an overarching experience, the feeling of constant uncertainty created a sense of suspicion for the player, which provoked them to seek answers to the games' mysteries. Dealing with an incomplete set of confusing information placed the player into a constant suspicion that needed

appeasing. At times, the feeling seemed close to anxiety, with the player describing *"a comprehensive feeling of uncertainty and certain type of paranoia"* (PR, Obra) or even *"existential dread of the answers ahead"* (PR, Outer). Mostly, however, the feeling of uncertainty was associated with indecision or ambiguity of the acquired information: *"I followed the priestess alone to the bath house and now started to doubt if she'll try to kill me"* (PR, City). Suspicion often evoked an enduring sense of self-doubt in the player: *"A few times I noticed how a few locations or markers appeared 'by themselves', in a way I had not noticed before, even though I'm certain I passed the location previously."* (PR, Dredge). Counter-intuitively, self-doubt seemed to be a useful state to solve the mysteries. The feeling of self-doubt was seen to foster the feeling of suspicion, which made the player constantly question their own interpretations, the information they had acquired, and even the game itself. Interestingly, the felt suspicion fostered the questioning mode, since it kept the player less fixated on a particular interpretation and more open to other explanations. However, occasionally suspicion also aggravated the player when their overly suspicious behaviour led to false interpretations and frustrations. Feelings of obsession were apparent at times, when the player, for example, felt *"suspicion to move on to a new chapter before the previous was nearly complete"* (PR, Obra)", or when the player returned to an unsolved quest instead of moving on: *"I returned once again to Brittle Hollow against my earlier resolve"* (PR, Outer). This type of strong need for closure highlighted player's perceived uncertainties in the games.

Managing uncertainty was unsuccessful at times and resulted in experiences of disempowerment, which was associated with reports of overwhelm, and feeling *"sort of dumb"* (PR, Dredge). Frustration was also a salient emotion in this regard, in particular when the player felt their progress was slow. These experiences usually preceded a task-oriented mindset, where the player reported how *"mystery feels far away this time. This is probably because this time I was mostly blowing away different things and that action makes you think a little bit less of mystery"* (PR, Dredge). In some cases, the player felt in need of an *aha* moment, or epiphany, to advance in the game and for this reason was unable to connect the threads: *"I could't understand the energy chamber even though all the pieces seem to be present"* (PR, Outer). The feeling connected to the sense that the solution ought to be clear but is out of the player's reach, which caused feeling of incompetence. Feelings of disempowerment were most prevalent in the case of Obra Dinn, where the player failed to solve the main mystery of the game: *"At the moment, the main feeling is disappointment from the fact that I was not able to solve the whole sequence of events. The disappointment feels like a strong, physical sensation in the chest"* (PR, Obra). Failing to unravel the main mystery was connected to the most noticeable disappointments, which was particularly apparent with Obra Dinn and Forgotten City. Notably, one of the greatest disappointment was because the player felt they received too much information:

> *"I'm trying so hard to think why the resolution of the game felt dissatisfying in the context of mystery games, and maybe for me it boils down to how I got an answer to everything. The developers felt necessary to close all the possible questions."* (PR, City)

Receiving all the answers in an explicit manner seemed to abolish mystery and thus provoked a sense of dissatisfaction for the player.

Conversely, some of the games resulted in experiences of empowerment in the player, which were related to reports of *"feeling smart"* (PR, Obra) or *"feeling somehow special"* (PR, Dredge). The player regarded the hard-earned information with enthusiasm and pride: *"I consider the collected information as a treasure, and I frequently admire it in my log book."* (PR, Outer). Another source for empowerment was related to cases where the game presented information in an implicit manner. As an example, while playing Dredge, the player encountered a fish merchant, who for some reason wanted to eat a peculiar fish. The player considered this act strange compared to the created baseline

of strangeness, which made them observe an information gap. Later, when the player discussed with another character, they mention how some people eat peculiar fish to reach immortality. Since the fish merchant was not explicitly mentioned, the player was able to follow the trail of bread crumbs and bridge the information gap with a fitting interpretation by themselves. Not getting the confirmation from the game made the player feel *"special, like me and the game have a secret, which we both know but is not talked out loud"* (PR, Dredge). In essence, the player experienced pleasure from not receiving clear-cut answers and enjoyed staying in uncertainty. The pleasure of uncertainty was apparent also when curiosity made the player anticipate information that would alleviate the uncertainty: *"It feel like I have millions of questions that require an answer and my fingers are aching to solve them"* (PR, Obra); *"I didn't notice any uncomfortable uncertainty, unlike with Obra Dinn, but instead that eager anticipation of the upcoming events"* (PR, Edith). The derived pleasure from uncertainty, anticipation, and intrigue appeared particularly with cases of irresolution.

4.3 Irresolution as the Core of the Mystery Play Experience

The final theme, *irresolution as the core of the mystery play experience*, describes what effect unraveled answers – or the lack of them – had on the mystery player experience. Since previously mentioned questioning mode (continuously asking questions) had been such a focal activity to the mystery play experience so far, the need to find answers appeared different in a few of the games. To our surprise the player felt less need for definite answers, but was content to have them ambiguous in the end of the game. The player put aside the need to know and rather accepted the openness of the answers ahead. In effect, the player accepted the irresolution of the mysteries:

> *"I don't know why this happens, but I really don't even care for the answer to that question."* (PR, Edith)

> *"I arrived to a forest full of galaxies. I don't know what it means, but I don't feel the need to know. It is beautiful. I cry."* (PR, Outer)

This feeling of irresolution, depicting mysteries which do not provide a clear-cut solution at the end of the mystery, but rather stay somewhat open or perplexing, was most prominent with Edith Finch, Outer Wilds, and Dredge. With these games, the player expressed how *"many things were left open in the game, and I don't mean only the side quests"* (PR, Dredge). We observed that the sense of irresolution was more frequent with the games where the player perceived the answer to the main mystery as more ambiguous than clear-cut: *"– we will never know as a player, what the past truly contained. The main mystery in the background stayed open"* (PR, Edith). Overall, the player did not seem to find the lack of answers in irresolution unpleasant, but rather described appreciating the pleasure of uncertainty:

> *"The ending stayed open. - - Despite of everything, all those open questions swim inside me peacefully, distinctly different than they were at the beginning."* (PR, Outer)

The experience of irresolution brought forward a variety of strong emotional reactions from the player. Being in the mystery condition seemed to keep player in somewhat vulnerable state, which made some experiences more salient than others. The player pondered on the beauty of gameplay encounters by describing how *"the world is full of wonderful and beautiful things"* (PR, Edith) and was moved especially during the irresolute experiences: *"I was the first to arrive, yet it was all of us who played. Alone, together. This is where I was moved to tears for the first time"* (PR, Outer). Especially notable experiences were those associated to the feeling of awe. For one, the player had earlier expressed some form of an *"existential dread of the answers ahead"* (PR, Outer) close to the ending of both Outer Wilds and Edith Finch:

> *"I stand by the shore and stare at the house glowing in red. Suddenly I dread what that unknown shall reveal to me (Edith) about the curse."* (PR, Edith)

Additionally, with all the irresolute games, the player pondered their significance in relation to the world, how the *"the space is vast and I, as a player, am small. I'll be exploring it for a while, which makes it feel even bigger, inexplicable, and mysterious"* (PR, Outer). Interestingly, the player did not only compare themselves to the visible game environments, but also symbolically to the mystery at hand: *"the size of the mysteries is planetary in this game. While usually mystery solving includes the fates of individuals, now we are trying to find out about the fate of a whole nation"* (PR, Outer). Thus, the vastness of questions at hand made the player feel insignificant in the face of them.

Although the player had engaged in reflection throughout all mystery play experiences, particularly the games that caused irresolution aroused reflection on profound questions by letting the player *"wander to different emotions and invites to ask questions, in particular of life and death."* (PR, Edith) and how *"the game seems to say that the largest mysteries are not meant to be solved. - - I felt the answer to the mystery larger than myself. Not only main mystery of the game, but mystery of life. Unknown is always present"* (PR, Edith). Therefore, being in the mystery condition and having experience of irresolution seemed to let the player explore the larger questions also within themselves.

The quest to unravel the main mystery and find the larger explanation was unclear during most parts of the play experience: *"I cannot tell at the moment what is the biggest question that I'm supposed to solve"* (PR, City). The quest aroused frequent reflection on mystery atmosphere. For example, the player once observed how *"the feel of mystery is minimal, probably because I know so well what I must do"* (PR, City) or mystery felt particularly distant when *"there is a lot of action going on, luring monsters etc."* (PR, Dredge). Therefore, the occasions that lacked the mystery atmosphere were moments in which the player was well-accustomed to the game or the current in-game goal was particularly clear.

Reaching the conclusion of the main mystery was the most meaningful part of the play experience. The quest to find out the main question was at times likened to *"important theme for the game"* (PR, Outer) or to *"the big, fundamental questions in your mind. That there is a larger explanation"* (PR, Edith). Asking myriad of questions aimed to find out the resolution to the main mystery of the game. The act of unraveling the main mystery unraveled also a myriad of confirmations during the progression of game, i.e., filled the information gaps. These confirmations were attained in such frequent manner that their impact remained difficult to observe. Confirmations were immediately treated as new information that swiftly formed a new interpretation: *"Gabo witnesses flash in the sky in the beginning of each loop, just as I had observed"* (PR, Outer). However, the player considered progression in game as enjoyable, and receiving confirmations brought them incrementally forward. While the player received enjoyment from confirmations in general, their effect was less salient than reaching the resolution of the main mysteries. The significant amount of invested play time and interconnected interpretations made the main mysteries particularly meaningful for the player. In effect, the heightened importance placed larger expectations to the resolution as well. Perhaps for this reason, the player found irresolution in the end a pleasant state – it allowed the larger explanation still exist as grand as they had imagined.

5 Discussion

This section highlights the three major findings and themes concerning the observed mystery player experience: 1) enjoyment of irresolution, 2) the openness of mystery condition, and 3) the role of interpretation management for the mystery player experience. Furthermore, we provide a set of design guidelines for designers of mystery games.

5.1 Enjoyment of Irresolution

The first distinct finding from the data in understanding the aesthetic mystery game experience was player's enjoyment of irresolution. Considering the extent of the player pursuing answers throughout the games, one of the most surprising findings in the player's experience was the player's choice to disregard their need for definite answers and instead welcome the openness of answers. Therefore, irresolution seemed to be the major distinguishing factor between the enjoyment of detective and aesthetic mystery games. A possible explanation for this might be the fact that understanding real-world explanations is allegedly one of the appeals of detective fiction since they portray complex social situations [39]. Readers seek to perceive the intentions and motives of other people in a story, which creates the expectation for realistic, rational, and thus solvable, explanations free of ambiguity [39]. Based on the previously discussed model of mystery resolution enjoyment, receiving answers is a foundational appeal for the detective genre [44]. Seemingly in contrast to this, the quality of aesthetic mysteries as incomprehensible and unsolvable did not make the player dislike them, but instead appeared as a main motif for appeal. In practise, irresolution was a source for player enjoyment.

Importantly, irresolute mystery games aroused a mixture of powerful emotional reactions from the player. These types of reactions are often associated with eudaimonic player experiences. The player-researcher reported profound emotional responses, such as beauty and awe; in addition, they documented existential reflections and perceptions of meaningfulness. In particular, *appreciation* is seen as a central appraisal for eudaimonic player experiences [14, 65], encompassing feelings of beauty, wonder and awe [68]. Appreciation towards artistic works links to its perceived ambiguity; previous research has associated viewers experiencing greater appreciation and interest towards modern art works, which they deemed subjectively more ambiguous [62]. Research on eudaimonic game experiences has repeatedly highlighted the importance of player interpretation and ambiguity for eudaimonic experiences [10–12, 18], but it has not explicitly considered the link between ambiguity and appreciation. Based on our findings, we suggest that the inherent ambiguity and openness of the irresolute mystery games made them particularly suited vehicles to instigate eudaimonic player experience.

One unexpected finding in the mystery player experience was related to player-researcher's experience with *awe*. Our findings suggest that video games do not need to rely solely on visual cues to incite experiences of awe. Based on previous work, the central appraisals for awe – viewer's need to accommodate new information and the experience of perceived vastness [40, 69] – were both present in the data of mystery play experience with irresolution. Previous research has regarded the perceived vastness of encountered stimulus (such as natural landscapes and large buildings) as posing a challenge for the person's self-perception, as they experience a sense of smallness next to the significant, vast stimulus [79]. Some research has considered awe particularly relevant to video games, since games tend to contain awe-eliciting elements, such as huge buildings, environments or enemies [69]. The perceived threat of the enemies can also be a feature related to awe [69] with negative valence [40]. In our data, related to the main mysteries in two of the games, the player expressed a sense of threat of the answers ahead. Additionally, the player admired the beauty of the game world and frequently contemplated the supernatural in it. Thus, our findings associate three additional awe appraisals (i.e., threat, beauty, and supernatural) [40] with the mystery play experience. In previous game research, awe-eliciting vastness has mainly been attributed to the visual size of game elements [69], giving little consideration to the conceptual vastness of a concept [40, 79]. In our data, during the mystery player experience the player reflected numerous times how they perceived the main mystery as something vast, an awe-eliciting factor. The breadth and scope of the questions made the player feel insignificant. Mysteries which are beyond human

understanding can therefore incite a feeling of conceptual vastness, which may be an additional factor to awe experience in video games. We argue that a particularly important precursor for these experiences was the mystery condition.

5.2 Openness of the Mystery Condition

As our second major finding, we discovered an experiential quality which seemed to make the player more open towards aesthetic encounters. Mystery condition, as we characterized it, is a state of wonder and fascination, which allows players to see an extended space of possibilities, making them more open to reflection and meaningful emotional experiences. In this sense, the experience resembles enchantment in games; a sensation of being charmed and at awe of the game world [70].

Our findings suggest that when the player-researcher questioned the rationality of the game world and included explanations beyond rationality, they entered the state of mystery condition. In mystery condition, the player's subjective experience seemed to be more aesthetic, or evocative. Kokkos et al. [46, p.157] associate the aesthetic experience with heightened emotional expression and imagination, "leading thus to the awareness of issues which may not be easily comprehended through rational argumentation". Hence, compared to detective fiction that revolves around clear-cut, rational solutions, the mystery condition encompassed engagement more akin to the aesthetic experience, which has been seen to provide "the means through which meanings that are ineffable, but feelingful, can be expressed and understood, helping us to tolerate ambiguity" [46, p.157]. The evocative quality of aesthetic mystery player experience seems to arouse a kind of *interactive vulnerability* Cole and Gillies [12] describe, in which the act of doing through play makes the experience particularly engaging. By playing aesthetic mystery games, the player can expect to be somewhat liberated from the confines of rationality, free to explore the boundaries of the game world and themselves. Based on the data, the mystery condition was an inherently enjoyable condition where the wider possibility space made the player want to extend their stay.

We argue that the player's transition towards mystery condition and therefore towards more open-minded thinking relates to the need for cognitive closure [47]. In their study, Djikic et al. [22] indeed showed that reading fictional literature resulted in a lower need for cognitive closure and in an "opening of the closed mind". Openness makes a person inspect their common frame of thinking [68], thus connecting to *interest*, which is a type of knowledge emotion associated with uncertainty, conflict and novelty-seeking [4, 80]. A lower need for cognitive closure seems a possible explanation for the player-researcher's transition to more open-minded thinking, as a high need for closure has been speculated to make decision-making more rigid [22, 47, 85]. From a design standpoint, the need for cognitive closure appears interesting since it is both a stable personality trait and a state caused by a situation [47, 85], making it potentially an asset for the design of games that are open for interpretation.

With regards to player interpretation and the need for cognition [8, p.130], i.e., one's tendency to "enjoy and engage with thinking", seems to relate particularly well to aesthetic mysteries. Based on our data, the player's perceived enjoyment and tendency to ponder and reflect the open questions in the game amid uncertainty seems consistent with Zillman's [89] uncertainty model. As Zillman [89] postulates, mystery enjoyment in the uncertainty model stems from the reader's enjoyment of confronting the problem rather than finding an answer, i.e., to resolve the mysterious situation rather than solve it. Our findings give support to Zillman's [89] idea that some readers want to immerse themselves in the uncertainty of the open questions, just like some players find enjoyment from uncertainty while playing aesthetic mystery games. The need for cognition seems to explain in some part why mystery fiction both incites and invites to reflect, to take up a *quest for questions* in a game.

The player's quest for asking questions and seeking answers seems to closely relate to interest, which is an emotion that is rarely considered in player experience research. Interest, an emotion which highlights new and comprehensible events as worthy of attention [80] has been shown as the combining nominator between uncertainty, ambiguity, novelty, complexity and conflict [62]. One of the main appraisals of interest is novelty-complexity, which is a type of exploratory behaviour characterised by the pursuit of novelty, complexity, uncertainty, or conflict [68] without a goal to increase specific, missing knowledge [4]. Rather, novelty-seeking directs one to general exploration of the surrounding environment to gather a broad range of new information [52], which may explain the want to explore and reflect in the mystery player experience. In particular, novelty-seeking involves risks and an experience of suspense to acquire novelty through exploration [68]. Previous game research has not drawn the connection to exploratory behavior and suspense in terms of novelty-seeking even though research work combining uncertainty, curiosity and suspense has been called for [48]. Since curiosity has not been observed from the vantage point of novelty-seeking, the usefulness of uncertainty and suspense have remained unexplored even in studies relating directly to exploration games [31]. Based on our findings, we propose that interest and novelty-seeking as potentially important avenues for further research on player exploration and reflection.

5.3 Player's Interpretation Management

Our third major finding highlights the importance of player interpretation management for enjoyable mystery experience. We suggest that the player's perceived ability to successfully create, compile, dissolve, or confirm interpretations during the game contributed to a feeling of doing better than expected, eliciting empowerment [21]. In particular, it seems that the player's perceived competence to handle ambiguity played a substantial role in the mystery play experience. Similarly, Muth et al. [62] discovered that art viewers did not see ambiguity of art works as a problem that should to be solved, but viewers rather experienced positive reinforcement from their ability to handle ambiguity. In our data, the player's perceived competence with ambiguity manifested itself in different interpretation management strategies. This meant that the act of solving mysteries in the game turned into the principal *doing* in the mystery player experience.

The main part of the mystery player experience involved the player to face the perceived ambiguity and take up a "challenge of understanding" [11, p.8]. Hence, we draw parallels to Arjoranta's [3] characterisation of *interpretive challenge*, which describes a players need to understand varying concepts to manage and solve elements in a game. As an example, Arjoranta [3] uses Her Story [G8], in which the player needs to comprehend complex concepts about law, society, and murder in order to solve the mysterious case. We propose to extend Arjoranta's definition, as we feel it does not currently encompass the whole range what could be considered an interpretive challenge, particularly found in irresolute mystery games where some questions in the game remain open. Our findings suggest that solving all in-game mysteries is not a prerequisite for mystery enjoyment, but perceiving competence to handle irresolute mysteries can be enjoyable. In similar way as Cole and Gillies [11] consider interpretative agency as a rewarding activity for players in itself, the mystery enjoyment in games stems also from the player's pursuit of a satisfactory personal meaning. As Rusch [74, p.101] pointed out: "Whether one can make sense of everything else in between is not so important as long as it seems that there is a deeper, unifying meaning that ties it all together to one coherent whole." Rusch's [74] notion further highlights how some elements of an enjoyable mystery player experience need not solving. Our work further expands the interpretative challenge to include the nuance of pursuing and managing players' own interpretations, not only the games' concepts *in situ*.

The player's quest to reveal the main mysteries in the data resembled to great extent the previously discussed metaphor as a mystery approach that Rusch [74] alluded to. According to

Rusch [74], the challenge for design is to find a sweet spot where the players balance between frustration and fascination as they uncover the hidden meaning of the game. However, while the player-researcher recorded moments of frustration and fascination in the data, we were unable to identify a meaningful connection between frustration and fascination. While Rusch [74] does offer applicable ideas for game designers, the mystery as a metaphor approach is built for specific purposes of her topic; design of deep games in which the players pursuit the hidden meaning of the game [74]. Rusch's [74] approach thus mostly applies to mystery games that are build to represent a certain metaphor. While we agree that this viewpoint is a useful way to design mystery games, the approach does not take into account that some mystery games are not necessarily designed to convey a specific, metaphoric message, but it can arouse multiple interpretations in players without developers having a specific message to deliver.

5.4 Design Guidelines

In previous three sections, we have discussed the most notable findings based on the recorded player data. In this section, we present design guidelines which combine direct observations from the data, main arguments from the Discussion section, and previous mystery game design expertise of the player-researcher. Each guideline is mapped to one of the three themes with abbreviations (T1, T2, T3).

It is worth emphasizing how we recommend using ambiguity of information in mystery games. We do not consider ambiguity as a particularly useful characteristic *in the end* of a detective mystery game for their need to provide clear-cut answers. If irresolution is a desirable outcome, we encourage to use ambiguity at the end of the game. However, ambiguity of information *during* the game is highly encouraged for all types of mystery games.

- ***Encourage questioning mode to facilitate exploration* (T1)**. Start by setting player expectations by letting them know that they are playing a mystery game. Make sure in the beginning of the game that there are at least a few apparent gaps of information for the player to notice. DO THIS by making the gaps observable through open questions.
- ***Know the logic of your game to summon the mystery condition* (T1).** Does the game world adhere to pure, human-driven logic, or to irrational, something imbued with magic? Knowing the logic of the game will help to guide the players towards mystery condition, where they can allow themselves be liberated from the confines of rationality and explore the extended possibility space. DO THIS by hinting during the game how the explanation behind everything may relate to supernatural.
- ***Provide tools for thinking to support interpretations* (T2).** Since a major part of mystery solving happens inside the player's head, provide them with tools that help to unravel the big picture. DO THIS by providing the player with some form of a information map in the game where players can manage their interpretations. What are the major building blocks to the mystery you want to be unraveled? Think if there are repeating elements to your mystery; is the player able to quantify some of the information gaps? Consider making them apparent to your players to allow them track their progress. Depending on your aspirations for the game, pay careful attention to what extent you execute this: DO NOT quantify all the unknowns.
- ***Sustain suspicions to motivate player's curiosity and uncertainty* (T2).** Although there might not always be suspects to the mystery at hand, there ought to be suspicion. Keeping players on their toes helps to build a fertile ground for questions. When the players are questioning the occurring events, they also use critical outlook to scrutinize their interpretations. DO THIS by offering players ambiguous, contrasting information. DO NOT go overboard with suspicion – also remember to confirm facts.

- ***Leave some part of the main mystery open to enable irresolution* (T3).** When the player thinks within extended possibility space, their idea of the explanation behind everything is imaginative and personal. Support this interpretation. DO THIS by keeping some part of your main mystery open in the end. Additionally, keep track of some of the most important and less important questions in your game. Some the questions of lesser importance do not need to be answered explicitly. DO THIS by making players ask questions which lack a confirmed answer in the game world.

5.5 Limitations and Future Work

We analyzed mystery games to draw out the distinct characteristics of aesthetic mysteries. Based on our findings, it seems that the use of ambiguity of information is a particularly important concept for mystery games, both during the game and in its conclusion. The game industry already seems to utilize the concept of information gaps [18, 30, 82], but research findings still lack empirical testing. Particularly, the need for cognitive closure appears to be a promising area for further research, since manipulating its situational properties could lead the player to open up their thinking to accept and even welcome ambiguity. Future work could approach this, for example, through prototype testing. Additionally, interest as an emotion has gained little attention in player experience research, but we believe further studies on this topic could help us further understand reflective and eudaimonic gameplay experiences.

Recently, we have seen player experience research approaches that seek to capture player experience that is more rooted in the immediate experience of gameplay in contrast to relying on solely retroactive questioning of players [36, 84, 86, e.g.,]. Our approach to collect data from the player-researcher's first-person accounts is an attempt to capture more vivid accounts of player experience. Our data collection method relied to a great extent on writing observations on notes and journals; however, methods such as voice-recordings might have helped capture even more immediate aspects of player experience.

As Mueller and Isbister [61] point out, providing design guidelines is a balancing act between general and specific instructions. The goal to cater for a broad group of designers can backfire with too detailed advice, but too much generalization can reduce the usefulness of the guidelines in actual design situations [61]. Asking the practising designers to comment on the formed guidelines could have been a strategy to mitigate this issue, but this was out of scope for this current work. Instead, we relied on our observations from the data and player-researcher's background with mystery games.

5.6 Implications for HCI

Prior to our work, the play experience of mystery has remained true to its name. The detective-centered vantage point of previous mystery studies has prevented recognizing the potential of other types of mysteries for eliciting reflective and eudaimonic experiences, not only in games but in interactive media more broadly. By establishing aesthetic mysteries as a distinct category from detective mysteries, our study contributes to the theoretical understanding and practical design of mysteries in HCI. The implications for HCI extend beyond merely recreational contexts, as our findings could also help inform the design of more enjoyable and effective interactive technologies for different prosocial purposes. As noted earlier, designing mysteries is not an activity happening only in games, but it extends to learning environments [7, 38, 42], aiming to foster user engagement and enhanced learning outcomes. Our work contributes to the existing knowledge of intentionally designed ambiguity [27, 67] and multiple interpretations [78] by providing the concept of mystery condition. The concept lays groundwork for future research on how to understand certain types of reflective and meaningful user experiences [56] in interaction design and learning environments.

Furthermore, our contributions offer applicable guidance to designers of mysteries through the outlined design guidelines.

6 Conclusions

Mysteries are a particularly engaging form of fiction, but there has been little research on how players experience mysteries in video games. Mysteries are known to encourage curiosity, make use of uncertainty, and apply ambiguity to their benefit, which are all areas of interest to player experience research, especially those concerning eudaimonic player experiences and reflection. Despite this, mysteries have not been researched for their contrasting dual-meaning, both as detective mysteries with clear-cut solutions versus mysteries and as something unsolvable that are beyond the scope of understanding. In particular, as something partly incomprehensible and open-ended, mysteries have remained overlooked in games.

To investigate what constitutes mystery player experiences and how to design for them, we inspected five mystery games through formalist game analysis. By investigating the player-researcher's gameplay experiences, we developed three overarching themes that (1) outline the perceptual and emotional qualities of mystery experiences in video games, (2) help unpack the broad category of mystery games, and (3) inform the design of interpretive player experiences. Our findings demonstrate that a lack of clear-cut solutions to a mystery could at times be a more enjoyable outcome of a mystery game compared to an outcome where the player is provided with explicit answers to all their questions. Irresolution was associated with profound emotional responses, such as as awe and feeling of beauty, existential reflections, and perceptions of meaningfulness and appreciation. Thus, all the uncertainties need not be resolved for players to experience mystery enjoyment in games.

Additionally, our work expands the previous research on eudaimonic game experiences by providing more granularity to the discussion concerning player interpretation. We argue that interpretation management is an important part of mystery games, since such games relate closely to interpretative challenges. An important component of interpretation management is ambiguity of information. Leaving purposeful gaps for the player to fill in with their own interpretation is a particularly applicable concept for designers. Whereas our work focuses on entertainment games, our findings could benefit the design of interactive technologies in general, particularly those that aim to produce reflective and interpretive user experience, for instance, in the context of education and learning.

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