

Exploring The Effects of Social and Auditory Distraction on Performance in Gaming.

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Abstract

Existing research recognises how individuals adapt when learning game mechanics specifically in problem-solving games. This study aimed to examine if the auditory or social distraction that a participant experienced would affect their performance navigating a problem-solving game as suggested in previous studies. Participants were assigned to one of six conditions: either a social setting or a solo setting, then subjected to either relevant, irrelevant, or no auditory distractions by the researcher. There was an N of 72 participants in total with an equal number of 12 in each group. The gender demographic consisted of 28 Males, 40 Females, and 4 Non-Binary. Results returned a nonsignificant result on the effect of the outlined distraction types on gaming performance. A significant difference was reported between gamers and non-gamers and between males and females. The study supported Flow Theory and Cognitive Load Theory and provided implications surrounding game development and the influence of a teacher's interaction with students in the classroom. The distraction script designed by the researcher failed to consider elements highlighted in the experiment which resulted in a limitation of this study. Another limitation noted is the small sample that accounts for only a large effect size.

Introduction and Literature Review

Gaming has grown in popularity over the years with the development in the field of technology. Advancements in game consoles and interfaces have expanded the scope of how people not only view video games but interact with them. Games can also work as a source of entertainment media that assist escapism and often a popular way to relax or have fun among the younger generation. Players can engage with games in a range of levels resulting in a varied gaming experience. This can be observed when comparing games played in a solo environment and games played in a multi-player setting. This difference in interaction with the game as a result of the social condition could pose both a positive and negative effect on an individual's overall performance. Like in a classroom where a teacher provides instructions to students as they complete a task, a person may experience the same level of distraction even when playing a game. With a variety of games on the market, the ability for an individual to learn about its mechanisms and structure must also be understood to then guide the presentation of the game itself.

Video Game Literacy

Game Literacy is defined by an individual's ability to understand and adhere to the mechanics of a game. Video games specifically pose their own set of rules that are presented in a digital space. Video game literacy focuses on a player's competency in these spaces (Eng, 2023). Shifflet (2022) details the elements in game design that aid in cultivating game literacy amongst players citing the tutorial, background context, and managing of cognitive load.

Cognitive Load Theory

Working memory is described as the active coding and manipulation of information done by the brain during cognitively engaging tasks such as "learning, reasoning, and comprehension" (American Psychological Association, 2018). Our working memory can hold "small amounts of material" (Craik&Jacoby, 2023, p. 30) of about five to nine items of information at a time (Cowan, 2010; Miller, 1956). Cognitive Load is described by the American Psychological Association (2018) as the amount of attention or focus needed to complete a

cognitive task. Ungvarsky (2026) further adds that cognitive load affects how well the brain deals with multitasking due to the limited capacity of one's working memory.

This provides the basis of Cognitive Load Theory (CLT). This theory considers the limited capacity of the working memory and details how the brain might filter through information (Sweller, 2011). This theory has since been applied to learning environments to increase how effective the teaching element might be as described by Shifflet (2022). CLT is partitioned into three types: intrinsic, extraneous, and germane. Intrinsic details the extent of difficulty presented by the stimuli to the individual, extraneous refers to the active comprehension of the task, and germane highlights the amount of cognitive attention required to complete the task (Clark, C.&Kimmons, R., 2023).

In relation to video game literacy, CLT is used to design and present games by following a set of heuristics that cultivate the player's understanding of the world in a video game. Berta et al. (2025) conducted a study to explore cognitive functions amongst casual gamers, non-gamers, and participants who may be at risk of developing a gaming disorder. The study referred to "implicit sequence learning" which is the subconscious curation of knowledge (Meier & Cock, 2012) and detailed how it might manifest in casual gamers. Results of the Berta et al. (2025) study suggested that being a casual gamer does not enhance implicit sequence learning.

Flow Theory

Flow is described as the "state of optimal experience" that usually develops as a result of engaging in an enjoyable activity that promotes focus and concentration (American Psychology Association, 2018; Csikszentmihalyi, 1990, as cited in Manfredi et al., 2024). In video games, flow is noted to put players into a state of deep focus that may cause them to subconsciously ignore stimuli outside of the flow inducing stimulus (Huang, 2023; Michailidis, 2018). Manfredi et al. (2024) looked at how familiarity with the digital space could influence how long was spent in a Virtual Reality (VR) space. Results of the study highlighted that

participants who were familiar with VR did spend more time in the space in comparison to those who were not familiar with the environment. This brings forward considerations surrounding prior game-experience and knowledge that will be relevant to include in this report.

Distraction and Learning

CLT impacts working memory which is the core of implicit sequence learning that occurs when a person meets unfamiliar systems presented in video games. Interruption of this process can hinder how effective the function is hence the importance of understanding how distraction affects learning. A study conducted by Debelu and Goshu (2025) aimed to explore the different learning distractions faced by students that affect their academic performance. Although this study considers video game performance, attention and memory are aspects of learning that are linked to both academic performance (Commodari et al., 2025) and, as previously stated, in gaming. Debelu and Goshu (2025) detailed in their study that the results showed students were distracted by noise from other classrooms, phone calls, and teachers being late to class. These can be categorised into social distraction and auditory distraction. Ren et al. (2025) conducted a study that questioned how different interventions changed the impact of distractions during the visual working memory process. Participants were exposed to four levels of distraction "no-distraction, encoding-distraction, full-distraction, and delay-distraction" (Ren et al., 2025, Procedure section). Results of the study noted that participants find it more difficult to filter out distractions if the cognitive tasks are more complex and difficult.

Social Distraction

Distraction is defined as when a person's attention is taken away from a task (American Psychology Association, 2018). This can occur and be a result of social settings. Welhaf et al. (2025) conducted a study that considered extraneous variables of distraction during cognitive testing specifically about environmental and social distraction. Participants ("older adults" -non age specific) took part in daily cognitive assessments for one week and were asked to detail their social and environmental situations during the assessments. Findings suggested mild

differences in focus between external distractor categories. In conjunction with my research topic, this study proposes the consideration of the impact of distraction when completing a task. It also offers an insight on varying degrees of distraction and environment. This speaks to not only uncontrollable distraction, but also self-imposed distraction like being near friends and family in a casual setting.

Frister (2024) detailed a study that looks at the levels of distraction that might impact or disrupt flow when gaming. It considered relevant and irrelevant aspects of one's gaming experience and how the irrelevant area of a game hinders the player's completion of it. The study held several research questions so therefore ran three experiments. A within study was employed amongst all studies to consider the varying levels of distraction. Findings of the research displayed significant effects of perceptual distraction on gaming performance.

Although there are studies that suggest that group-work and peer-learning is beneficial (Beattie&Ersoy, 2025), peers can be a source of distraction as detailed by Frisby et al. (2018). The report aimed to further test existing literature that suggests the social aspect of being in a classroom may affect the student's ability to focus and pay attention efficiently. The results noted that there were both positive and negative elements of social interaction that takes place in the classroom from both teachers and students alike; both reporting that distraction moved attention away from a specific task. This highlights not only the distraction experienced socially from peers, but also the distraction experienced through instructions from teachers.

Auditory Distraction

Auditory distraction is described as the interruption of a cognitive function due to an external sound (Banbury et al., 2001). Komar et al. (2025) conducted a study about the differing effects of speech that is masked by "pink noise" compared to "pure speech". Pink noise refers to specific sound that supports focus and thus lowering the capacity for distraction (Ellermeier&Hellbrück, 1998, as cited in Komar et al., 2025). The results presented that participants found the masked

speech less distracting in recall tasks. This proposes that individuals may find it easier to tune out noise when faced with a cognitive task. In gaming, both CLT and Flow Theory can potentially also influence this phenomenon.

Irrelevant Distraction

Nagaraj (2021) took the concept of auditory distraction a step further by exploring the effect of irrelevant sound during a listening comprehension task. With a sample of 53 adults between the ages of 18 and 37, a within groups method was used. Groups would experience a “noise and quiet condition” (Nagaraj, 2021, Stimuli and General Procedure section) whilst completing a cognitive task. Results presented enhanced information processing amongst participants which, as reported in Meier and Cock (2012), is a key part of implicit sequence learning. The study also reported a regular disruption in attention switching. This can pose questions surrounding the effectiveness of auditory input from an authority figure during the task which is a consideration of this present study.

Portier-Charneau and Sanchiz (2024) looked at Game-Based Learning (GBL) and if differing instructions between groups had a significant difference in the participants' approach to an academic game. The method consisted of 54 participants in the 14-16-year-old range. It's noted that all participants were French speakers so this study could behave differently amongst English speakers given the cultural differences apparent in language. When considering the environment students learn in and the available resources that a university might have, it's important to consider group/ individual environments when discussing distraction in addition to the initial presentation of the problem-solving task. The sample size is a limitation of the study. Another limitation would note the similarity between the games. For the sake of this study, it could be manifested in a different way to test if the lack of significance is truly the result or just a byproduct of an insignificance between groups.

Current Study

This current study aims to test varying levels of verbal distraction in a solo and group setting. Testing relevant, irrelevant, and no distraction within both groups,

the goal of this study is to use previous research as a stepping stone to explore this gap in the literature. An additional element that will be recorded is if participants are gamers or not. It serves as a function to control for a difference in performance times; if a participant is a gamer and part of a distraction group, they may have a shorter time of completion compared to a non-gamer in a non-distraction group simply because of the lessened learning curve surrounding game mechanics.

Research Questions

Do verbal distractions from an authoritative figure and social distractions from peers have an effect on students navigating a puzzle game?

Hypotheses

H1) There will be a difference in the gaming performance of the participants based on the verbal distraction type.

H2) There will be a difference in the gaming performance of the participants based on the social distraction type.

H3) There will be a difference in the gaming performance of the participants based on the gaming experience.

H4) There will be an interaction between the verbal distractions and the social distractions on the gaming performance of the participants.

H5) There will be an interaction between the verbal distractions and the gaming experience on the gaming performance of the participants.

H6) There will be an interaction between the social distractions and the gaming experience on the gaming performance of the participants.

H7) There will be an interaction between the social distractions, the verbal distractions, and the gaming experience on the gaming performance of the participants.

Methodology

Design

This study utilised a 2x3 between group quantitative experimental design. Participants were allocated into one of six groups with 12 participants in each condition. The first independent variable was Social Distraction and was separated into two levels: Group condition and solo condition. Participants were recruited either as a group of friends or individually. This determined which social distraction condition participants were divided into. The second grouping variable determined what type of auditory distraction participants were exposed to: relevant distraction, irrelevant distraction, and no distraction. Relevant distraction included helpful tips and reminders about the game's mechanics and how to approach completing levels. Irrelevant distraction consisted of comments about the sound design, the game's popularity, and its release dates. The time of completion for the set tasks was the dependent variable. Participants were assigned to each verbal distraction group on a rotating basis of: relevant, irrelevant, none.

Participants

All participants were screened before the study by asking if they have ever played the game Portal before. If not, the individual was allowed to take part in the study. A power analysis for a large effect size of 0.4 presented a minimum of 64 participants. There were 72 valid participants in this study. Three participants were excluded because of incorrectly passing through screening. These participants had stated that they had not played Portal to then announce that they had played the game to their peers during the study. Participants were recruited from a convenient sampling method through data collection fairs, social media posts, and classroom visits in an Irish higher education institution. An element of snowball sampling was also used as participants referred friends that also met the screening criteria to partake in the study. The participants' gender demographic showed 28 Males (38.8%), 40 Females (55.5%), and four Non-Binary (5.5%). The ages of participants ranged from 18-38 with a mean (M) = 21 and standard deviation (Stdv) = 2.87. Amongst the participants 42 (58%) were listed as non-gamers. All participants were treated in line with the ethical standards

detailed by the Psychological Society of Ireland as well as obtaining ethical approval by the Psychology Ethics Committee (PEC) of IADT.

Materials

All participants were given a printed Information Sheet (Appendix A) to provide relevant information for the study, followed by a Consent Form (Appendix B) and a Participant Demographic Form (Appendix C) to gather the unique identifier code and demographic information about the participant. OBS Studio version 32.1.0 was the screen recording software used to capture the gameplay footage. The videogame Portal: First Slice, is a demonstration version of the original Portal game that supplies the first 10 levels of the game for free to download from the online videogame catalogue: Steam. The game involves a series of escape-like rooms that require the use of portals to manoeuvre through the puzzles. An understanding of physics regarding gravity and velocity is required for later levels in the game. Participants were required to use the mechanisms learned in each level to help move through each subsequent room. The game of Portal was specifically selected due to its direct use of complex cognitive tasks that provide an appropriate stimulus detailed in the research question.

Figure 1

Gameplay of level 02 by the researcher



Figure 2

Gameplay of level 02 by the researcher



Note. Participants were tasked to complete levels in the game including this one.

A digital stopwatch timer was used by the researcher using a phone. The researcher used a digital Script (Appendix D). After completion of the set tasks on the game, participants were given the Debrief Form (Appendix E), which details the deceptive nature of the study as well as any resources that the participant might avail of.

Procedure

A pilot study was conducted with nine participants. Some key changes because of this pilot was to include earphones so that unsynchronised sound from the game does not disrupt group variables. Social group participants were also now specifically instructed not to communicate/ help each other to avoid support from group members as a confounding variable.

Participant(s) arrived at the psychology testing lab and were greeted by the researcher.

Figure 3

Solo Condition Room

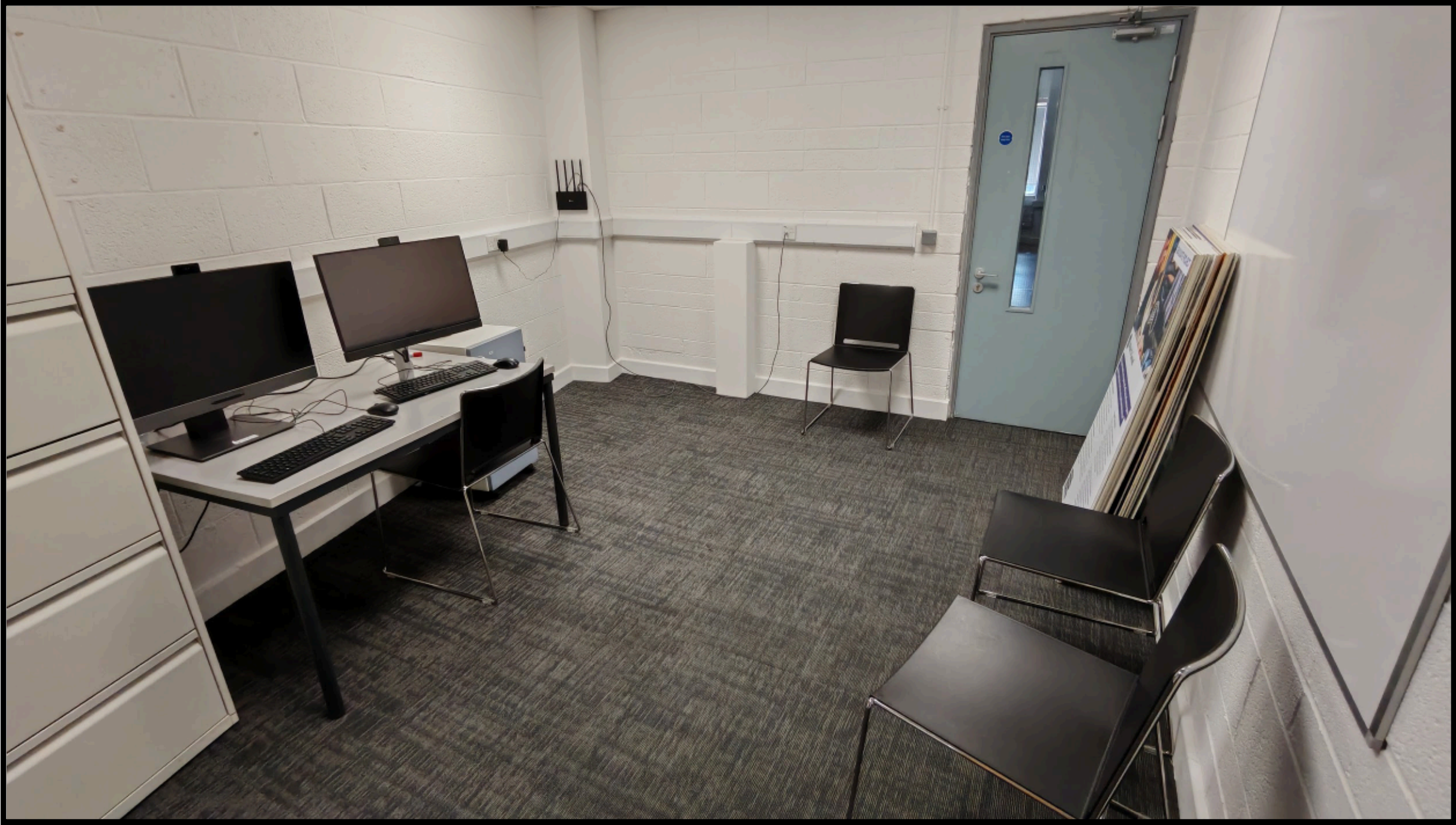


Figure 4
Solo Condition Room, additional angle



Figure 5

Group Condition Room



Participant(s) were seated at a computer where they read a physical information sheet and asked any questions that they had. They then completed the consent form and demographic questions sheet. Upon completion of these forms, the researcher began OBS Studio screen recording (if consent by the participant was given) and loaded up the PORTAL: FIRST SLICE game. The researcher then read from Part One of the script (Appendix D). If the participants were a part of the social group condition, they were sectioned in groups of three and specifically instructed not to help each other. They were permitted to look at each other's computer screens. They were also instructed to use one earphone so that if the sound from the game is out of synchronisation, it doesn't disrupt but also does not completely isolate them from each other.

The researcher began the timer, and the participant(s) started the game. During this time, the researcher began to read out prompts from Part Two (if a part of the Relevant Distraction Group) or Part Three (if a part of the Irrelevant Distraction Group) of the script. If they were a part of the no auditory distraction group, the researcher remained silent whilst the participant(s) completed the tasks. A protocol for the Researcher was listed in the event of likely

circumstances that the researcher referenced throughout the experiment (Appendix F). Participant(s) completed the levels to the best of their ability. Once the elevator-like doors closed upon completion of level 03, the researcher stopped the timer and recorded it as the participant's score.

The researcher thanked the participants, presented the debrief and read through it with them as well as answered any questions the participants had. They were given the opportunity at that time to opt their data out of the study in any capacity (be it their video recording or all data).

The researcher thanked participants once again and directed them out of the experiment space.

Ethics

Ethical Guidelines outlined by the Psychological Society of Ireland and the Psychology Ethics Committee in IADT were adhered to throughout the recruitment and participation of this study. Participants were all over the age of 18 and continuously reminded that they are not obligated to complete the study and can withdraw at any time. If a participant exhibited frustration or seemed to not make any progress, the researcher checked in and reminded them that they could withdraw if they wished to do so.

Results

The research question of if verbal distractions from an authoritative figure and social distractions from peers have an effect on students navigating a puzzle game was tested in this study. Analysis produced a nonsignificant result on the hypothesis. In reference to gender and gaming experience, results returned a significant result. The means and standard deviations for the performance are presented in Table 1 below.

Table 1

Means and Standard Deviations of participants performance by social and auditory distraction

Social Distraction	Auditory Distraction	Mean (in seconds)	Standard Deviation	N
Solo Condition	Relevant Distraction	544.33	227.82	12
	Irrelevant Distraction	589.00	234.29	12
	No Distraction	546.83	254.24	12
	Total	560.06	233.15	36
Group Condition	Relevant Distraction	567.75	256.36	12
	Irrelevant Distraction	542.83	262.51	12
	No Distraction	577.25	244.02	12
	Total	562.61	247.47	36
Total	Relevant	556.04	237.48	24

Distraction			
Irrelevant	565.92	244.47	24
Distraction			
No Distraction	562.04	244.35	24
Total	561.33	238.72	72

A two-way between groups ANOVA was performed to evaluate the effects of social distraction and auditory distraction on the participant's performance of the game. The results indicated no significant difference for social distraction, $F(1, 66) = 0.002$, $p = 0.965$, partial $\eta^2 = 0.000$; no significant difference for auditory distraction, $F(2, 66) = 0.010$, $p = 0.990$, partial $\eta^2 = 0.000$; and there was no significant interaction between social distraction and auditory distraction, $F(2, 66) = 0.176$, $p = 0.839$, partial $\eta^2 = 0.005$.

A Shapiro-Wilk test of normality was employed to test the assumption of normal distribution on the dependent variable. This assumption was violated $W(72) = 0.857$, $p = <0.001$.

Table 2

Test for normality table

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig. Value	Statistic	df	Sig. Value
Performance in seconds	0.164	72	<0.001	0.857	72	<0.001

Levene's test for equal Variance presented that the assumption of equal variance was violated.

Table 3

Levene's Test Of Equal Variance

		Levene Statistic	df1	df2	Sig. Value
Performance in Seconds	Based on mean	0.248	5	66	0.939
	Based on Median	0.094	5	66	0.993
	Based on Median and with an adjusted df	0.094	5	62.3 01	0.993
	Based on trimmed mean	0.240	5	66	0.943

An independent sample T-Test was used to explore if there was a difference in the performance of gamer's compared to non-gamer's. The results indicated a significant difference between the two. $t(70) = -6.11, P < 0.001$

A two-way between groups ANOVA was performed to evaluate the effects of gender and gaming experience on the participant's performance of the game. The results indicated a significant difference for gender. $F(2, 66) = 7.88, p < 0.001$, partial $\eta^2 = 0.193$; a significant difference for gaming experience, $F(1, 66)$

= 7.23, $p = 0.009$, partial $\eta^2 = 0.099$; and there was a significant interaction between gender and gaming experience, $F(2, 66) = 4.46$, $p = 0.015$, partial $\eta^2 = 0.119$. Using Tukey for multiple comparisons, it can be observed that the significant differences is apparent between the male non-gamers and female non-gamers

Table 4

Means and Standard Deviations of participants performance by gender and gaming experience

Gender	Experienced Gamer	Mean (in seconds)	Standard Deviation	N
Male	Yes	378.74	145.75	19
	No	435.11	210.21	9
	Total	396.86	167.25	28
Female	Yes	423.50	130.34	10
	No	756.33	169.25	30
	Total	673.12	215.70	40

Discussion

The results of this study suggest that there is no difference in the performance of the participants regardless of the type of distraction that they were subjected to. This means that neither social distraction nor auditory distraction had an effect on gaming performance. This contrasts existing research that points towards the effect of distraction as a variable on performance. One potential method to explain this inconsistency could be the activity that participants engaged with in the current psychological literature surrounding learning and distraction. Many of

these papers consider learning and distraction in regard to a comprehension literature task or recall task (Fitchel & Mumford, 2025; Ren et al., 2025; Sageengrana & Selvakumar, 2024), rather than a gaming or problem-solving task.

Referring to the content outlined by Ren et al. (2025) it was highlighted that there was a strong influence of distraction on an individual's recall accuracy. Although this study takes that concept of working memory and its relevance in relation to recalling instructions and learning game mechanics for specifically non-gamers, the interaction of the game itself could potentially be enough to mitigate any similar results due to the difference in stimuli that the participants interacted with. The study also noted that the more intense the cognitive load required for the task is, the more difficult it will be for the participant to filter out information. This study did not include an element for participants to report their experiences with the game and their perceived level of difficulty. Although it is difficult to gauge if a factor that supplemented the lack of effect in the distractions was a result of the low-difficulty of the game itself, it is worth noting this variable.

The result of this study also contrasts that which is detailed in Debelu and Goshu (2025). This could be as a result of the difference between academic performance and game performance despite the similarity in cognitive function required for both. This study did, however, focus on in-person distractions such as comments from the researcher or remarks from peers whereas Debelu and Goshu (2025) consider phone calls and noise from outside the classroom. The difference in results can be explained through the level of distraction that this fall under as detailed in Guo et al. (2022) which was also mentioned in Frister (2024).

Something interesting to note was that there was a significant difference in performance between the gamers and non-gamers as well as a notable difference between gender with males performing better than females. The results of the present study showed that gamers performed almost twice as well as non-gamers but surprisingly, the majority of high performing non-gamers were also male. This could be a result of self-perception in women and negative perception of femininity which can lead to a decreased enjoyment of games

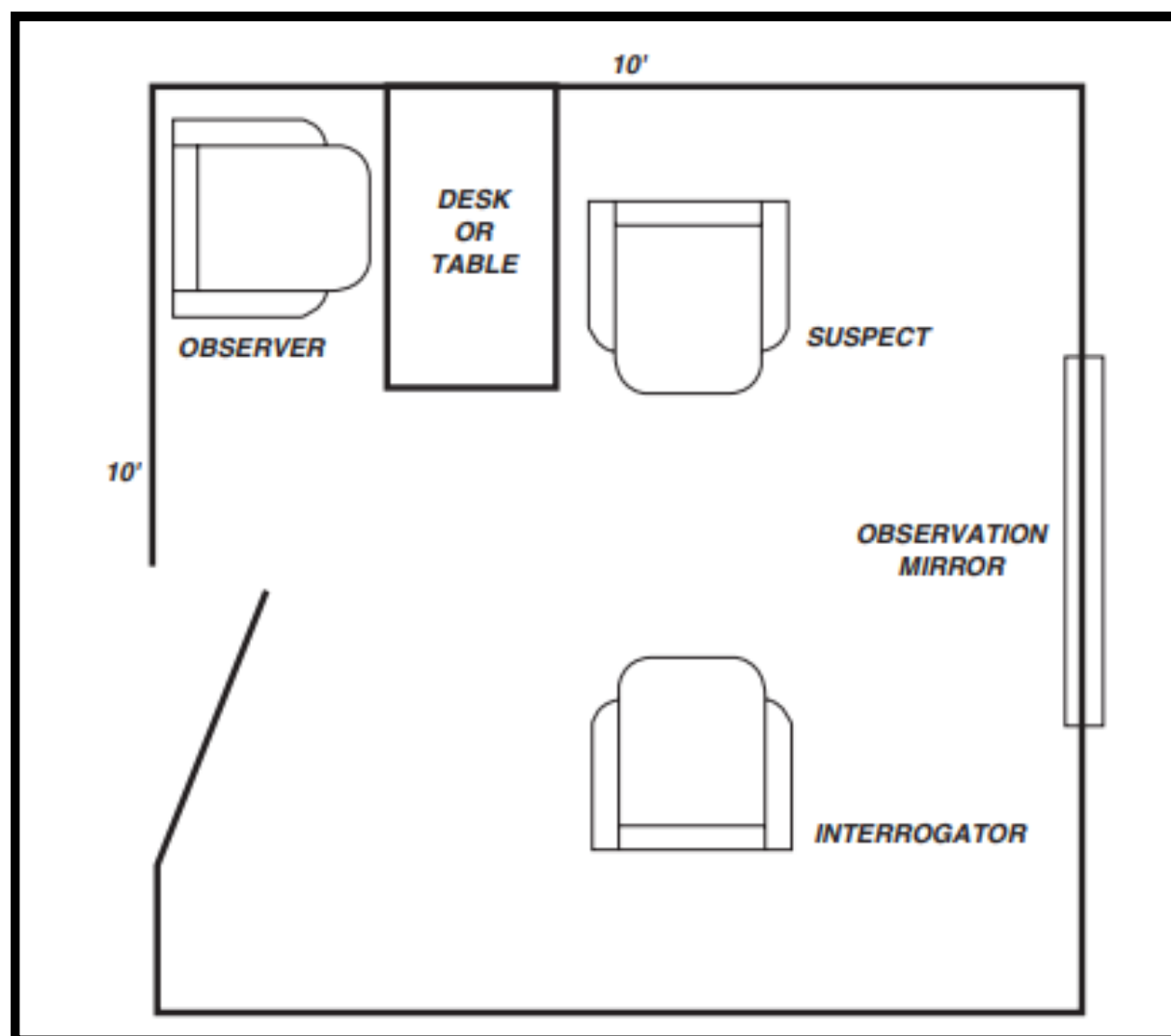
(Kneer et al., 2022). The difference could also be a result of the negative portrayal and treatment of women in video games (Santoniccolo et al., 2023) which can discourage women from playing games and thus decreasing the familiarity of video games in that demographic. With game literacy being an important part of learning and adapting to new games as discussed through Eng (2023) and Shifflet (2022), it may contextualise the prolonged completion time of the game in this study from females.

STRENGTHS

The design of this study was carefully considered in relation to the variables. When separating participants into the respective social groups, the room and environment that participants were situated in was specifically adapted for the study. In the group condition, participants were set up in a row of three computers with the partition removed between them so that they may observe each other's screens. The solo condition room had the blinds on the windows drawn to limit external distraction from outside of the testing space. The researcher always positioned the participants between themselves and the door, as well as the room and environment of both social distraction conditions. This is a technique taken from forensic psychology to allow for the participant to subconsciously note that there is nothing between them and withdraw from the study.

Figure 6

Image of recommended interrogation room layout



Note. Image by Inbau, Reid, Buckley, and Jayne (2001), as cited in Kassin and Gudjónsson (2004).

The experimental design of the study is also a strength as presented through its controls. Although this study produced a nonsignificant result based on the data, this study observes a different angle and combination of variables in the relevant space of game literacy and distraction.

WEAKNESS

Limited time resulted in recruitment numbers insufficient to identify a small or medium effect size. Material such as the script and verbal distractions were made by the researcher and failed to consider variables that became apparent throughout the study. The length of time between statements became dependent on how long a participant took to complete each task. This variance in frequency could cause a difference between how much the distraction affected each participant. This study also has implications when considering a classroom setting as depicted in the structure of the social condition. These findings could implicate that teachers can provide helpful instruction if they deem it necessary whilst students engage in a task without concern of impacting performance. It does however pose the question of how much of that information is being taken on board by the student if they are too focused on the task.

THEORETICAL IMPLICATIONS OF THIS STUDY

Cognitive Load Theory suggests that the brain will filter through information due to the limited capacity of the working memory. The theory highlights that the cognitive load will often be assigned to the implicit sequence learning aspect of a task and discard excess items of information. The results of this study support this theory as distraction did not affect the participants' performance. One could argue that CLT would result in the distraction that would take up the cognitive load required to learn the game mechanics but due the structure of this study might have avoided that. Due to the fact that distractions were introduced after participants had completed the first level, there is a chance that the brain had already assigned all available cognitive load on paying attention to the in-game instructions thus filtering out the distractions that came later from the researcher and peers.

In a similar vein, this study also supports Flow Theory which notes that an individual will enter a state of deep focus due to enjoyment from a cognitively stimulating task. From observation, the participants in the group condition specifically could have experienced flow as a result of not only enjoyment but also competition (Hu et al., 2023). The results of this study that depicted no effect on distraction on performance could be because of active flow theory amongst the participants. It's also worth noting that a nonsignificant result of distraction on performance does not particularly mean that participants weren't distracted but that it did not have an effect on the performance.

PRACTICAL IMPLICATIONS OF THIS STUDY

The results of this study suggest that although from this sample, distraction does not influence performance on puzzle video games like Portal, it opens an opportunity to consider how people approach games that blend both problem solving and an understanding of game mechanics. When developing games or tools to test or train the brain in these types of cognitive tasks, it is important to consider the factors that directly influence the player's performance outside of distraction.

FUTURE RESEARCH

Future researchers are encouraged to consider looking at the social distraction variable through the lens of solo and co-operation (CO-OP.) modes of games. It would also be interesting to observe this in a non-video game space and explore if similar results emerge from problem-based board games or puzzles. Further exploring the gender difference in video game performance would also be another suggestion but specifically why this might occur and how it can be controlled for. Future researchers could also look into the use of different games that require different cognitive tasks such as memory, or comprehension tasks like solving riddles; it could be noteworthy to explore how much of an impact being familiar with game mechanics have on an individual's performance compared to their baseline IQ as a covariate. An observational element could be added in addition to note where exactly individuals tend to be distracted and to what extent i.e. pausing for a moment, turning around entirely to engage with the researcher, actively engaging with the researcher etc. Adding a qualitative assessment concerning the perceived difficulty of the game could also provide relevant data in future research.

CONCLUSION

In conclusion, this study sought out to explore the capacity in which third level education students can work through a problem-solving videogame whilst being subjected to various types of both auditory and social distraction. Results returned nonsignificant which offer noteworthy contrast to the literature and support of existing theories. Other areas of interest have also been highlighted in the data such as gender and prior game experience. This study suggests that distraction may not have the effect that is proposed in past research. It does have some implications regarding game development and sets a solid foundation for future research in this area.

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Appendix

Appendix A – Information Sheet

Information Sheet

Title of project: Videogames and Learning

You are being invited to take part in the research ‘Videogames and Learning’. This project is being undertaken by Jay Katherine Amusan for their major research project as part of the BSc (Hons) in Applied Psychology, IADT.

Before you decide whether you wish to take part, it is important for you to understand why this research is being done and what it will involve. Please take time to read this information carefully and discuss it with someone you trust. If there is anything that is unclear or if you would like more information please ask, our contact details are at the end of this information sheet. Thank you for reading this.

What is the purpose of the project?

The purpose of this study is to highlight the use of games in learning in group and individual settings. This specific study will address problem solving through the video game PORTAL. Since players often play games in either a solo or group setting, the degree of attention and level of success provided to a game may vary between these two environments. This study aims to consider this difference in these conditions.

Who is/Why are you being invited to take part?

As the focus demographic of this study is 3rd level education students, you have been asked to partake in this study because you are currently enrolled in a third level education institution.

What is involved?

If you consent to partake in this study, you will be asked to complete the first four levels of the game PORTAL under a timed condition. You will either be completing these levels alone or alongside a group. This should take around ten minutes.

Do I have to take part?

You are free to decide whether you wish to take part or not. If you do decide to take part, you will be asked to sign a consent form that lets us know you have read this information sheet and understand what is involved in the research. You are free to withdraw from this study at any time and without giving reasons.

What are the disadvantages and risks (if any) of taking part?

Due to the fact that this study is timed, you might experience frustration or pressure to complete the levels. The timing however is only a measure and has no reflection on your skills. The duration of completion, be it long or short will NOT negatively impact my study and all data is welcomed and wanted.

If at any point it gets too frustrating, you are free to withdraw your participation immediately with no questions asked.

What are the possible benefits of taking part?

Although this study may not have positive implications in your life, the data you provide can help add to our understanding of games in a learning and cognitive space.

How will my information be used?

With your permission, we will collect screen recordings of your game session for further analysis on player behaviours between the groups. These recordings do NOT NEED to occur at all, though if they are, the data will not be traced back to you upon publishing and will be completely anonymised. This data will only be used to highlight any additional patterns of interest amongst the participants.

You can refuse screen recordings of your game session by leaving the relevant section of the consent for unticked. This will not affect the results of the study in any way

If at any point you wish for your video recording to be removed, you are free to do so at any point before February 19th. If you do wish to remove any piece of your data collected, you can email the researcher at n00220556@iadt.ie and grainne.kirwan@iadt.ie.

The other piece of data collected is the time taken to complete the first four levels of the game. The results of this analysis will be reported in the thesis for the BSc (Hons) in Applied Psychology in the Dun Laoghaire Institute of Art, Design & Technology. This can be requested through the library at IADT, or by emailing the researcher or supervisor at n00220556@iadt.ie and grainne.kirwan@iadt.ie . This study may also be published in an academic journal article and may be written about for blog posts or media articles and these can be requested from the researcher

How will my data be protected?

Under the EU General Data Protection Regulation (GDPR) the legal basis for collecting data for scholarly research is that of public interest. The regulations regarding the protection of your data will be followed. Only data which is needed for analysis will be collected. By giving your consent to take part in the study you are consenting to the use of your data as detailed in this information sheet.

The data will be retained by the researcher for at least one year, and may be retained for up to 7 years if the results of the study are published in certain capacities (e.g. in a journal article). There is also a possibility that the fully anonymised dataset may be submitted to a journal and made available to other researchers and academics worldwide for verification purposes, but if this occurs it will be ensured that you are not identifiable from the data.

As the supervisor on this project, I, Grainne Kirwan, am responsible for ensuring that all datasets will be stored in accordance with GDPR regulations and those which are not submitted to a journal will be fully deleted on or before 2033.

Those who will have access to the data will be the primary researcher undergoing their Major Research Project: Jay Katherine Amusan, their supervisor: Grainne Kirwan, their statistics lecturer for data analysis of the time: Christine Horn, and the Psychology Lab Technician for analysis of the video game footage.

All data will be stored on the IADT network protected onedrive system.

In an event of a data breach, the data protection officer in IADT will be informed immediately

Your data will be encoded with a unique identifier during the data collection phase. Its sole purpose is for the event in which you wish to remove your data, it can be identified and removed from the study.

Your data will be treated according to GDPR regulations. You can contact IADT's Data Protection Officer at dp@iadt.ie, and more information on your rights concerning your data at <https://iadt.ie/about/your-rights-entitlements/gdpr/>

Who has reviewed the study?

This study has been approved by the IADT Psychology Ethics Committee.

What if you have any questions or there is a problem?

If you have a concern about any aspect of this study, you may wish to speak to the researcher(s) who will do their best to answer your questions. You should contact Jay Katherine Amusan at n00220556@iadt.ie and their supervisor Grainne Kirwan at grainne.kirwan@iadt.ie.

Thank you

Date

CONSENT FORM

Title of Project: Gaming and Distraction

Name of Researcher/s: Jay Katherine Amusan

Please tick box

- 1 I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.

- 2 I understand that my participation is voluntary and that I am free to withdraw at any time.

- 3 I understand that data collected about me during this study will not be identifiable when the research is published.

- 4 I am over 18 years of age

- 5 I agree to take part in this study.

- 6 I agree for my gameplay to be screen-recorded

Name of participant Date Signature

Researcher Date Signature

PARTICIPANT CODE AND DEMOGRAPHIC INFORMATION FORM

1. Please provide us with an anonymised code which we can use to identify your data if you later wish to have it removed from our dataset. Please do so by answering the following two questions:

2nd and 3rd letter of a parent/guardian's name?

Favourite type of food

2. Gender: I identify as:

prefer not to say

3. I am (insert your age in years)

prefer not to say

4. Do you play video games using the following platforms: Xbox, PC, PlayStation, or Nintendo Switch for more than 7 hours a week?

Yes

No

Appendix D – Script

SCRIPT

PART ONE

Thanks for agreeing to participate in my study. In front of you is a game called PORTAL in which you will be asked to complete the first four levels from level 00 to level 03 as quickly as you can. As stated in the information sheet, you can withdraw from the study at any time, simply inform the researcher (myself) that you wish to stop. Only once the doors close to the elevator-like mechanism. AFTER completing level 03 the the timer will be stopped. No audio will be collected from the computer’s microphone so feel free to talk out loud, if you need to curse that’s okay, you can even peek at each other’s screens if you want. Please do not help each other. To reiterate, do complete these levels as FAST as you can.

When I say go, you will be asked to click on the button on your screen now and begin the game.

PART TWO

(one line will be stated during level 01, level 02, and level 03)

58 syllables

(relevant) Those are your buttons on the side to maneuver your character. It was a little unclear but it's the WASD controls like the up-down-left-right controls. You change the direction with your mouse then move around the space with those keys

*(if researcher is interrupted with an additional question they must say: just try your best!
This study isn't a reflection of your own abilities, you're doing great!)*

(if researcher is interrupted with a response of “I know this already” or anything along those lines, they must say: just making sure it's a fair test. Good to know you're already familiar with the controls.)

51 syllables

(relevant) Picking up the block can be tricky, so take your time selecting the right buttons. I understand you may feel a time pressure, but being deliberate in your placement with objects might save time in the long run.

57 syllables

(relevant) Observe the scene as you enter before taking action to get a sense of the puzzle before you do it. Oftentimes, if you run straight into it, it can get pretty confusing but ultimately go with what feels best for you.

PART THREE

(one line will be stated during level 01, level 02, and level 03)

56 syllables

(irrelevant) The voice has a bit of a weird vibe to it. I think if you compare it to the likes of siri, it's got a weird twang that you just can't place but maybe it's just because of the year it was made. Either way, you're doing really well.

54 syllables

(irrelevant) I realise that there's a lot of sound effects in this game. It certainly enhances the experience, but it almost feels cartoonish. It helps with the overall gameplay. Keep it up, though

56 syllables

(irrelevant) it's actually a quite well-designed game for its time, I think it was made in 2007? The general flow of the game is timeless and comes with lore that I know people like. But yeah, just keep going as you are

DEBRIEFING INFORMATION FORM

Title of Project: Videogames and Learning

Name of Researcher/s: Jay Katherine Amusan

Thank you very much for taking part in this research study.

The purpose of this study was to highlight learning in different environmental conditions (solo vs group) but also to examine learning in the presence or absence of different kinds of verbal distractions. This specific study looked at problem solving through the video game PORTAL. This study aimed to consider this difference in this distraction.

The study used deception in which for some participants there was verbal distraction from the researcher that you were not made aware of prior to the study. It was not informed that you might be in a distraction group where I aimed to distract you by speaking during your gameplay. The effect of this distraction on your time is a core variable in my study and was not communicated during the initial briefing. This use of deception was necessary to imitate real scenarios in a classroom where a teacher may provide extra information, both relevant and non relevant, while students attempt to complete a task they've been set.

You can now ask any questions and if you wish to have your data removed may do so now or at any point before the data analysis period.

Withdrawal information

If you have any questions about this study, or if you would like to withdraw your data from the study, please feel free to either do so now, or to later contact the researcher or supervisor at n00220556@iadt.ie or grainne.kirwan@iadt.ie . In your email let them know your unique ID code. If you submit a request for data removal, all data collected from you will be securely deleted. You will be able to remove your data from the study until the 19th of February when the data will be combined and analysed. Data removal will not be possible after that date. Please keep a copy of this information in case you wish to remove your data.

Data protection

Your data will be treated according to GDPR regulations. You can contact IADT's Data Protection Officer at dp@iadt.ie, and more information on your rights concerning your data at <https://iadt.ie/about/your-rights-entitlements/gdpr/>

Support resources

If you have been affected by the content of this study in any way, the organisations below may be of assistance.

IADT STUDENTS:

Counselling Service - Carriglea Building on Campus

Request an appointment : studentcounselling@iadt.ie

Niteline - free confidential support 9pm-2:30am

1800 793 793

NON IADT STUDENTS

Samaritans - emotional support call line

Email jo@samaritans.ie

Phone: 116 123

Text About It - Mental Health Text Support

Text: 50808

Thank you again for taking the time to participate in this research.

If you have any questions about this study, please contact the researcher Jay Katherine Amusan at n00220556@iadt.ie or supervisor Grainne Kirwan at grainne.kirwan@iadt.ie

Appendix F – Protocol for Researcher

PROTOCOL FOR DISTRACTION GROUPS

Participant(s) will arrive at the psychology testing lab.

Participant(s) will be greeted by researcher.

Participant(s) will be seated at a computer where they will read and complete a physical information sheet and consent form.

Upon completion of the consent form, the researcher will load up the PORTAL 1 game and read from PART ONE of the script.

Solo Distraction Group

Once completed, the researcher will begin the timer and the participant will start the game and play.

During this time, the researcher will begin prompts from PART TWO or PART THREE of the script, depending on the relevant or irrelevant group. If they are part of the No Verbal Distraction Group, the researcher will remain silent.

Participant will complete the levels to the best of their ability.

Once the elevator-like doors close upon completion of Level 03, the researcher will stop the timer and record it as the participant's score.

Group Distraction Group

Once completed, the researcher will begin the timer, and the participants will start the game and play.

During this time, the researcher will begin prompts from PART TWO or PART THREE of the script depending on the relevant or irrelevant group. If they are part of the No Verbal Distraction Group, the researcher will remain silent.

Participants will complete the levels to the best of their ability.

Once the elevator-like doors close upon completion of Level 03, the researcher will stop the timer and record it as the participant's score.

Researcher will then thank the participants and present the debrief form as well as answer any questions the participants may have. They will be given the opportunity in this time to opt their data out of the study in any capacity (be it their video recording or all data) immediately or in the future before February 14th.

Researcher will thank participants and direct them out of the experiment space.

IF PARTICIPANT ASKS FOR HELP: "I'd like for you to try as much as you can on your own."

IF PARTICIPANT GETS DISTRACTED AND ABANDONS THE TASK: do not interfere. If the timer maxes out, mark it as an "incompleted due to distraction". Then present debrief form

IF PARTICIPANT CANNOT COMPLETE TASK BEFORE CUT OFF TIME: "That's the extent of time that can be allocated to the completion of this task. You've done very well, thank you for participating." Mark as "incomplete due to difficulty" Then present debrief form.

IF ONE PARTICIPANT IN A GROUP COMPLETES TASK BEFORE OTHER PARTICIPANTS: "Well done for completing the task. While you wait, feel free to help your peers or just relax in the meantime"