Die-r Consequences: Player Experience and the Design of Failure through Respawning Mechanics

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***Abstract*—In games, failure that leads to death is a trope that players are all too familiar with. We were motivated by this to explore how altering the consequences of death on player progress affected aspects of the player experience. Specifically, our research investigated the relationship of death and respawning mechanics – precisely the location of respawn points – to player experience (PX) constructs, such as mastery, challenge, autonomy, curiosity, and immersion. We developed a simple 2D platformer game that only differed in respawn point locations: the start of the game (permadeath), the start of a level, the last reached checkpoint, and the last manually saved point. We report findings from a study with 72 participants that indicated modifying a respawn mechanic can lead to varying effects on PX and that different mechanics may be more effective for specific types of players (challenge- and goal-oriented). We then discuss the implications for targeted game design and opportunities for further research into death and respawning mechanics.**

***Index Terms*—Game design, Player experience, Failure, In-game death, Respawning; Player traits, Platformers**

I. Introduction

Death is commonly ingrained in the player experience as a way to represent failure [1]–[4]. While there is much work that examines the mechanics of player death in games through the lens of difficulty – dynamic difficulty adjustment [5], [6], challenge design [7]–[9], and challenge modeling [10] – there are other aspects of the player experience (PX) that have similarly crucial roles in how a game is perceived. More specifically, games are typically evaluated in a general sense, such as whether they are fun, hard, or have flow; however, it is often difficult to address the direct connection of those perceptions to specific game design mechanics. Therefore, it can be helpful to break the player experience down into narrower areas. Challenge is one example of a *functional* aspect of PX, whereas there are also *psychosocial* aspects such as meaning, mastery, immersion, autonomy, and curiosity [11]. As death is largely unavoidable when playing games, game designers and researchers should work to better understand how players are affected by it.

In this paper, we conducted a between-subjects study with 72 participants where we modified where players respawned after dying in a simple 2D side-scrolling platformer game, based on respawn point locations from the Death and Rebirth Taxonomy [12], [13]. In respective test conditions, the respawn points were located in: the very start of the game ("permadeath"-like), the start of a level, the last reached checkpoint, or the last point where the player manually saved the game state. We used the Player Experience Inventory (PXI) [11] to examine how altering the consequences of death on player progress affects challenge and psychosocial aspects of PX. We also examined whether players' affinity for challenge and goals in games (i.e., their traits) were related to their experience of those PX constructs.

Our results showed that there were significant differences among the respawn point location groups. Specifically, the use of checkpoints related to lower PX ratings for autonomy and curiosity as opposed to using savepoints and respawn to start of game (permadeath). Players' final death counts also negatively related to most of the measured PX constructs (mastery, autonomy, curiosity, and challenge), meaning that the more times they died, the less they experienced those dimensions of PX. However, immersion was positively related, meaning that the more times players died, the more immersed they felt. Lastly, higher scores for players' challenge orientation traits positively related to higher PX ratings for mastery and immersion, while their goal orientation scores positively related to autonomy. Our results indicate that even modifying just one respawning mechanic in the same platformer game leads to differences in player experiences.

II. Background

A. Player Death and Failure

Deadly mistakes are recoverable in video games but have much graver final consequences outside of that virtual reality. McAllister & Ruggill [14] argued that games use this human understanding of "mortality salience" or death awareness as their "deepest mechanic". Similarly, Juul [1] argued that failure in games leads to feelings of inadequacy that players feel they must overcome. However, failures in games are not of one nature to players as there are also "positive failures" [15]. For example, through the lens of queer game studies, the experience of failure could actually be seeked out instead of avoided, due to some dissatisfaction with abiding by the status quo [16]. Aytemiz [17] differentiated player failures into either *in-loop* (expected difficulties within game loop, such as failing to solve a puzzle) and *out-of-loop* (unexpected difficulties outside of game loop, such as accessibility issues). When players encounter in-loop failures repeatedly by dying, the motivation for gameplay is brought to life.

Despite death being the way of life in games, there is surprisingly a limited amount of academic work on the subject of its mechanics. There has been interest in death primarily from the game studies perspectives, such as regarding its representation and relationship to human experiences of mortality [1]–[4], [18], [19]. However, death and respawning mechanics themselves are lesser examined. One notable exception is the use of "permadeath" mechanics—the permanent in-game death of a playable character [20]—where there is interest in studying why players are drawn to these high-risk mechanics [20]–[23]. This genre of games have also gained commercial popularity in recent years as demonstrated in games such as *Hades*, *Dark Souls*, *Rust*, and *DayZ*.

More broadly, the Death and Rebirth Taxonomy [12], [13] was developed as a tool to identify elements related to the experience of dying and respawning in games. We used this taxonomy to focus our study on modifying the locations of respawn points after player death, as this was a way to vary the consequences of death.

B. Player Experience and Failure

While many player experience surveys exist such as PENS [24] and GEQ [25], Abeele et al. [11] argued that they tend to focus more on overall experiences, such as enjoyment, that are difficult to pin down to smaller game design elements. Secondly, they offer different perspectives on what constitutes a 'good' player experience" [11]. The Player Experience Inventory (PXI) was then developed to measure both functional and psychosocial aspects of player experience on one scale. The breadth of concepts that PXI measures at once enables game designers and researchers to more clearly understand how the selection of game design elements relate to certain player experiences. Therefore, the PXI was particularly useful in our case, as we were interested in how specific respawning elements affect relevant PXI constructs, such as mastery, challenge, autonomy, curiosity, and immersion. For clarity, these were the following definitions given for our selected constructs: (a) *mastery* is a "sense of competence and skillfulness derived from playing the game", (b) *challenge* is "the extent to which the challenges in the game match the player's skill level" (not the same as difficulty level), (c) *autonomy* is "a sense of autonomy and freedom to play the game as desired", (d) *curiosity* is "a sense of interest and curiosity the game arouses in the player", and (e) *immersion* is "a sense of absorption and immersion experienced by the player" [26]. These were relevant as they addressed players' self-perception of their skills and interest in the game as they face variations of setback punishments (i.e. respawning to different locations).

Mastery-oriented individuals are often related to having better resilience to experiences of failure, such as working harder to find solutions to problems, as opposed to those helpless-oriented who more easily discouraged [27], [28]. Craig Anderson has examined the relationship between mastery orientation and failure-related behaviors in video games [15], [29]–[31]. *Challenge* and difficulty levels affect the intensity of those in-game failures and the skill level required to manage them [32]. As attribution theory explains that people tend to relate events to specific causes [33], it's crucial to examine whether players experience *autonomy* to understand what factors they attribute their failures to (e.g. their skills, the game's design, etc.). Lastly, games are supposed to be engaging regardless of difficulty level. Therefore, measuring *curiosity* and *immersion* can inform whether players feel compelled to keep playing despite experiencing failure. These constructs are conceptually related to the PENS definition of presence [11], which is often measured as a crucial component of player enjoyment [24].

III. Methods

A. Study Goals

The goal of this study is to use the Death and Rebirth Taxonomy [12], [13] to explore how modifying respawn point locations after in-game death affects player experience. We tested four respawn point location conditions (independent variable): (1) respawn to start of game (permadeath), (2) respawn to start of level, (3) respawn to checkpoint, and (4) respawn to savepoint (Fig. 1 shows these respawn groups on a game progression timeline). This study examines the relationship of those conditions to the player experience of mastery, challenge, autonomy, curiosity, and immersion (dependent variables). We also explored whether player death count and challenge and goal player orientation trait scores significantly related to those PX constructs.

We assumed that altering respawn locations would be a simple but effective way of varying the degrees of punishment after in-game death. Juul described this type of consequence as a "setback punishment" [32], where the player needs to replay parts of a game. The variation of punishment for player failure affects the perception of a game's difficulty and flow. However, Juul also found that the desires of players are often contradictory, as they simultaneously want to win (i.e. game should be easy) and to be challenged (i.e. game should be hard). Achieving this tricky balance in game design is a challenge in itself; therefore, we explored the nuances of that dynamic by examining other parts of the player experience in addition to challenge.

We assumed that a small punishment for failure with respawning to regularly-set checkpoints—the most popular of respawning mechanics found in a previous study on platformer games [13]—would immerse players the most, leading to higher self-perception of skills (mastery) and motivation to keep exploring the game (curiosity). In contrast, we assumed that the most punishment for failure with the permadeath-like respawning to the start of the game would break immersion most, leading to lower self-perception of skills (mastery) and motivation to keep exploring (curiosity).

As for other setback punishment variations, we assumed that giving the player agency to save the game whenever they wanted would afford the most autonomy, and that having the player respawn to the start of levels was a better balance for difficulty (checkpoints would be too easy and permadeath would be too hard). When used in the context of games, the conceptual differences between immersion and flow are

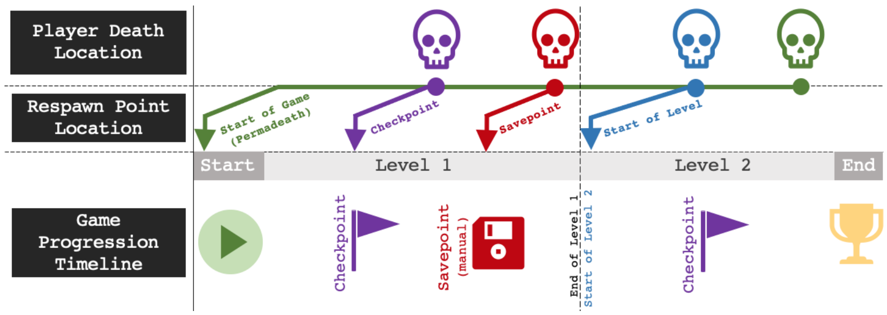

Fig. 1: A timeline depicting where players will respawn upon dying in the game, depending on the respawn point location type: checkpoint, savepoint (manual), start of level, and start of game (permadeath).

still being debated, but it has been found that common measurements observe the same phenomenon [34]; therefore, we believe that our study also contributes to the understanding of how failure design relates to flow.

We detail our hypotheses more specifically in the following. Our main hypothesis was that *there will be significant differences among the four different respawn point location conditions in regards to player experience constructs*. We further developed this notion into the following hypotheses to be more specific in our observation:

Compared to other respawn point location conditions, players in:

- **Respawn to checkpoint** will experience: highest mastery PX (*H1a*), immersion PX (*H1b*), and curiosity PX (*H1c*).
- **Respawn to start of game (permadeath)** will experience: lowest mastery PX (*H2a*), immersion PX (*H2b*), curiosity PX (*H2c*), autonomy PX (*H2d*), and challenge PX (*H2e*).
- **Respawn to savepoint** will experience: highest autonomy PX (*H3*).
- **Respawn to start of level** will experience: highest challenge PX (*H4*).

Regarding player death counts:

- Higher **death counts** will be significantly negatively related to all measured PX constructs, meaning lower: mastery PX (*H5a*), challenge PX (*H5b*), autonomy PX (*H5c*), curiosity (*H5d*), and immersion (*H5e*).

Regarding player orientation traits:

- **Challenge orientation trait** scores will be significantly positively related to mastery PX (*H6a*), immersion PX (*H6b*), and challenge PX (*H6c*).
- **Goal orientation trait** scores will be significantly positively related to mastery PX (*H7a*), immersion PX (*H7b*), autonomy PX (*H7c*), curiosity PX (*H7d*), and challenge PX (*H7e*).

B. "Jumpy" Platformer Game Design

To investigate our hypotheses, we conducted a between-subjects study. We created a simple platformer game *Jumpy* in four versions for each respawn point location condition: (1) respawn to start of game (permadeath), (2) respawn to start of level, (3) respawn to checkpoint, and (4) respawn to savepoint. All versions of the game employed the same mechanics and only differed where the player respawned after they died in the game.

We intentionally designed it so that other identified Death and Rebirth Taxonomy components (death conditions, player progress changes, aesthetics, and obstacles) were uniform to isolate the potential effects of specifically modifying respawn locations. The game had a total of five levels that increased in difficulty. Implementing conventions from the platformer genre, the player moves across the level from left to right until they collide with a treasure chest, which represented the end of a level.

As the only mechanics in *Jumpy* are to avoid environmental obstacles (move left, move right, jump, collect coins, and get hurt), we implemented a more forgiving death condition *out of health*, as opposed to *instant death*. The player started with five hearts and could earn up to three bonus hearts by collecting coins. Each coin was worth 10 points and every 50 points earned one bonus heart (max total health of eight hearts). Any player collision with an enemy or environmental obstacle resulted in the loss of a heart. The player died whenever they lost all their hearts (hence *out of health*) or fell into the water or spiky pits.

We also standardized player progress – both number of hearts and points – to save only up to the last reached respawn point location and end of a level (e.g. when beating a level, the current number of hearts and points are saved). I.e., all player progress from the last reached respawn point is lost upon death (e.g. in the respawn to start of game (permadeath) condition, all points and/or hearts earned are lost when you die before beating the entire game). The consequences for player death then ranged from low-risk (checkpoints and/or savepoints) to high-risk (start of game).

Furthermore, the levels were identical across conditions and designed with two types of *environmental obstacles* [12], [13] that hurt the player on collision: (1) *static* enemies and environmental objects, which stayed in place, and (2) *automated* enemies, which patrolled in consistent movement patterns. Additionally, to prevent the potential bias of aesthetic representations of death in this study, player death (failure) simply triggered a very short sequence of events where a glitch sound played, the player's character faded out, and abruptly cut to the player being dropped to the last reached respawn point location.

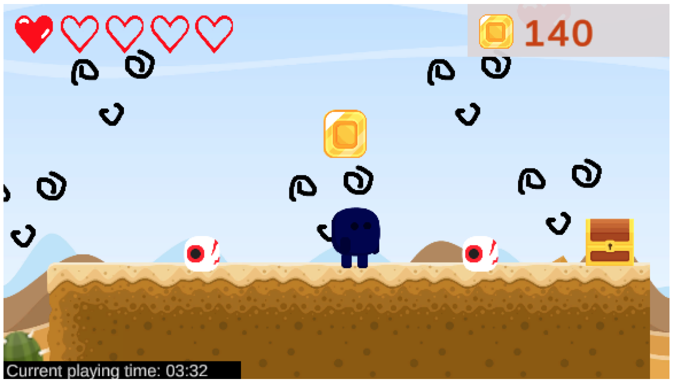

Fig. 2: A screencap of *Jumpy*. Player progress stats (hearts and points) were displayed on the game UI at all times.

C. Measurements

Participants completed surveys before (pre-test) and after (post-test) playing the game.

In the pre-test survey, data was collected for demographics and player orientation trait scores through the Trait Model of Game Playing Preferences [35]. Tondello et al.'s player orientation traits included aesthetic, narrative, goal, and challenge orientation; our study focused on challenge and goal orientation scores.

The game recorded final player progress statistics; our study focused on the total player death count.

In the post-test survey, we used the Player Experience Inventory (PXI) [11] to measure functional and psychosocial PX constructs. Our study focused on mastery, immersion, autonomy, curiosity, and challenge. Abeele et al. [11] established the construct validity of the PXI using both exploratory and confirmatory analysis. Items across both surveys were measured on a 7-point Likert scale, ranging from 1-Strongly disagree to 7-Strongly agree.

D. Participant Recruitment

Participants were recruited through university students and social media sites (e.g. Twitter, Reddit, Facebook, Discord, and Slack). A total of 72 participants (age ranged from 18-44 years old; broken down into 18-24 years old group (43.5% of participants), 25-34 years old group (52.7%), and 35-44 years old group (4.2%)), completed the study fully online. The breakdown of gender was the following: 37 participants identified as female, 32 as male, and three as non-binary. Daily gaming frequency habits data was also collected, with 22.22% of participants playing less than one hour daily, 34.72% playing 1-2 hours daily, 34.72% playing 3-4 hours daily, 4.2% playing 5-6 hours daily, and 4.2% playing 7+ hours daily. All participants participated voluntarily, with only eligible university student participants receiving class credit.

E. Procedure

When participants clicked the invitation link, they were randomly assigned to one of the four test conditions: (1) respawn to start of game (permadeath), (2) respawn to start of level, (3) respawn to checkpoint, and (4) respawn to savepoint. Participants first took the pre-test survey regarding demographics and player orientation traits. They were then given up to 15 minutes to play a version of *Jumpy*, the platformer game. They weren't given information as to the death and respawning mechanics in their version. They were simply given the game controls (moving and jumping) and scoring rules – every 10 points earns a heart and beating the entire game within a certain time period earned a bronze, silver, or gold medal. If they finished the game faster than 15 minutes or didn't finish on time, the game stopped and their final gameplay statistics were displayed. Simple stats were displayed such as their total completion time, total score, total number of deaths, and earned medal. Then, they were automatically moved to the post-test survey where they took the PXI [11].

IV. Results

A. Statistics

We were interested in exploring how modifying the location of respawn point types related to PX constructs such as mastery, challenge, autonomy, curiosity, and immersion. With an alpha = 0.05 and power = 0.80, conducting an a priori power analysis for an ANOVA with effect size = 0.4 using *G*Power* [36] resulted in the projected sample size of 68 participants with 17 participants in each test condition. Firstly, we conducted normality tests and found that we didn't have normal distribution. Data transformation techniques (square root and log10) also didn't normalize the data. Therefore, we decided to use the Kruskal-Wallis H test, or "one-way ANOVA on ranks", an alternative non-parametric method to analyze our data. Additionally, we were also interested in whether death count and players' orientation traits related to PX constructs. We used Spearman's Rank-Order Correlation to analyze those relationships. An alpha level of 0.05 was used for all statistical tests. See Table I for a table of statistical tests results.

B. Respawn Point Location Types and Player Experience (PX) Constructs

Significant differences of moderate effects were found in the medians among the respawn point location type groups for PX constructs of **autonomy** ($\chi^2(3, N = 72) = 9.757$, $p = 0.021$, $\eta^2 = 0.112$) with mean ranks scores of 36.89 for respawn to start of level, 42.86 for respawn to start of game, 23.86 for respawn to checkpoint, and 42.39 for respawn to savepoint, and **curiosity** ($\chi^2(3, N = 72) = 11.230$, $p = 0.011$, $\eta^2 = 0.134$) with mean ranks scores of 35.64 for respawn to start of level, 48.22 for respawn to start of game, 25.14 for respawn to checkpoint, and 37.00 for respawn to savepoint.

We then conducted post-hoc tests adjusted with Bonferroni correction to evaluate pairwise comparisons among the four

TABLE I: Player Experience Constructs in Relation to Death Counts, Respawn Types, and Player Trait Scores

	Mastery	Challenge	Autonomy	Curiosity	Immersion
Total Player Death Count	Spearman's Corr. p = **0.037** r_s = **-0.367**	Spearman's Corr. p = **0.027** r_s = **-0.261**	Spearman's Corr. p = **0.023** r_s = **-0.268**	Spearman's Corr. p = **0.032** r_s = **-0.253**	Spearman's Corr. p = **0.017** r_s = **0.554**
Respawn Point Location Types (Checkpoint, Savepoint, Level, Permadeath)	Kruskal-Wallis H p = 0.212	Kruskal-Wallis H p = 0.592	Kruskal-Wallis H p = **0.021** η^2 = **0.112**	Kruskal-Wallis H p = **0.011** η^2 = **0.134**	Kruskal-Wallis H p = 0.642
Challenge Orientation Trait Score	Spearman's Corr. p = **0.048** r_s = **0.234**	Spearman's Corr. p = 0.542 r_s = 0.073	Spearman's Corr. p = 0.120 r_s = 0.185	Spearman's Corr. p = 0.887 r_s = 0.017	Spearman's Corr. p = 0.788 r_s = -0.032
Goal Orientation Trait Score	Spearman's Corr. p = 0.683 r_s = -0.049	Spearman's Corr. p = 0.322 r_s = -0.118	Spearman's Corr. p = **0.038** r_s = **0.245**	Spearman's Corr. p = 0.069 r_s = 0.216	Spearman's Corr. p = 0.138 r_s = 0.177

groups. The results of these tests indicated the following significant differences:

- For *autonomy PX*, the respawn to start of game (permadeath) group slightly scored higher than the respawn to checkpoint group ($p =$ 0.037).
- For *autonomy PX*, the respawn to savepoint group also slightly scored higher than the respawn to checkpoint group ($p =$ 0.046).
- For *curiosity PX*, the respawn to start of game group significantly scored higher than the respawn to checkpoint group ($p =$ 0.005).

No significant differences were found among the respawn point location groups for mastery, immersion, and challenge.

C. Death Counts and PX Constructs

Significant correlations of varying effects were found between player death counts and all the measured PX constructs (mastery, immersion, autonomy, curiosity, and challenge). We detail the respective significant results:

- For **mastery** PX, death counts had a weak negative correlation across all respawn point location groups (r_s = -0.367, p = 0.037). However, the respawn to start of level group in particular had a strong negative correlation with death counts (r_s = -0.693, p = 0.001).
- For **challenge** PX, death counts also had a weak negative correlation across all respawn point location groups (r_s = -0.261, p = 0.027). However, the respawn to checkpoint in particular had a strong negative correlation with death counts (r_s = -0.610, p = 0.007).
- For **autonomy** PX, death counts had a weak negative correlation across all respawn point location groups (r_s = -0.268, p = 0.023).
- For **curiosity** PX, death counts had a weak negative correlation across all respawn point location groups (r_s = -0.253, p = 0.032).
- For **immersion** PX, death counts did not have significant correlations overall, but did show a moderate positive correlation for the respawn to start of game group (r_s = 0.554, p = 0.017).

Overall, it appears that examining results for respective respawn point location groups yielded stronger correlations, reinforcing their differences.

D. Player Orientation Traits and PX Constructs

Examining results for respective respawn point location groups similarly yielded stronger correlations made when analyzing player orientation traits and PX constructs. Significant correlations of varying effects were found between player orientation traits of challenge and goal and mastery, autonomy, and immersion. We detail the respective significant results:

- For **challenge orientation trait**, *mastery PX* had a weak positive correlation across all respawn point location groups (r_s = 0.234, p = 0.048). However, challenge orientation trait scores in the respawn to start of level group in particular had a strong positive correlation with mastery (r_s = 0.674, p = 0.002).
- Regarding *immersion PX*, the respawn to savepoint group in particular had a moderate positive correlation with challenge orientation trait score (r_s = 0.534, p = 0.022).
- For **goal orientation trait**, *autonomy PX* had a weak negative correlation across all respawn point location groups (r_s = 0.245, p = 0.038).

V. Discussion

We will discuss the observed effects of modifying the location of respawn points on each player experience (PX) construct respectively for clarity and their implications for game design for specific types of players.

A. Autonomy: Transparency & Goal-Oriented Players

Our assumptions for effects on autonomy were partially supported. We hypothesized that players would experience the most autonomy in the respawn to savepoint condition (*H3*) and the least in respawn to start of game (permadeath) condition (*H2d*). Recall that permadeath actually had highest autonomy (mean rank of 42.86) with savepoint following closely after (mean rank of 42.39). We found the high autonomy ratings in the savepoint group intuitive, as players had free will to save their current progress at any point in the game. This also accompanied our findings that players scored autonomy higher the less they died, and may have had some impact on the permadeath group's higher perceived autonomy since they experienced the least deaths (mean of 25.06).

However, we initially expected the permadeath group to experience the least autonomy, because dying in that condition led to the greatest loss (all player progress), so we found it interesting that respawn to checkpoint actually scored the worst (mean rank of 23.86). We theorize that respawn to checkpoints scored the least autonomy because players weren't involved in the decision as to where they respawned after dying in the game. Though placements of respawn point locations may seem intuitive to game designer(s), those decisions may appear arbitrary or a frustratingly "bad" decision from the player's perspective. When designing the game for our study, we selected checkpoints around stretches of the game that could be more difficult to complete (e.g. a checkpoint right before a long jump that required precise timing or a checkpoint right after beating a challenging area). Regardless, the player may not have wanted their progress to be automatically and unexpectedly saved at a checkpoint. Despite the consequences of death being the greatest in the permadeath condition, players knew exactly what to expect whenever they died.

Additionally, a player's goal orientation trait score – indicating how much they enjoyed completing game goals – showed a slight relationship to their autonomy score (*H7c*). This suggests that if one were to target goal-oriented players, the game should afford a high degree of autonomy. A potential method to accomplish this is to pay careful attention to relaying as much information about the consequences of death to the player. Though our game did not explicitly state what happens when a player dies, in the savepoint condition, the controls for saving the game were displayed as part of the start screen. In the permadeath condition, the consistent reset to zero points, initial five hearts for health, and relocation to the very start of the game was explicit and obvious. These factors could have contributed to the experience of highest autonomy in that condition. We suggest that more work could examine this phenomenon deeper, as something like a specific study that focused on the presence (and lack) of transparency around death and respawning mechanics could have an effect on player autonomy.

B. Mastery: Frequency of Failure and Achievements & Challenge-Oriented Players

Though this study did not yield significant differences among the respawn point location groups in mastery (*H1a*, *H2a*, *H7a*), we did find that mastery significantly related to death count (*H5a*) and challenge orientation trait scores (*H6a*) —particularly in the respawn to start of level condition. Specifically, as we expected, players scored mastery lower the more times they died. We argue this indicates game designers should try to minimize the occurrences of persistent unconquerable failure if they want to maximize their players' self-perception of mastery.

However, this experience could vary depending on players' orientation traits. Our findings showed that in the respawn to start of level group, players who were more challenge-oriented scored mastery higher. Challenge-oriented players prefer difficult challenges [35]. Therefore, this suggests that if one wanted to target challenge-oriented players, implementing middle-ground consequences for failure such as respawning to start of levels could better higher mastery. We hypothesize that designing a level that is too easy simply could backfire for challenge-oriented players, as they may perceive their in-game skills to be superficial due to the game's lack of difficulty. In our game, failing/dying in the respawn to start of level condition meant that the player didn't lose all of their player progress, yet still had to live with the periodically-saved consequences of their past actions, whether those were good or bad performances in previous levels. Beating a level seemed to be a fairer assessment of ability compared to the low-risk, high-reward situation in respawn to checkpoints and savepoints and extreme-risk, no-reward situation in permadeath.

1) Preventing Learned Helplessness in Educational Games:

Game design that affords mastery could help engage players that are less mastery-oriented (i.e. prone to learned helplessness). This knowledge can also be particularly helpful in the case of educational game design, where failure experiences have been found to promote learning [31]. Future work could study how setback punishment, such as in the form of respawn points and player progress changes, could impact the effectiveness of educational games in different subject areas.

C. Curiosity: Revealing Less Means More

We initially expected that players would rate curiosity highest in the respawn to checkpoint condition (*H1c*) and the least in start of game (permadeath) (*H2c*). However, our findings found the reverse to be true. We assumed that players would be overwhelmed with frustration in having to completely start over repeatedly every time they died, leading to less curiosity or motivation to finish the game. Analyzing our findings showed it is apparent that designing specifically for curiosity is based on how much is revealed to the player over time. Players were least curious when respawning at checkpoints, because it was more likely for them to save their progress in a level and therefore see more of it faster. This contrasts players who respawned to the start of game (permadeath) who likely saw less of the levels, having to play more slowly and carefully to avoid death, due to the higher-risk consequences of proceeding in the level without caution. Our findings did show that the more times a player died, the lower they scored their curiosity and permadeath had the least amount of deaths (mean rank of 21.19). Consequently, we suggest that game designers pay closer attention to what is revealed over time to their players to maximize a sense of curiosity in their game.

D. Challenge: Death Counts Affect Perception of Difficulty

To reiterate, a higher challenge score in the PXI [11] meant players perceived the game's difficulty to be appropriate (i.e. match their perceived skill level), not that they perceived the game to be the most difficult. We expected respawn point location groups to demonstrate differences in regards to challenge PX scores (*H2e*, *H4*, *H6c*, *H7e*) but did not find any. However, higher death counts did significantly relate to challenge PX scores (*H5b*), meaning that the more times a player died, the more they felt that that the game did not have an appropriate difficulty level (i.e. unbalanced difficulty). This observation was particularly strongest in the respawn to checkpoint condition, which makes sense as players in it had the highest death counts (mean rank of 50.78, compared to 21.19 in permadeath). Additionally, Arias & Larsson [37] previously found that players were more accepting of difficult gameplay when they felt that they had more influence in the game. The perceived high level of difficulty would then be justified by a greater sense of autonomy in the eyes of the player. As previously discussed, the checkpoints group also experienced the least autonomy, which may have affected their perception of the game's challenge level.

Another possible factor is that similar to autonomy, the presence (or lack of) explicit internal or external information about the game's difficulty affects the perception of it. A game like *Jumpy* did not state its intended challenge level (e.g. difficulty selection screen) nor had reviews of it online that players had as a point of reference. Our findings do indicate that if game designers were to create an intentionally difficult game, they may need to be intentional with their failure design choices as implementing checkpoints may make the game feel unbalanced. Overall, we do not necessarily want to state that respawn point locations have absolutely no effect on perceived challenge. Rather, we call for more research to be done on these nuances and how other aspects of PX and game design (i.e. beyond simply altering one mechanic, such as balancing player progress changes or differing representations of death/failure) influence the perception of difficulty in games.

E. Immersion: Raise the Stakes of Player Actions

Counter to our initial expectations, no significant differences were found among the respawn point location groups for immersion. We assumed that immersion would be most present for players that respawned to checkpoints because it would afford a more continuous experience for players (*H1b*), and least present for players that respawned to the start of game (permadeath) because it would afford a more disjointed experience (*H2b*).

However, it was within the respawn to start of game (permadeath) group where we observed that the more times a player died, the more immersed they actually felt. Instead of creating a disjointed player experience, it appears that players were more immersed playing the high stakes extreme-risk, no-reward game version. These findings were supported by the literature surrounding permadeath. Copcic et al. [20] summarized the shared sentiment of permadeath scholars that the finality of dying in games gives more excitement and meaning to in-game death and player actions. Interestingly, we also found that the more challenge-oriented a player was, the higher they scored immersion (H6b). Within this context, it is more obvious to see the connection to the rising popularity of permadeath mechanics in roguelikes, RPGs, and other game genres. Scholars have argued that dying can lead to greater player satisfaction/enjoyment [22], [38]–[40]. The sunk cost fallacy [41] could also be relevant here, as players want to see some reward worthy of the time they spent playing the game. With the permadeath condition, they lose the reward (e.g. satisfaction of beating the game) every time they die, so it could affect their engagement (immersion) to persist past failure. Therefore, our findings indicate that if game designers wanted their challenge-oriented players to experience a higher degree of immersion, they should raise the stakes in gameplay to afford more active zen focus compared to passive/casual attitudes.

Overall, our findings clearly indicate that modifying the location of respawn points can affect respective aspects of the player experience, as opposed to simply measuring whether a game is fun, hard, or has flow. We believe this calls for more research into how game design elements – especially relating to functional/systematic death mechanics – can be more intentionally used to create specific player experiences tailored to particular types of players.

F. Limitations and Future Work

When designing the study, we anticipated facing difficulties with participant recruitment during the coronavirus pandemic, as we depended on remote online participation that required at least 20 minutes of a volunteer's time. It is possible that our results could've trended towards more significant results with more participants. Additionally, quantitative data from surveys is useful but still only one type of tool to tell the story of player experience. A mixed-methods approach incorporating qualitative methods – such as obtaining live player reactions to failure and/or recorded in-game behaviors – would be useful to accompany survey data, and this is work that we hope continues in the future.

Regardless, our findings show the relevance of studying the relationship of death and respawning mechanics with functional and psychosocial aspects of player experience. We hope that our work can be used to motivate other games researchers and designers to experiment with designing player failure, as well as provide a starting point for further studies on the experience of failure (or lack thereof) in other game genres (e.g. RPGs, narrative-based games), modes (e.g. cooperative versus competitive multiplayer), and platforms (e.g. console, mobile, VR/AR).

VI. Conclusion

In this paper, we explored the effects of modifying the location of respawn points in a platformer game on the player experience (PX). Upon dying in the game, players were respawned to one of the following locations: start of the game (permadeath), start of the level, checkpoint, and savepoint. Altering those conditions were tested for their effects on PX constructs, such as mastery, challenge, autonomy, curiosity, and immersion. We also studied the relationship of player death counts and player orientation traits – challenge and goal – with those PX constructs.

We found that there were significant differences among the respawn point location groups. Players who respawned to checkpoints typically experienced less autonomy and curiosity compared to players that respawned to start of game (permadeath) and those who respawned to savepoint. Player death counts also had significant relationships with all measured PX constructs. Additionally, players' challenge orientation trait scores related to their experience of mastery and immersion, whereas their goal orientation trait scores related to their experience of autonomy. These findings suggest that modifying death and respawning mechanics has the ability to affect respective aspects of the player experience. Our findings indicate that more work can be done to further explore how to tailor experiences of failure towards specific types of players in various contexts such as entertainment and/or education (serious games).

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