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The cultural phenomenon that *Minecraft* (Mojang 2009) has become over the past decade demonstrates, amongst many other things, a powerful appetite for games where the player is thrown in a virtual playground to do as they please. Aerospace-themed survival-crafting game *Astroneer* (2019) by System Era Softworks (henceforth referred to as System Era) is one of many such video games released since that capitalizes on this trend. The appeal of such games lies in that they can be enjoyed by players with various interests, abilities and backgrounds: the average player can mine, build, and fight whatever and whomever they please, or even create entire games within the game. Not only do the two games share basic design principles, such as procedurally generated game spaces or a lack of enforced linear progression, System Era also has former *Minecraft* Lead Artist Spencer Kern as its Art Director (Noclip 2019), creating a kinship that transcends core mechanics. Indeed, System Era developers' elevator pitch for their game is "*Astroneer* is to Play-Doh is what *Minecraft* is to LEGO" (DevGAMM 2017; Microsoft Developer 2018). The design of such games is, in many ways, less constricted than that of other avatar-based genres, such as action-adventures or first-person shooters. Freedom, playfulness, and creative play are often associated with such design, which evoke questions about agency. This article connects these notions and asks: can agency help us better understand how playfulness can be designed?

To answer this question, this article presents a theory-based discussion of *Astroneer*'s production in order to highlight themes in design decisions that can be seen as facilitating a high degree of player freedom, which in turn can support playful gameplay. I will first briefly trace the conceptual history of the notion of playfulness and agency respectively. I will argue that we can think of agency as the possibility space for meaningful player action, which in avatar-based games can be feasibly sketched by observing what the avatar can and cannot do. The case study of *Astroneer* will illustrate the productivity of this approach: I will interrogate the *paratexts*[1] surrounding the game's development[2] to see how developers discussed design decisions that facilitate playfulness.[3] Doing so will illustrate how thinking of agency as something afforded by game design can be a productive analytical tool to identify design decisions that facilitate player freedom and creative thinking. This, in turn, will shed light on whether, and if so how, playfulness can be designed.

Video Games and Playfulness

A vital characteristic of video games is the perpetual tension they create between the freedom of play and the constriction of rules. In games where some, if not all, goals are not clearly defined and the player can set them for themselves, a playful attitude is essentially a necessity, as without the incentive to explore and experiment, there is a risk of loss of interest, if not straight boredom. Salen and Zimmerman (2004, p. 304) break this down in a productive way into three levels of playful activity (see

Eludamos Vol. 12, No. 1 (2021)
pp. 39–61

Figure 1). First, they argue that "gameplay" is the narrowest kind of activity where the players adhere to the clearly set rules of a game. Second, "ludic activities" they define as those that may not necessarily take place within the confines of a clearly defined game, such as animals playing with toys. Third, "being playful" is the broadest category that encompasses not only the activity of play, but also the attitude, or "spirit" of play (Salen and Zimmerman 2004, p. 303).

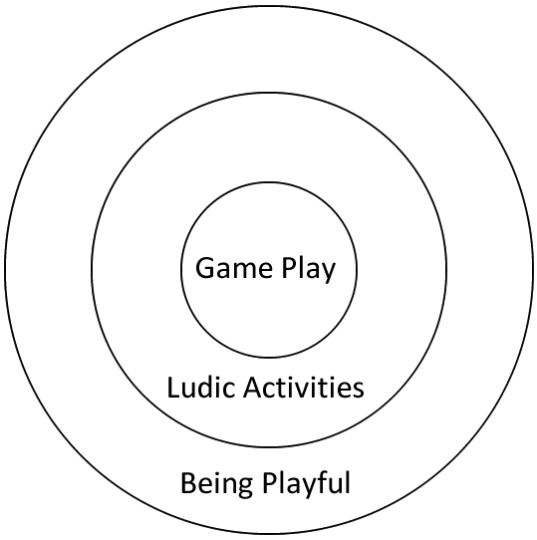

Figure 1: Three categories of play by Salen and Zimmerman (2004, p. 304).

Miguel Sicart complicates this observation further when, pointing to the ubiquity of "emotional design" (2014, p. 21) in marketing and design of technology, he argues that playfulness is not restricted to the context of games, or even play, but is a more generalizable attitude that many designers actively rely on to generate our interest in, and foster our engagement with, technologies, services, and other designed artifacts. The distinction that Salen and Zimmerman as well as Sicart make between play as an activity and playfulness as a state of mind (which is observed by many others; see, e.g., Bateson and Martin 2013; Malaby 2007; Schechner 2013; Stenros 2015) is an important one to make. It is easy to take it for granted that playing with video games automatically means that we have a playful attitude towards the experience, which is not necessarily the case—or at least not exclusively. Video games can enable, and often encourage, a variety of different emotions: the footsteps of lurking threat Mr X in horror game *Resident Evil 2* (Capcom 2019) can induce sheer panic, whereas repeatedly trying and (inevitably) failing to defeat notoriously difficult bosses Ornstein and Smough in *Dark Souls* (FromSoftware 2011), a fantasy role-playing game known for its high skill ceiling, will make anyone's blood boil.[4] It is important to note that these emotions do not necessarily make it impossible for a degree of playfulness to also be facilitated by games, it just might not be the dominant affect video games can trigger. Even something as seemingly contradictory as seriousness can not only coexist with playfulness but is a necessary component to it (Jørgensen 2014).

Playfulness is even more comprehensively theorized by Jaakko Stenros, who defines it as a

> metamotivational state, or an attitude […] It is innate to the player, and characterised as being voluntary, spontaneous, and wherein the activity itself is its primary goal. It is present in the moment and can be sparked in an instant, change drastically at any time, and can disappear without warning. Although it is possible to foster and harness playfulness, it cannot be fully tamed. […] Playfulness does not have a moral dimension; it is neither good nor bad in itself—it simply is. (2015, p. 77)

Not only does this framing of playfulness acknowledge the conceptual distinction between play as an activity and playfulness as a mindset, it also expands the definition so that it covers any activity governed by a playful attitude, regardless of duration, the confirmation of other players or spectators, or even universal values such as good or bad play. In this way, Stenros's understanding of playfulness encompasses both categories of "ludic activities" and "being playful" proposed by Salen and Zimmerman, and more. Keeping this complexity in mind, I want to draw attention to how Stenros highlights that playfulness can be *fostered*. He admits to not exploring this further when writing that he "all but ignored […] how different design constructs entice play" (Stenros 2015, p. 95). This article rises to this call to action of sorts by asking: can playfulness be designed? And if so, how? I argue that we can unpack this by drawing on existing discourse that examines how meaningful player action, or in other words, *agency*, can be fostered by video games.

Agency as Meaningful Player Action

The concept of empowered ability to take action is ubiquitous in media studies, not only with regard to media reception (e.g., "interpretive inference" in Bordwell 1989, p. 136; "participatory culture" in Jenkins 2012, p. 46) but also with regard to medial representation (e.g., Meyers 2008 on women; Downing and Husband 2005 on race; Mukherjee 2017 on postcolonialism). In game studies, we can find three main trends in how agency is talked about. First, many frame agency in terms of diversity, representation, and community participation in and around video games (e.g., Banks 2013; Gray and Leonard 2018; Joseph 2018; Ruberg and Shaw 2017; Shaw 2014; Sotamaa 2007). Second, we have narratologically-oriented approaches which understand agency as a player's ability to change the course of a video game's story (e.g., Domsch 2013; Hammond, Pain, and Smith 2007; Stang 2019; Tanenbaum and Tanenbaum 2009, 2010). Third, we have a linking of agency to game mechanics, platforms, and the material affordances[5] of video games (e.g., Boonen and Mieritz 2018; Brock and Fraser 2018; Cheng 2007; Habel and Kooyman 2013; Harrell and Zhu 2009; Jørgensen 2003; Keogh 2018a; King and Krzywinska 2006; Mäyrä 2019; Nguyen 2020).[6] This article sits closest to this last approach. I propose to think about agency as the possibility space for meaningful choice expressed via player action, afforded and constrained by a game's design (see also Bódi and Thon 2020; Bódi forthcoming). In the context of avatar-based games, which this article focuses on, we can further add that this player action typically translates to the game via avatar action, and so looking at how game design affords and contains specifically what the avatar can and cannot do is a productive way to analyze agency. Framing agency

thus would then mean that playfulness can also be thought of as a possibility space for action, as afforded and constrained by design. I do not mean for this to be an exclusive definition of agency, as I believe that would not be productive, given the complex conceptual history of the term. The following theory section is influenced more by the philosophical tradition of "explication" (Carnap 1950, p. 3), which fundamentally is inexact and therefore cannot be proven right or wrong, best described as a combination of drawing existing concepts and theories while also attaching new meaning to them (Belnap 1993, p. 116).

Accordingly, I draw on two existing, and indeed well-known, discussions on meaningfulness and agency by Janet Murray, and by Katie Salen and Eric Zimmerman. Murray defines agency as "the satisfying power to take meaningful action and see the results of our decisions and choices" (1997, p. 126). In a more recent work, Murray unpacks this further by emphasizing that it is the design of a game that "arouses" players into taking action, which in turn triggers "an appropriate response" from the game systems, resulting in agency as a "pleasurable experience" (2011, p. 12) to manifest. In other words, agency is when game design invites the player to take action, provided that the action is acknowledged by the game systems as such. Although Murray attaches agency to the emotion of pleasure, which is somewhat restrictive, as we saw above that video games can trigger a variety of different affects, Murray's definition is useful nonetheless in that it highlights the importance of a relational dynamic between the formal, or structural, affordances of game systems and the actions of players. This is echoed by Salen and Zimmerman (2004), who do not mention agency explicitly, but whose definition of meaningful play is the other discussion my conceptualization of agency is indebted to. They argue that "meaningful play" (Salen and Zimmerman 2004, p. 37) is fundamentally relational, that is, the meaningfulness of play emerges from the interaction between the player's actions and the outcome this generates from the game systems. Furthermore, they condition meaningfulness of play by two factors: discernibility and integration. In other words, meaningful play, they argue, can only occur if the player is able to discern the outcome of their actions immediately, and if these consequences are consolidated within the game's systems.

There are two key take-aways from this. First, that meaningfulness of play emerges from the interaction between player and system, and therefore is not an inherent quality of either alone. It does not exist in and of itself, but emerges in the feedback loop between the two, one triggering the other. Second, for meaningfulness to successfully emerge, the impact of player action on the game system needs to be palpable and relevant within the game itself. Not only must there be a feedback loop, the points of interaction within the loop must be at least perceptible, if not obvious, to the player, and relevant within the context of the action. Let's apply this to an example. In a shooter game, the avatar may have a gun, and so the player may be able to make the avatar shoot at an in-game object, such as a wooden crate. However, if the crate does not explode with a loud bang and cracks, if there are no splinters flying everywhere injuring the avatar, or if no non-player character comments on this mayhem, did they really shoot that crate? Was the action meaningful? This is what Salen and Zimmerman mean by "discernible" (2004, p. 34) and "integrated" (2004, p. 35) relationship between action and outcome, and this is how I argue we can understand meaningfulness in the context of agency. If meaningfulness of action as a central quality of agency emerges from the interaction

between the player and the game systems, then the next step is to look at how we can further break down these two participants. In the context of avatar-based games, one of the main functions of the avatar is to be a vessel that carries out the player's choice in the game. Daniel Vella provides us with a useful concept here, that of the "playable figure" (2015, p. 10) which he argues has two functions: a representational significance, and a translator of player action to in-game action. In the latter's case, Vella describes the avatar as the "singular point of origin" (2015, p. 225) that serves as a channel for all player action to be carried out in the game. In this sense, the avatar can be seen as a vehicle of agency, and so looking at how the avatar manifests player choice is a productive method to ask questions about player agency, which then in turn can illuminate the possibility space for playfulness to be triggered as well. Second, what Salen and Zimmerman call "game system" (2004, p. 33) can be more broadly considered as the formal or structural components of games. There is plenty of research on how these components can facilitate player agency. Notably, Mateas and Stern think of agency as an affordance of the "formal and material constrains" (2005, p. 654) of video games, and Wardrip-Fruin and colleagues also argue that agency is supported by a "underlying computational model" (2009, p. 7).[7] It is important to acknowledge the complexity of video games as composite artifacts, but instead of the details of terminology, such as the relationship between rules and mechanics, what helps more with understanding how avatar action is afforded is the emphasis on the relational dynamic between the player and the game—in other words, the invocation, the act of affording or constraining in a broader, more holistic sense. As Gregersen and Grodal observe, "[t]he extent to which an embodied sense of agency, ownership, and personal efficacy is fostered by games is very much a question of overall design" (2008, p. 67). I will therefore use the umbrella term *game design* to refer to that which affords avatar action within the software, as created by developers. In sum, looking at what the avatar can and cannot do, as afforded or constrained by game design, can therefore take us one step closer to understanding how playfulness can be designed.

Designing Playfulness: The Case Study of *Astroneer*

The premise of aerospace-themed *Astroneer* (System Era 2019) is that the player/avatar crash-lands on a desolate planet and needs to survive until reinforcements arrive. The game's audiovisual aesthetics are somewhat cartoonish and non-threatening, tapping into joyful and exciting space exploration fantasies. The core mechanic of the game revolves around the "Terrain Tool," which is an upgradeable object somewhere between a gun and a vacuum cleaner (see Figure 2). The "Terrain Tool" is used to hoover up and spew out terrain, allowing for the creation of near-infinite shapes from makeshift bridges to underground bases. Coupled with a modular base-building mechanic often found in similar games, *Astroneer* satisfies the criteria for an "editor game" (Abend and Beil 2016, p. 5), a kind of "virtual LEGO" (Schutz 2014, p. 237), where the main goal is less to win, more to play. Drawing on the promotional paratext of the game released during its production, I will highlight threads in the communicated design intention with regards to how a playful attitude was planned to be facilitated by shaping the possibility space for avatar action through design.[8]

Figure 2: The "Terrain Tool" in action.

System Era Game Designer Aaron Biddlecom outlined the main design objective as follows: "One of our primary goals with *Astroneer* is to provide an open-ended gameplay experience that incentivizes creative problem solving" (admin 2017, n.pag.). This design intention can be qualified with the help of the well-known distinction between two types of play proposed by anthropologist Roger Caillois in the 1960s, *ludus* and *paidia*. The former describes a more straight-forward and rule-regulated play, whereas the latter is free, unconstrained, creative play, which is also reflected in the gleeful way Caillois describes it: *paidia* is "an almost indivisible principle, common to diversion, turbulence, free improvisation, and carefree gaiety," an "uncontrolled fantasy," a "frolicsome and impulsive exuberance" (Caillois 1961, p. 13). Now, it is important to keep in mind that while paidic play is free play, it is still constrained by rules, as all play is "free movement within a more rigid structure" (Salen and Zimmerman 2004, p. 304). As Frasca (2003, p. 230) points out, when children play make-believe, an inherently free and comparatively unregulated form of play, they still adhere to some sort of rules, such as what constitutes a soldier or a doctor. Frasca calls such rules in video games, for example those governing the behavior of in-game objects, "paidia rules" (2007, p. 116). Keeping this caveat of sorts in mind, Biddlecom's "open-ended gameplay" incentivizing "creative problem solving" (admin 2017, n.pag.) would then fall into paidic territory, whereby there are ample possibilities for player agency to be realized via avatar action. This would, in turn, support a playful attitude towards the experience.

When reviewing Caillois' discussion of *ludus* and *paidia*, Frasca argues that *paidia* is typically the form of play children enjoy, using "construction kits, games of make-believe, kinetic play" (2003, p. 229). As noted before, *Astroneer*'s elevator pitch was that "*Astroneer* is to Play-Doh is what *Minecraft* is to LEGO" (DevGAMM 2017, n.pag.; Microsoft Developer 2018, n.pag.). The LEGO ethos of Systematic Creativity, which "is about using logic and reasoning along with playfulness and imagination, to generate ideas or artifacts that are new, surprising and valuable" (Ackermann et al. 2009, p. 4) rings true for Play-Doh. As anyone who has ever touched a LEGO brick

or a blob of Play-Doh can attest, such activities do not have a winner or a loser in the strict sense, no game goals to speak of, as opposed to *ludus*, which inevitably results in a win or lose state. As Aaron Biddlecom puts it elsewhere, System Era's design decisions align with a logic of *paidia*, whereby the aim is less to create a winning situation, more to facilitate creative problem-solving:

> We see ourselves as a puzzle-based survival game in the sense of, you're this stranded engineer kinda McGuiver-ing your way to success. The obstacles that we wanna introduce are obstacles that you can solve, rather than defeat. (System Era 2017a, n.pag.)

Here we have the first item on our Designing Playfulness To-Do List of sorts: designing problems that need solving, rather than defeating, thereby eliminating the need for a final win-situation. This attitude is echoed by fellow System Era Game Designer Samantha Kalman, who describes the design process as following a script commonly found in what she specifies as the "open-world survival crafting" (Giant Bomb 2018, n.pag.) genre:

> It's a script that has emerged with sort of more open-world survival crafting games […] There's a lot of like, open-ended gameplay, and you can make up your own goals, and so like we're trying to more, like give you toys to play with. Do you wanna play with this? No? Okay there's like 30 other things over here, maybe you like one of those. (Giant Bomb 2018, n.pag.)

Although *open-world* as a genre descriptor can be misleading (as it is often used interchangeably with another term, *sandbox*, despite referring to slightly different design models; see, e.g., Giddings 2014, p. 259; Nitsche 2008, p. 171), this approach to the design process reinforces the idea that the studio's design intention was less to create a game where the player's path is guided, more to provide tools for the player to do as they please. As such, the intention seemed more to be about creating a game still constrained by rules (primarily in a way all games are by definition), but was also about incentivizing experimentation and tailoring the play experience to player preference. This incentive aligns with a general principle of designing paidic games, according to game developer and theorist Chris Bateman (2005), who points out that every game element must encourage free experimentation in order for the game to afford paidic play. Aaron Biddlecom's words suggest a link between designing for gameplay characterized by playful experimentation, and giving the player as much agency as possible:

> We think the game is most interesting when the player has as much agency as possible over how they tackle a given challenge. And so as much as possible we don't wanna give you pre-baked solutions to things. We wanna give you the pieces and the tools so that you can build up your toolbox and use those tools dynamically as you encounter a problem, in a different way each time. (System Era 2017a, n.pag.)

The relationship between playful and paidic design is somewhat more complicated however. As shown by Sebastian Deterding (2016, p. 105; see also Deterding 2015; Deterding et al. 2011.), when designing for gameful and/or playful experiences, it is important to observe whether we are talking about the whole system exhibiting ludic or paidic qualities, or it is individual elements within that do so. Although Deterding

theorizes specifically about gamification and serious games, this distinction can be applied to video games created for entertainment purposes as well, as not all video games that have paidic qualities or elements have their whole systems exhibit the same quality—for example, in open-world action-adventure role-playing game *Assassin's Creed Valhalla* (Ubisoft Montreal 2020), the player/avatar can spend as long as they want tracking down in-game animals to pet them, thereby creating a self-contained minigame of sorts with arbitrary rules and no rigid win-state, but this does not mean that the whole game is a "frolicsome exuberance" (Caillois 1961, p. 13). In this light, agency conceptualized as the possibility space for player/avatar action afforded by game design becomes useful in unpacking how playfulness can be designed: by zooming in on how game elements afford said action, we can then identify those that have a paidic quality to them, and if so, examine how they support playfulness. In the case of *Astroneer,* there are two salient design decisions in the paratextual corpus that developers connected to enabling creative experimentation and playfulness: *procedural content generation* and a *diegetic interface*.

Procedural Content Generation and Diegetic Interface

Astroneer makes use of a method called *procedural content generation*, which can generate terrain, resources, or both. What does this mean? According to Ian Bogost (2007, p. 4), procedurality is to create code that indirectly creates representation, as opposed to direct authorship. In very simple terms, procedural content generation in the context of video games means that, as opposed to hand-crafting every single detail, the system randomly arranges things like level layout, or location of resources, according to rules predetermined by the designer. While Bogost is concerned with the rhetorics of representation, computer science provides more practical definitions of procedural content generation which are of greater relevance for an investigation concerned with how player action is afforded by a game's design (rather than with perhaps more intricate processes of meaning-making). From this disciplinary perspective, procedural content generation is generally understood to mean "the algorithmic creation of game content with limited or indirect user input" (Shaker et al. 2016, p. 1), where content is understood as everything contained in a game, bar non-player character behavior, and the engine itself: "levels, maps, game rules, textures, stories, items, quests, music, weapons, vehicles, characters, etc." (Shaker et al. 2016, p. 1). System Era's developers pursued a mixed approach in *Astroneer*. As Lead Designer Jacob Liecthy notes:

> With procedural generation, you really have to make sure that the 'randomization knobs' have the right range. If you give up too many parameters to the generator, you're going to get a lot of noise that isn't fun or interesting to the player. We've solved this issue by introducing artist-designed biomes. These biomes are picked semi-randomly and distributed on our planets, and the placements of all the plants, minerals, and features are fully random. But, at the end of the day, each environment is one that we know is going to be fun and play well each time we hit the 'generate' button. (Liecthy quoted in Rowe 2016, n.pag.)

Specifically, it was *Minecraft* developer Markus 'Notch' Persson (Notch 2011) who based terrain generation on what is known amongst 3D animators and programmers as Perlin noise. Noise-based generation is often used in this approach for terrain

creation in video games. The original technique was created as a solution for creating organic and realistic-looking textures in computer-generated imagery for Disney (Perlin 1985, p. 287), and today has many variants. In general, it is most useful "whenever small variations need to be added to a surface (or something that can be seen as a surface)" (Shaker et al. 2016, p. 58). System Era Creative Director Adam Bromell explains noise-based generation in *Astroneer*:

> [T]he simplest way to think about it is random frequency that we represent by waves, and those waves you can think of as mountain peaks and valleys, and we manipulate them to make terrain […] So it is literally different every time we do it, within a set of rules that we apply. (System Era 2018, n.pag.)

In *Astroneer*, developers worked towards combining procedural content generation with hand-crafted assets as a means to achieve balance between overly resource-expensive detail and procedurally generated chaos. System Era Engineer Zabir Hoque notes that

> [t]he goal with procedural content is to provide novelty, but we want some level of familiarity, so the player isn't just experiencing chaos. […] With our terrain system, we could just use Perlin noise everywhere in the terrain with random values and say 'Look! It's different every time!' but this is what leads to the feeling of bland repetition. Instead, we try to think of how the player will play the game and when they'll seek out novelty, and that is where we try to introduce variation. (quoted in Bradley 2018, n.pag.)

This approach to creating game spaces introduces a high degree of variability to what the player/avatar encounters at the start of every new game, which in turn gives more freedom to the player to explore, experiment, and with the "Terrain Tool," exercise their creativity. It also means that there is not a series of predetermined challenges the player/avatar needs to overcome in order to progress, as it could be difficult to implement fixed progression into ever-changing game spaces. Such design affords considerable possibility space for player agency to be expressed via avatar action. Given it supports creative experimentation by offering a highly varied gameplay experience not only between players, but between individual playthroughs, it can be seen as a paidic quality or element, as understood by Deterding (2016). Moreover, given that it is an element that is fundamental to the game's design, namely the generation of the very game spaces the player/avatar can traverse and the objects they can interact with, *procedural content generation* can also be seen as supporting playfulness in a broader sense.

Another feature that can be seen to support playfulness is what System Era developers call a *diegetic interface.* Originally coined by literary theorist Gerard Genette (1983), the term *diegetic* was popularized in game design vernacular by the developers of survival horror game *Dead Space* (EA Redwood Shores 2008),[9] and *Astroneer*'s developers also cited this game as their reference point for their approach to interface design (DevGAMM 2017; System Era 2016). It was not just one feature amongst many others, *Astroneer*'s developers placed considerable emphasis on its successful implementation. As System Era Co-Founder and CEO Brendan Wilson explains, it was crucial in facilitating the kind of creative gameplay experience they wanted players to have:

> The biggest standout feature in *Astroneer* is diegetic interaction. Diegetic refers to elements that are rendered in the world in a way that the characters would be able to see and interact with them. A HUD overlay with a health meter is non-diegetic, but, like, a readout on an oxygen tank rendered in the world, that would be diegetic [pause for video demonstration]. This direction emerged from the desire of clever improvisation to be part of the gameplay. We wanted *Apollo 13*, we wanted Mark Watney, tinkering and jury rigging, we wanted that process to feel alive and deeply interactive. […] It brings out that sort of tactile joy that you get from physical toys. (Microsoft Developer 2018, n.pag.)

Minimizing the overcast user interfaces on *Astroneer*'s gameworld[10] was thus a step towards wanting to facilitate playful, experimentational interaction in the game by removing obstacles which phase said interaction. Wilson furthermore adds the notion of "tactile joy" (Microsoft Developer 2018, n.pag.) as a desired impact, the like of which is elicited by playing with physical toys. This aspiration is also mentioned elsewhere by Game Designer Samantha Kalman when she talks about what "emotional aesthetics" (System Era 2017b, n.pag.) they were aiming for:

> The other designer Aaron and I did this analysis of what are all the sort of emotional aesthetics of the game. And we found that tactility is one of our key aesthetics. When I played the game with controller, the sort of metaphor that arrived in my mind was that, like, I used to play with action figures, where you like squeeze the legs and you punch or something like that, so to me it was like, the controller becomes some sort of action figure. I feel like when I'm playing *Astroneer*, I'm playing with action figures. (System Era 2017b, n.pag.)

It is this almost visceral feeling of playing with actual toys that the diegetic implementation of research logs, craft menus, backpack management, and other features normally relayed by superimposition, was designed to enable. The *diegetic interface* is thus another concrete game design element that can be seen as a facilitator of playfulness: in a sense it subverts the player's expectation for there to be some distance between them and the digital, virtual, immaterial gameworld reinforced by overcast user interfaces, thereby making the tactile, visceral sensation of open play with traditional toys all the more strongly evoked.

Conclusion

What is most important to acknowledge, and what this article also emphasized, is the fluidity of the concept of playfulness, and the value in steering away from rigid definitions. In this vein, the main contribution of this article to studying playfulness is that we can draw on the notion of agency as an analytical steppingstone towards unpacking how game design can support the manifestation of what Caillois calls paidic play. Having highlighted that playfulness can be "fostered and harnessed" (Stenros 2015, p. 77), and having conceptualized agency as the possibility space for meaningful player action afforded by design, this article went on to examine the case study of survival-crafting game *Astroneer* to look for design decisions that facilitate creative and free play. Through analysis of the game's paratexts, such as developer live streams, interviews, and trade conference talks, the article identified two features that developers see as facilitating playfulness: *procedural content generation* in level design, which can introduce a high degree of variability to the gameplay experience

and therefore encourage creative experimentation; and a *diegetic interface*, which can reduce the distance between player and game, and also evoke the feeling of playing with physical toys. As such, this article argued that playfulness can indeed be, to a certain degree, designed. In doing so, this article hopefully has shown that there is value in drawing on the concept of agency as afforded by game design as a means to explore how playfulness can be designed.

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Notes

[1] Coined by French narratologist Gerard Genette (1997), *paratext* refers to materials surrounding a literary text that contribute to the reading experience,

such as a book cover or the editor's notes. Adapted to video games, this includes things like journalistic coverage, analogue and digital marketing and advertising, or developer blogs. While this notion has appeared in game studies before (see, e.g., Aarseth 1997; Consalvo 2007; Jones 2008; Newman 2008), and neighboring media disciplines, such as film and TV studies, have long embraced the analytical value of such sources (see, e.g., Caldwell 2011; Grainge and Johnson 2015; Gray 2010; Hesford 2013), it has only been in recent years that *paratext* begun to creep in from the periphery in game studies (see, e.g., Booth 2015; Consalvo 2017; Dunne 2016; Fernández-Vara 2015; Švelch 2020; Vollans et al. 2017; Wright 2018, 2022), with some scholars still opting for alternative terms (see, e.g., "additions" in Chapman 2016, p. 269).

2 While at first *Astroneer* was produced by a skeleton crew who actively and directly engaged with their players throughout development, coming up to the release of the game's first official version in 2019 this function was taken over by community managers, which is a common audience management role in contemporary game production. The majority of streams, blog posts, and interviews cited here are from before this shift, directly from the game's designers. For more on the role and impact of community managers in the video game industry, see, e.g., deWinter et al. 2017; Zimmerman 2019.

3 The paratextual corpus used for this article consists of materials published within a specific time frame. The starting point is 2015, the formation of System Era (see admin 2015), and the endpoint is Summer 2019, a few months after the release of *Astroneer 1.0*, which can be considered the first iteration of the finalised base game. This is because, not uncommonly of indie games, the game was not developed behind closed doors, but with the constant involvement of the player base via Steam forums, developer diaries, convention booths, and the like. These provide rich insight to the development process and the highest priority design decisions made along the way. For more on independence in and around video games, see, e.g., Garda and Grabarczyk 2016; Juul 2014, 2019; Lipkin 2016; the chapters in Ruffino 2020; and the articles in Simon 2013 for comprehensive discussions on the subject. More specifically, see, e.g. Dyer-Witheford and de Peuter 2009, p. 3–93, or Johns 2005 on the politics of labour and capitalist mechanics of video game production; Harvey and Fisher 2015 on women in independent game production; Kennedy 2018 on women in game jams; Gallagher 2017 or Guevara-Villalobos 2015 on identity politics in and around independent games, and Thon 2019 on the audiovisual aesthetics of indie games.

4 For more on gameplay and emotions, see, e.g., Csikszentmihalyi 1975 on flow, Mäyrä and Ermi 2005, or Ryan 2015, p. 85–114, on typologies of immersion; Järvinen 2009 or Perron 2005 on classifying emotions elicited by game design; Perron 2018, p. 66–127, and Thon 2019 on fear specifically; Swink 2008 or Isbister 2016, p. 1–42, for designer perspectives on emotion and games; Grodal 2009, p. 158–181, on agency and emotions during gameplay; Gregersen and Grodal 2009, p. 66–69, or Keogh 2018a on agency and embodiment; or the essays on cognition, affect, and emotion and video games in Perron and Schröter 2016.

5 *Affordance* is a term introduced by psychologist J. J. Gibson in his seminal work *The Ecological Approach to Visual Perception* (2014) and refers to an object property which enables interaction: for instance, the grasp-ability of a handle, the tie-ability of rope. In other words, an object can afford some kinds of interaction by means of limiting others.

6 Jennings observes a similarly rich conceptual history of the term when arguing for "plural modalities of agencies" (2019, p. 88), though she identifies four slightly different strands on how agency has been discussed in game studies: in terms of narrative agencies, agency and embodiment, agency as illusion, and agency as authorship/creative control.

7 Agency and technology are explored in more detail in science and technology studies. See, e.g., Callon and Latour 1981 or Latour 2005 for an introduction to actor-network theory. For more on actors in and around gameplay, see, e.g., Taylor 2009 or De Paoli and Kerr 2010. More specifically, agency in the creation of video games is discussed in, e.g., Banks 2013; Deuze et al. 2007; Dyer-Witheford and de Peuter 2009, pp. 3–33; Hadas 2020, pp. 141–179; Keogh 2018b.

8 Although such texts are often generated with promotional intent in mind, and therefore need to be considered with a proverbial pinch of salt, the video game industry is notoriously secretive (see, e.g., Foxman and Nieborg 2016; O'Donnell 2014), and so turning to sources like game reviews or interviews at industry events is a productive way around the invisible wall. Journalistic coverage of video games often features suggestions for best play practice, and also speak to socio-historical context, state of the industry, technology, and trends, as well as containing recommendations for improving design, and hypotheses about design intention which exhibit various degrees of educated guessing, as found by Zagal and colleagues (2009, p. 221). As such, we can reconstruct, to a degree, design ethos and design intention by looking at how the studio in question communicates their professional and artistic identity, what the aesthetics are of the games they produce over time, and how these are reported on in trade press, social media, and other outlets. For more on distilling design intention from paratexts, see Bódi (forthcoming). For more on video games and marketing more broadly, see, e.g., Kline et al. 2003; Kerr 2006, pp. 43–101; Nieborg 2011, pp. 113–118; Zackariasson and Dymek 2017; Zackariasson and Wilson 2012.

9 Dino Ignacio, the Lead UI Designer of *Dead Space*, has unpacked the design thinking behind this decision and its implementation at a 2013 talk at the Game Developers Conference (GDC), noting that the main direction in the game's UI design was to create "the most immersive environment [they] could" (GDC 2017, n.pag.), which they felt was supported by the science-fiction setting, and which in turn aimed to amplify the game's ability to elicit fear in the player.

10 Although some use the term to describe a game's fictional world (e.g., Jenkins 2006; Juul 2005, pp. 131–162), I understand *gameworld* to refer to the totality of game spaces. For more on this, see Bartle 2004; Jørgensen 2013, pp. 56–58; Klastrup 2009; Klevjer 2006: 58; Thon 2016, 2017; and Wolf 2012.