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Unsettling Play: Perceptions of Agonistic Games

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In this paper, we propose Agonistic Games (AGs) as a serious games subcategory that can stimulate critical reflection on topics of dark heritage through multiperspectivity and unsettling play. We first discuss the emerging topic of agonism in memory studies, and then how games can be used to support its objectives. We then discuss the development of 2 original AGs: Endless Blitz and Umschlagplatz '43. We explore whether these two AGs were perceived as capable of stimulating critical reflection by collecting data from visitors to the exhibition 'Krieg. Macht. Sinn' at the Ruhr Museum in Germany where the games were installed, and from participants in an online course describing the games. From analysing data collected, we outline four factors inhibiting the capacity of AGs to stimulate critical reflection (topic, context, design, and assumptions about games) and propose strategies for overcoming these inhibitors. Our findings are valuable to scholars, game researchers, and designers, strengthening the foundations for the design and development of future AGs.

CCS Concepts: • **Human-centered computing** → **Interaction design**; • **Applied computing** → *Media arts*.

Additional Key Words and Phrases: agonistic games, serious games, agonism, museum games, critical reflection, multiperspectivity, dark heritage, memory studies

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1 INTRODUCTION

Human beings have always played games [36] yet “digital technologies have given games a new relevance” [67]. Evolving from simple blips and paddles to complex interactive systems, contemporary video games represent much more than a way to pass the time. Beyond entertainment, games are used for serious purposes (a.k.a. serious games) such as teaching [48] and influencing real-world change [58]. Indeed, games are becoming recognised, in academia and some areas of the games community, as a legitimate means of changing attitudes, promoting social reflection [64], changing how we respond to stress and pain [46], and interrogating topics of importance to society at large [63].

Hence, serious games are a buoyant field of research in their own right [12, 43], with researchers, designers and developers charged to generate and evaluate games that, amongst other aims, strive to evoke empathy in players and promote critical reflection [20, 30]. The utility of serious games is, however, still unclear and most of the evaluation efforts are focused on knowledge acquisition, which is a limited use of games given their potential to increase awareness and affect behaviour [4, 7]. The mixed results of deployments [11, 34, 61] raise questions of how serious games achieve the objectives for which they were designed—such as social awareness, critical

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48 reflection and positive behavioural change—and how positively they are received within the contexts for which
 49 they are intended. Furthermore, games may be perceived as a ‘trivialization’ of a subject, or even as having a
 50 negative impact on players, especially when they include references to conflict [2]. Such perceptions may result
 51 in a tendency to avoid games as mechanisms for critical reflection.

52 In this paper, we report the design and development of 2 original games that engage with unsettling events
 53 associated with World War Two, i.e. with *dark heritage*. Our core intention in offering these games is to prompt
 54 critical reflection on such unsettling topics by drawing on the theory of agonism: a concept originating from
 55 Memory Studies literature. Agonism is a new mode of remembering the past that does not focus on heroes vs
 56 villains (antagonism) or the plight of the victim (cosmopolitanism), but rather the motivations and experience
 57 of all social agents without apparent bias [13]. To the best of our knowledge, this is the first time that agonism
 58 has been applied to games development. Hence, it is unclear how well ‘agonistic games’ may stimulate critical
 59 reflection, or how they will be received by players when they handle complex and emotive topics such as the
 60 Holocaust. Therefore, we ask the following research question and sub-questions:

- 61 • RQ 1: Are agonistic games (AGs) capable of stimulating critical reflection on unsettling historical events?
- 62 • RQ 1.1: What factors may inhibit critical reflection in AGs?
- 63 • RQ 1.2: How can we overcome factors that inhibit critical reflection in AGs?

64 First, we present an overview of how games deal with dark heritage (Section 2). We then outline the concept
 65 of agonism, and its value as a means of exposing audiences to historical perspectives that may be uncomfortable
 66 or unsettling, such as those covered by dark heritage (Section 3). We discuss AGs as a way to promote critical
 67 reflection on sensitive topics by presenting multiple perspectives and unsettling choices within a resonating
 68 context (Section 4), leading to a description of two original AGs: Endless Blitz (Section 4.1) and Umschlagplatz '43
 69 (Section 4.2). Both games were developed as part of the Horizon 2020 project UNREST and were exhibited at the
 70 Ruhr Museum as part of the ‘Krieg. Macht. Sinn’ exhibition on war and violence in European memory (Nov 2018
 71 - June 2019). We describe the data collection methodology deployed to answer our research question (Section 5)
 72 and present our results (Section 6). Results are discussed with respect to how the games were perceived by the
 73 public and the extent to which they could stimulate critical reflection (Section 7). We conclude by listing key
 74 barriers to critical reflection identified in our evaluation and suggest ways to mitigate such issues.
 75

76 2 DARK HERITAGE AND GAMES

77 *Dark heritage*—a term derived from dark tourism—refers to a type of cultural heritage site associated with bloody
 78 conflicts, atrocities, tragedy, human suffering, and sites of barbarism and genocide [28, 41]. Sites of dark heritage
 79 such as Auschwitz are becoming increasingly popular as tourist ‘attractions’. While it was once believed that
 80 this popularity was due to people’s fascination with the macabre, today we know that sites of dark heritage are
 81 visited for a variety of reasons [45]. For example, there may be a general desire to identify with the victims of
 82 atrocity, or a more personal interest such as to remember family history or honour ancestors. Other reasons to
 83 visit such sites include historical curiosity, to understand and ‘connect with’ the past, or to visit a key location for
 84 national identity, e.g. a ‘must see’ location.
 85

86 Rising interest in dark heritage has informed both academic research [62] and popular entertainment. However,
 87 for many years there existed an assumption that printed books were the only medium that could effectively
 88 share reality, including the horrors of the past [55]. Steven Spielberg’s *Schindler’s List*, for example, was strongly
 89 criticised for what was perceived as a ‘trivialization’ of the Holocaust, with prejudice towards film as a less
 90 authoritative medium than the written word [15]. This attitude has been changing, albeit slowly, with film now
 91 regarded as a viable means of expressing cultural memory; even when the histories in focus are as emotionally
 92 charged as the Holocaust [15]. This is still, however, not the case with another form of entertainment that is
 93 often considered too trivial to expose historical topics in a sensitive manner: games.
 94

95 On one hand, games could be a strong tool in the construction of cultural memory, partly due to their high
 96 popularity and accessibility [14, 60]. Games are also able to position players as active actors *within* a historical
 97 scenario who are empowered through opportunities to make meaningful interactions and decisions [60]. Further,
 98 the non-linear nature of games can facilitate the representation of multiple perspectives; arguably more easily
 99 and convincingly than linear media such as novels or film [60].

100 On the other hand, games are still seen as limited in their ability to handle serious themes, with examples
 101 running the risk of “generating controversy by being perceived as tasteless” [51]. There are several reasons for
 102 this. One is that the gaming industry lacks strong figures like Lanzmann, Spielberg or Tarantino who have the
 103 profile to push moral and social boundaries. Additionally, once serious thematic elements such as the Holocaust
 104 are placed into a game, they run the risk of being treated as simply another ‘game piece’ [51]. Placing a topic into
 105 a ludic frame may be perceived as mistreating cultural memory or treating it with less respect that it deserves [14].
 106 As a consequence, historical topics that evoke strong emotive reactions are usually avoided in games [40]. The
 107 Holocaust in particular appears to be a taboo topic [16]. As Chapman describes, “though WWII is a frequent theme
 108 for videogames, the Holocaust is never mentioned or included unless couched in extremely strong negotiating
 109 frames” [14]. This is because, according to Kansteiner:

110 “some of the key institutional players of the Holocaust memory establishment cannot imagine how
 111 they could successfully transfer their didactic and political mission into simulative and interac-
 112 tive ludic digital environments and have therefore concluded that video games and their brand of
 113 genocide/human rights education are simply incompatible with each other” [40].

114 In general, it is often believed that games cannot possibly communicate sensitive and contested memory in a
 115 sensible manner. Similarly, WWI games often avoid trenches, which are strongly tied in cultural memory with
 116 the pain and suffering of the soldiers:

117 “WWI games that attempt to engage popular memory run the risk of being perceived as allowing
 118 players to occupy inappropriate or unsettling playable positions and re-enact historical episodes of
 119 exploitation, cruelty and abuse through their in-game actions” [14].

120
 121 Indeed, the game *Battlefield 1*—a first-person shooter set in WWI—attracted considerable criticism for its
 122 representation of soldiers in the trenches. In contrast, games such as *Call of Duty: World War II* which limit
 123 references to the Holocaust to a short mention tend to attract less scrutiny.

124 An alternative solution is proposed by the game *Czechoslovakia 38-89: Assassination (C38)*. This is a single
 125 player game set in the Nazi-occupied Czech Territories following the assassination of Reinhard Heydrich. Rather
 126 than avoiding an unsettling topic, C38 is built using authentic memories of World War II, shared through eight
 127 characters who represent different, and sometimes contradictory, perspectives. While these characters were not
 128 real, they were based on historical research. The game was positioned as an educational tool for schools and was
 129 in general well received, with reviews praising its historical theme and the multiple perspectives: “It excels in
 130 realistic depiction of small choices and compromises that could have had devastating consequences” [60]. This
 131 positive reception may also be due to the fact that C38 was designed much like a documentary, which is a well
 132 established medium for discussing contested histories. The game, however, did attract some criticism, including
 133 suggestions that player decisions were limited [60].

134 Another solution is offered by *Spec Ops: The Line (Spec Ops)*. This is a third-person shooter video game
 135 where the player is positioned as the captain of an elite American Delta Force team sent into a post-catastrophe
 136 Dubai on a reconnaissance mission. Players’ moral judgement is challenged by putting them in the midst of
 137 situations where unthinkable choices that affect human life must be made. In contrast to C38, however, *Spec*
 138 *Ops* avoids reference to any specific historical event. By using a fictional setting together with an unexpected
 139 change in narrative, the game succeeds in creating a sense of gratification through uncomfortable yet meaningful
 140 experiences [37]. Furthermore, any negative consequences of player choices are made clear through narrative
 141

142 feedback methods such as cut scenes. Hence, players are made well aware of the results of their actions and their
 143 impact on the game world. The resulting sense of discomfort that players experience successfully triggers moral
 144 reasoning, demonstrating the potential of Spec Ops to stimulate critical reflection.

145 In the following sections we explore the design and perception of two games that place players into unsettling
 146 and uncomfortable experiences, much like Spec Ops, while maintaining an historical context rather than a
 147 fictional one like C38. Before delving into the details of our games, we introduce their basis: cultural memory
 148 theory, in particular an emergent memory approach known as agonism.

150 3 AGONISTIC MEMORY

151 Memory studies is an interdisciplinary field that supports reflection on the past in order to make sense of the
 152 present [25, 66]. In a European context, memory studies provide a means of understanding the current EU political
 153 climate by examining collective memory of the acts of war and violence that to a significant extent defined Europe
 154 in the 20th century [13]. To date, collective memory has been shaped largely by two dominant regimes: the
 155 antagonist and the cosmopolitan [25, 44]. Antagonistic memory relates to group identity, and as such aligns often
 156 with nationalist thinking of ‘us’ as good and ‘them’ as evil. It is typically characterised by a loaded recounting of
 157 historical events and a tendency to express perspectives in a highly emotive way [10]. Cosmopolitan memory in
 158 contrast emphasises democratic principles and human rights while allocating division between good and evil to
 159 democratic and totalitarian ideologies respectively. The cosmopolitan view emphasises the plight of the victim,
 160 and attempts to defuse nationalistic discourse through qualities of self-reflexivity and rational deliberation [10].

161 Both antagonistic and cosmopolitan modes of remembering have, however, come under scrutiny as ill equipped
 162 to consolidate contrasting perspectives on the causes and consequences of violent conflict. Where antagonistic
 163 memory reinforces a dichotomy of ‘us’ versus ‘them’ in the service of reinforcing national identity—a perspective
 164 that has catalysed the rise of the populist right wing—the cosmopolitan view is arguably overly de-politicised to
 165 the point that it ignores fundamental differences in political and social interests [52]. In response, a third type of
 166 memory, agonistic memory has been proposed as a means of addressing a lack of interaction between antagonistic
 167 and cosmopolitan modes [53]. This emergent strategy attempts to promote social cohesion by re-politicising
 168 collective memory while avoiding alienation of political opponents:

170 “Agonistic remembrance does not make a primary distinction between good and bad, but seeks to
 171 contextualise socially and historically, after a comprehensive study of the past; that is, it seeks to
 172 understand, and to understand the perpetrator of violence. It is radical in its embracing of multiple
 173 perspective. It does not exclude or marginalise. Its dialogue has an open structure, one that does not
 174 necessarily aim for consensus” [5].

176 An agonistic mode of remembering takes a multi-perspective approach, relying on the testimonials not only
 177 of victims to understand acts of violence and oppression (as in the cosmopolitan view) but also perpetrators,
 178 witnesses and bystanders. In this way, historical context is derived by attempting to understand the motivations
 179 of actors on all sides, thus avoiding the moral categories of ‘good’ and ‘evil’ that underpin both antagonistic
 180 and cosmopolitan modes of remembrance [10]. The complexities of historical context are as a result exposed;
 181 challenging both the constructed nature of antagonistic memory and the perhaps equally problematic striving for
 182 accord that defines the cosmopolitan view. In cultural products such as museum exhibitions, this multiperspectivity
 183 is usually combined with unsettling counter-narratives to provoke a mode of critical reflection that draws on
 184 all standpoints, no matter how disagreeable any particular one may at first seem [13, 20]. Such narratives are
 185 paradigmatically open-ended, allowing museums to compare conflicting positions and providing opportunities
 186 for visitors to draw their own conclusions [54].

189 4 AGONISTIC GAMES

190 How might games be a useful means to engage with the core principles of agonistic memory, and so promote critical
 191 reflection on topics of dark heritage? At its core, the agonistic mode of remembrance promotes consideration
 192 of and deliberation on events from multiple competing perspectives, some of which are often uncomfortable
 193 and unsettling. One may detect agonism within games where players assume a persona and undertake actions
 194 that may evoke feelings of guilt or would be deemed questionable if framed in a real-world context. They may
 195 be asked to dominate worlds or to commit nefarious acts to achieve game objectives. They may in contrast be
 196 tasked to save the world, to assist others in doing so, or simply to survive. If such actions were modelled on
 197 historical figures and factual events, games could serve as a way of placing people in the shoes of real-world
 198 victims, perpetrators and bystanders. They could experience first hand the motivations that drive such people
 199 and view a scenario from a broad range of perspectives. This is agonistic.

200 In our previous research, we derived a set of tenets for incorporating agonism in games [20]. The collective
 201 aim of these tenets is to establish a gaming scenario that encourages players critically to reflect on topics of dark
 202 heritage. The first tenet asserts that games should provide unsettling choices for the player in order to stimulate
 203 critical reflection (T1). These choices may be operationalised implicitly or explicitly. For example, an explicit
 204 choice may be embedded in the narrative: at some point in the game, players must choose to take a resource
 205 or not, or to betray a non-player character (NPC) or not. An implicit choice may be integrated into the game's
 206 mechanic: in god simulators such as Black and White [49], players may distribute a limited amount of resources
 207 amongst a set of competing NPCs. They may choose to attack enemy villages to impress devout worshippers
 208 and grow their follower base, or perform miracles to conjure wood for a fire or food for their worshippers to eat.
 209 In the context of agonism, explicit and implicit choices may be designed to promote multiple perspectives on
 210 the topic. Taking our resource management example, consider putting the player in the role of a commander
 211 who must decide where to send particular troops and the size of cohorts. Sending too many to one location may
 212 leave others at risk of attack: equally, if the battle is too dangerous then many fighters will be lost. The game may
 213 emphasize the stories behind the fighters, re-humanizing them from their assigned roles in combat, to promote
 214 reflection on the consequences of the commander's decision.

215 This brings us to the second tenet of AGs: encouraging engagement with multiple perspectives for a given
 216 scenario (T2). Games have traditionally been designed to follow the hero narrative: players assume the role of the
 217 hero sent in to defeat the evil tyrant or rescue the princess [24]. However, some games experiment with placing
 218 players in different roles where the 'hero' has particular character flaws, or is not all they seem at first glance. For
 219 example, the game series Luigi's Mansion places players in the shoes of the famous Nintendo mascot's brother
 220 [18]. Luigi is in many aspects the opposite of Mario: he is frightened, and at first incapacitated and reluctant to
 221 assume the role of a hero. Another example is the game Devil May Cry in which players assume the role of Dante,
 222 the son of the god Sparta [39]. Dante is not exactly a 'good' character: he cares little for the fate of humanity and
 223 is drawn into battle with the dark lord Mundus not to save the world but driven by vengeance, believing him
 224 responsible for the death of his family. By playing the game as a demon slaying demon, players engage with the
 225 perspective of a bad character doing good things irrespective of good intentions or, in this case, lack thereof.

226 Games may also be designed such that players swap roles after a period of time, or indeed pose as different
 227 roles, promoting multiple perspectives through gameplay mechanics rather than story. For example, the popular
 228 deception based board game Avalon pits two teams of protagonists and antagonists against each other [1]. The
 229 antagonists are all aware of each other's allegiance, but the protagonists do not know who else is on their team.

230 The deceptive theme of the game lies in the quest mechanic. Players chosen by the 'quest master' each
 231 play either a 'success' or 'failure' card, placing it face down on the table. The placed cards are then shuffled.
 232 Protagonists *must* always choose the 'success' card. Antagonists can choose a 'success' card, which gives a
 233 point to the protagonists, or a 'failure' card, which earns the antagonist a point. If the latter is chosen, while the
 234

235

antagonist remains hidden, every player now knows that a traitor existed in that quest's team, casting doubt among the players and on the 'quest master' who chose the team.

An expansion to the game maintains this core mechanic and adds two characters who exchange their affiliation during the game. One begins as a protagonist and the other as an antagonist, but a random draw of a card may force them to change their allegiance. Thus, players who initially take the perspective of heroes may end up on the side of villains, and must therefore change their strategy to win the game. This mechanic can be applied when designing AGs to provoke a multiperspective view on the game's narrative.

The final tenet specifies a resonating context (T3). A resonating context can be achieved in two ways: by ensuring either (1) that the game's subject matter is relatable to its target audience or (2) that the game's subject matter is connected to the geographical location in which the game is installed and played. For example, the game *Father and Son* places the player in the shoes of a man who never knew his father, an archaeologist at the National Archaeological Museum of Naples. What starts as a personal story becomes universal as the main character unveils not only his father's history but also connections between different historical eras. The game is also location based: players must visit the Museo Archeologico Nazionale di Napoli to unlock extra content, thus bridging the game's world with the physical space of the museum. In the following subsections we introduce two agonistic games we developed to stimulate critical reflection about war and conflict. Both games were installed in the exhibition 'Krieg. Macht. Sinn.' at the Ruhr Museum in Essen, Germany, and available for the public to play from November 2018 to June 2019.

4.1 Endless Blitz

Endless Blitz (hereafter EB) is a two player game where players face off and compete against one another given complementary goals. One player is a pilot flying over a city with the objective of destroying as many targets as possible, maximizing casualties as they drop a payload of bombs from their aircraft. The other player assumes the role of an evacuation officer in the city tasked with rescuing as many civilians as possible from the bombing by sending people to shelters. By playing both sides, players can experience two opposite perspectives in the same scenario (T2).

Furthermore, each player needs to make unsettling decisions in a short time (T1). With a limited payload, the bomber must predict where the rescuing player will send civilians and thus strategically destroy targets which they think contain the most civilians. Equally, the evacuation officer must try to outwit the bomber by hiding civilians in low value targets. However, each target may protect only a limited number of civilians and any civilians who are not accounted for are lost at the end of the game. This is happening very fast as the bomber moves forward across the city at a fixed speed and may not reverse its course.

While EB is set in a generic city, the game was inspired by a five-month campaign by the allied forces to bomb the Ruhr area of Germany during the second world war. The bombing of the Ruhr is still very much alive in the memories of the residents of the area, so the game's subject remains relevant to the local visitors (T3).

4.1.1 Game design. EB is designed to be played on a single large touch screen surface. Both players face off against each other, with the touch screen divided in half by a panel, so that each player cannot see what the other is doing. On the bomber side of the screen, the player sees an aerial view of a city. They pass over a set of target buildings modelled after known targets of the original Ruhr area bombing and must select their target and which bomb to use to destroy it, as shown in Figure 1. The plane's payload consists of a limited stock of bombs, each with different destructive power, so players must consider not just which building to destroy but which bomb to use. To the player's right is a column panel user interface showing the bombs available (the inventory), with used bombs semi-transparent to provide feedback after launching the bomb. In the centre of the view is a cross-hair sight indicating where a bomb would fall if it were dropped. In the centre bottom is a button to drop the currently

selected payload. Players can touch the panel to select their next bomb, then touch the centre-bottom button to drop the payload where the crosshairs indicate.

The evacuation officer plays using the view on the other side of the screen, as shown in Figure 1. On their left is a column panel representing civilians yet to be evacuated. At the top of their screen is a horizontal panel showing the remaining buildings not yet destroyed by the bomber and any civilians currently housed there. The evacuation officer must select a building from the top panel which then changes the current selection in the centre of the screen. Touching this building starts an animation where the civilian is sent to take shelter in the building. The user interface is updated in real time: when the bomber destroys a building, any civilians taking refuge there are killed, and the image representing the building in the top panel changes to reflect the now destroyed building. Figure 1 shows an example where the church has been destroyed (Zerstört).

4.1.2 Game development. EB was developed using the Unity 3D game engine, a game development environment that offers tools and techniques for implementing staple game aspects such as graphics rendering and game loop functionality, while allowing for high-level customization through C# scripting. EB took around 6 months to develop including background research, prototyping and implementation, with a core team of 6 people: 2 historians, 2 programmers, a 3D modeller and a 2D artist. We took an iterative approach to game design, involving many cycles of paper prototype based sprints to establish the game's look and feel as well as its gameplay mechanics. Each cycle consisted of 2 to 3 workshop sessions where each team member proposed 1 to 2 designs, maximizing the ideation phase before applying a filtering process involving playtesting with the paper prototype to understand how the game would evolve as players played it. All members of the team participated in playtests. Throughout the game design phase, we had frequent input from various stakeholders: we met with fellow researchers on the UNREST project to demonstrate prototypes and discuss the agonistic aspects of the game. We

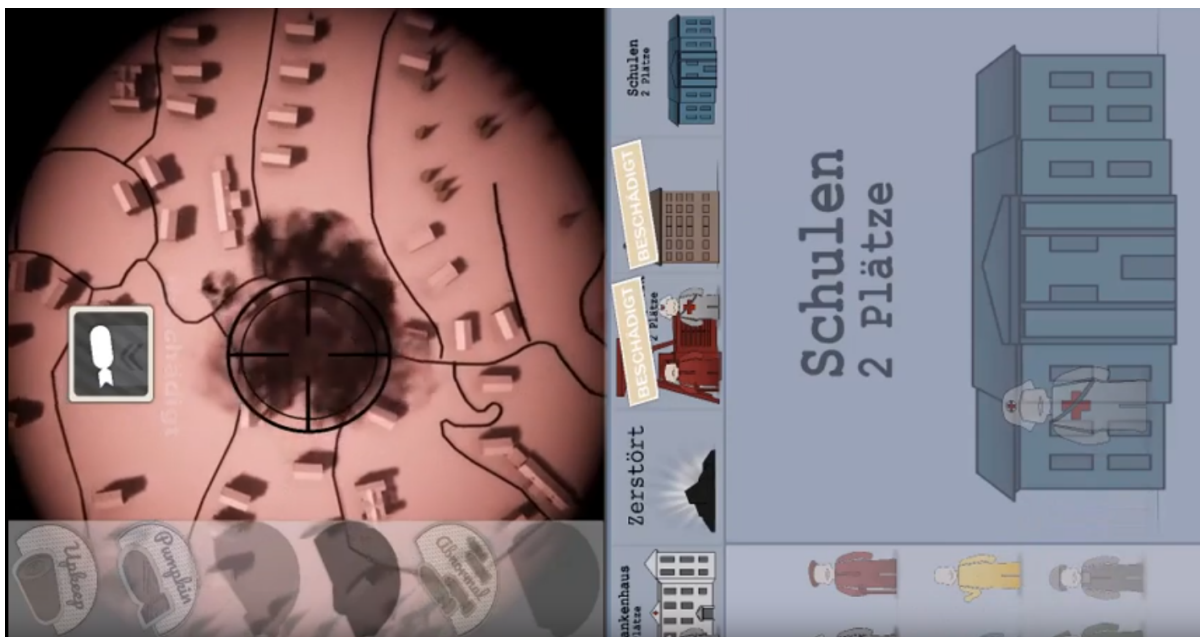


Fig. 1. A screenshot of the in-game UI for Endless Blitz. The shot shows the bomber's and the evacuation officer's perspectives. The screen is split in half where the physical divider is positioned.

also liaised with the Ruhr Museum staff and exhibition curator to ensure the games were historically accurate and to plan the installation of the games in the exhibition space.

4.2 Umschlagplatz '43

Umschlagplatz '43 (hereafter UM43) is a narrative-driven agonistic game for up to four players. UM43 was intended to contrast with the impersonal, procedural approach of EB by encouraging reflection on World War II personal stories and events from multiple perspectives.





UM43 presents a fictionalised scenario based on the humanitarian efforts of Marek Edelman, a Polish political activist responsible for smuggling Jewish deportees out of Warsaw's Umschlagplatz, a holding area near the railway station used to transport individuals from ghettos to Nazi death camps. Edelman would visit the Umschlagplatz each day with the aim of extracting supporters of the Warsaw Ghetto Uprising, often making difficult decisions on whom to save. Indeed in one of only a handful of interviews, Edelman reflects on the reality of the selection process:

“I was merciless. One woman begged me to pull out her 14-year-old daughter, but I was only able to take one more person, and I took Zosia, who was our best courier” [42].

UM43 positions Edelman as a non-player character, tasked to evacuate one individual of several gathered at the Umschlagplatz. Players assume the role of one of four characters awaiting deportation. Players know of Edelman's role, and their mission is to convince him that they should be the one to be saved. In rounds they select and exchange narrative fragments that expose their chosen character's past, their relationship with the war, and critically why they should be saved because of how they could benefit the resistance. In this way, players experience different perspectives depending on the character they choose to play (T2). To establish accuracy and multiperspectivity of contexts and narratives, we conducted oral history interviews with German and Polish natives with personal or family connections to World War II, the Wehrmacht and the Resistance. Interviewees were keen to share their stories, partly to preserve the memory of loved ones but also to recognise the role of historical insight in addressing the rise of national populism across their respective countries in recent years. Multiple accounts were compared, distilled and anonymised to construct four archetypal character profiles for use in UM43, with each in some way exposing the problematic nature of delineating individuals into categories of 'victims' or 'perpetrators' (See Table 1). With respect to T1, UM43 aims to evoke tension in the way that players must confront cognitive dissonance: they are at once likely empathetic to a deportee's predicament and compelled to consider deception or defamation as a means of saving themselves. Indeed to win the game, players must ultimately accept their character's individual flaws or crimes while explicitly condemning another human being in need. Whereas the act of one (imperfect) individual condemning another might evoke a charged emotional response in the antagonist view, the agonistic perspective strives to encourage a more balanced review of the sociopolitical context that drives such actions. Ultimately, UM43 attempts to promote critical reflection on the motivations behind making unsettling decisions. In the context of the Holocaust, we expected such decisions would have the potential to be deeply unsettling, especially considering the game was installed in a German museum visited mostly by German citizens who have a long history confronting Nazism's crimes such as the Holocaust (T1). This potential was further increased in that UM43 was designed first and foremost to be experienced at 'Krieg. Macht. Sinn', an exhibition that was itself trying to stimulate critical reflection on conflict and an environment where we would expect players to be somewhat mindful of the interaction between history and agonistic modes of remembrance.

4.2.1 Game design. The game consists of 5 screens: a central screen showing a top view of the Umschlagplatz surrounded by 4 touch screens. Each of these touch screens is dedicated to a character. The screen shows an image of the character with a brief description and is complemented with a physical ID card. Each ID card consists of an A4 page presenting an image of the character, basic demographic information (e.g. age, gender,

Table 1. Umschlagplatz '43 character profiles and their historical inspirations.

Character	Profile	Historical Inspiration
	<p>As a teenager, Philip was an ardent patriot and ONR (National Radical Camp) advocate. Encouraged by his university tutors' speeches, he became an ONR member, supporting the Ghetto Benches and Jewish segregation in Polish universities. Despite joining the fight at the start of the war, he quickly ended up earning a living black-mailing people who were helping Jews and selling them out to Nazis.</p>	<p>Philip is inspired by the numerous Italian families who moved to Poland in the early 19th Century during and following Napoleon's conquests in Eastern Europe. Generations of these families fought in World War One and Two. These families tended to display nationalistic tendencies, joining groups such as the ONP.</p>
	<p>A member of the Jüdischer Ordnungsdienst. David's wife is terribly ill, so to earn the money to get her vital medicine he took the difficult decision to collaborate with the Nazis and keep order in the Warsaw Ghetto. He remains openly Jewish and, despite his position, tries to help those in need.</p>	<p>The Jüdischer Ordnungsdienst or Jewish Ghetto Police collaborated with Nazi officers to guard ghetto gates, deter smugglers and round up prisoners for deportation to death camps. Considered by some as tools of the Holocaust or as themselves victims, the Jewish Ghetto Police demonstrate the complexities of life under the Nazi regime.</p>
	<p>Born in 1918 into a Jewish family, Maria was trained as a nurse. Married to a Jewish shop owner, she had a daughter, Lydia, in 1933. In 1940 the whole family along with their parents and cousins were sent to the Ghetto. Using her position and access to medical supplies, she poisoned the eldest members of her family before leaving the Ghetto in fear that they would face a far worse fate in the camps.</p>	<p>Maria is inspired by the true story of a World War II nurse who killed her parents so they could die peacefully rather than suffer at the hands of their Nazi occupiers. A separate story was of a woman who begged for her child to be saved at the Umschlagplatz at the cost of her own life.</p>
	<p>Klaudia was forced to hide her homosexual relationship to keep both parties safe, however, someone began blackmailing her partner. Klaudia decided to pay the black-mailer, yet they continued to demand more money to keep the secret. Klaudia had no choice but to fight back. Deciding to eliminate the danger, she came across a Jewish nurse who will prepare 'specially dosed medication' to order.</p>	<p>Klaudia exposes how homosexual people (both female and male) were mistreated during World War II. At the same time, she is an example of the many strong women who resisted aggressors through civil action, sabotage or people smuggling. Klaudia is the only person in UM43 who was not afraid to confront the Nazis directly.</p>

job occupation), a short biography, and the historical research that informed the character. Players could read the information provided by the screen and the ID card to get a sense of the character and decide which one to play as. Players start the game by clicking the next arrow button on their screen. By placing the characters' screens around a central screen, we ensured that players would be facing one another as they might have done in conversation at the Umschlagplatz. In each turn, players have to choose from three different statements that are shown on their screen. The player can decide to commit to a statement that is either true or deceiving (i.e. that obscures potentially incriminating personal information), or alternatively at certain points can elect to defame other characters to improve their own profile within the group. Each statement is assigned a 'personal value' and 'trustworthiness' score that may be positive or negative depending on the nature of the facts, lies or 'dirt' communicated (See Figure 2). For example, while Philip's disclosure that he has exchanged information with the Nazis reduces his trustworthiness, the promise of divulging details of Axis plans to Marek increases his personal value. Given that the game makes explicit to players how scores are affected by their selections, UM43 could be criticised initially as lacking a sense of jeopardy. This is, however, mitigated by applying a heavy points modifier to a particularly unsettling decision towards the end of the game, where players are asked by Marek to choose who should not be saved. A character's cumulative score would likely be compromised should their story be judged by others as contradictory or suspicious.

4.2.2 Game development. UM43 was developed using web technologies; HTML and CSS handle the structure and styling of content while JavaScript enables player interaction and holds scoring data. The JSON file format is used to store statements, enabling speedy updates to the narrative content of the game as required. UM43 was developed over the same period as EB and involved similar activities of paper prototyping and UNREST

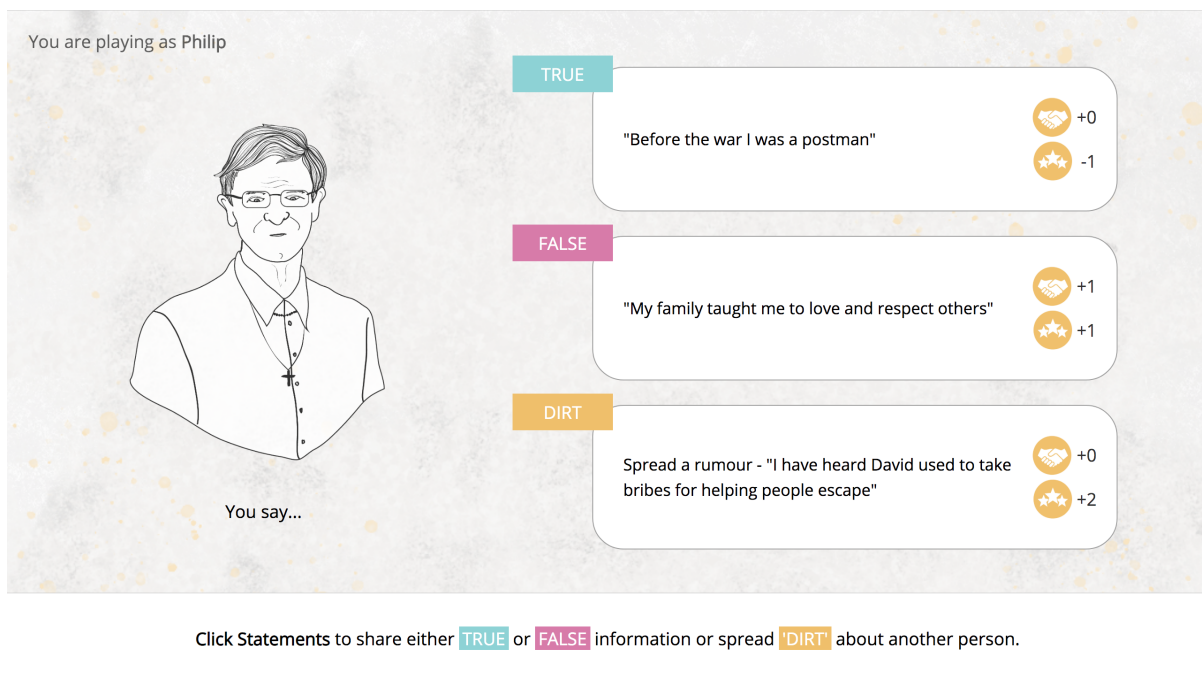


Fig. 2. A screenshot of UM43 gameplay. Here the player is asked to exchange a truth, a lie or a rumour with another player.

471 stakeholder review to shape the version deployed at the Ruhr Museum. The game was translated into German
472 for use in the ‘Krieg. Macht. Sinn’ exhibition, a process that required careful attention to ensure that the tone of
473 the initial English setting was preserved.

474 5 METHODOLOGY

475
476 We used a combination of methods (Figure 3) to explore whether AGs were perceived as capable of stimulating
477 critical reflection on historical events (RQ1). We collected data from visitors to the exhibition at the Ruhr Museum
478 where the games were installed, and from participants in an online course describing the games.

479 5.1 Exhibition at the Ruhr Museum

480
481 We collected data from visitors to the exhibition ‘Krieg. Macht. Sinn’ using a combination of direct observation and
482 interviews. Direct observation has been successfully used to record museum visitors’ behaviour, their movement
483 through rooms, their attention to exhibit content, and viewing time [6, 26]. It is, however, challenging to gain
484 a rich understanding of the visitor experience just by observing them; as researchers we may make biased
485 assumptions about their state of mind [33]. To mitigate this concern, we combined observational data with
486 interviews to provide a range of data on visitor attitudes, experiences, and behaviours [3].

487
488 *5.1.1 Participants and sampling.* Participants were randomly selected from adults visiting the exhibition during
489 its opening week (Monday to Sunday). Since we were interested in understanding factors that may inhibit AGs
490 from facilitating critical reflection, we first looked to identify barriers to play (since not playing the game would
491 necessarily preclude its stimulating critical reflection). We therefore included both visitors who did and did not
492 play the EB and UM43 games. 31 visitors were selected at random and observed by a researcher, with 24 of them
493 seen to engage with the games to some degree. A second researcher asked a random sample of visitors whether
494 they were available for an interview, with 18 visitors accepting (3 females and 15 males aged 19-73). 6 of these 18
495 interviewees had played EB and none had played UM43.

496
497 *5.1.2 Direct observation.* Since people may behave differently if they are aware they are being observed, we used
498 an unobtrusive method to record our observations, meaning visitors did not know they were being observed
499 [6]. A researcher was present in the gallery and used a paper form to note visitors’ level of engagement. We
500 carried out direct observation to collect data about visitors’ behaviour towards the games, including whether the
501 games caught visitors’ attention and whether they were played or not. Based on Bitgood’s stages of attention
502 of museum visitors to an exhibition [6], for each game we labelled visitor engagement in 1 of 3 ways: (1) ‘Play’
503 (i.e. fully engaged) if visitors undertake a complete or partial playthrough; (2) ‘Interact’ (i.e. focused) if visitors
504 were touching game screens or inspecting supporting materials (e.g. ID cards for UM43) yet made no apparent
505 attempt to undertake a playthrough; (3) ‘Stop’ (i.e. captured) if visitors were stopping to watch other players or
506 to observe the games’ screensavers which consisted of short loops of content. In this way, we could gauge the
507 number of visitors who interacted with the AGs and how. All the data collected from direct observation were
508 transcribed and organised into a spreadsheet where we recorded the visitor ID, the type of engagement, actions
509 such as reading labels or chatting with another visitor, and how many times the game was played.

510
511 *5.1.3 Interviews.* The interviews were semi-structured. While we had a set of questions, we allowed visitors to
512 bring up new ideas and topics. We wished to interview both visitors who played and did not play the games
513 as we were also interested in identifying the key barriers to play. Hence, we usually started by asking whether
514 they played the games or not, and why they played or did not play the games. Another line of questioning
515 regarded the choices they made while playing the games. For instance, which characters or side they chose,
516 and why. We also collected basic socio-demographic data (i.e. age, gender, nationality). Each interview was
517 audio-recorded and then transcribed. Since our aim with the interviews was to collect in depth qualitative data,

we ran a thematic qualitative analysis of the transcripts. Based on guidelines for conducting thematic analysis [8], we first familiarised ourselves with the data, then coded the data, searched for and named themes. The data were coded by two researchers independently. Themes were discovered following the technique of cutting and sorting: interesting quotes were cut out and pasted into a separate document. Similar quotes were then sorted into groups. Each group was named and these labels formed the themes.

5.2 Online course (MOOC)

We collected and analysed online comments left by those undertaking the course ‘Politics and the Modern World’ delivered by the University of Bath. This online course (hereafter referred to as the MOOC) was created to discuss how people remember war and violence by comparing different modes of remembering. The MOOC explored how the new model of agonistic memory can help us better understand conflict, and covered case studies including the AGs we developed. While participants were not given an opportunity to play EB or UM43 (in contrast to those interviewed in the museum), they watched a video describing the two AGs and could leave their comments. We were particularly interested in analysing online comments because it has been shown to be effective in understanding individuals’ perspectives on controversial topics, as people feel safer expressing their opinions in the virtual environment rather than in person [9]. This provided a complementary analysis and also allowed us to gain a better understanding of how the AGs were perceived by a larger sample of people besides visitors to ‘Krieg. Macht. Sinn’.

5.2.1 Participants and sampling. Participants in the online course included educators, archaeologists, museum professionals, diplomats, academics and students from a variety of fields (e.g. technology, philosophy, intercultural studies, history). We collected a total of 114 comments referring to the AGs. We excluded from the sample any comment not related specifically to the games (e.g. discussing only the wider exhibition) or duplicates (i.e. sometimes comments were posted twice by mistake).

5.2.2 Comments analysis. We analysed the 114 comments using online content analysis, a quantitative method used to count how many times a specific concept appears within online content [29, 47]. Based on our research objectives and findings from the museum exhibition, we developed a coding book, creating a set of categories and subcategories before coding (See Table 3). Two researchers (hereafter referred to as the coders) manually coded the comments independently. First, the comments were copied into a Word file. Secondly, the coders highlighted sentences from the comments using different colours according to the categories. The coders followed the code book that listed and explained each category. In this way, we tried to ensure a systematic and replicable coding of the data. If a highlighted sentence could not be assigned to any of the provided categories, then coders could create a new category. In practice, however, this was not required. Thirdly, the highlighted sentences were added to a spreadsheet. In the spreadsheet, a label was added to each sentence to describe its meaning, and the corresponding categories and subcategories were selected. In the eventuality of discrepancies between the two coders, the code was verified by a third coder who decided which category and subcategory to assign. Lastly, the instances of each category and subcategory were counted.

6 RESULTS

In this section we report data gathered from the Ruhr Museum and the MOOC. Direct observation in the museum provided data to help us understand if and how visitors engaged with the games. Of the 31 individuals observed, 3 played EB and 2 played UM43. Engagement with the games more frequently took the form of basic exploratory interaction or cursory observation of the game kiosks (Table 2). Indeed, there were 24 distinct instances of engagement with the games: 12 with EB (by 7 females and 5 males) and 12 with UM43 (by 6 females and 6

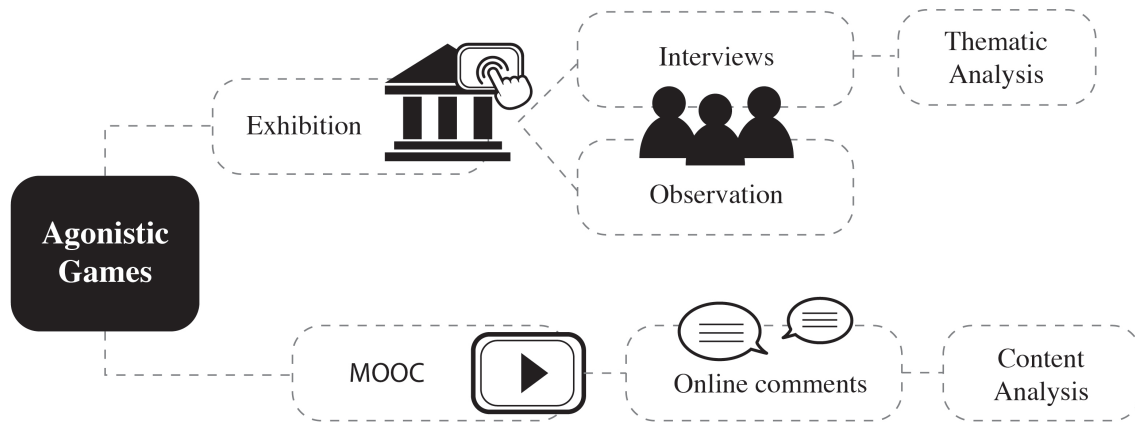


Fig. 3. Parallel timeline diagram showing our methodology in phases from game development through to content analysis.

Table 2. Number of visitors who engaged with the games (Stop, Interact, and Play)

	Stop	Interact		Play
		With screen	Screen + Info (e.g. ID cards)	
UM43	3	1	6	2
EB	8	1	0	3

males). For UM43 the printed ID cards were found to be of more interest than the game itself, while with EB the predominant mode of engagement was visual inspection.

Of the 18 museum visitors we interviewed, 6 played EB and none played UM43. These interviews provided additional insight into how both AGs were perceived by the public, including reasons for not playing the games. These motivations include for example the context of gameplay (6.2) and the game design (6.3).

The analysis of the MOOC comments provided us with insight into how the AGs were perceived by scholars, museum professionals and politicians. Some comments contained multiple sentences and/or paragraphs. Within these comments we collected, 58 sentences were rated as positive towards the games, 29 as unsure, 38 as negative. 30 were suggestions and 19 were examples of other games (See Table 3). In particular, the games were considered engaging (30 mentions) and educational (24 mentions). Furthermore, in some cases participants were also positive that games can stimulate critical reflection (17 mentions) and provide different perspectives (11 mentions).

However, while the AGs seemingly had the potential to cause critical reflection, data collected from direct observation and interviews suggest that only a small proportion of the museum visitors played our AGs. From the data collected, we identified four main factors influencing perception of the games: (1) the topic of a game; (2) the location in which a game is played; (3) the design of a game; and (4) people's assumptions about games.

6.1 Topic

The analysis of the MOOC comments confirmed that specific topics are very challenging for games and can inhibit play. In particular, the games were considered trivializing of complex and sensitive topics such as war and genocide (14 mentions). This was an issue especially for UM43. According to participant P.7, the game “seems to

612 *reduce the deeply problematic and the very real tragedy of conflict to the imaginary world of a game*” and again
 613 P34: *“My concern is that the games sanitise and trivialise warfare”* and P.38: *“by creating these games, it takes away*
 614 *something of the seriousness of these histories”*. P.82 had a very personal and traumatic experience of World War II
 615 and according to him, *“War is far too serious to be treated so trivially”*. According to P.113, *“important events that*
 616 *we have discussed during the course, may well be being trivialised by making them into games”*. P.112 agreed: *“I*
 617 *believe that it is totally inappropriate to have these types of games on the horrors and atrocities of war”*.

618 The word ‘violence’ was also associated with games 15 times across responses. In particular, the topic of EB was
 619 perceived as too violent, focusing mostly on the role of the bomber. Although our games were not designed with
 620 children in mind, their influence on the younger generation was still a concern for 9 participants. For example,
 621 according to P.110: *“A child playing bombing games or selecting people to live could cause emotional problems later*
 622 *on”*. For P.35, games *“can impact on some peoples’ minds. (A lot of research has shown this.) Negatively I mean. I*
 623 *think young people should be interacting with life and not with computers”*. The negative influence of games is
 624 further argued by P.112 who says *“there are many children around the world who sadly are influenced by video*
 625 *games”* and P.72 who states *“unfortunately, a lot of children, young and old people already have played games*
 626 *where they watch violence”*. P.87 supports these statements by referencing a real-world event: *“right now a lot of*
 627 *my students play a game called Fortnite, which if I am not mistaken the New Zealand attacker cited as one of his*
 628 *motivations”*. Therefore, the opinion of some of our participants is that games should not focus on killing and
 629 destroying. For example, P.85 argues that *“the market is over crowded with video games that use violence as the*
 630 *main mechanic and purpose [...] Why [sic] video games so often take the perspective of the soldier/killer?”*.

631 However, in 19 cases games were believed to have a beneficial impact on younger audiences. While we could
 632 use games to engage children, participants highlighted just how important it is to talk with parents and educators
 633 *“so that the message is not lost or misinterpreted”* (P.109). 3 participants even suggested the need for psychologists
 634 to be involved in the game design phase, and potentially in analysis of the end product.
 635
 636

637 6.2 Context of gameplay

638 Through the interviews and the MOOC we identified that the location of the games - a public space rather than a
 639 private setting such as a home - influenced how the games were perceived in four main ways:
 640
 641

- 642 (1) *Focus of visitor attention*. Among the more than 200 objects on display [19], two of the interviewees did not
 643 even notice that there were games installed. The issue that the games were often overlooked was confirmed
 644 by our observations: of the 31 visitors we observed. 16 did not look at EB and 19 did not look at UM43.
- 645 (2) *Time*. Visitors typically spent little time at the exhibition (33 minutes on average) and in turn tended to
 646 focus their limited time on the historical artefacts on display. One visitor, for example, highlighted how
 647 seeing the ‘real’ objects is better than watching a screen.
- 648 (3) *Number of players*. Visitors who were visiting the exhibition alone perceived the games as a multiplayer
 649 experience only. For example, EB is a two player game. One visitor started interacting with EB but soon
 650 determined that he could not play alone. In contrast, UM43 could be played alone with artificially intelligent
 651 (AI) computer controlled characters but visitors did not seem to notice. While in a private setting it could
 652 be more feasible to find other players (e.g. family members, friends), it is not so easy to invite strangers to
 653 play together in a public setting.
- 654 (4) *Perception of museum games*. MOOC comments expressed low expectations about the quality of museum
 655 games in general. This may have inhibited play. P.83 summarizes that *“there are too many computer ‘games’*
 656 *in museums which suffer from poor implementation and design which experienced gamers will avoid on sight”*.

6.3 Game design

Insights gained from the Ruhr Museum and the MOOC comments exposed three ways in which the design of the games influenced how they were perceived and whether they could stimulate critical reflection or not:

- (1) *Hardware*. Two of the visitors interviewed stated that they did not interact with UM43 because the 5 screen configuration gave the impression that it would be difficult to play. In this way, the design of the hardware influenced how the game was perceived, inhibiting play and, as a result, the potential for critical reflection.
- (2) *Instructions*. The gameplay of EB was found not to be intuitive. A full playthrough was needed before the mechanics and objectives of the game were understood, despite instructions being available at the kiosk. For example, players of EB did not realise immediately that they were in competition (i.e. bomber pilot vs evacuation officer). One person playing as the evacuation officer understood this only when some of the civilians under her care disappeared as the other player deployed a bomb.
- (3) *Multiple perspectives*. Online comments were optimistic about the idea of stimulating critical reflection on topics of history by exposing multiple perspectives. For example, P.114 thought that *“the games will be a great way to encourage people, especially of the younger generation, to reflect on the severity of the events and bring them to life in a believable way”*. In this way, games *“have the potential to provide players with a perspective they haven’t considered”* (P.39). According to P.25, *“if a player is likely to play both sides of the story [...] it is unlikely that they will not feel any sort of connection to each side, resulting in some understanding of each and multi-perspectivity”*. More than half of the participants (58 of 114) acknowledged that AGs may have a positive effect on players in terms of adopting different perspectives, learning more about historical events, and/or reflecting on the past.

6.4 Assumptions about games

The interviews and MOOC comments exposed two key assumptions about what a game is: (1) games are just for children; and (2) games must have a winning condition. These assumptions may not only influence the decision to play or not to play the games but also inhibit critical reflection. For example, 23 participants were unsure about the impact of AGs and were worried that the games may not be perceived as intended by adults: *“Part of the challenge is that games are regarded as purely for entertainment and aimed for children/younger audiences. Arguably they have the greatest power to unsettle us as they can put us in a perpetrators virtual shoes”* (P.69). Indeed, although the games were designed for adults, they were mostly considered as a positive activity for the younger audience (19). If games are considered a ‘children only’ activity, then adults may not even try them.

Another issue was that players expected to ‘win’ the games if they took the ‘right’ decisions, that is, if they followed an optimal strategy. MOOC comments provide an understanding of this issue. Three participants argued that gamers may not like our games because they do not result in a winner; a feature typically associated with games. For instance, P.57 was afraid that *“the game [EB] being never-ending - you don’t win or lose - while not unattractive in a time-limited museum setting would not meet the expectations of the vast majority of gamers who want the win, the hit”*. Unsurprisingly, our AGs were compared 5 times to commercial games with clear winning conditions such as Battlefield, Call of Duty, and the Witcher. However, winning may not always be desirable in AGs as agonism advocates an open-ended narrative that provides opportunities for reflection [54]. This is particularly true of EB, which is perpetual and as such does not conclude in success or failure.

During interviews, players explained that their choices were made exclusively to win the game, to achieve objectives, without examining the context or the consequences of their actions. For example, players would choose the bombs causing higher damage or rescue medics and soldiers because the game determined that they were especially important for the war. While the action of destroying buildings in EB may have felt normal during the playthrough, during the interview one player stated that the action of destroying buildings in EB stuck in his head after playing the game. However, at the end of EB, it was not clear who won the game or if there was a winner at all.

Table 3. MOOC comment data. On the right is the number of times each category and subcategory was assigned to sentences from the comments.

Negative	38
Positive	58
Unsure	29
Suggestion	30
Example	19
Unsure about impact	23
Unsure about empathy	8
Unsure about learning	3
Unsure about ethical	8
Unsure about reflection	8
Engaging, fun	30
Not fun	15
Brutal	8
Unsettling	4
Disrespectful	11
Oversimplify	13
Educational	24
Deliver message	11
Different perspectives	11
NOT different perspectives	1
Critical thinking	17
Not critical thinking	2
Good for <i>kids</i>	19
Dangerous for <i>kids</i>	9
Good for <i>adults</i>	6
Needs empathy	1
Needs challenging	2
Needs planning	3
Involve psychologists	3
Needs more perspectives	3
Museum experience	4
Role playing game	2
Boardgame	1
News/blog	2
Videogame	12

Although the absence of a win condition was intentional by design, this caused some frustration for the more experienced gamers in particular. Other players claimed that the games did not encourage critical reflection, yet during interviews the same individuals were actually reflecting on the consequences of their actions. It seems then that the interviews themselves were beneficial in helping players to analyse their in-game choices and situate them within the agonistic context of the exhibition.

7 DISCUSSION

Based on our analyses of the data collected from the exhibition at the Ruhr Museum and the MOOC, in this section we highlight key factors that inhibit critical reflection in AGs (RQ 1.1) and discuss how these inhibitors may be overcome (RQ 1.2). We draw conclusions on the capacity of AGs to stimulate critical reflection on unsettling historical events (RQ 1).

7.1 RQ 1.1: What factors may inhibit critical reflection in AGs?

We identified four main factors influencing how games are perceived and their ability to stimulate critical reflection: (1) the topic of a game; (2) the location in which a game is played; (3) the design of a game; and (4) assumptions about games.

7.1.1 Game topic. As described in Section 2 and confirmed by our findings, games are perceived by some as inadequate at or even inappropriate for representing nuanced and sensitive topics, such as the Holocaust. Our findings show that such views extend clearly to AGs, with EB described as ‘violent’ and UM43 prompting strong opinions related to ideas that games trivialise warfare and reinforce undesirable behaviours. Indeed, a telling example is found during discussions of EB amongst MOOC participants in which the role of the bomber prompted stronger reactions than the evacuation officer—and was the key focus of discussion—despite the two characters having equal prominence in the game. Our AGs offered players unsettling choices (T1) and presented multiple perspectives (T2), yet these characteristics did not translate to a deeper reflection on the topic for the majority of people who encountered EB and UM43. Instead, both players and MOOC participants observing gameplay seemed to misinterpret the core message of our AGs or struggled to take them seriously as tools for critical reflection.

This situation was not entirely unanticipated, and we attempted during the development of our AGs to mitigate immediate negative responses by treating their historical context with great care. For UM43, as an example, we followed approaches found in commercial games that deal with unsettling topics such as Czechoslovakia 38-89: Assassination, and drew on a series of interviews with World War II survivors or their relatives. The incorporation of these accounts in UM43 was reviewed by curators of ‘Krieg. Macht. Sinn’ and experts in memory studies, leading

to several iterations on how the material was handled in the game; for example, the decision to articulate the

753 historical inspiration for playable characters via physical ID cards that accompanied the exhibit. These measures
754 were, however, not enough to encourage individuals to progress from reaction to reflection, and therefore it
755 is clear that further methods of implementing the intentions of AGs, i.e. the function of gameplay to provoke
756 critical reflection on contentious events from multiple perspectives, is needed.

757 *7.1.2 Context of gameplay.* In Section 4, we defined **T3** as a function of where the game is played, i.e. its
758 geographical location, and how the game's subject matter is relatable to those playing it. While true, this
759 definition is lacking other clear factors arising from our study results: namely the importance of the environment
760 in which AGs are situated. For example, upon installing our AGs in the Ruhr Museum exhibition, it quickly
761 became clear to us that the games truly manifest their resonating context *in situ*, i.e. within the environment
762 established by the exhibition. The consequences for **T3** then may be that when an AG is played outside an
763 established context, that AG may lose its resonance with players. That is, the environment surrounding the game
764 is crucial to supporting critical reflection. As developers of EB and UM43, we engaged the curators of the Ruhr
765 Museum frequently during the design process, not only to ensure the historical authenticity of our games but
766 also to negotiate their placement in the exhibition. Nevertheless, the design and development of both games
767 was treated mostly as an outsourced, and to some extent adjunct, activity. This may have influenced how the
768 games were perceived by the public, with many visitors not even noticing the games in the context of the overall
769 exhibition.

770 We also identified time as a key factor in a public environment such as a museum [27]. First, the time spent
771 interacting with a game in a museum or public space is typically significantly less than at home, especially since
772 visitors tend to spend less than 20 minutes in an exhibition regardless of its topic or size [59]. Based on our
773 observations, we know the average time our visitors spent in the exhibition was 33 minutes. Considering that
774 visitors may be interested in the various topics and objects on display, this means that they may not have much
775 time remaining to dedicate to a game. Secondly, players in a public setting such as a museum must be considerate
776 of the people around them: other members of the public may want to see the same display or play the same game,
777 pressuring them not to spend much time with the game. As a consequence, interactive experiences in public
778 contexts are commonly used for up to 4 minutes [35]. Accordingly, our games were designed to be played in less
779 than 5 minutes. However, quick gameplay sessions are difficult to design as there is usually no time to complete a
780 tutorial session, that is one or two levels to learn and practise the rules of the game. This limits the scope of the
781 game's narrative, impacts decisions on mechanics and user interface, and ultimately requires players to negotiate
782 a significant amount of information without much time for processing. While many games are successfully
783 designed to be played in public spaces [50] and consider issues surrounding the time to learn mechanics, the
784 purpose of these games is to entertain. AGs have a purpose beyond entertainment, which is to stimulate critical
785 reflection. Hence, players not having sufficient time to engage their critical faculties after just a few minutes of
786 gameplay may be another inhibitor to stimulating this critical reflection.

788 *7.1.3 Game design.* Both EB and UM43 deploy new game mechanics which were devised to fulfil the tenets
789 of agonistic play [57]. As such, we did not use mechanics familiar to players, who had instead to learn a new
790 set of rules to play the games. This aspect, together with the public's general unfamiliarity with the concept of
791 agonism and the short-form style of the games, presented a significant challenge and affected how the games
792 were perceived. Especially in EB, players must in a matter of moments comprehend the relationship between
793 bomber and evacuation officer, and make decisions that respond appropriately to game rules and objectives.
794 This may place a high cognitive load on players, potentially interfering with their capacity to derive meaning
795 from their experiences. Indeed, high demand cognitive tasks in games more broadly may "leave no cognitive
796 resources available for generalizations and acquisition of meaningful knowledge" [38]. Players of UM43 navigate
797 the gameplay a little more slowly than in EB due to UM43's turn based mechanic. Their capacity successfully
798 to comprehend the game's message may nevertheless still be hampered by the significant amount of textual
799

information that they are expected to process. During UM43, players are tasked to understand and act on their own character's situation while reading, analysing and committing to working memory the fragmented accounts of up to three other in game characters. Furthermore, juxtaposition of contrasting perspectives—fundamental to the aims of an AG—also requires high cognitive load as players have to identify, understand and empathise with opposing views. The fact that we took a series of high risk game design decisions made the game mechanics particularly complicated to understand, causing confusion and even at times frustration for players. Ultimately, the use of multiple perspectives and of new game mechanics based on agonistic theory entails high cognitive demand, which in turn may limit the capacity for games as complex as AGs to achieve their intended aim of promoting critical reflection—at least as a short form game in a public setting.

7.1.4 Assumptions about games. AGs are a type of serious game so their purpose extends beyond entertainment. Hence, the goals and objectives of AGs do not necessarily align with those of games in general. However, EB and UM43 were often associated by the MOOC participants with commercial warfare games such as Battlefield and Call of Duty rather than other serious games such as Czechoslovakia 38-89: Assassination. Hence, the players expected our AGs' main aim to be entertainment, with two main consequences.

First, players expected AGs to offer *realistic conflicts* like well known warfare games. This realism is often due to photorealistic art used to immerse players into conflict. For instance, players use extremely realistic weapons that can be used to hurt people. If characters in the games are hurt, players typically encounter representations of blood. Due to this realism, those games are usually considered openly violent. As a consequence, AGs were also assumed to display acts of violence. However, the games deliberately do not offer photorealism. EB's artistic style is paper-like, far from the realistic killing of traditional warfare games. UM43 on the other hand offers a minimalist art style and involves mechanics of conversation where players share information between each other, not violent acts.

The second issue raised by both the MOOC comments and the interviews was that the player's goal—rather unsurprisingly—is usually to win. Though recent years have seen a rise in interest in games without clear win states, for example walking simulators such as Firewatch [56], players still generally expect either to win or to lose a game. This preconception about games has two consequences. First, players will likely opt to select choices that will award them the most points, without necessarily reflecting on their actions. Secondly, the realisations that EB does not have a winner and that in UM43 even the most considered strategy may not necessarily enable a player to win may result in frustration.

7.2 RQ1.2: How can we overcome such inhibitors?

7.2.1 Overcoming inhibitors related to game topic. Although addressing wider preconceptions of games is beyond the scope of this paper, we suggest two ways in which we and future designers of AGs can mitigate challenges related to players' misinterpreting the core message and function of games that engage topics of dark heritage. The first is to establish a mode of pre-game briefing that serves to outline the characteristics of AGs and their intention to encourage critical reflection on unsettling historical topics. While EB and UM43 currently include an overview of the core mechanics and a short introduction to the narrative context of the games, they do not expose their agonistic underpinnings. Players unfamiliar with agonism (a relatively new mode of remembrance) may therefore find it difficult to recognise and interpret why AGs negotiate sensitive subject matter, reference acts and actors that have negative connotations, and ask players to make unsettling choices. A promising format for the pre-game briefing is a 'couch commentary'; that is, short video excerpts of gameplay accompanied by voiced descriptions and explanations of the material presented. Couch commentaries offer the benefit of being incorporated directly into an AG, thus exposing the context, function and even the core mechanics of the game before or during player interaction, depending on their design.

847 A second way to address negative perceptions or preconceptions of AGs, e.g. that they trivialise war, is to
 848 enhance their legitimacy by adopting a full participatory or co-design process. While survivors of World War II
 849 and their relatives were interviewed to inform the design of both EB and UM43, they were not actively involved in
 850 the game’s design, development and evaluation stages. This is a limitation we will address in future AG projects to
 851 ensure that the final form of our games expresses unsettling topics in a way that echoes the reality of the events
 852 depicted; both in terms of historical information and overall tone. A co-design process would give stakeholders,
 853 e.g. survivors, perpetrators, historians and policymakers, a central role in designing AGs—from setting key aims
 854 through to testing *in situ*—and help developers shape the way in which various perspectives are framed and
 855 communicated. Through this co-design process we would not only get input to ensure the historical authenticity
 856 of the games but also gain stakeholder’s approval, thus legitimising the existence of the games. For example, a
 857 collaboration with Jewish communities would be key to legitimise a game about the Holocaust. To encourage
 858 critical reflection in players, however, it is important to make them aware that such a participatory process has
 859 been undertaken. If the historical validity and legitimisation of the games is not made explicit or is unconvincing,
 860 we suspect that some individuals faced with AGs will continue to find it difficult to move past initial reactions
 861 to the topic or preconceptions that games are an unsuitable means of engaging sensitive topics. Hence, we
 862 recommend presenting AGs along with metadata and background information, for example behind-the-scenes
 863 footage of development and/or research material used to develop the game’s historical context. The ‘couch
 864 commentary’ offers one means of revealing the input of relevant stakeholders in the design, development and
 865 evaluation of AGs, and it is likely that further effective methods of doing so will emerge as our research progresses.
 866 In this way, the games are transparent regarding their source material and how they relate to the historical
 867 context in an agonistic way.

868 *7.2.2 Overcoming inhibitors related to the context of gameplay.* Our AGs were installed in a museum; a public
 869 space. While public spaces can be successful in providing a resonating context (for example due to the geographical
 870 location or objects displayed around the games), they also present challenges. The main issue is time available to
 871 play. A private context, such as a home, would give players more time to play and potentially more time to think
 872 and reflect on the game’s subject matter. Playing at home could, however, cause the loss of resonant context,
 873 especially if this context is established through the connection between the game topic and the geographical
 874 location in which it is played. A solution may be to offer a capacity to book a slot to play the game, thus
 875 encouraging individuals to dedicate an appropriate amount of time to play and to reflect critically upon the AG.

876 Another issue is that visitors would often not even look at the games. This could be due to the AGs’ not being
 877 fully integrated into the curation of the exhibition. Museum professionals should be aware of the full potential
 878 of games to engage visitors with difficult and polarising topics. If a museum handles AGs as supplementary to
 879 their primary offer, then they are likely to allocate fewer resources and planning to their development. As a
 880 result, visitors may perceive museum games as irrelevant or may not perceive them as an integrated part of an
 881 exhibition. To overcome the challenge of encouraging this form of stakeholder input, one suggestion we make is
 882 to help museum professionals understand the benefits of serious games by including them more generally in
 883 activities of playing and making games with a purpose [22]. In this way, they would gain first hand experience of
 884 how a game can influence the behaviours of players and, further, the value of serious games when situated in
 885 cultural institutions and experiences.

887 *7.2.3 Overcoming inhibitors related to game design.* As previously discussed (Section 7.1.3), design decisions
 888 based on agonistic theory may cause high cognitive demands. Kalyuga and Plass’s research [38] on managing
 889 cognitive load in games suggests ways to mitigate issues associated with high cognitive load while adhering
 890 to the agonistic tenets. They suggest several factors in game-based learning environments that contribute to
 891 extraneous cognitive load, including the rate at which new information is introduced into working memory, and
 892 the spatial or temporal distancing of related chunks of information. Drawing on this work, we suggest two ways
 893

894 to overcome high cognitive load. First, designers of AGs should consider reducing the number of actors within
895 a game scenario or rethink the sequencing in which character stories are exposed to players. For example, EB
896 could begin with a brief animation or video to set the scene for the pilot and evacuation officer, while UM43
897 might reduce the total number of playable characters. Secondly, in EB and UM43 we could provide information
898 at different stages, with the possibility of prompting instructions when needed. For instance, in EB information
899 about the bombs available and the evacuee profiles is presented only within initial game sequences. During the
900 game, players were then required to connect very quickly a bomb's nickname (e.g. Pumpkin) or evacuee profile
901 (e.g. Nurse) to their value to the war effort. While a label illustrating the bombs and evacuees' values was attached
902 to the game kiosk, players seemed either not to notice or simply to focus on the screen. As their task is on the
903 screen, that is where their attention focuses and where they expect to find the information they need [21]. Hence,
904 players had to recall this information later when making choices of where to bomb (when playing as the pilot) or
905 whom to save (when playing as the evacuation officer). Without on demand access to a knowledge base about
906 the bombs or evacuee values, players are likely to resort to 'trial and error' strategies that—although successful
907 in some cases—are cognitively inefficient [65] and potentially detrimental to the two player gaming experience.
908 A simple fix in this case would be to offer 'just in time' information [31] by including points values on bomb
909 and evacuee icons within the portion of the game where players deploy such selections (see Figure 1). UM43
910 also describes the characters only at the beginning of the games. While printed ID cards are always available,
911 players may not have time to go and read them during gameplay, especially given that those cards are rich in
912 content, diving deep into each character story and historical background. Thus, on demand access to information
913 or visual cues displayed close to the character's image on screen may be an appropriate solution for UM43 too.
914 Finally, UM43 presents players with a difficult choice, namely that of who should be saved. The game might
915 therefore help reduce the cognitive load found at the end of the game by instead presenting players with several
916 less significant choices spread out over the course of the game.

917 *7.2.4 Overcoming assumptions about games.* The agonistic approach is novel and not yet established in games.
918 Furthermore, the purpose of AGs is quite different from established commercial games as AGs do not focus only
919 on entertainment but also aim to stimulate critical reflection. However, since players have little to no familiarity
920 with agonism, they do not have the knowledge necessary to recognise the game's ambitions to promote reflection
921 through multiperspectivity and unsettling decision making. The risk is that players will instead resort to linking
922 AGs with something more familiar, such as educational games that are usually for children or commercial games
923 that have clear winning conditions. These associations are misleading and may cause confusion and frustration,
924 inhibiting critical reflection. Hence, it is critical to communicate explicitly the scope of the games and their
925 theoretical underpinning, i.e. agonism, to players before they start the game. Information could be shared in
926 the environment surrounding the game, using for example labels or marketing material, or at the beginning of
927 the game, perhaps through a theatrical introduction/cut scene. In the specific case of a museum, information
928 could be communicated through museum channels, for instance in person by the staff or through the museum
929 website. As noted in the previous section (7.2.3), players tend to focus their attention on the screen. Thus an in
930 game communication, before initiating play, may be the best solution. We could add an indication on the opening
931 screen to indicate that these are AGs and do not necessarily have a winner. The game could even allow players
932 the option to get additional information on AGs if they wish to do so.
933

934 7.3 RQ1: Are agonistic games capable of stimulating critical reflection on unsettling historical events?

935 Our findings show that players, when engaging with games that deal with sensitive topics, can find it difficult
936 to transition beyond a reflexive, immediate emotional response and towards a more critical interpretation of
937 the scenario depicted. Hence, the sense of unease that AGs aim to establish (**T1**) is the very thing that may
938 inhibit their capacity to provoke critical reflection. We argue that this is not a limitation of the agonistic mode
939

941 of remembrance but rather that games are not yet widely accepted as a sufficiently nuanced tool for handling
942 topics of intellectual and emotional weight. Our findings suggest that our AGs in isolation were limited in their
943 ability to provoke critical reflection. While this may be the case, we observed that players, when discussing their
944 gameplay experience during the post-game interviews, were able to think more objectively about and learn from
945 their actions. The interviews acted as a debrief that provided players with the required space and guidance to
946 make sense of what they had experienced through the lens of agonism.

947 Similarly, the MOOC comments suggest that some form of facilitation, for instance from educators, may be
948 beneficial to help players derive meaning from AGs. This confirms what Crookall has advocated: “real (solid,
949 lasting, meaningful and deeper) learning comes not from the game, but from the debriefing” [17]. Crookall clarifies
950 that although learning can happen while playing “. . . deeper lessons are drawn out in a debriefing session”. In the
951 field of serious games, De Troyer [23] argues that debriefing is essential for effectiveness as it allows players to
952 reflect on their gaming experience and to turn it into learning. Hence, we propose that a debrief is needed to
953 make sense of agonistic experiences in games and to give players the time and space for critical reflection. This
954 illustrates that playing an AG is merely an experiential phase in a wider framework for critical reflection; a tool
955 that can support an agonistic mode of remembering but cannot achieve it independently. But while debriefing is
956 considered “an essential part of any serious game” [32], this aspect is often overlooked by designers [17, 23].

957 A debrief, beyond the *de facto* debrief provided by the interviews conducted with the subset of visitors for our
958 research purposes, was not originally planned for EB and UM43. Besides the fact that comprehensive debriefing
959 is usually expensive and time-consuming, it is unclear how it could be conducted in practice. It is for instance
960 infeasible to interview every player of an AG installed in a museum, either individually or in groups. De Troyer
961 [23] also argues that a debriefing phase is usually performed by a human facilitator, but while this “approach
962 may be quite effective, it is expensive, time consuming, and not possible when the serious game is used in a
963 non-facilitating space (e.g. at home) or when no expert facilitator is available”, e.g. in public spaces like museums
964 (pp. 287). Recent research from Grund and colleagues [32] may offer a solution: an integrated approach to
965 debriefing which could be deployed within the AGs. Following De Troyer’s [23] arguments, a debriefing after
966 game play could provide a solution to giving players an opportunity to reflect critically.

967 968 8 CONCLUSION

969 In this paper we have described how agonistic memory theory can be applied to games and answer the following
970 research question: are agonistic games capable of stimulating critical reflection on unsettling historical events?
971 Two corollaries stem from this: what factors may inhibit critical reflection in AGs and how can we overcome such
972 inhibitors? To address these questions we report the design of two AGs developed as part of an exhibition at the
973 Ruhr Museum in Essen, Germany, and analyse perspectives collected from exhibition visitors and participants in
974 a MOOC in which the games were presented. Based on the data collected, we identified four key inhibitors to
975 critical reflection in AGs: (1) the topic of a game; (2) the location in which a game is played; (3) the design of a
976 game; and (4) assumptions about games.

977 First, we point out how games tackling unsettling topics such as bombing and genocide may cause players to
978 perceive games as unduly violent, trivialising and insensitive. One way to address this perception is to implement
979 a couch commentary that expresses the function and intentions of AGs. Secondly, we describe how the context in
980 which the games are played may influence how they are perceived. This can be addressed by fully integrating AGs
981 into the curation of their host environment (e.g. a museum exhibition), in turn encouraging stakeholder input.
982 Thirdly, we outline how challenges related to game design and cognitive load can both obscure the core agonistic
983 message and negatively impact a player’s ability to reflect critically on the game’s subject matter. Solutions may
984 include reducing the number of characters in AGs, or by offering ‘just in time’ information on game mechanics
985 and narrative content within the games themselves. Finally, we note how the expectations of the public about
986

warfare games, which typically offer realistic representations of conflict and conclusive winning conditions, can also impact how effectively AGs achieve their intended outcomes. To solve this the games could explicitly communicate their role beyond entertainment—and whether there is or is not a winning condition—through in game features such as cut scenes.

Our AGs were shown to evoke strong reactions, particularly from MOOC participants, which is *per se* evidence of their potential as tools for critical reflection. However, our findings suggest that the games alone may not offer sufficient opportunity or impetus to prompt players to reflect on unsettling topics in a critical way. Building from insights presented in this paper, we plan in future work to formalise a framework for the design of AGs. This work will include methods of integrating an explicit debrief into AGs to enhance their capacity to facilitate critical reflection.

To conclude, our paper pushes the boundaries of serious games by introducing the culturally novel concept of agonistic games, providing two implementations of this concept and an extensive analysis of their capacity for stimulating critical reflection. Although we have identified a number of challenges to overcome, our study offers a valuable account that can inform the development of future AGs.

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REFERENCES

- [1] 2020. The Resistance: Avalon. <https://boardgamegeek.com/boardgame/128882/resistance-avalon>
- [2] Craig A. Anderson. 2003. *Violent Video Games: Myths, Facts, and Unanswered Questions*. Technical Report. American Psychological Association. <https://www.apa.org/science/about/psa/2003/10/anderson>
- [3] Craig A. Anderson and Jennifer Rowley. 2012. *Conducting research interviews*. Technical Report 3-4. Emerald Group Publishing Limited. 260–271 pages. <https://doi.org/10.1108/01409171211210154> ISSN: 20408269 Publication Title: Management Research Review Volume: 35.
- [4] Francesco Bellotti, Bill Kapralos, Kiju Lee, Pablo Moreno-Ger, and Riccardo Berta. 2013. *Assessment in and of serious games: An overview*. Vol. 2013. <https://doi.org/10.1155/2013/136864> ISSN: 16875893 Publication Title: Advances in Human-Computer Interaction.
- [5] Stefan Berger and Wulf Kansteiner. 2019. Antagonistic, Cosmopolitan and Agonistic Memories of War. In *'Krieg. Macht. Sinn': War and Violence in European Memory*. Klartext.
- [6] Stephen Bitgood. 1988. An Overview of The Methodology of Visitor Studies. *Visitor Behavior* 3, 3 (1988), 3.
- [7] Elizabeth A. Boyle, Thomas Hainey, Thomas M. Connolly, Grant Gray, Jeffrey Earp, Michela Ott, Theodore Lim, Manuel Ninaus, Claudia Ribeiro, and João Pereira. 2016. An update to the systematic literature review of empirical evidence of the impacts and outcomes of computer games and serious games. *Computers and Education* 94 (March 2016), 178–192. <https://doi.org/10.1016/j.compedu.2015.11.003> Publisher: Elsevier Ltd.
- [8] Virginia Braun and Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 2 (Jan. 2006), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- [9] Angela Brodsky. 2018. *Using Content Analysis of Internet News Article Comments to Understand Climate Change Denial*. SAGE Publications Ltd. <https://doi.org/10.4135/9781526483836> Publication Title: Using Content Analysis of Internet News Article Comments to Understand Climate Change Denial.
- [10] Anna Cento Bull and Hans Lauge Hansen. 2016. On agonistic memory. *Memory Studies* 9, 4 (Oct. 2016), 390–404. <https://doi.org/10.1177/1750698015615935>
- [11] Antonio Calvo-Morata, Cristina Alonso-Fernández, Manuel Freire, Iván Martínez-Ortiz, and Baltasar Fernández-Manjón. 2020. Serious games to prevent and detect bullying and cyberbullying: A systematic serious games and literature review. *Computers and Education* 157

- (Nov. 2020), 103958. <https://doi.org/10.1016/j.compedu.2020.103958> Publisher: Elsevier Ltd.
- [12] Marcus Carter, John Downs, Bjorn Nansen, Mitchell Harrop, and Martin Gibbs. 2014. Paradigms of games research in HCI. In *Proceedings of the first ACM SIGCHI annual symposium on Computer-human interaction in play - CHI PLAY '14*. ACM Press, New York, New York, USA, 27–36. <https://doi.org/10.1145/2658537.2658708>
- [13] Anna Cento Bull, Hans Lauge Hansen, Wulf Kansteiner, and Nina Parish. 2019. War museums as agonistic spaces: possibilities, opportunities and constraints. *International Journal of Heritage Studies* 25, 6 (June 2019), 611–625. <https://doi.org/10.1080/13527258.2018.1530288> Publisher: Routledge.
- [14] Adam Chapman. 2016. It's Hard to Play in the Trenches: World War I, Collective Memory and Videogames. *Game Studies - The international journal of computer game research* 16, 2 (2016). <http://gamestudies.org/1602/articles/chapman>
- [15] Tim Cole. 2017. *Selling the Holocaust: From Auschwitz to Schindler; How History is Bought, Packaged and Sold*. Routledge.
- [16] Brian Crescente. 2010. Anti-Defamation League Slams 'Fun' Holocaust Video Game As Horrific And Inappropriate. <https://kotaku.com/anti-defamation-league-slams-fun-holocaust-video-game-5712163> Publication Title: Kotaku.
- [17] David Crookall. 2010. Serious Games, Debriefing, and Simulation/Gaming as a Discipline. *Simulation & Gaming* 41, 6 (Dec. 2010), 898–920. <https://doi.org/10.1177/1046878110390784> Publisher: SAGE PublicationsSage CA: Los Angeles, CA.
- [18] Brian Davis. 2019. Luigi's Mansion 3.
- [19] D. De Angeli, D. J. Finnegan, and L. Scott. 2019. Agonistic games. In *Krieg, Macht, Sinn: Krieg und Gewalt in der europäischen Erinnerung = war and violence in European memory*, S. Berger, H. T. Grütter, and W. Kansteiner (Eds.). Klartext Verlag, 168–184. <https://klartext-verlag.de/programm/fachbuch/geschichte/3022/krieg.-macht.-sinn>. Num Pages: 18.
- [20] Daniela De Angeli, Daniel J. Finnegan, Lee Scott, Anna Bull, and Eamonn O'Neill. 2018. Agonistic Games: Multiperspective and Unsettling Games for a Social Change. In *Proceedings of the 2018 Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts (CHI PLAY '18 Extended Abstracts)*. ACM, New York, NY, USA, 103–108. <https://doi.org/10.1145/3270316.3270594> event-place: Melbourne, VIC, Australia.
- [21] Daniela De Angeli and Eamonn O'Neill. 2015. Transfer of learning between screen-based and gallery-based content: an initial study. In *1st International SEAHA Conference*. 48. https://www.ucl.ac.uk/seaha-cdt/sites/seaha-cdt/files/2015_seaha_conference_book_of_abstracts.pdf
- [22] Daniela De Angeli and Eamonn O'Neill. 2020. Towards a Gameful Museum : Empowering Museum Professionals via Playing and Making Games. *The International Journal of the Inclusive Museum* 13, 1 (2020), 37–53. <https://cgscholar.com/bookstore/works/towards-a-gameful-museum>
- [23] Olga De Troyer. 2017. Towards effective serious games. In *2017 9th International Conference on Virtual Worlds and Games for Serious Applications, VS-Games 2017 - Proceedings*. Institute of Electrical and Electronics Engineers Inc., 284–289. <https://doi.org/10.1109/VS-GAMES.2017.8056615>
- [24] Teun Dubbelman. 2011. Playing the hero: How games take the concept of storytelling from representation to presentation. *Journal of Media Practice* 12, 2 (Jan. 2011), 157–172. https://doi.org/10.1386/jmpr.12.2.157_1 Publisher: Routledge eprint: https://www.tandfonline.com/doi/pdf/10.1386/jmpr.12.2.157_1.
- [25] Astrid Erl. 2011. *Memory in Culture*. Palgrave Macmillan UK. <https://doi.org/10.1057/9780230321670> Publication Title: Memory in Culture.
- [26] Nuria Galí Espelt and José Antonio Donaire Benito. 2006. Visitors' Behavior in Heritage Cities: The Case of Girona. *Journal of Travel Research* 44, 4 (May 2006), 442–448. <https://doi.org/10.1177/0047287505282956> Publisher: SAGE Publications Ltd.
- [27] John H. Falk and Lynn D. Dierking. 1995. *Recalling the Museum Experience*. Vol. 20. Taylor & Francis, Ltd. <https://doi.org/10.2307/40479023> Publication Title: The Journal of Museum Education.
- [28] Malcolm Foley and J. John Lennon. 1996. JFK and dark tourism: A fascination with assassination. *International Journal of Heritage Studies* 2, 4 (Dec. 1996), 198–211. <https://doi.org/10.1080/13527259608722175> Publisher: Taylor & Francis Group.
- [29] Roberto P. Franzosi. 2004. Content Analysis. In *Handbook of Data Analysis*. SAGE Publications, Ltd, 1 Oliver's Yard, 55 City Road, London England EC1Y 1SP United Kingdom, 548–565. <https://doi.org/10.4135/9781848608184.n24>
- [30] Gonzalo Frasca. 2001. *Videogames of the oppressed: Videogames as a means for critical thinking and debate*. PhD Thesis. Georgia Institute of Technology.
- [31] James Gee. 2008. *What Video Games Have to Teach Us About Learning and Literacy. Second Edition* (rev ed edition ed.). Palgrave Macmillan, New York.
- [32] Christian Karl Grund and Michael Schelkle. 2019. Developing Serious Games with Integrated Debriefing. *Business & Information Systems Engineering* 62, 1 (Jan. 2019), 87–101. <https://doi.org/10.1007/s12599-019-00579-2> Publisher: Springer Science and Business Media LLC.
- [33] George E. Hein. 1998. *Learning in the Museum*. Vol. 47. Routledge. <http://books.google.com/books?id=Yz4pflj1jMoC&pgis=1> Publication Title: Assessment.
- [34] Maurice Hendrix, Ali Al-Sherbaz, and Victoria Bloom. 2016. Game Based Cyber Security Training: are Serious Games suitable for cyber security training? *International Journal of Serious Games* 3, 1 (March 2016). <https://doi.org/10.17083/ijsg.v3i1.107> Publisher: Serious Games Society.

- 1082 [35] Eva Hornecker and Matthias Stifter. 2006. Learning from interactive museum installations about interaction design for public settings.
1083 In *ACM International Conference Proceeding Series*, Vol. 206, 135–142. <https://doi.org/10.1145/1228175.1228201>
- 1084 [36] Johan Huizinga. 1949. *Homo Ludens: A Study of the Play-Element in Culture*. Routledge & Kegan Paul, London. [http://art.yale.edu/file_](http://art.yale.edu/file_columns/0000/1474/homo_ludens_johan_huizinga_routledge_1949_.pdf)
1085 [columns/0000/1474/homo_ludens_johan_huizinga_routledge_1949_.pdf](http://art.yale.edu/file_columns/0000/1474/homo_ludens_johan_huizinga_routledge_1949_.pdf)
- 1086 [37] Kristine Jørgensen. 2016. The Positive Discomfort of Spec Ops: The Line. *Game Studies* 16, 2 (2016). [http://gamestudies.org/1602/](http://gamestudies.org/1602/articles/jorgensenkristine)
1087 [articles/jorgensenkristine](http://gamestudies.org/1602/articles/jorgensenkristine)
- 1088 [38] Slava Kalyuga and Jan L. Plass. 2009. Evaluating and Managing Cognitive Load in Games. In *Handbook of research on effective electronic*
1089 *gaming in education*. IGI Global, 719–737.
- 1090 [39] Hideki Kamiya. 2001. Devil May Cry.
- 1091 [40] Wulf Kansteiner. 2017. The Holocaust in the 21st Century: Digital anxiety, transnational cosmopolitanism, and never again genocide
1092 without memory. In *Digital Memory Studies: Media Past in Transition*, Andrew Hoskins (Ed.). Routledge, New York, 31. <https://doi.org/10.4324/9781315637235> Section: 5.
- 1093 [41] Mehdi Khosrow-Pour. 1. *Encyclopedia of Information Science and Technology, Fourth Edition*. IGI Global. [https://www.igi-global.com/](https://www.igi-global.com/gateway/book/173015)
1094 [gateway/book/173015](https://www.igi-global.com/gateway/book/173015) Publication Title: <http://services.igi-global.com/resolvedoi/resolve.aspx?doi=10.4018/978-1-5225-2255-3>.
- 1095 [42] Hannah Krall, Lawrence Weschler, and Marek Edelman. 1986. *Shielding the Flame: An Intimate Conversation with Dr Marek Edelman, the*
1096 *Last Surviving Leader of the Warsaw Ghetto Uprising*. Henry Holt & Company.
- 1097 [43] Fedwa Laamarti, Mohamad Eid, and Abdulmotaleb El Saddik. 2014. *An overview of serious games*. Vol. 2014. [https://doi.org/10.1155/](https://doi.org/10.1155/2014/358152)
1098 [2014/358152](https://doi.org/10.1155/2014/358152) ISSN: 16877055 Publication Title: International Journal of Computer Games Technology.
- 1099 [44] Daniel Levy, Michael Heinlein, and Lars Breuer. 2011. Reflexive particularism and cosmopolitanization: the reconfiguration of the
1100 national. *Global Networks* 11, 2 (April 2011), 139–159. <https://doi.org/10.1111/j.1471-0374.2011.00316.x> Publisher: John Wiley & Sons,
1101 Ltd.
- 1102 [45] Duncan Light. 2017. *Progress in dark tourism and thanatourism research: An uneasy relationship with heritage tourism*. Vol. 61. Elsevier
1103 Ltd. <https://doi.org/10.1016/j.tourman.2017.01.011> ISSN: 02615177 Publication Title: Tourism Management.
- 1104 [46] Jane McGonigal. 2016. *SuperBetter: The Power of Living Gamefully* (reprint edition ed.). Penguin Books.
- 1105 [47] Sally J. McMillan. 2000. The Microscope and the Moving Target: The Challenge of Applying Content Analysis to the World Wide Web.
1106 *Journalism & Mass Communication Quarterly* 77, 1 (March 2000), 80–98. <https://doi.org/10.1177/107769900007700107>
- 1107 [48] Tamotsu Mitamura, Yasuhiro Suzuki, and Takahumi Oohori. 2012. Serious games for learning programming languages. In *2012*
1108 *IEEE International Conference on Systems, Man, and Cybernetics (SMC)*. Institute of Electrical and Electronics Engineers, 1812–1817.
1109 <https://doi.org/10.1109/ICSMC.2012.6378001> ISSN: 1062-922X.
- 1110 [49] Peter Molyneux. 2001. Black and White.
- 1111 [50] Markus Montola, Jaakko Stenros, and Anika Waern. 2009. *Pervasive Games: Theory and Design* (1 ed.). CRC Press. [https://www.](https://www.routledge.com/Pervasive-Games-Theory-and-Design/Montola-Stenros-Waern/p/book/9780123748539)
1112 [routledge.com/Pervasive-Games-Theory-and-Design/Montola-Stenros-Waern/p/book/9780123748539](https://www.routledge.com/Pervasive-Games-Theory-and-Design/Montola-Stenros-Waern/p/book/9780123748539)
- 1113 [51] Torill Elvira Mortensen, Jonas Linderroth, and Ashley M. L. Brown. 2015. *The dark side of game play : controversial issues in playful*
1114 *environments*. Routledge, New York. [https://www.routledge.com/The-Dark-Side-of-Game-Play-Controversial-Issues-in-Playful-](https://www.routledge.com/The-Dark-Side-of-Game-Play-Controversial-Issues-in-Playful-Environments/Mortensen-Linderroth-Brown/p/book/9781138827288)
1115 [Environments/Mortensen-Linderroth-Brown/p/book/9781138827288](https://www.routledge.com/The-Dark-Side-of-Game-Play-Controversial-Issues-in-Playful-Environments/Mortensen-Linderroth-Brown/p/book/9781138827288)
- 1116 [52] Chantal Mouffe. 2005. *On the Political*. London: Routledge.
- 1117 [53] Chantal Mouffe. 2012. *An Agonistic Approach to the Future of Europe*. Vol. 43. The Johns Hopkins University Press. [https://www.jstor.](https://www.jstor.org/stable/23358660)
1118 [org/stable/23358660](https://www.jstor.org/stable/23358660)
- 1119 [54] Chantal Mouffe. 2013. *Agonistics: Thinking the World Politically*. London: Verso.
- 1120 [55] Robert A. Rosenstone. 1995. *Revisioning History: Film and the Construction of a New Past*. Princeton University Press, Princeton, New
1121 Jersey.
- 1122 [56] Campo Santo. 2016. Firewatch.
- 1123 [57] David Schaller. 2014. Game Mechanics and the Museum: Designing simple gameplay around complex content. In *Museums and the*
1124 *Web 2014*. [https://mw2014.museumsandtheweb.com/paper/game-mechanics-and-the-museum-designing-simple-gameplay-around-](https://mw2014.museumsandtheweb.com/paper/game-mechanics-and-the-museum-designing-simple-gameplay-around-complex-content/)
1125 [complex-content/](https://mw2014.museumsandtheweb.com/paper/game-mechanics-and-the-museum-designing-simple-gameplay-around-complex-content/)
- 1126 [58] Karen Schrier. 2016. *Knowledge Games: How Playing Games Can Solve Problems, Create Insight, and Make Change*. Johns Hopkins
1127 University Press.
- 1128 [59] Beverly Serrell. 2015. *Exhibit labels : an interpretive approach* (2 ed.). Rowman & Littlefield Pub Inc.
- [60] Vít Šisler. 2016. Contested Memories of War in Czechoslovakia 38-89: Assassination: Designing a Serious Game on Contemporary
History. *Game Studies* 16, 2 (2016). <http://gamestudies.org/1602/articles/sisler> Publisher: Game Studies.
- [61] Marios Stanitsas, Konstantinos Kirytopoulos, and Elise Vareilles. 2019. *Facilitating sustainability transition through serious games: A*
systematic literature review. Vol. 208. Elsevier Ltd. <https://doi.org/10.1016/j.jclepro.2018.10.157> ISSN: 09596526 Publication Title: Journal
of Cleaner Production.
- [62] Philip R. Stone, Rudi Hartmann, Tony Seaton, Richard Sharpley, and Leanne White. 2018. *The Palgrave handbook of dark tourism studies*.
Palgrave Macmillan. <https://doi.org/10.1057/978-1-137-47566-4> Publication Title: The Palgrave Handbook of Dark Tourism Studies.

- 1129 [63] Tarja Susi, Mikael Johannesson, and Per Backlund. 2007. *Serious Games : An Overview*. Institutionen för kommunikation och information.
1130 <http://urn.kb.se/resolve?urn=urn:nbn:se:his:diva-1279>
- 1131 [64] Chris Swain. 2007. Designing Games to Effect Social Change. In *Proceedings of DiGRA 2007 Conference*. Digital Games Research
1132 Association. <https://pdfs.semanticscholar.org/15f1/7d179a7272cb5a0ec0db524d7596731b7535.pdf>
- 1133 [65] John Sweller. 1988. Cognitive Load During Problem Solving: Effects on Learning. *Cognitive Science* 12, 2 (1988), 257–285. https://doi.org/10.1207/s15516709cog1202_4 https://onlinelibrary.wiley.com/doi/pdf/10.1207/s15516709cog1202_4.
- 1134 [66] Richard Terdiman. 1993. *Present Past: Modernity and the Memory Crisis*. Cornell University Press. <https://www.jstor.org/stable/10.7591/j.ctv1nhqp2>
- 1135 [67] Eric Zimmerman. 2015. Manifesto for a Ludic Century. In *The gameful world: approaches, issues, applications*, Steffen P. Walz and
1136 Sebastian Deterding (Eds.). MIT Press, 19–22.
- 1137
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