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Loot Box Spending in Children and Adolescents – An Exploration of Risk and Protective Factors

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Dedications

I dedicate this body of work firstly to my wonderful parents Chris and Andrea, for all your love and unwavering support in what I do, and for shaping me into the person I am today.

To my sisters Jenna and Kelsie for always looking out for me and encouraging me.

To my late grandad, Walter Borthwick, to whom I promised to make it this far in 2011. I hope I've made you proud.

And finally, to my wonderful cat Leo, who sadly passed away during thesis writeup on 20th July 2023 at 12 years old. Thank you for being there for me day in, day out and putting up with my constant moves in pursuit of this career. You will be sorely missed.

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Lay Summary

Name of student:	Rob Joice	UUN	S2137963
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Loot boxes are chance-based items bought with real world money in video games. They first rose to popularity in 2009 and are prevalent in many modern video games such as FIFA 23. Players spend real world money for loot boxes, typically against very poor odds of obtaining an item they desire.

Concerns have been emerging at a policy level for a number of years, with early studies indicating that loot box spending predicts problem gambling and problem gaming. Many video games with gambling components attract an 18+ age rating, yet games containing loot boxes can be rated as appropriate for ages 3+. Such a discrepancy may be placing children and adolescents at risk of financial harm. This raises concerns around problematic gambling and gaming symptoms overlapping with mental health and neurodevelopmental problems typically assessed and treated in Child and Adolescent Mental Health Services in Scotland, inclusive of impulsivity as a component of executive functioning and emotional regulation.

This thesis initially sets out with a systematic review, aiming to understand the extent of what is known so far about the relationship between loot box spending and its potential risk factors, specifically in the child and adolescent population. Findings from this review indicated that problem gambling and problem gaming were significant predictors of loot box spending in this population, and that additional factors such as impulsivity, being bullied, and being male may be emerging. It highlighted the need for research to move in the direction of understanding through a Clinical Psychology lens, with no studies appearing to have been conducted in Scotland thus far.

Next, the empirical project aimed to further investigate the relationship between loot box spending and potential risk factors in Scottish children and adolescents. It was found that problem gaming predicted loot box spending across the participants from an online recruitment group, and the whole sample. Internalising problems also predicted loot box spending within a school recruitment group. Additionally, impulsivity predicted loot box spending but only in females across the whole sample. These findings, which appear to be the first of their kind in Scotland, suggest that research focused specifically on patients in CAMHS settings may be fruitful in helping understand the predisposition to and prevalence of loot box spending in potentially vulnerable children.

Thesis Abstract

Introduction

This thesis set out to address two objectives. Firstly, a systematic review was conducted to develop an understanding of the risk and protective factors for loot box spending specifically in children and adolescents. Secondly, the empirical project sought to test the significance of these findings in Scotland and to expand on them, specifically in the domains of problem gaming, impulsivity, and social and emotional wellbeing.

Methods

The systematic review identified eleven studies using a predefined selection criteria. The empirical study recruited 32 young people aged 12-14 from a school based in a rural area of Scotland, and 109 young people aged 16-18 via online recruitment. Both groups completed the same digital questionnaire, completing demographic-based questions as well as measures on loot box spending, problem gaming, impulsivity, and emotional/social wellbeing. Responses for both groups were combined and analysed using multiple linear regression to identify significant predictors of loot box spending.

Results

The systematic review indicated that problem gambling and problem gaming were significant predictors of loot box spending in this population, and that additional factors such as impulsivity, victimisation, and maladaptive coping strategies may be linked. There may also be a small cohort of females for whom problem gambling is a particularly potent predictor of

high loot box spend. It also highlighted a need for quantitative studies in Scotland, as well as an opportunity to understand the loot box spending phenomenon through a Clinical Psychology lens.

The empirical project found a significant link between problem gaming and loot box spending in this population. Additionally, impulsivity predicted loot box spending but only in females. Though internalising problems appeared to predict loot box spending in a small school-based recruitment group, problems with social and emotional wellbeing were not significant predictors of loot box spending in the wider sample, though this may be linked to the specificity and sensitivity of these measures according to this sample size.

Conclusion

These findings suggest that further research is required to understand the relationship between loot box spending, problem gaming, and impulsivity in young people. Symptoms of impulsivity and problem gaming call for clinicians to develop understanding of the prevalence of loot box spending, and the potency of these risk factors, in potentially vulnerable CAMHS patients. Understanding this phenomenon in patients with Attention Deficit Hyperactivity Disorder, Autism Spectrum Conditions, Intellectual Disabilities and Emotional Disorders would be of benefit to raise awareness of an apparently prevalent yet clinically undetected risk and in turn develop appropriate risk assessment and psychological intervention.

Correlates of Loot Box Spending in Children and Adolescents – A Systematic Review

Abstract

Background

Loot boxes, or chance-based in-game purchases, are a subject of national governmental concern but strikingly undetected in the domain of Clinical Psychology, particularly in relation to their impact on children and adolescents. The prevalence of loot box spending among young gamers is alarming, and there is growing evidence of potential psychological and behavioural risk factors associated with this phenomenon.

Method

This systematic review explores the risk and protective factors related to loot box spending in children and adolescents. A thorough search was conducted across various databases to identify relevant studies that met specific inclusion criteria. Quality of the reviewed studies was also evaluated.

Results:

11 studies were identified, with a notable increase in research in recent years. Findings indicated significant correlation between loot box spending and problem gambling, as well as problem gaming. Correlation with age, biological sex, bullying experiences, substance use (e.g., smoking, vaping, marijuana), emotional factors, and impulsivity were more tentative.

Conclusion

The impact of these risk factors on loot box spending warrants further investigation, as does the distinction between predictors of loot box spending and problem gambling. Understanding the influence of personality traits, impulsivity, gaming addiction, and parental factors on loot box spending may be of additional benefit. Clinical Psychology can play a crucial

role in addressing this issue by raising awareness, improving risk assessment, and implementing evidence-based interventions to mitigate the impact of loot box spending on the mental health and financial well-being of young people.

Keywords: Loot boxes, video gaming, problem gambling, problem gaming, children, adolescents, risk factors, Clinical Psychology

Key Practitioner Message

- The prevalence of loot box spending in children and young people remains undetected and poorly understood in mental health services.
- Though previous systematic reviews reveal an emergence of literature relating to adult populations, less is known about risk and protective factors of loot box spending in the adolescent population.
- Technology is moving faster than research, exacerbating the need to understand the current evidence base in this domain.
- This review found evidence of correlation between loot box spending and problem gaming / problem gambling, with emerging tentative evidence of a link with age, sex, impulsivity, and maladaptive coping strategies.
- Such findings highlight the need to develop understanding of young people's engagement with loot boxes in the context of mental health or neurodevelopmental disorders that may predispose them to higher engagement and spend, with potential risk of financial harm.

Introduction

Loot boxes have increasingly become a controversial topic in the world of video gaming and in turn of emerging concern in the domain of Clinical Psychology. They are defined as "any game related purchase with a chance-based outcome" (Close and Lloyd, 2021). Since their initial introduction in 2004 and subsequent rise to prominence from 2009 onwards, they have generated an estimated £21 billion for the gaming industry worldwide and were projected to generate £35 billion of revenue in 2022 (De Camp, 2021).

In the United States, it was discovered that 88% of 8–18-year-olds play video games, with 68% playing on a weekly basis and 23% daily (Petry et al., 2015). Similarly in the United Kingdom, 93% of children aged 10-16 play video games on a regular basis, with 97% males and 90% females engaging with this medium (Parent Zone, 2019). Zendle and Cairns (2018) and Brooks and Clark (2019) indicate that 49-78% of adult gamers have bought loot boxes, whereas it is estimated that 17-24.9% of young people have also purchased them (De Camp, 2021). Across the gaming population in the UK, approximately half of loot box revenue is generated by the top 5% of spenders, categorised as those who spend over £100 per month (Close et al., 2021). This pareto-type distribution appears to be consistent in the adult population (De Camp, 2021), and suggests that a specific and potentially vulnerable group of gamers are spending large sums of money compared to the average gamer population.

Social and Psychological Concerns linked to Loot Box Spending

Loot boxes offer gamers a chance of winning a highly desirable in-game item by spending real-world money, but typically against poor odds that are often not fully disclosed to the player (Close and Lloyd, 2021). Popular video games employing this monetisation mechanism include the FIFA football series (Video Standards Rating Council Board, 2023) through its Ultimate Team mode, and Pokémon Go (Google Play Store, 2023) via its "egg and incubator" system.

Video games that include "simulation of gambling" are now automatically rated by the Pan European Games Information (2023) rating board (PEGI) as appropriate only for ages 18 and above in the United Kingdom. However, games such as FIFA and Pokémon Go are rated as appropriate for ages 3+ and 7+ respectively and given a separate indicator of "In-game purchases (Includes Random Items)". Controversy around loot boxes is borne out of accusations that they emulate gambling due to the intermittent reinforcement mechanisms at the heart of their appeal to gamers, as well as the striking discrepancy in the linguistic nuance used to describe loot boxes within the gaming industry. This environment potentially leaves vulnerable and theoretically under-aged people exposed to predatory monetisation schemes (Close & Lloyd, 2021).

With this discrepancy in mind, some governments have moved to implement legislation to ban loot boxes in video games targeted towards young people, including Belgium in 2018 (Gerken, 2018) and China in 2019 (Xiao, 2020). The UK Government had similarly considered

this measure with a call for evidence (UK Government, 2020) to inform its review of the Gambling Act 2005. This call for evidence concluded that, although there was evidence of correlation between problematic gambling behaviour and purchasing of loot boxes in the adult and young adult population, causation was unclear. As such, the UK Government did not move to broaden the legal definition of gambling but aimed to develop a new Video Games Research Framework to further explore the relationship between gambling and loot boxes (UK Department for Media, Culture & Sport, 2023; UK Digital, Culture, Media, and Sport Committee, 2022).

Correlates of Risky Loot Box Spending in Adults

There is currently a limited number of systematic reviews exploring risk and protective factors in loot box spending in the general population. Reviews indicate that empirical studies have focused predominantly on adult or young adult populations (Gibson et al., 2022; Spicer et al., 2022; Yokomitsu et al., 2021). For instance, between a period of 2018-2021, Yokomitsu and colleagues (2021) identified 20 empirical studies, of which 11 included adult participants, 3 featured "mixed" participants of adults and adolescents, 2 had populations where age was unclear, and 4 featured adolescent participants. Research thus far points to various emerging risk factors for excessive loot box spending in the adult population.

Problem Gambling and Loot Box Spending in Adults

Though psychological research has similarly explored the potential impact of video game violence, screen time and internet safety, in-game spending has become of increased interest for researchers. The current systematic reviews indicate that there is robust evidence of significant positive correlation between problem gambling behaviour and "risky" loot box engagement, which is understood as high spend and high frequency of spend (Brooks & Clark, 2019; Close et al., 2021; Drummond et al., 2020; Wardle & Zendle, 2021). Zendle (2020) found a medium to large effect size between loot box spending and score on the Problem Gambling Severity Index (PGSI) (Ferris & Wynne, 2001). Wardle and Zendle (2021) also found that loot box spenders were 4.4 times more likely to experience problematic gambling, were more likely to be male, more likely to be younger, and also to score higher on impulsivity measures.

Internet Gaming Disorder/Problem Gaming and Loot Box Spending in Adults

The emerging diagnostic category of Internet Gaming Disorder (IGD) is provisionally categorised as a "non-substance addiction" in the Diagnostic and Statistical Manual of Mental Disorders version 5 (DSM-V) (American Psychiatric Association, 2013). It appears to be interchangeable with the term of "problem gaming" in recent research literature. The symptomology of IGD may have overlap with other psychiatric disorders such as depression, anxiety and attention deficit and hyperactivity disorder in adults. Whilst Brooks and Clark (2019) found no correlation between "risky" loot box spending and problem gaming, this was not corroborated by other studies which found that problem gaming predicted higher spend on loot boxes in adults (Spicer et al., 2022; Yokomitsu et al., 2021). Furthermore, there is a question of how underlying risk factors of IGD may in tandem escalate risky loot box spending,

particularly due to increased exposure to loot boxes through increased gaming time, and a possible predisposition to increased impulsivity and poor emotional regulation within its symptomology.

The Present Study

A systematic review approach was selected for this study. Firstly, it was deemed that research in this area was in an emerging field and this approach, likely the first review specific to the child and adolescent population, would highlight research priorities going forward. Secondly, it was felt that study populations and psychometric measures would be highly heterogeneous at this stage in the research literature, with high variability already evidenced in systematic reviews focusing on adult and young adult studies.

Due to the increasingly urgent need to ascertain clear correlates of in-game spending for children and young people with regards to protections for this potentially vulnerable group, this systematic review sets out to explore what risk and protective factors may predict or reduce harmful loot box spending in this specific population. The following questions informed the methodological approach to this review:

Research Questions

(1) What is the current prevalence of research exploring the risk and protective factors of loot box spending specifically in the child and adolescent population?
(2) What risk factors and/or protective factors correlate with loot box spending in the child and adolescent population?

Method

A systematic review was undertaken to identify relevant studies that explore correlates of loot box spending in children and young people. Articles were compiled using a specific search strategy up to 10th May 2023. This strategy was employed across several online databases – PsycINFO, PubMed, Embase (1974-), Medline (1946-),CINAHL, ASSIA and Public Health Database. The following search terms were used: “Loot box”, “Microtransaction", "In game purchase” and “In app purchase”.

Inclusion Criteria

Studies were included in the systematic review if they met the following inclusion criteria: (1) written in English language; (2) the study assessed the bivariate relationship between loot boxes and other potential variables; (3) the study was published in a peer reviewed journal, or available as “grey literature”; (4) study participants included children and adolescents between the ages of 5-18 years in line with general Child and Adolescent Mental Health Service age criteria for Scotland (Scottish Government, 2020); and (5) the study included participants up to the age of 18 as part of a child and adolescent cohort.

Exclusion Criteria

Studies were excluded from the initial search and subsequent screening and full-text review for the following: (1) studies that only considered microtransactions or in-game/app purchases where players are guaranteed a specified item (not chance-based); (2) studies where it was not possible to clearly separate children and young people's data from adult participants' data; and (3) studies that included 18-year-old participants but as part of an adult cohort.

Screening Protocol

Two raters (the author and a professional from Child and Adolescent Mental Health Psychological Services) independently assessed the suitability of articles for inclusion as part of the review based on the above criteria using Covidence online software. Each article was initially rated by review of its title and/or abstract where available, and categorised as "Yes", "No" or "Maybe" as to how it met the inclusion and exclusion criteria. Duplicate articles were mainly eliminated automatically by Covidence software but also manually removed where appropriate. Any articles rated as "Maybe", or where agreement was not initially established between raters, were re-examined and discussed between raters to reach consensus.

The full text of each included article was then read independently by both raters to further categorise studies as "Yes", "No" or "Maybe". Raters again discussed articles where there was a rating discrepancy in order to reach consensus.

The reference sections of each remaining article were searched to capture any eligible articles that may have been missed in the initial database search. The same process was followed as above for reaching consensus on their inclusion.

Data Collection

The following data were collected for each included study: (1) author; (2) country/nationality; (3) age range of sample; (4) research setting (e.g. community, school); (5) research design; (6) loot box index type (e.g. loot box spend, Risky Loot Box Index score); (7) variables associated with loot box spending; (8) psychometric measures used for these variables; (9) main results related to loot box spending and (10) sources of funding and/or conflicts of interest.

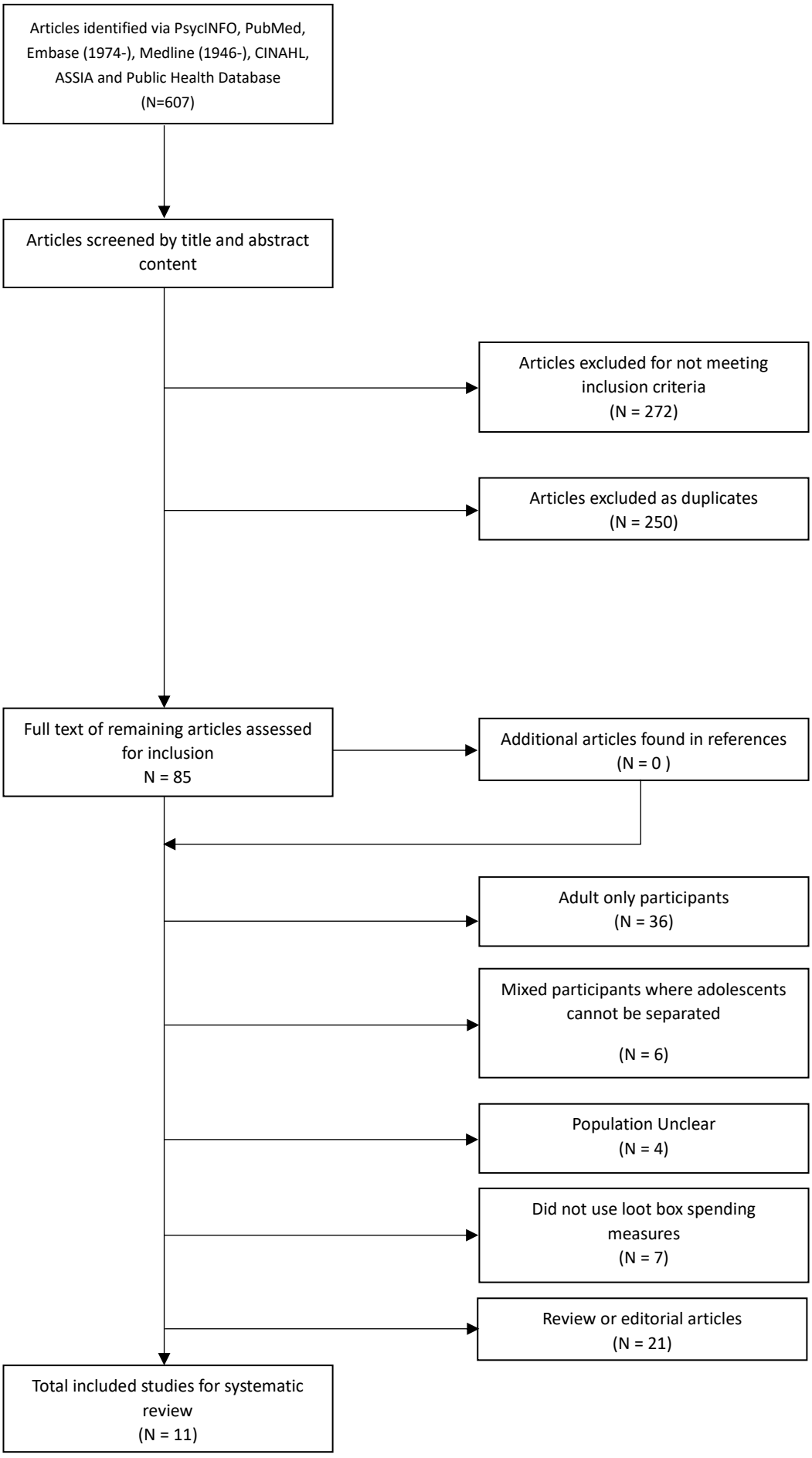
Assessing Methodological Quality

In line with a previous systematic review on characteristics of loot box users conducted by Yokomitsu and colleagues (2021), the 14-item Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (National Heart, Lung and Blood Institute, 2021) was used independently by both raters, with each study given a percentage score. Discrepancies were then discussed between raters and consensus reached. Each study was then rated under the following criteria (1) Poor: 0-24%, (2) Fair: 25-49%, (3) Good: 50-74% and (4) Excellent: 75-100%. However, the authors of this tool advise against dependence on a quantified scoring system – this appears to be in order to encourage evaluation based on each study's individual strengths and weaknesses in line with the specific quality criteria they meet. Therefore,

although the percentage system was maintained as a “guide”, the overall rating was modified according to which specific criteria were met.

Figure 1 visualises the systematic review screening process.

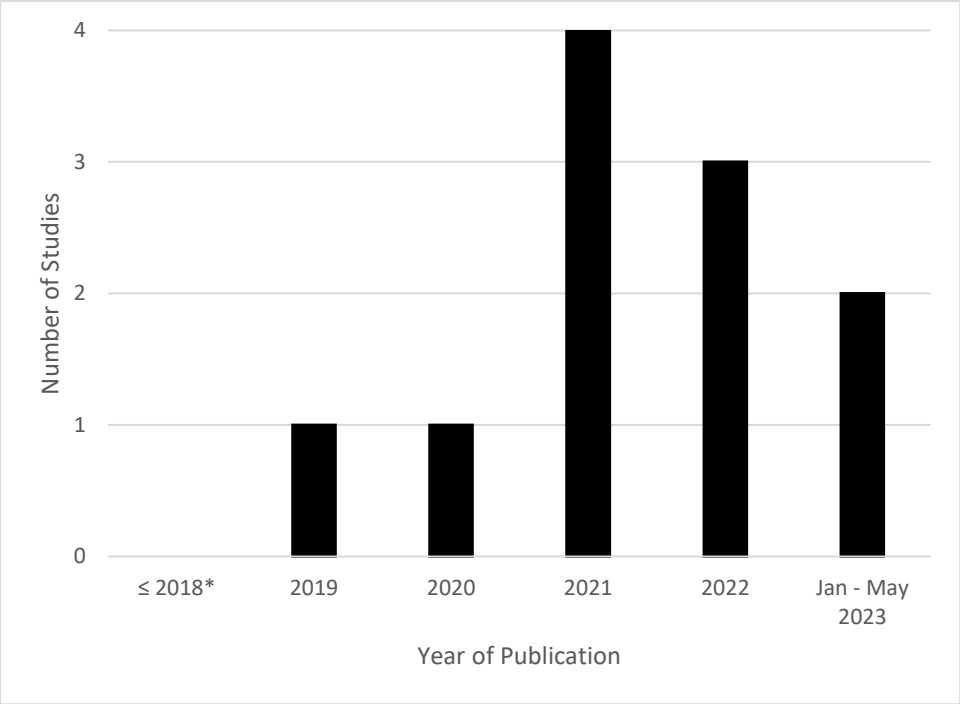
Fig. 1 Flowchart demonstrating screening process



Results

Prevalence of Studies exploring Covariates of Loot Box Spending in Children and Adolescents

Fig. 2 Bar chart demonstrating prevalence of studies per year



Of the 11 articles identified for review, the earliest publication exploring correlations between loot box spending and potential risk/protective factors in the child and adolescent population appears to have emerged in 2019, some ten years since the beginning of the loot box rise to prominence in 2009. Figure 2 visualises the prevalence of studies, with a quadrupling of the number of publications per year in 2021, and two identified thus far in 2023.

Table 1 displays additional information, separate to the main findings, from all 11 studies included in this systematic review.

Table 1 Study and sample characteristics, study setting, research design, data collection date, loot box measures used and variables explored across the reviewed studies

Author	Country	Sample Age Ranges and Characteristics	Setting	Design	Data Collection Date	Loot Box Measures	Variables related to LBs (and measures used)
De Camp (2021)	United States	2 separate data sets (2018 & 2019) from Delaware School Survey 2018: Ages 13-14 (n=4678) and 16-17 (n=3909) 2019: Ages 13-14 (n=2126) and 16-17 (n=2329)	School	Cross-Sectional Study	2018 & 2019	Frequency of purchase over past year	Delaware School Survey (DSS): Gambling Parental Bond Depression/Anxiety Victimisation Bullying Substance Use School Grades Gender Race/Ethnicity
González-Cabrera et al. (2022)	Spain	Age 11-17, mean age=14.9 +-1.79 years n=4123, male=57.5%, female=42.5% 6th grade primary=2.6% First Secondary Cycle=30.9% Second Secondary Cycle=28.9% High School=11.6% Professional Vocation=25.1%	Mixed - Online/School	Cross-Sectional Study	February & March 2021	Purchase in last 12 months Frequency of purchase in last week Monthly spend Problematic Use of Loot Boxes (PU-LB)	Internet Gaming Disorder Scale-Short Form (IGDS9-SF); Spanish version Gambling Disorder Questionnaire (OGD-Q)
González-Cabrera et al. (2023)	Spain	Age 11-17, n=2213, male=48.9%, female=51.1% Cohort assessed in two waves, six months apart Time 1 mean age=13.89 ± 1.46 Time 2 mean age=14.20 ± 1.50 6th grade: 1.3% Compulsory Secondary Education: 88.4% High school: 8.4% Basic Vocational Training: 2.1%	Mixed - Online/School	Cohort Study	Time 1: December 2020, Time 2: May 2021	T1: Loot box spend (Y/N) in last 12 months T2: Loot box spend (Y/N) in last 6 months Frequency of spend/opening in a week Amount of spend in last month	Internet Gaming Disorder Scale - Short Form; Spanish (IGD9-SF) Online Gambling Disorder Questionnaire (OGD-Q)

Table 1 Continued

Author	Country	Sample Age Ranges and Characteristics	Setting	Design	Data Collection Date	Loot Box Measures	Variables related to LBs (and measures used)
Hing et al. (2022)	Australia	Age 12-17 Advertisement sample: n=843, male=69.4%, female=30.6% Mean age=14 Non-gamblers=31% Non-problem gamblers=10.9% At-risk gamblers=8.2% Problem gamblers=49.9% Qualtrics sample: n=826, male=55.2%, female=44.8% Mean age=14 Non-gamblers=50.7% Non-problem gamblers=24.6% At-risk gamblers=9.2% Problem gamblers=15.5%	Online	Cross-Sectional Study	16th April - 23rd May 2020	Frequency of spend, Opened free loot boxes	Past-year problematic gambling: 9-item DSM-IV-MR-JMonetary form of gambling (e.g. lottery, race betting, poker): Frequency of spend
Hing et al. (2023)	Australia	Aged 12-17, n=826, mean age=14.81, male=57.7%, female 42.1%, other 0.2% "Gamers", n=646 (78.2%)	Online	Cross-Sectional Study	April & May 2020	Monthly loot box purchasing	Internet Gaming Disorder Scale (IGD) Barratt Impulsiveness Scale - Brief When last played an esports/non-esports game When last played game with gambling components Past-month engagement in social casino games Microtransactions in simulated gambling games - frequency and amount of spend
Ide et al. (2021)	Japan	Data from Tokyo Teen Cohort (TTC) study Age 14, n=1615, male=63.2%, female=36.8% Caregivers also included, n=1615	Unclear	Cross-Sectional Study	Not Specified	Yes/No to purchasing	Problem online gaming - Adapted using DSM-V criteria for gambling disorder, but not validated
Irie et al. (2022)	Japan	Age 15-18, n=1052, male=42.1%, female=56.2%, not provided=1.7% Age 15-16: n=367 Age 16-17: n=387 Age 17-18: 298	School	Cross-Sectional Study	October-December 2020	In-Game Purchase Questionnaire - included section on unplanned loot box purchases and amount of money spent per month	Depression: Patient Health Questionnaire for Adolescents Japanese version (PHQ-A) Problematic Online Gaming Questionnaire (POGQ) - Japanese version

Table 1 Continued

Author	Country	Sample Age Ranges and Characteristics	Setting	Design	Data Collection Date	Loot Box Measures	Variables related to LBs (and measures used)
Kristiansen & Severin (2020)	Denmark	Age 12-16 years, n=1137, male=49.5%, female=50.6%Age 12-13: 43.7%Age 14-15: 41%Age 16+: 15.4%Total classed as "gamers" n=995	Online	Cross-Sectional Study	Not Specified	Loot Box Engagement in 12-month period: (1) No engagement (2) earned loot box (did not purchase/sell items from loot box), (3) purchased a loot box or key to unlock a loot box (did not sell items from loot box), (4) sold items from loot box	Problem gambling severity: South Oaks Gambling Screen - Revised for Adolescents (SOGS-RA)Demographic profile: gender, age
Rockloff et al. (2021)	Australia	Includes adolescent cohort: age 12-17, n=911, male=47.2%, female=52.8% Young adult cohort: age 18-24, n=1025, male=32.7%, female=67.3%	Online	Cross-Sectional Study	Not Specified	Loot box use: Opened Y/N Age at first opening Age at first purchase Sold items from loot boxes: Y/N Attitudes towards loot boxes Played game with loot boxes in last 12 months: Y/N	Problem Gambling Severity Index - PGSI Gambling Problems - DSM-IV-MR-J for adolescents Ages 12-17: Intention to gamble as adults - list of 14 activities Attitudes Towards Gambling Scale - ATGS (no adolescent form of scale, but used for age 12-17 group also)
Sanmartín et al. (2021)	Spain	11-18 years old (mean=14.62), n=266, male=56.8%, female=43.2% Adults (aged 19+) (mean=25.17) n=209, male=75.6%, female=24.4%	Mixed - Online/School	Cross-Sectional Study	Not Specified	Frequency of Spend (Weekly/Monthly/Every 6 Months/Yearly), Amount Spent per Frequency of Spend	Age group (adolescent vs adult)
Zendle, Meyer and Over (2019)	Worldwide - Countries not specified	16-18 years old n=1155 Male=88%, Female=9%, Other=3% 16yo=26.4%, 17yo=26.6%, 18yo=543 Previous month loot box spend - Yes=40.5%, No=59.5% Time of purchase after first playing a game - Within a day=4.1%, Within a week=4.3%, Within a month=11.1%, More than a month=80.6%	Online	Cross-Sectional Study	20-24th December 2018	Monthly Spend, Monthly Frequency	Other microtransactions: Monthly spend Problem Gambling: Canadian Adolescent Gambling Inventory (CAGI) Impulsivity: Eysenck Impulsiveness Scale (Partial, 5-item) Loot Box Features: Ability to cash out, gameplay advantages, games give away free loot boxes, loot box shows near misses, use of in-game currency, qualitative motivations

The Relationship between Loot Box Spending and Problem Gambling

Of the 11 studies included in this review, seven explored the relationship between loot box spending and problem gambling in the child and adolescent population. González-Cabrera and colleagues (2022) found that purchasers of loot boxes were 4.43 times more at risk of problem gambling (CI 95%; 1.54-12.78) and also scored higher on the Gambling Disorder Questionnaire (OGD-Q) (González-Cabrera et al., 2020) compared to non-purchasers (YES = 2.91 ± 5.73; NO = 1.36 ± 3.61; t = 3.615, p <0.001, d = 0.32).

A further study by González-Cabrera and colleagues (2023) compared results of a cohort at Time 1 (T1) and Time 2 (T2, at 6 months later than T1). Across the overall sample, participants who bought loot boxes at T1 and T2 were significantly more likely to have indicators of online gambling disorder than participants who (1) bought at T1 but not T2, and (2) did not buy at T1 and T2 (p<0.001). At T1, it was discovered that boys who purchased loot boxes were 2.67 times (CI 95%, 1.92-3.72) more likely to exhibit online gambling behaviours when compared to boys who had not purchased them. Boys who purchased were 1.96 times (CI 95%; 1.43-2.70) more likely to gamble online at T2. Girls who purchased loot boxes at T1 were 10.74 times (CI 95%; 2.35-48.96) more likely to have a clinical online gambling problem at T2 compared to girls who did not purchase – this relationship was not significant for boys. Girls who purchased loot boxes at T1 were also 3.32 times (CI 95%; 2.02-5.46) more likely to exhibit online gambling behaviours compared to girls who did not purchase them. Girl purchasers were also 3.59 times (CI 95%; 2.31-5.56) more likely to gamble online at T2 if they had purchased loot boxes at T1.

Hing and colleagues (2022) found a significant correlation between loot box purchasing and both gambling problems and classification of participants as “at-risk” or “problem” gamblers in Australians. In an online sample recruited by advertisements, recent loot box purchasers were 6.99 times as likely to be “at-risk” gamblers ($p<0.001$), as well as 6.31 times as likely to score as “problem gamblers” compared to those who did not make loot box purchases. Participants who purchased loot boxes within the last 4 weeks also significantly predicted problems with gambling behaviours ($p<0.01$, OR=3.73). Within a sample recruited via Qualtrics, loot box purchasers were 3.07 times as likely to be “at risk” gamblers ($p<0.001$) and 8.28 times as likely to be classed as “problem” gamblers ($p<0.001$). Moreover, those who purchased loot boxes within the previous 4 weeks were significantly more likely to be “at-risk” (OR=2.76) or “problem” (OR=6.00) gamblers.

Kristiansen & Severin (2020) also found a stronger association between loot box spending and problem gambling amongst girls (local $\gamma = 0.777$, $p<0.043$) compared to boys (local $\gamma = 0.541$, $p<0.01$). Across the whole sample, increased loot box engagement via purchasing them, or selling items received from them, increased risk of problem gambling ($p<0.001$). Additionally, this correlation appeared to be stronger in the older participant groups – the age 12-13 group (local $\gamma = 0.294$, $p=0.322$) had the weakest association compared to ages 14-15 (local $\gamma = 0.779$, $p<0.01$) and ages 16-17 (local $\gamma = 0.565$, $p<0.1$) respectively.

Rockloff and colleagues (2021) found that gambling problems were more prominent in both girls and boys who made loot box purchases ($p<0.05$). Positive attitudes towards gambling were more strongly held in girls who both bought and sold loot boxes more often than their

peers, and those who bought loot boxes more recently compared to their peers were also likely to have fewer negative attitudes towards them ($p<0.05$). Consequently, girls who bought loot boxes within the previous year were also more likely to exhibit problematic gambling ($p<0.05$).

Zendle, Meyer and Over (2019) evidenced a correlation whereby loot box spending was predicted by problem gambling ($p<0.001$, Spearman's $p = 0.347$, $n^2=0.120$). Furthermore, the severity of problem gambling predicted an increase in loot box spending ($U = 103\ 206.500$, $p<0.001$, $n^2 = 0.098$). Specific psychological features of loot boxes also exacerbated the relationship between loot box spending and gambling, where games gave away free loot boxes ($p<0.001$) and made contents available for only a limited amount of time ($p<0.001$).

Finally, and contrary to the aforementioned studies, De Camp (2021) demonstrated that, though a correlation between problem gambling and loot box spending may be present, the specific risk and protective factors for either variable may differ significantly given impulsivity only correlated with problem gambling and not loot box spending.

The Relationship between Loot Box Spending and Problem Gaming

Five of the 11 studies explored the possible relationship between loot box spending and problem gaming.

Collectively, there was evidence that problematic gaming predicted loot box spending across all five studies. Of two separate samples of 11-17 year olds, one sample of loot box purchasers were at increased risk of Internet Gaming Disorder (IGD) compared to non-purchasers within the same study (YES = 7.46 ± 6.56; NO = 4.11 ± 4.76; t = 17.451, p <0.001, d = 0.58) (González-Cabrera et al., 2022) whilst a second sample of loot box purchasers in a separate study (González-Cabrera et al., 2023) exhibited significantly higher levels of IGD if they purchased them at Time 1 and Time 2 (6 months apart) compared to participants who purchased loot boxes at T1 and not at T2, and those who did not purchase at either time. Girl purchasers were 8.91 times (CI 95%; 3.20-24.88) more likely to endure gaming problems of clinical concern compared to non-purchasers.

Hing and colleagues (2023) found that clinical gaming disorder was predicted significantly by increased loot box spending when controlling for both impulsiveness and demographic variables (OR=1.98). Ide and colleagues (2021) found that participants who purchased loot boxes were 3.75 times more likely (95% CI; 2.17-6.48) to experience problematic gaming and that this likelihood was lower in males (OR 2.88, 95% CI 1.51-5.51) compared to females (OR 6.73, 95% CI 2.42-18.72).

Irie and colleagues (2022) contained a small subsection for loot boxes in a microtransactions-based questionnaire, with findings suggesting that problem gaming subscales of "preoccupation" and "overuse" on the Problematic Online Gaming Questionnaire (POGQ) (Demetrovics et al., 2012) significantly predicted loot box purchasing ($p<0.05$) in a Japanese adolescent school sample.

Other Correlates of Loot Box Spending

Other potential correlates were identified in seven of the 11 studies. Biological sex appeared to play a role in loot box spending, whereby females were significantly less likely to purchase them in the age group of 13-14 ($\beta loot=-0.528$, $p<0.01$) and 16-17 ($\beta loot=-0.326$, $p<0.01$) (De Camp, 2021) and males more likely to engage with them in general ($p<0.001$) (Kristiansen & Severin, 2020). As previously stated, the relationship between loot box spending and problem gambling may be more potent in females (Kristiansen & Severin, 2020).

Age also appeared to have an inverse relationship with loot box spending in some studies when compared to adults. For instance, an adolescent group in one study spent significantly more per month on loot boxes compared to an adult group ($p=0.023$, $r=0.21$) (Sanmartín et al., 2021). Compared to adults, they were also more likely to purchase 6-10 loot boxes per week ($p=0.014$) and spend between either €11- €25 ($p<0.001$) or €26- €50 ($p<0.001$) (González-Cabrera et al., 2022). However, one Japanese study (Ide et al., 2021) found that their 14-year-old participants' loot box purchasing (on a limited and historical yes/no basis) did not differ significantly from loot box purchasing of their adult primary caregivers ($p=0.93$).

De Camp (2021) indicated that 13–14-year-old participants being bullied in their neighbourhood significantly predicted a greater number of loot box purchases ($\beta_{loot}=0.067$, $p<0.05$). Loot box purchasing was also more likely in 16-17-year-old participants who were bullied in school ($\beta_{loot}=0.083$, $p<0.05$), frequently smoked cigarettes ($\beta_{loot}=0.063$, $p<0.05$), vapes ($\beta_{loot}=0.089$, $p<0.05$) or marijuana ($\beta_{loot}=0.092$, $p<0.05$).

In considering psychological and emotional factors, Sanmartín and colleagues (2021) additionally found that, amongst both adult and adolescent participants, feelings of guilt (χ^2 (1, N = 164) = 14.296; p = 0.000; Cox and Snell R2 = 0.083) and general distress (χ^2 (1, N = 164) = 23.814; p = 0.000; Cox and Snell R2 = 0.135) were predicted by not obtaining the item the participant desired from a loot box purchase, whereas obtaining the desired item predicted stronger feelings of loss of control (χ^2 (1, N = 164) = 9.083; p = 0.003; Cox and Snell R2 = 0.054). Adolescents (29%) also reported weaker feelings of guilt from purchasing loot boxes compared to adults (71%). Irie and colleagues (2022) indicated that loot box spending may also be correlated with symptoms of depression via score on the Patient Health Questionnaire for Adolescents (PHQ-A) (Johnson et al., 2002) in a Japanese population ($p<0.05$).

Interestingly, though impulsivity has only been directly explored in one of the 11 studies there was weak evidence for a significant positive correlation with loot box spending (Zendle, Meyer & Over, 2019). Furthermore, though the De Camp (2021) study found evidence of some covariates associated with loot box spending, it was also found that the individual predictors of problem gambling and loot box spending may differ significantly.

Quality Assessment of Reviewed Studies

Table 2: Quality assessment of studies using the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies

Study	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total Y (%)	Quality Rating
De Camp (2021)	Y	Y	Y	Y	N	N	N	Y	Y	N	N	N	O	Y	7 (50%)	Fair
González-Cabrera et al. (2022)	Y	Y	Y	Y	N	N	N	Y	Y	N	Y	N	O	Y	8 (57.1%)	Good
González-Cabrera et al. (2023)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	N	Y	10 (71.4%)	Good
Hing et al. (2022)	Y	Y	Y	Y	N	N	N	Y	Y	N	N	N	O	Y	7 (50%)	Fair
Hing et al. (2023)	Y	Y	Y	Y	N	N	N	Y	Y	N	N	N	O	Y	7 (50%)	Fair
Ide et al. (2021)	Y	Y	O	Y	N	N	N	Y	N	N	N	N	O	N	4 (28.6%)	Poor
Irie et al. (2022)	Y	Y	Y	Y	N	N	N	Y	Y	N	N	N	O	Y	7 (50%)	Fair
Kristiansen & Severin (2020)	Y	Y	N	Y	N	N	N	Y	Y	N	N	N	O	Y	6 (42.9%)	Fair
Rockloff et al. (2021)	Y	Y	O	N	N	N	N	Y	Y	N	N	N	O	Y	5 (35.7%)	Fair
Sanmartín et al. (2021)	Y	Y	O	O	N	N	N	Y	N	N	N	N	O	Y	4 (28.6%)	Fair
Zendle, Meyer & Over (2019)	Y	Y	O	Y	Y	N	N	Y	Y	N	N	N	O	Y	7 (50%)	Fair

Table 2 displays the outcome of quality assessment. The average quality score was 36.7%, with one study rated as poor, eight studies rated as fair, two studies rated as good, and none rated as excellent. Individual criteria were rated on the following basis: Y = Yes, N = No, O = Other (Cannot Determine, Not Applicable, or Not Reported).

Only one study provided a sample size justification (Criteria 5) (Zendle, Meyer & Over, 2019) in spite of some guidance on sample estimation available in the literature, such as that provided by findings of a previous adult study by Brooks and Clark (2019).

One study (González-Cabrera et al., 2023) used a cohort approach whilst all others were cross-sectional in design. Criteria 6 (exposure assessed prior to outcome assessment), Criteria 7 (sufficient timeframe to see an effect) and Criteria 10 (repeated exposure assessment) could only be met by this study, thus contributing to a higher overall quality score compared to the other studies.

Criteria 11 (outcome measurement using a validated tool) was deemed only met by González-Cabrera et al. (2022) with use of the Problematic Use of Loot Boxes Questionnaire (PU-LB). All other studies appeared to use non-validated measures, such as relying on participant self-report of frequency and amount of spend on loot boxes.

Furthermore, no study blinded the researchers from participants (Criteria 12), and the one cohort study (González-Cabrera et al., 2023) had a follow-up loss after baseline of 21.4% and thus could not meet Criteria 13 (loss of follow up after baseline of 20% or less).

Only Ide at al. (2021) did not appear to adequately measure and adjust for potential confounding variables for their impact on the relationship between exposure and outcome (Criteria 14), a factor which influenced its overall quality rating in spite of receiving the same percentage score as another study (Sanmartín et al., 2021).

Conflicts of Interest in Reviewed Studies

All studies in this review declared that there were no conflicts of interest. Five studies received funding from external agencies. However, there were also no concerns with undue influence from these funders.

Discussion

There appears to be an emerging evidence base within the child and adolescent literature that demonstrates a significant correlation between loot box spending and various potential risk factors, though strength of evidence varies for these factors. Most notably, research to this point has focused mainly on problem gambling and problem gaming across this population with potential additional factors of age (with young people spending more often and more frequently than adults) (Sanmartín et al., 2021), biological sex (with increased risk of spending and engagement if male, but potentially increased potency of problem gambling behaviours in female purchasers of loot boxes) (Kristiansen & Severin, 2020), being bullied (De Camp, 2021), smoking cigarettes, vapes or marijuana (De Camp, 2021), distress and lack of guilt (Sanmartín et al., 2021), as well as symptoms of depression (Irie et al., 2022). Strikingly, there was weak or no evidence for impulsivity increasing the risk of loot box spending, with only two studies examining this relationship directly (Hing et al., 2023; Zendle, Meyer & Over, 2019).

The impact of underlying contributors to loot box spending through problem gambling, problem gaming, and other potential risk factors, require further and deeper exploration in the child and adolescent population to see if there is "cross-over" from more specific domains that collectively comprise these risk factor concepts. There remains a question of causation given that ten of the 11 studies were cross-sectional designs examining a single "point-in-time", and the remaining cohort study could not conclude that causation was evident.

Though correlation appears evident, the suggestion that the individual risk factors for loot box spending and problem gambling may differ significantly (De Camp, 2021) is useful in moving research forward into considering additional domains of interest. For instance, De Camp (2021)'s additional risk factors of bullying, smoking/vaping and marijuana use, indicate that domains such as interpersonal relationships and emotional dysregulation (potentially indicated through maladaptive self-soothing strategies) may be worth exploring.

Studies do not yet explore possible underlying and developing personality traits which may predispose specific children and adolescents to risk factors for loot box spending. Given that female loot box purchasers may be more vulnerable to problem gambling and that male purchasers appear to engage and spend more, there may be merit to exploring differences in temperament and personality traits between sexes as predictors of loot box spending/engagement since personality differences are evident at this level in the five-factor model of personality (Marsh, Nagengast & Morin, 2012). Furthermore, exploration of impulsivity is currently extremely limited and may benefit from further study, as well as deeper analysis of potential correlation with more specific components such as "fun seeking" and "reward responsiveness" (Carver & White, 1994).

From a Clinical Psychology perspective, Child and Adolescent Mental Health Services in Scotland would benefit from a broadening and deepening of the understanding of risk and protective factors for loot box spending in what is an almost completely unassessed phenomenon in clinical settings. Patients and their families may be placed at undue and undetected risk of financial harm from this in-game monetization scheme based on

intermittent reinforcement principles. The use of robust and valid psychometric measures to assess loot box spending and its potential risk/protective factors appears to be mixed in the reviewed articles. Measures typically used by Clinical Psychology in CAMHS settings may be useful tools to explore potential correlational factors in community settings across Scotland as a starting point. For example, the Strengths and Difficulties Questionnaire (SDQ) (Goodman, Meltzer & Bailey, 1998) would allow researchers to explore possible correlations in domains such as problems with internalizing/externalizing, and quality of interpersonal relationships. There has also been extremely limited consideration of the quality of the parental relationship in managing child and adolescent exposure to these in-game monetization schemes, as well as parental understanding of the potency of loot boxes in video games, and the responsibility of parents to safeguard a potentially vulnerable children from harm.

There appears to be overlap of problem gaming and problem gambling symptoms with other clinical presentations in the DSM-V (American Psychiatric Association, 2013). Clinical Psychology has a role to play in understanding how children and adolescents who experience executive dysfunction (via diagnoses such as Attention Deficit Hyperactivity Disorder, Intellectual Disability, Autism Spectrum Conditions, Obsessive Compulsive Disorder and Depression) interact with loot boxes in video games given their prominence. Raising awareness of the loot box phenomenon amongst, and enhancing the knowledge of Clinical Psychologists who are, unbeknownst, working with children and adolescents engaging with loot boxes will in turn improve risk detection and risk assessment and begin to inform development of evidence based psychological interventions to reduce risk of financial harm.

Limitations

This review was limited by the sole exploration of studies written only in English. Whilst two studies had Japanese participants, there will likely be additional literature produced in Asian countries where the prevalence of problem gaming is known to be high (Fam, 2018). Furthermore, though nine studies had participants from Western countries, none of these studies included British participants. Though there may be conceptual transferability of findings to British children and adolescents, the current population gap in the literature calls for further research to buttress the emerging literature and explore its relevance in the United Kingdom. Moreover, this highlights the need to steer Clinical Psychology research towards understanding this widespread phenomenon amongst British children and adolescents to inform service development such as in assessment approaches and evidence-based interventions.

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Loot Box Spending in Children and Adolescents – An Exploration of Risk and Protective Factors

Abstract

Background

Video gaming and loot box spending behaviours are currently undetected and poorly understood in CAMHS settings in Scotland, potentially leaving patients at risk of financial harm. Clinical presentations such as Attention Deficit and Hyperactivity Disorder, Autism Spectrum Conditions, and Intellectual Disabilities may be at higher risk of loot box spending via predisposition to impulsivity from executive dysfunction. This study further explores some of the risk/protective factors identified in the systematic review in relation to Scottish children and adolescents.

Method

Pupils who attended a secondary school in a rural area of Scotland were recruited (ages 11-14; mean age 13.43; range 12.46 – 14.39). A second group of participants who lived in Scotland were recruited online (mean age 17.07; range 16.00 – 18.96). Both groups completed an online Qualtrics survey including psychometric measures: Risky Loot Box Index (Brooks & Clark, 2019), Gaming Addiction Scale (Lemmens et al., 2009), Behavioural Inhibition and Activation System (Carver & White, 1994), and the Strengths and Difficulties Questionnaire (Goodman, 1998).

Results

Both video gaming, and previous experience of purchasing loot boxes with real money was highly prevalent. Within the school based group, only SDQ Internalising score predicted loot box spending. Within the online recruitment group, gaming addiction score significantly predicted loot box spending. Further analysis across the combined sample showed that

behavioural disinhibition was also a significant predictor of loot box spending in female participants across the combined sample. Gaming addiction score also predicted loot box spending in participants who declared Additional Support Needs. No other assessed factors were significant in this study.

Conclusion

Findings exacerbate the necessity to develop awareness and risk assessment approaches in CAMHS settings, and encourages research specific to these settings where certain clinical presentations may be more predisposed to impulsivity via executive dysfunction compared to the general population.

Keywords: Loot boxes, problem gaming, impulsivity, children, adolescents, Clinical Psychology

Key Practitioner Message

- Problematic gaming and loot box spending is poorly detected and poorly understood in clinical CAMHS settings in spite of their prevalence within the child and adolescent population.
- Problem gaming has been shown to predict loot box spending, with an emerging yet tentative link to impulsivity and social/emotional difficulties as additional risk factors.
- This study found that gaming addiction score positively predicted loot box spending in the child and adolescent population. This was also the case in those who declared Additional Support Needs. Impulsivity was found to positively predict loot box spending across the combined sample, but only in females.

- Findings indicate a necessity to move research into clinical settings to explore the relationship of these risk factors in patients who may be at higher risk of loot box spending via predisposition to impulsivity in their clinical presentation.
- Future research would help increase awareness of this phenomenon in CAMHS settings, with the potential development of appropriate risk assessment and intervention.

Introduction

The systematic review suggests that risk and protective factors of loot box spending are poorly researched in spite of the rise to prominence of this video-gaming mechanic worldwide since the late 2000s (Close & Lloyd, 2021). Research appears very much to be in the process of establishing significant correlates of loot box spending, with early indications of significant correlation with both problem gambling (De Camp, 2021; González-Cabrera et al., 2022; González-Cabrera et al., 2023; Hing et al., 2022; Kristiansen & Severin, 2020; Rockloff et al., 2021; Zendle, Meyer & Over, 2019) and problem video gaming (González-Cabrera et al., 2022; González-Cabrera et al. 2023; Hing et al.; 2023, Irie et al., 2022). There is also indication that biological sex influences frequency and magnitude of loot box spending, with males being more likely to spend frequently and spend more compared to females (De Camp, 2021; Kristiansen & Severin, 2020), but that the correlation with problem gambling may be more potent in females who purchase loot boxes (Kristiansen & Severin, 2020). Adolescents are likely to spend more often and in greater amounts compared to adults (González-Cabrera et al., 2022; Sanmartín et al., 2021) though a study in Japan suggested that this may not be the case (Ide et al., 2021).

Quality of interpersonal relationships may be a factor, with suggestions that being a victim of bullying in their neighbourhood or school (De Camp, 2021) increases risk of loot box spending in adolescents. Maladaptive coping strategies, such as smoking cigarettes, vaping, or marijuana use, may also increase risk (De Camp, 2021). Adolescents may also feel fewer feelings of guilt compared to adults when purchasing loot boxes (Sanmartín et al., 2021) yet symptoms of depression may also exacerbate spending (Irie et al., 2022).

While many of these risk factors appear to be in line with risk factors for problem gambling (Dowling et al., 2017), this was not corroborated by De Camp (2021). Furthermore, there was a lack of significant evidence thus far for the role of impulsivity in loot box spending for adolescents (Zendle, Meyer & Over, 2019).

Clinical Psychology, Problem Gaming, and Loot Box Spending in Children and Adolescents

Clinical Psychology has moved to support assessment and treatment for problem gaming (also known as Internet Gaming Disorder). Though the condition is currently classified as requiring further research in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) (American Psychiatric Association, 2013), a specialist service was developed and launched in the UK in 2019 (NHS Central & North West London NHS Foundation Trust, 2021; NHS England, 2019) to provide multidisciplinary support for this condition, inclusive of Clinical Psychology. The service describes offering interventions for patients aged 13 and over who have difficulties regulating their video game use and managing the detrimental impact this may have on their daily life. However, this service appears only to offer support to patients based in England and Wales, with no specialised NHS service provided in Scotland.

Given the emerging evidence for problem gaming as a significant risk factor for loot box spending, there is clinical need to develop understanding of these risk factors to detect and prevent potential financial harm. Regarding problem gaming, there appears to be diagnostic overlap with conditions frequently treated in CAMH services in Scotland. The DSM-V suggests

various symptoms as indicative of problem gaming, including (1) preoccupation with playing games, (2) significant withdrawal symptoms, (3) ineffectiveness in regulating gaming time in spite of awareness of problems, (4) loss of other hobbies or interests, (5) use of games as a means of "escapism" or to avoid uncomfortable emotions such as guilt, helplessness or anxiety, and (6) gaming has caused a negative impact on relationships and/or education. This symptomology may share transdiagnostic overlap with presentations typically seen in CAMH Services in NHS Scotland and also categorised in the DSM-V, such as Attention-Deficit/Hyperactivity Disorder (ADHD), Autism Spectrum Conditions (ASC), Depression, and Intellectual Disability (ID). Patients presenting with such conditions may demonstrate difficulties with executive dysfunction, emotion regulation, maladaptive coping strategies and interpersonal relationships – known risk factors for problem gambling which may subsequently link to loot box spending.

Impulsivity

Impulsivity, as a component of executive dysfunction, is also known to have higher prevalence in children and adolescents who present with ADHD (Sayal et al., 2018); a condition which appears to have high comorbidity with ASC (Hours, Recasens and Baleyte, 2022) and ID (NHS Digital, 2022).

Impulsivity can be conceptualised through two over-arching concepts in the Behavioural Inhibition System and Behavioural Activation System (BIS/BAS) scales (Carver & White, 1994). The BIS is deemed to govern an individual's aversive motivational system by eliciting anxiety

and cautiousness, and in turn higher behavioural inhibition. Therefore, those high in BIS would tend to exhibit lower impulsivity. However, the BAS is broken into 3 separate domains: Reward Responsiveness (i.e. a strong sense of satisfaction or pleasure in response to reward), Fun Seeking (i.e. a desire for new rewards and thrilling or novel experiences) and Drive (i.e. level of persistence in pursuit of desired rewards). These concepts appear to marry well with interactive mechanics that are implemented into video games to encourage loot box spending.

Though impulsivity is a significant risk factor for problem gambling in the adult population (González-Ortega et al., 2013) as well as the child and adolescent population (Dowling et al., 2017), its role as a significant predictor of loot box spending in children and adolescents does not have sufficient evidence at this time (Spicer et al., 2022; Zendle, Meyer and Over, 2019). This calls for research to investigate impulsivity as a specific risk factor, given that sensation seeking may increase in potency to age 19, decreasing gradually thereafter. Additionally, behavioural inhibition may steadily increase from preadolescence and plateau between the ages of 23-26 (Steinberg et al., 2016).

Additional Concerns

There are concerns that children and young people in the United Kingdom typically wait 10 years for CAMHS treatment from the time their symptoms first emerge (Health and Social Care Committee, 2021). Normalisation of loot box spending (Close & Lloyd, 2021) and lack of awareness of this prevalent social issue in CAMHS settings contribute to it going undetected.

There is clinical need to further explore the risk and/or protective factors of loot box spending in the child and adolescent population in order to expand on current findings.

This study attempts to tentatively steer the literature towards the domain of Child and Adolescent Mental Health Services, with a view to begin understanding the prospective prevalence of loot box spending and its predictors in relation to problem gaming, impulsivity and emotional/social functioning (strengths and difficulties), in the child and adolescent population of Scotland. Developing the knowledge base in this area will hopefully inform future development of adequate assessment tools and interventions to reduce harm caused by loot box spending in the child and adolescent population.

Research Question

(1) Do problem gaming, impulsivity, and emotional/social wellbeing (externalising and internalising behaviours, prosocial behaviours and impact on functioning from interpersonal relationships) predict risk of loot box engagement in children and adolescents in the general population in Scotland?

(2) How do predictors of loot box engagement differ according to sex and additional support needs?

Method

Ethical Considerations

The project was given ethical approval by the University of Edinburgh's School of Health in Social Science Research Ethics Committee. Additional approval was given by the participating Local Authority and School for Group 1 below.

A Priori Power Calculation

A multiple linear regression model was implemented for this power calculation using G*Power statistical software (Faul et al., 2007). Brooks and Clark (2019) suggest that gambling-related variables predict 37% of the variance in loot box engagement. For this model, a medium effect size estimate of 0.15 was used, at 0.8 power. Nine predictors were added to the model: (1) Gaming Addiction Scale Score, (2) SDQ Impact Score, (3) SDQ Internalising Score, (4) SDQ Externalising Score, (5) SDQ Prosocial Score, (6) Behavioural Inhibition System Score, (7) Behavioural Activation System (BAS) Drive Score, (8) BAS Fun Seeking Score, and (9) BAS Reward Responsiveness Score. The measures for these predictors are discussed further in due course below. Power calculation indicated 114 participants would be required to detect a medium effect.

Group 1

Pupils who attended a secondary school in a rural area of Scotland were recruited from years S1-S3 (ages 11-14; mean age 13.43; range 12.46 – 14.39). Total participants were n=32 after

two responses were removed for providing no answers, one for providing an age outwith the inclusion criteria for this group, and one for providing a highly unlikely weekly expenditure on loot boxes ("More than £50") per week. The participating school were provided with study information and consent forms for parents, with the school managing the consent process. Only pupils who received parental consent were invited through the school to participate. Pupils completed an online Qualtrics survey in a classroom setting using mobile devices where they were provided with online study information and consent forms prior to commencement. A debrief information form was also provided at the end of the survey. Data for this group were collected from 27th-28th June 2023.

Group 2

Adolescents aged 16-18 (mean age 17.07; range 16.00 – 18.96) who live in Scotland were recruited via Meta advertising. Advertisements were set as a "Traffic" campaign to maximise reach for budget, with a maximum national "audience size" of 152200 – 179000. Specific interests could not be targeted for this cohort. Advertisements were shown across all possible mediums on Facebook, Instagram and their corresponding Audience Network and Messenger platforms, and targeted only to those who were connected via a wi-fi connection. This group were invited to complete the same online Qualtrics survey. Participants were required to complete a Captcha to reduce risk of survey input from bots, with study information and consent forms then provided at the beginning. IP location estimates were provided by Qualtrics' "GeoIP Estimation" tool for each response. Qualtrics state that "GeoIP data is an approximate location based on the best know location of the IP address the response was uploaded from. Our GeoIP databases are 99.8% accurate on a country level". A total of 171 responses were initially obtained, for a total advertising budget of £123.05.

Only responses with a GeoIP Estimation location of Scotland or close to the Scottish-English border, and who confirmed they lived in Scotland were retained, resulting in 56 being removed due to location. 6 responses were removed for not consenting to the study. Total remaining responses were n=109. Data for this group were collected from 6th – 23rd July 2023.

Additional Criteria for Both Groups

For both groups, the survey was open to participants who were fluent in English. For Group 1, pupils were excluded if they had a formal diagnosis of intellectual disability whom teaching staff identified as unable to provide informed consent and complete the survey.

Additional Group Information

Group 2 was an additional group recruited following difficulties with school-based recruitment and time pressures for completion of this Clinical Psychology doctoral project. It was not possible to recruit via Facebook for users under the age of 16 due to consent reasons, so both Group 1 and 2 were analysed both separately and in combination where relevant to allow for a more expansive participant pool. Additionally, participants were recruited from Scotland with the aim of increasing the applicability and specificity of findings to the Scottish social context to inform future development of Scottish services and further research.

Qualtrics Survey

The survey is provided in Appendix 1.

Participants were asked to provide specific demographic information – date of birth, biological sex, Additional Support Needs status, Free School Meal status, video game platforms used, and video game most played in the past month.

Participants also completed psychometric measurement tools: the RLI, GAS, BIS/BAS and SDQ. Those who indicated no previous history of making loot box purchases did not complete the RLI, and instead were given a score of 0 for this measure.

Psychometric Measurement Tools

Loot Box Engagement

Loot box engagement was measured in part by self-report: experience of buying loot boxes at any point in the past (Y/N), weekly spend on loot boxes (£), and frequency of purchase per week. The participants were asked to complete the Risky Loot Box Index (RLI) (Brooks & Clark, 2019), a scale comprising 12 items aimed at evaluating the extent of problematic involvement with loot boxes. The scale presented statements like "I have purchased more loot boxes after not receiving valuable items," and participants rated their responses on a five-point Likert scale, ranging from strongly disagree to strongly agree. Previous research has shown promising reliability and validity of the RLI, correlating significantly with the Problem Gambling Severity Index (Ferris & Wynne, 2001) and Gambling Related Cognitions Scale

(Reber, 2012). In this study, the RLI had a Cronbach's alpha score of 0.838, indicating good internal consistency.

Problem Gaming

This domain was measured with the short version of the Gaming Addiction Scale for Adolescents (GAS-7) (Lemmens, Valkenburg & Peter, 2009). This comprises a 5-point Likert scale, with responses ranging from "Never" to "Very Often". The purpose of this assessment is to gauge seven fundamental factors relevant to the development of the DSM-V classification known as Internet Gaming Disorder. These factors include difficulties related to withdrawal, conflict, relapse, and mood modification. The measurement tool has shown both good validity and strong reliability in the child and adolescent population. The GAS demonstrated a Cronbach's alpha score of 0.767, indicating good internal consistency.

Impulsivity

This domain was measured using the Behavioural Inhibition System and the Behavioural Activation System (BIS/BAS) scale (Carver & White, 1994). This psychometric tool assesses individual differences in two distinct motivational systems through the Behavioural Inhibition System (1 factor), and a Behavioural Activation System (3 factors – Drive, Fun Seeking, and Reward Responsiveness). The BIS/BAS model is adequately supported in the adolescent population where scores are comparable to the adult population (Cooper et al., 2007). The BIS/BAS scales demonstrated a Cronbach's alpha score of 0.896, indicating good internal consistency.

Strengths and Difficulties

The Strengths and Difficulties Questionnaire S11-17 (SDQ S11-17) (Goodman, Meltzer & Bailey, 1998) is a widely used behavioural screening tool specifically designed for assessing strengths and difficulties in individuals aged 11 to 17 years. It assesses a wide range of psychological attributes and provides a comprehensive evaluation of a child's or adolescent's social and emotional wellbeing. Its application is prevalent in CAMH Services. Goodman, Lamping and Ploubidis (2010) suggest utilizing an adapted version of the questionnaire for low-risk or general population samples. While this adapted version generally maintains the reliability and validity of the original SDQ, it may exhibit poorer discriminant validity between certain subscales.

This version involves an alternative 25-item questionnaire split into three subscales: "internalizing problems" (including emotional and peer-related problems), "externalizing problems" (covering conduct and hyperactivity problems), and the "prosocial" scale. Additionally, participants also completed an impact supplement, which assesses the influence of interpersonal relationships on overall wellbeing. Although a separate questionnaire with slightly different wording is available for age 18+, and in order to maintain consistency with the measure across all participants, 18-year-old participants also completed this questionnaire. The SDQ demonstrated a Cronbach's alpha score of 0.803, indicating good internal consistency.

Hypotheses

Within Group 1, Group 2 and the Combined Sample:

(1) Gaming Addiction Scale (GAS) score, SDQ internalising/externalising/prosocial/impact scores, and Behavioural Activation System Scores (BAS – Drive, Fun Seeking and Reward Responsiveness) scores will be positive predictors of RLI score;

(2) Behavioural Inhibition Score will be an inverse predictor of RLI score;

Within the Combined Sample:

(1) Predictors of RLI score will remain consistent irrespective of sex (male/female) or Additional Support Needs (yes/no), but more potent for individuals with Additional Support Needs.

Results

Combined Sample Demographics

A total of 141 responses were received, with a mean age of 16.25 and range 12.46 – 18.96. Responses were provided by 105 males (74.5%), 32 females (22.7%) and 4 (2.8%) undisclosed. 31 (22.0%) of respondents stated that they had Additional Support Needs at school, college or university, with 97 (68.8%) stating they did not, and 13 (9.2%) providing no response. 19 (13.5%) stated that they were recipients of free school meals, with 110 (78.0%) stating they were not, and 12 (8.5%) providing no response.

Loot Box Engagement

Across the combined sample, 99 respondents (70.2%) stated that they had experience of purchasing loot boxes at any point in time. Categories for weekly spend on loot boxes was condensed post-hoc (£0, £1-10, £11-20, £21-30, £31-40). Of the 96 respondents who had previously bought loot boxes at any time and also provided a response to this question, 47 (48.96%) had not purchased in the previous week; with the next most popular category of spend being £1-10 (n=35; 36.46%), then £11-20 (n=10; 10.42%), then £21-30 and £31-40 both having 2 respondents each (2.08%).

Weekly frequency of loot box spend was condensed into 3 groups (0, 1-5, 6-15). Of the 98 loot box purchasers who also provided a response to this question, 56 (57.14%) tended to make no purchases on a weekly basis, with 38 (38.78%) purchasing 1-5 times per week, and only 4 (4.08%) purchasing more frequently than that.

Problem Gaming and Video Game Engagement

The Gaming Addiction Scale (Lemmens et al., 2009) advises that diagnostic criteria for gaming addiction is likely met in participants who answered "Sometimes" or more frequently on at least 4 of the questions. Using this approach, 68 of 141 respondents (48.2%) met criteria for problem gaming/gaming addiction. Weekly time spent gaming (in hours) was also recorded and condensed into 5 categories (0-10, 11-20, 21-30, 31-40, 40+). Of 140 responses, 41 (29.29%) spent 0-10 hours per week, 32 (22.86%) spent 11-20 hours, 30 (21.43%) spent 21-30 hours, 18 (12.86%) played for 31-40 hours, and 19 (13.57%) played for 40 hours.

Fig. 1. Share of Platform Engagement in Study Sample; n=141

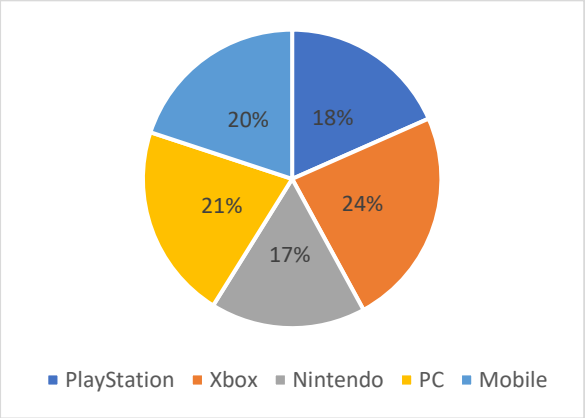
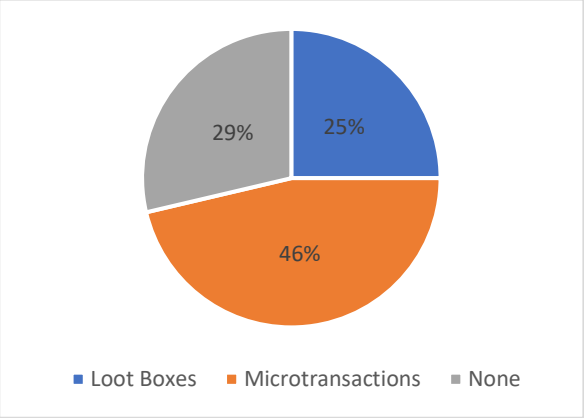


Fig. 2. Percentage of games most recently played according to microtransaction type; n=136



Figures 1 and 2 display both the gaming platforms respondents tended to engage with, as well as the rate at which they engaged with video games that included prominent microtransaction or loot box features in the previous month. Respondents were able to provide multiple answers for platforms used. Whilst platforms appear to have a relatively equal share of young people's engagement, a striking 96 out of 136 respondents (71.32%) had mostly been playing video games that contained "in-app purchases" (non-randomised microtransactions) or

“random in-game purchases” (loot boxes) according to PEGI ratings (Pan European Game Information, 2023) for each game declared by participants.

Regression Analysis

Using SPSS, a forward multiple linear regression approach was used due to the large number of predictor variables in order to systematically identify the most relevant. The whole sample demonstrated a normal distribution (Shapiro-Wilk; p=0.165). BAS Reward Responsiveness was removed from the Combined Sample model due to high collinearity with BIS System (Pearson correlation of 0.724) and BAS Fun Seeking (Pearson correlation of 0.727). See appendix for further information.

Tables 1 displays the significant findings from this regression analysis according to sample (Group 1, Group 2, and Whole Sample): .

Table 1: Results showing significant predictors of RLI Score across sample groups

		B	Std. Error	β	t	p
Group 1 (n=32)	(Constant)	23.081	4.140		5.576	<0.001
	SDQ Internalising	-1.393	0.439	-0.501	-3.172	0.003
Group 2 (n=109)	(Constant)	7.428	4.696		1.582	0.117
	GAS Score	0.851	0.217	0.362	3.924	<0.001
	BIS System Score	-0.454	0.183	-0.229	-2.480	0.015
Combined Sample (n=141)	(Constant)	8.835	4.245		2.081	0.039
	GAS Score	0.761	0.176	0.342	4.323	<0.001
	BIS System Score	-0.439	0.166	-0.209	-2.641	0.009
Combined Sample Males (n=105)	(Constant)	4.755	4.058		1.172	0.244
	GAS Score	0.574	0.221	0.248	2.596	0.011
Combined Sample Females (n=32)	(Constant)	16.307	7.391		2.206	0.035
	GAS Score	1.103	0.262	0.542	4.210	<0.001
	BIS System Score	-1.140	0.287	-0.512	-3.974	<0.001
Combined Sample ASN = No (n=97)	(Constant)	9.828	4.980		1.973	0.051
	GAS Score	0.822	0.213	0.371	3.861	<0.001
	BIS System Score	-0.442	0.205	-0.207	-2.159	0.033
Combined Sample ASN = Yes (n=31)	(Constant)	-5.947	7.634		-0.779	0.442
	GAS Score	0.892	0.387	0.394	2.307	0.028

Group 1

Within this school-based survey group (n=32), there were 19 male and 13 female respondents (age range: , mean age). Only 3 stated that they had additional support needs (with 23 stating no). 20 declared prior experience of loot box spending (62.5%). 9 participants (39.13%) appeared to meet criteria for gaming addiction.

Only SDQ Internalising score (B=-1.393, β=-0.501, t=-3.172, p=0.003) was a significant predictor of Risky Loot Box Index (RLI) score, and findings indicated an inverse relationship between the two.

Group 2

Within the online survey group (n=109), 86 respondents answered that they were male and 19 answered that they were female. 28 answered that they had additional support needs (with 74 answering that they did not). 79 respondents answered that they had previous experience of loot box spending (72.48%). 59 respondents (54.13%) appeared to meet criteria for gaming addiction.

Gaming Addiction Scale (GAS) score was a significant positive predictor of RLI score (B=0.851, β=0.362, t=3.924, p<0.001) whilst BIS System score was a significant inverse predictor of RLI score (B=-0.454, β=-0.229, t=-2.480, p=0.015). However, further analysis below suggests that BLI System score was significant only in female participants.

Combined Sample

Across the combined sample (n=141), GAS score (B=0.761, β=0.342, t=4.323, p<0.001) positively predicted RLI score. Behavioural Inhibition System (BIS) Score (B =-0.439, β=-0.209, t=-2.641, p=0.009) inversely predicted RLI score. 13.7% (R-Square=0.137, F<0.001) of the variance in RLI score was explained by this model.

Combined Sample: Males vs Females

When the combined sample was split to consider sex differences, only GAS score was a significant positive predictor of RLI score in males (n=105) (B=0.574, β=0.248, t=2.596, p=0.011). Within the female cohort however, GAS score (B=1.103, β=0.542, t=4.210, p<0.001) was a significant positive predictor whilst BIS score (B=-1.140, β=-0.512, t=-3.974, p<0.001) was a significant inverse predictor of RLI score.

Combined Sample: Additional Support Needs (ASN)

Within the ASN group (n=31), only GAS score (B=0.892, β=0.394, t=2.307, p=0.028) was found to positively predict RLI score. Within the non-ASN group, GAS score (B=0.822, β=0.371, t=3.861, p<0.001) positively predicated RLI whilst BIS score (B=-0.442, β=-0.207, t=-2.159, p=0.033) inversely predicted RLI score.

Other Variables

For clarity, there was no evidence of other significant predictors of RLI score between the remaining measures (BAS Drive, BAS Fun Seeking, BAS Reward Responsiveness, SDQ Externalising, SDQ Prosocial, and SDQ Impact scores) across the samples/groups explored.

Discussion

This study appears to be the first in Scotland to corroborate previous studies in identifying problem gaming as a significant predictor of risky loot box engagement (González-Cabrera et al., 2022; González-Cabrera et al. 2023; Hing et al.; 2023, Irie et al., 2022). However, this evidence appears limited to the online participant group in this study. Though the link between impulsivity and loot box spending may be weak (Zendle, Meyer and Over, 2019), this study has found that impulsivity in the context of behavioural disinhibition may predict risky loot box engagement in females. Nevertheless, the combined model of gaming addiction score and behavioural disinhibition score only predicted 13.7% of variance in RLI score in the combined sample, suggesting the presence of other significant factors that were not detected in this study.

It was initially surprising to find that behavioural disinhibition was only a predictor of loot box engagement in the online female cohort, and not the online male cohort. However, it is also recognised that, within an ADHD context of which behavioural disinhibition is a factor, males tend to be diagnosed and therefore treated for ADHD symptoms more frequently and earlier in their development than females due to differences in how they may typically present with symptoms. This diagnostic ratio may be 5:1 in the UK (male:female) (Sayal et al., 2018). There may be a possibility that behavioural inhibition scores in females were lower than in males, and significant to loot box engagement, through reduced likelihood of receiving appropriate treatment for potential ADHD symptoms. However, further research making use of ADHD specific measures, such as the Conners behaviour rating scales (Conners, 2008) may be useful in screening for research participants who may meet diagnostic criteria for ADHD as this was

not specifically explored in this study and may provide valuable insight into any potential effect on female responses.

Additionally, where biological sex was provided by participants, 76.64% (n=105) were male and 23.36% (n=32) were female. Given Kristiansen and Severin's (2020) findings that problem gambling may be more potent in females, the key component of impulsivity and conceptualisation of ADHD symptomology in males and females is critical to further study given the evidence of correlation between problem gambling and loot box spending in other studies. As such, a larger female sample size in future studies would be of benefit to further explore the relationship between impulsivity and loot box spending according to sex.

It was also surprising to find that only problem gaming, and not impulsivity, was a significant predictor of loot box spending in participants with Additional Support Needs (ASN) in this study. However, Education Scotland (2017) provides a broad definition for the term that encapsulates difficulties across the domains of physical and mental health problems, problems with learning environment and family circumstances, and "social and emotional" factors. Additionally, there were comparatively low participant numbers for this category (31 out of 128; 24.21%) and the suitability of some of the psychometric measures (such as the BIS/BAS and SDQ featuring a large number of questions) may have affected responses from this cohort. This cohort may also be more likely to experience wider cognitive deficits other than impulsivity, for example in additional components of executive functioning such as processing speed, problem solving and working memory which were not explicitly captured within this study's measures. To that end there may be merit to moving research into clinical

CAMHS settings to look at a more specifically defined ASN cohort who would be receiving assessment or treatment for emotional or neurodevelopmental/cognitive difficulties alongside their ASN status.

The SDQ domains only bore a significant predictor of loot box engagement in the school based group (Group 1) via internalising problems. As the SDQ provides an overview of the impact on functioning across various domains, such as from interpersonal functioning, it may have lacked sufficient specificity or sensitivity to draw out key correlates in this study. School participants may have felt more inclined to participant in the study alongside friends in an attempt to reduce feelings of isolation and to maintain friendships, which in turn could potentially indicate internalising problems (via peer relationship problems). This social "pressure" is less likely to be replicated in the online group given the study questionnaire was advertised to individuals rather than a wider school group. Additionally, younger adolescents might have different patterns of internalizing problems and spending behaviours compared to older adolescents. The absence of gaming addiction score as a predictor of loot box engagement in the school group may also be influenced by small recruitment numbers as well as response bias whereby participants may have experienced influence to provide more socially/culturally desirable responses within the school classroom setting when in the presence of peers and teachers.

There is currently a lack of exploration of the quality of interpersonal relationships, with De Camp (2021) being the only study thus far to indicate potential correlates, such as victimisation, in this domain. Furthermore, De Camp (2021) also found potential correlation

between problem gambling and “parental bond” in younger children, and such a factor may be important to explore further in the context of loot box spending in clinical settings. Within the parenting domain, it appears relevant to consider that games featuring loot boxes are currently classed separately to games containing “gambling” in the UK, but that 86% of parents do not adhere to age restrictions on video games (Childcare, 2019). Therefore, children and adolescents continue to be exposed to loot box spending. Across this area of research, it will likely also be important to explore parental responsibility in protecting children and adolescents who may be predisposed to problematic loot box spending. Possible avenues for consideration are to explore parental understanding of the function and prevalence of loot boxes in video games, as well as parental views on them with regards to normalisation, and exploration of potential influence of parenting style (e.g. authoritative vs authoritarian vs passive parenting).

With both video gaming addiction and loot box spending being prevalent in this study’s combined participant cohort, this paper's findings suggest that there may be undetected clinical need to develop awareness and risk assessment of both for presentations typically seen in CAMHS settings who may be predisposed to impulsivity through executive dysfunction such as ADHD, ASD, and Intellectual Disability.

Additional Limitations

This study does not claim to have findings representative of the wider population of Scotland due to small recruitment numbers from a potential sample pool of over 150,000, at least in the online domain. Caution is also encouraged in the interpretation of combined sample findings due to limited homogeneity between Group 1 and Group 2.

Due to the nature of the recruitment process, the study advertisements may have appealed more to participants who preferred video gaming and as such, loot box engagement rates within this study may not be strongly comparable to the general population. Furthermore, given the online advertisements in particular were designed to appeal to participants and are naturally presented in a time-limited manner as part of a social media news feed, these may have attracted participants who were more driven to participate on impulse, possibly skewing BIS/BAS scores in Group 2.

Due to the strict location inclusion strategy for this study, there may have been valid responses that were removed due to the location of the Internet Service Provider the participant was connected to while online in Scotland (e.g. London). Due to Facebook advertising restrictions, another contributory factor to eliminating responses was that the author could only target potential participants who *live* in Scotland – this may have targeted participants who were outside of Scotland during the summer holiday period and as such, GeoIP Location data would have made them ineligible for the study.

The study's findings are limited to Scotland, a specific cultural and societal context. It is important to acknowledge that predictors of loot box engagement might differ in other cultural contexts, influenced by varying gaming norms, societal attitudes towards gambling/loot boxes, and regulatory environments.

As this study is cross-sectional by design, it cannot determine causation between loot box spending and its risk/protective factors at this stage. The study also relies on participant honesty in their self-reporting of their experiences. As the study is cross-sectional, it limits the ability to understand how loot box engagement and associated factors like impulsivity and gaming addiction evolve over time. A longitudinal study would provide more insight into whether these relationships are consistent or change, for instance with age, life circumstances, or changes in gaming habits.

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Conflicts of Interest

The author declares that there were no conflicts of interest.

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Appendix 1 - Qualtrics Survey

Please enter your Date of Birth.

Month
Day
Year

What is your biological sex?

- Male
- Female
- Prefer not to say

Are you classed as having Additional Support Needs at school, college or university?

- Yes
- No
- Don't Know

Do you receive free school meals?

- Yes
- No
- Don't Know

Which platforms do you play video games on? Please select all that apply.

- Mobile or Tablet
- PC or Laptop (including Steam, Epic Games etc)
- PlayStation
- XBox
- Nintendo
- Other
- None

Roughly how many hours per week do you spend playing video games?

Over the last month, which video game have you played the most? Please give only one answer. Please write "None" if you haven't played any.

Loot Boxes

What is a Loot Box?

A Loot Box is an item you buy in a video game using real world money that gives you a **chance** of getting something valuable. Sometimes the game will ask you to buy an in-game currency first (such as FIFA Points in FIFA 23) and then buy the Loot Box with this currency.

Some examples of Loot Boxes are:

Packs in FIFA Ultimate Team

Treasure Hunter Keys & Chests in RuneScape

Loot Boxes in Overwatch 1

Elder Rifts & Crests in Diablo Immortal

Gems and Gifts in Gacha Life

Coming up next, we're going to ask about your experiences with Loot Boxes.

Click "→" if you wish to continue.

Loot Boxes

Have you ever spent real money on in-game loot boxes?

- ○ Yes
- ○ No

Roughly how much money do you spend on loot boxes per week?

Roughly how often per week do you buy loot boxes with real money or with in-game currency bought with real money?

Your experiences with loot boxes.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I frequently play games longer than I intend to, so I can earn Loot Boxes	○	○	○	○	○
I believe obtaining items from Loot Boxes is an effective way to generate money	○	○	○	○	○
I will play for long periods of time to earn Loot Boxes	○	○	○	○	○
Receiving items from Loot Boxes is a primary reason why I play video games	○	○	○	○	○

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I buy Loot Boxes with the hope of receiving valuable items to sell	○	○	○	○	○
I have felt guilty about the amount of time or money I have spent on Loot Boxes	○	○	○	○	○
I have put off other activities, work, or chores to be able to earn or buy more Loot Boxes	○	○	○	○	○
Once I open a Loot Box, I often feel compelled to open another	○	○	○	○	○

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I have sometimes spent more on Loot Boxes than I could afford	○	○	○	○	○
I have bought more Loot Boxes after failing to receive valuable items	○	○	○	○	○

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The thrill of opening Loot Boxes has encouraged me to buy more	○	○	○	○	○
My Loot Box use has caused me problems	○	○	○	○	○

Great!

Thanks for your efforts so far!

The next set of questions ask about your gaming habits over the last 6 months.

Click "→" if you wish to continue.

Your Gaming Habits

How often during the last six months...

	Never	Rarely	Sometimes	Often	Very Often
did you think about playing a game all day long?	○	○	○	○	○
did you spend increasing amounts of time on games?	○	○	○	○	○
did you play games to forget about real life?	○	○	○	○	○
have others unsuccessfully tried to reduce your game use?	○	○	○	○	○

	Never	Rarely	Sometimes	Often	Very Often
have you felt bad when you were unable to play?	○	○	○	○	○
did you have fights with others (e.g. family, friends) over your time spent on games?	○	○	○	○	○
have you neglected other important activities (e.g. school, work, sports) to play games?	○	○	○	○	○

On we go!

Thanks!

There are only 2 sets of questions left!

Let's move on!

Click "→" if you wish to continue.

BIS/BAS

The next set of questions asks about your thoughts, feelings and behaviours. There are no right or wrong answers. Please be as accurate and honest as you can be.

	Very false for me	Somewhat false for me	Somewhat true for me	Very true for me
A person's family is the most important thing in life.	○	○	○	○
Even if something bad is about to happen to me, I rarely experience fear or nervousness.	○	○	○	○
I go out of my way to get things I want.	○	○	○	○
When I am doing well at something I love to keep at it.	○	○	○	○
I am always willing to try something new if I think it will be fun.	○	○	○	○
How I dress is important to me.	○	○	○	○

	Very false for me	Somewhat false for me	Somewhat true for me	Very true for me
When I get something I want, I feel excited and energized.	○	○	○	○
Criticism or scolding hurts me quite a bit.	○	○	○	○
When I want something I usually go all-out to get it.	○	○	○	○
I will often do things for no other reason than that they might be fun.	○	○	○	○
It is hard for me to find the time to do things such as get a haircut.	○	○	○	○
If I see a chance to get something I want I move on it right away.	○	○	○	○

	Very false for me	Somewhat false for me	Somewhat true for me	Very true for me
I feel pretty worried or upset when I think or know somebody is angry at me.	○	○	○	○
When I see an opportunity for something I like I get excited right away.	○	○	○	○

	Very false for me	Somewhat false for me	Somewhat true for me	Very true for me
I often act on the spur of the moment.	○	○	○	○
If I think something unpleasant is going to happen I usually get pretty worked up.	○	○	○	○
I often wonder why people act the way they do.	○	○	○	○
When good things happen to me, it affects me strongly.	○	○	○	○

	Very false for me	Somewhat false for me	Somewhat true for me	Very true for me
I feel worried when I think I have done poorly at something important.	○	○	○	○
I crave excitement and new sensations.	○	○	○	○
When I go after something I use a 'no holds barred' approach.	○	○	○	○
I have very few fears compared to my friends.	○	○	○	○
It would excite me to win a contest.	○	○	○	○
I worry about making mistakes.	○	○	○	○

Good effort!

Almost there! Only one more set of questions left!

Click "→" if you wish to continue.

SDQ

For each item, please mark the box for Not True, Somewhat True or Certainly True. Please answer all items as best you can even if you are not absolutely sure!

Please give your answers on the basis of how things have been for you **over the last six months.**

	Not True	Somewhat True	Certainly True
I try to be nice to other people. I care about their feelings	○	○	○
I am restless, I cannot stay still for long	○	○	○
I get a lot of headaches, stomach-aches or sickness	○	○	○
I usually share with others (food, games, pens etc.)	○	○	○
I get very angry and often lose my temper	○	○	○
I am usually on my own. I generally play alone or keep to myself	○	○	○
I usually do as I am told	○	○	○

	Not True	Somewhat True	Certainly True
I worry a lot	○	○	○

	Not True	Somewhat True	Certainly True
I am helpful if someone is hurt, upset or feeling ill	○	○	○
I am constantly fidgeting or squirming	○	○	○
I have one good friend or more	○	○	○
I fight a lot. I can make other people do what I want	○	○	○
I am often unhappy, down-hearted or tearful	○	○	○
Other people my age generally like me	○	○	○

	Not True	Somewhat True	Certainly True
I am easily distracted, I find it difficult to concentrate	○	○	○
I am nervous in new situations. I easily lose confidence	○	○	○
I am kind to younger children	○	○	○
I am often accused of lying or cheating	○	○	○
Other children or young people pick on me or bully me	○	○	○
I often volunteer to help others (parents, teachers, children)	○	○	○
I think before I do things	○	○	○

	Not True	Somewhat True	Certainly True
I take things that are not mine from home, school or elsewhere	○	○	○
I get on better with adults than with people my own age	○	○	○
I have many fears, I am easily scared	○	○	○
I finish the work I'm doing. My attention is good	○	○	○

Overall, do you think that you have difficulties in one or more of the following areas: emotions, concentration, behaviour or being able to get on with other people?

How long have these difficulties been present?

Do the difficulties upset or distress you?

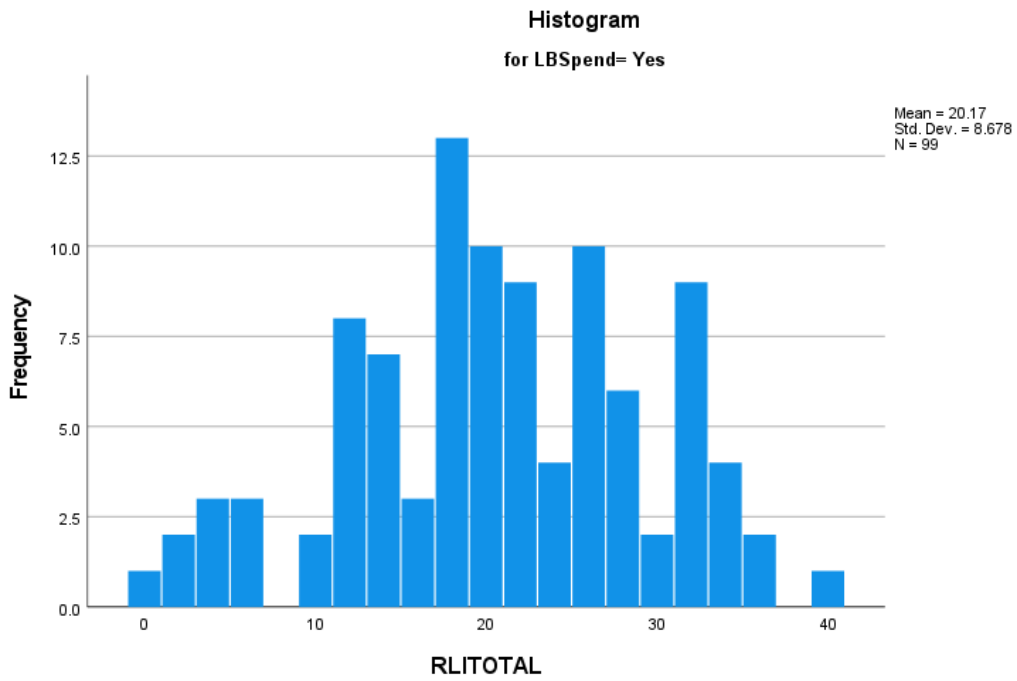
Do the difficulties interfere with your everyday life in the following areas?

	Not at all	Only a little	Quite a lot	A great deal
Home life	○	○	○	○
Friendships	○	○	○	○
Classroom learning	○	○	○	○
Leisure activities	○	○	○	○

Do the difficulties make it harder for those around you (family, friends, teachers, etc.)?

Appendix 2: Additional Data

RLI Score - Combined Sample



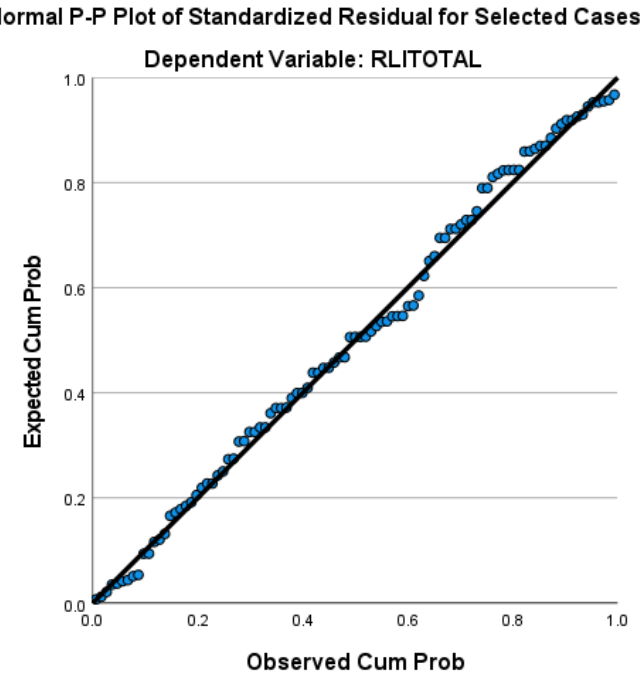
Tests of Normality

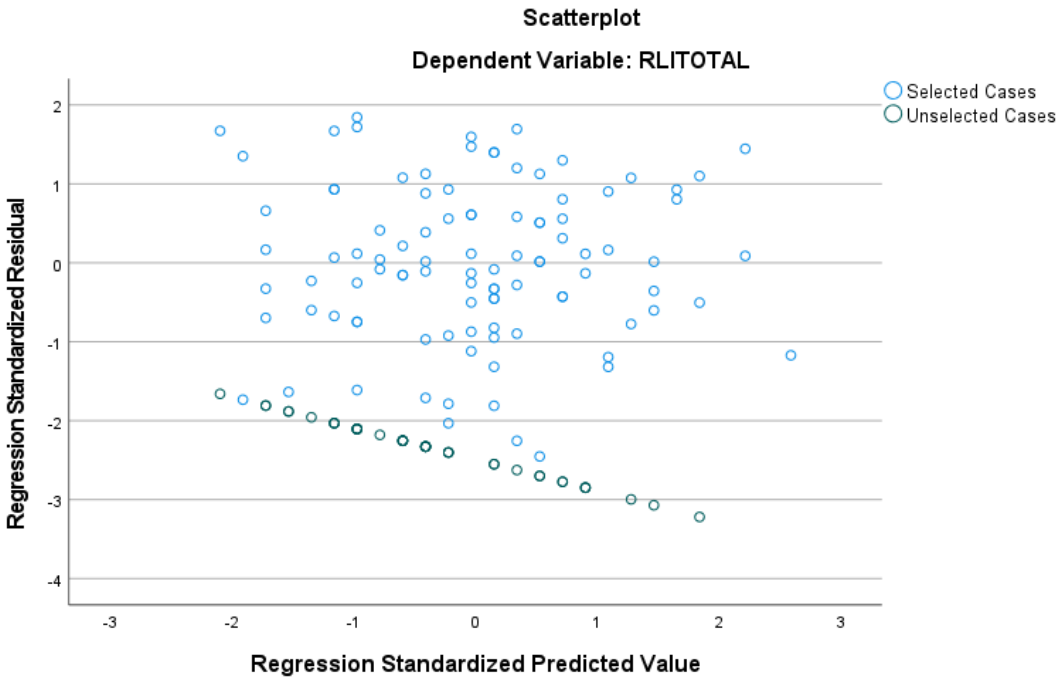
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	LBSpend	Statistic	df	Sig.	Statistic	df	Sig.
RLITOTAL	No	.	42	.	.	42	.
	Yes	.064	99	.200*	.981	99	.165

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Combined Sample RLI Total vs 9 IVs (Forward MLR)





Residuals Statistics[a,b]

	LBSpend = Yes (Selected)					LBSpend ~= Yes (Unselected)				
	Minimum	Maximum	Mean	Std. Deviation	N	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	13.44	28.49	20.17	3.214	99	13.44	26.08	19.04	2.980	42
Std. Predicted Value	-2.094	2.588	.000	1.000	99	-2.094	1.839	-.351	.927	42
Standard Error of Predicted Value	.815	2.269	1.103	.332	99	.824	1.897	1.111	.275	42
Adjusted Predicted Value	12.66	29.30	20.16	3.226	99	13.44	26.08	19.04	2.980	42
Residual	-19.868	14.947	.000	8.061	99	-26.080	-13.442	-19.045	2.980	42
Std. Residual	-2.452	1.845	.000	.995	99	-3.219	-1.659	-2.351	.368	42
Stud. Residual	-2.468	1.863	.000	1.005	99	-3.149	-1.615	-2.328	.366	42
Deleted Residual	-20.128	15.247	.008	8.234	99	-26.080	-13.442	-19.045	2.980	42
Stud. Deleted Residual	-2.536	1.888	-.001	1.014	99	-3.149	-1.615	-2.328	.366	42
Mahal. Distance	.001	6.696	.990	1.322	99	.023	4.157	.933	.997	42
Cook's Distance	.000	.086	.011	.017	99	.032	.249	.057	.040	42
Centered Leverage Value	.000	.068	.010	.013	99	.000	.042	.009	.010	42

a. Dependent Variable: RLITOTAL

b. Pooled Cases

Model Summary[b,c]

Model	R LBSpend = Yes (Selected)	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.370[a]	.137	.128	8.102	.137	15.419	1	97	.000

a. Predictors: (Constant), GASTOTAL

b. Unless noted otherwise, statistics are based only on cases for which LBSpend = Yes.

c. Dependent Variable: RLITOTAL

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1012.198	1	1012.198	15.419	.000[c]
	Residual	6367.883	97	65.648		
	Total	7380.081	98			

a. Dependent Variable: RLITOTAL

b. Selecting only cases for which LBSpend = Yes

c. Predictors: (Constant), GASTOTAL

Appendix 3

Author Guidelines

https://acamh.onlinelibrary.wiley.com/hub/journal/14753588/forauthors.html

Why submit to *Child and Adolescent Mental Health*?

- An international journal with a growing reputation for publishing work of clinical relevance to multidisciplinary practitioners in child and adolescent mental health
- Ranked in ISI: 67/129 (Pediatrics); 121/156 (Psychiatry); 100/143 (Psychiatry (Social Science)); 89/131 (Psychology, Clinical).
- 7,319 institutions with access to current content, and a further 6,696 institutions in the developing world
- High international readership - accessed by institutions globally, including North America (34%), Europe (34%) and Asia-Pacific (11%)
- Excellent service provided by editorial and production offices
- Opportunities to communicate your research directly to practitioners
- Every manuscript is assigned to one of the Joint Editors as decision-making editor; rejection rate is around 82%
- Acceptance to Early View publication averages 5 weeks
- Simple and efficient online submission – visit http://mc.manuscriptcentral.com/camh_journal
- Early View – articles appear online before the paper version is published. Click here to see the articles currently available
- Authors receive access to their article once published as well as a 25% discount on virtually all Wiley books
- All articles published in CAMH are eligible for Panel A: Psychology, Psychiatry and Neuroscience in the Research Excellence Framework (REF)

1. Contributions from any discipline that further clinical knowledge of the mental life and behaviour of children are welcomed. Papers need to clearly draw out the clinical implications for mental health practitioners. Papers are published in English. As an international journal, submissions are welcomed from any country. Contributions should be of a standard that merits presentation before an international readership. Papers may assume any of the following forms: Original Articles; Review Articles; Innovations in Practice; Narrative Matters; Debate Articles.

CAMH considers the fact that services are looking at treating young adults up until the age of 25, with the evidence that brains continue to develop until the age of 25, as well as the fact that a lot of issues that affect young adults and students are also relevant and topical to older adolescents. CAMH offers a discretionary approach and will take into consideration papers that extend into young adulthood, if they are pertinent developmentally to the younger population and contribute further to a developmental perspective across adolescence and early adult years.

Authors are asked to remember that CAMH is an international journal and therefore clarification should be provided for any references that are made in submitted papers to the practice within the authors' own country. This is to ensure that the meaning is clearly understandable for our diverse readership. Authors should make their papers as broadly applicable as possible for a global audience.

Original Articles: Original Articles make an original contribution to empirical knowledge, to the theoretical understanding of the subject, or to the development of clinical research and practice.

Review Articles: These papers offer a critical perspective on a key body of current research relevant to child and adolescent mental health. The journal requires the pre-registration of review protocols on any publicly accessible platform (e.g. The International Prospective Register of Systematic Reviews, or PROSPERO).

Short Research Articles: Short Research Articles should consist of original research of any design that presents succinct findings with topical, clinical or policy relevance. For example, preliminary novel findings from pilot studies, important extensions of a previous study, and topical surveys.

Letters to the Editor: These are short articles that offer readers the opportunity to respond to articles published in CAMH. Letters must only discuss issues directly relevant to the content of the original article such as to add context, correction, offer a different interpretation, or extend the findings.

Innovations in Practice: These papers report on any new and innovative development that could have a major impact on evidence-based practice, intervention and service models.

Narrative Matters: These papers describe important topics and issues relevant to those working in child and adolescent mental health but considered from within the context and framework of the Humanities and Social Sciences.

Debate Articles: These papers express opposing points of view or opinions, highlighting current evidence-based issues, or discuss differences in clinical practice.

Technology Matters: These papers provide updates on emerging mental health technologies and how they are being used with and by children and young people.
2. Submission of a paper to *Child and Adolescent Mental Health* will be held to imply that it represents an original submission, not previously published; that it is not being considered for publication elsewhere; and that if accepted for publication it will not be published elsewhere without the consent of the Editors.

3. Manuscripts should be submitted online. For detailed instructions please go to: **http://mc.manuscriptcentral.com/camh_journal** and c*heck for existing account* if you have submitted to or reviewed for the journal before, or have forgotten your details. If you are new to the journal c*reate a new account.* Help with submitting online can be obtained from the Editorial Office at ACAMH (email: **publications@acamh.org**)

4. Authors' professional and ethical responsibilities

Disclosure of interest form
All authors will be asked to download and sign a full Disclosure of Interests form and acknowledge this and sources of funding in the manuscript.

Ethics
Authors are reminded that the *Journal* adheres to the ethics of scientific publication as detailed in the ***Ethical principles of psychologists and code of conduct*** (American Psychological Association, 2010). These principles also imply that the piecemeal, or fragmented publication of small amounts of data from the same study is not acceptable. The Journal also generally conforms to the Uniform Requirements for Manuscripts of the International Committee of Medical Journal Editors (**ICJME**) and is also a member and subscribes to the principles of the Committee on Publication Ethics (**COPE**).
Informed consent and ethics approval

Authors must ensure that all research meets these ethical guidelines and affirm that the research has received permission from a stated Research Ethics Committee (REC) or Institutional Review Board (IRB), including adherence to the legal requirements of the study county. Within the Methods section, authors should indicate that 'informed consent' has been appropriately obtained and state the name of the REC, IRB or other body that provided ethical approval. When submitting a manuscript, the manuscript page number where these statements appear should be given.

Preprints
CAMH will consider for review articles previously available as preprints. Authors may also post the submitted version of a manuscript to a preprint server at any time. Authors are requested to update any pre-publication versions with a link to the final published article. Please find the Wiley preprint policy **here**.

Note to NIH Grantees
Pursuant to NIH mandate, Wiley-Blackwell will post the accepted version of contributions authored by NIH grant-holders to PubMed Central upon acceptance. This accepted version will be made publicaly available 12 months after publication. For further information, see **www.wiley.com/go/nihmandate**.

Recommended guidelines and standards
The Journal requires authors to conform to CONSORT 2010 (see **CONSORT Statement**) in relation to the reporting of randomised controlled clinical trials; also recommended is the **Extensions of the CONSORT Statement** with regard to cluster randomised controlled trials). In particular, authors must include in their paper a flow chart illustrating the progress of subjects through the trial (CONSORT diagram) and the CONSORT checklist. The flow diagram should appear in the main paper, the checklist in the online Appendix. Trial registry name, registration identification number, and the URL for the registry should also be included at the end of the methods section of the Abstract and again in the Methods section of the main text, and in the online manuscript submission. Trials must be registered in one of the ICJME-recognised trial registries:

Australian New Zealand Clinical Trials Registry

Clinical Trials
Neth**erlands Trial Register**
ISRCTN Registry
UMIN Clinical Trials Registry

Manuscripts reporting systematic reviews or meta-analyses will only be considered if they conform to the **PRISMA Statement**. We ask authors to include within their review article a flow diagram that illustrates the selection and elimination process for the articles included in their review or meta-analysis, as well as a completed PRISMA Checklist. The journal requires the pre-registration of review protocols on any publicly accessible platform (e.g. The International Prospective Register of Systematic Reviews, or PROSPERO).

The **Equator Network** is recommended as a resource on the above and other reporting guidelines for which the editors will expect studies of all methodologies to follow. Of particular note are the guidelines on qualitative work **http://www.equator-network.org/reporting-guidelines/evolving-guidelines-for-publication-of-qualitative-research-studies-in-psychology-and-related-fields** and on quasi-experimental **http://www.equator-network.org/reporting-guidelines/the-quality-of-mixed-methods-studies-in-health-services-research** and mixed method designs **http://www.equator-network-or/reporting-guidelines/guidelines-for-conducting-and-reporting-mixed-research-in-the-field-of-counseling-and-beyond**

CrossCheck
An initiative started by *CrossRef* to help its members actively engage in efforts to prevent scholarly and professional plagiarism. The journal to which you are submitting your manuscript employs a plagiarism detection system. By submitting your manuscripts to this journal you accept that your manuscript may be screened for plagiarism against previously published works.
5. Manuscripts should be double spaced and conform to the house style of *CAMH*. The title page of the manuscript should include the title, name(s) and address(es) of author(s), an abbreviated title (running head) of up to 80 characters, a correspondence address for the paper, and any ethical information relevant to the study (name of the authority, data and reference number for approval) or a statement explaining why their study did not require ethical approval.
Summary: Authors should include a structured Abstract not exceeding 250 words under the sub-headings: Background; Method; Results; Conclusions.

Key Practitioner Message: Below the Abstract, please provide 1-2 bullet points answering each of the following questions:

- **What is known?** - What is the relevant background knowledge base to your study? This may also include areas of uncertainty or ignorance.
- **What is new?** - What does your study tell us that we didn't already know or is novel regarding its design?
- **What is significant for clinical practice?** - Based on your findings, what should practitioners do differently or, if your study is of a preliminary nature, why should more research be devoted to this particular study?

Keywords: Please provide 4-6 keywords use **MeSH Browser** for suggestions

6. Papers submitted should be concise and written in English in a readily understandable style, avoiding sexist and racist language. Articles should adhere to journal guidelines and include a word count of their paper; occasionally, longer article may be accepted after negotiation with the Editors.

7. Authors who do not have English as a first language may choose to have their manuscript professionally edited prior to submission; a list of independent suppliers of editing services can be found at **http://authorservices.wiley.com/bauthor/english_language.asp**. All services are paid for and arranged by the author, and use of one of these services does not guarantee acceptance or preference for publication.

8. Headings: Original articles should be set out in the conventional format: Methods, Results, Discussion and Conclusion. Descriptions of techniques and methods should only be given in detail when they are unfamiliar. There should be no more than three (clearly marked) levels of subheadings used in the text.

9. All manuscripts should have an Acknowledgement section at the end of the main text, before the References. This should include statements on the following:

Study funding: Please provide information on any external or grant funding of the work (or for any of the authors); where there is no external funding, please state this explicitly.

Contributorships: Please state any elements of authorship for which particular authors are responsible, where contributorships differ between author group. (All authors must share responsibility for the final version of the work submitted and published; if the study include original data, at least one author must confirm that they had full access to all the data in the study and take responsibility for the integrity of the data in the study and the accuracy of the data analysis). Contributions from others outside the author group should also be acknowledged (e.g. study assistance or statistical advice) and collaborators and study participants may also be thanked).

Conflicts of interest: The journal requires that all authors disclose any potential sources of conflict of interest. Any interest or relationship, financial or otherwise that might be perceived as influencing an author's objectivity is considered a potential source of conflict of interest. These must be disclosed when directly relevant or directly related to the work that the authors describe in their manuscript. Potential sources of conflict of interest include, but are not limited to: patent or stock ownership, membership of a company board of directors, membership of an advisory board or committee for a company, and consultancy for or receipt of speaker's fees from a company, in the past 5 years. The existence of a conflict of interest does not preclude publication. If the authors have no conflict of interest to declare, they must also state this at submission. It is the responsibility of the corresponding author to review this policy with all authors and collectively to disclose with the submission ALL pertinent commercial and other relationships.

10. For referencing, *CAMH* follows a slightly adapted version of APA Style **http:www.apastyle.org/**. References in running text should be quoted showing author(s) and date. For up to three authors, all surnames should be given on first citation;

for subsequent citations or where there are more than three authors, 'et al.' should be used. A full reference list should be given at the end of the article, in alphabetical order.

References to journal articles should include the authors' surnames and initials, the year of publication, the full title of the paper, the full name of the journal, the volume number, and inclusive page numbers. Titles of journals must not be abbreviated. References to chapters in books should include authors' surnames and initials, year of publication, full chapter title, editors' initials and surnames, full book title, page numbers, place of publication and publisher.

11. Tables: These should be kept to a minimum and not duplicate what is in the text; they should be clearly set out and numbered and should appear at the end of the main text, with their intended position clearly indicated in the manuscript.

12. Figures: Any figures, charts or diagrams should be originated in a drawing package and saved within the Word file or as an EPS or TIFF file.
See **http://authorservices.wiley.com/bauthor/illustration.asp** for further guidelines on preparing and submitting artwork. Titles or captions should be clear and easy to read. These should appear at the end of the main text.

13. Footnotes should be avoided, but end notes may be used on a limited basis.

Data Sharing and Supporting Information

CAMH encourages authors to share the data and other artefacts supporting the results in the paper by archiving them by uploading it upon submission or in an appropriate public repository. Examples of possible supporting material include intervention manuals, statistical analysis syntax, and experimental materials and qualitative transcripts.
1. If uploading with your manuscript please call the file 'supporting information' and reference it in the manuscript.
2. Please note supporting files are uploaded with the final published manuscript as supplied, they are not typeset.
3. On publication your supporting information will be available alongside the final version of the manuscript online.
4. If uploading to a public repository please provide a link to supporting material and reference it in the manuscript. The materials must be original and not previously published. If previously published, please provide the necessary permissions. You may also display your supporting information on your own or institutional website. Such posting is not subject to the journal's embargo date as specified in the copyright agreement. Supporting information is made free to access on publication.
Full guidance on Supporting Information including file types, size and format is available on the **Wiley Author Service** website.
For information on Sharing and Citing your Research Data see the **Author Services website here**.

Original Articles

Original Articles make an original contribution to empirical knowledge, to the theoretical understanding of the subject, or to the development of clinical research and practice. Adult data is not usually accepted for publication unless it bears directly on developmental issues in childhood and adolescence.

Your Original Article should be no more than 5,500 words including tables, figures and references.

Review Articles

Research Articles offer our readers a critical perspective on a key body of current research relevant to child and adolescent mental health and maintain high standards of scientific practice by conforming to systematic guidelines as set out in the PRISMA statement. These articles should aim to inform readers of any important or controversial issues/findings, as well as the relevant conceptual and theoretical models, and provide them with sufficient information to evaluate the principal arguments involved. All review articles should also make clear the relevancy of the research covered, and any findings, for clinical practice.

Your Review Article should be no more than 8,000 words excluding tables, figures and references and no more than 10,000 including tables, figures and references.

Short Research Articles

Short Research Articles should consist of original research of any design that presents succinct findings with topical, clinical or policy relevance. For example, preliminary novel findings from pilot studies, important extensions of a previous study, and topical surveys. Short Research Articles will be peer reviewed and authors might be asked to revise and edit their article to acceptable standards for publication. Short Research Articles should follow standard guidelines, such as STROBE for observational studies, CONSORT extension for pilot trials etc.

Your Short Research Article should be 1500 words, excluding references, tables and graphs/figures. Your article should be structured, including the subheadings Introduction/Methods/Results/Discussion. There is a maximum of 1 table and 1 graph/figure. Please do not include more than 12 references.

Narrative Matters: The Medical Humanities in CAMH
These articles are both submissions and directly commissioned papers. They will be peer-reviewed. The articles should be on a humanities topic relevant to those working in child and adolescent mental health. The topics can include but are not restricted to: aspects of child mental health service history; representations of abnormal mental states or mental illness in children and teenagers in film, literature or drama; depictions of child mental health clinicians within popular culture; ethical dilemmas in the speciality. Interest and originality are valued. If in doubt, please contact the section
editor:

The essays should be between 1500 and 2000 words and written for an audience of child mental health professionals. For publishing reasons, there is an upper limit of 8 references for the article. Additional references may be given in the text if necessary.

Letters to the Editor
Letters to the Editor are short articles that offer readers the opportunity to respond to articles published in CAMH. Letters must only discuss issues directly relevant to the content of the original article such as to add context, correction, offer a different interpretation, or extend the findings. Letters will be evaluated for relevance to the index paper, scientific merit, and importance.

Letters should be submitted not later than 2 weeks after publication of the print issue of the Journal containing the paper of interest. Please note - all papers are published on Early View as soon as they are accepted. The letters should avoid personal attacks and unscholarly communication.

Letters will not be peer reviewed. However, the section Editor will review the letters and might consult another Editor before acceptance or rejection.
Due to the short length of this article type, your Letter should be between 500 and 700 words with a maximum of one figure or table. If in doubt, please contact the section editor

Innovations in Practice

Innovations in Practice promote knowledge of new and interesting developments that have an impact on evidence-based practice, intervention and service models. These might have arisen through the application of careful, systematic planning, a response to a particular need, through the continuing evolution of an existing practice or service, or because of changes in circumstances and/or technologies. Submissions should set out the aims and details of the innovation including any relevant mental health, service, social and cultural contextual factors, and give a close, critical analysis of the innovation and its potential significance for the practice of child and adolescent mental health.

Due to the short length of this article type, your Innovations in Practice article should be no more than 2,200 words including tables, figures and references and contain no more than 8 references.
Debate Articles

Our debate articles express opposing points of view or opinions, highlighting current evidence-based issues, or discuss differences in clinical practice. Although discussion of evidence is welcome, these articles generally do not include primary data. The evidence on which your arguments are based and how that was sourced should be explicit and referenced, and the quality of your evidence made clear.

Due to the short length of this article type, your Debate article should be no more than 1,000 words and contain no more than 8 references. If in doubt, please contact the section editor

Technology Matters

Technology Matters provides updates on emerging mental health technologies and how they are being used with and by children and young people. We aim to cover established technologies such as computer-assisted psychological interventions as well as more novel technologies (e.g. mobile apps, therapeutic games, virtual reality). We will present the evidence base for their use, showcase how they can complement other interventions and are being used in practice and address wider cross-cutting issues (such as technology accreditation, regulation, cost etc.) relevant to practitioners and service funders.
Your paper should be between 1000 and 1500 words. Please do not include more than 7 references. If in doubt, please contact the section editors or .

Manuscript Processing

Peer Review Process: All material submitted to CAMH is only accepted for publication after being subjected to external scholarly peer review, following initial evaluation by one of the Editors. Both original and review-type articles will usually be single-blind reviewed by a minimum of two external referees and only accepted by the decision Editor after satisfactory revision. Any appeal of an editorial decision will first be considered by the initial decision Editor, in consultation with other Editors. Editorials and commissioned editorial opinion articles will usually be subject to internal review only, but this will be clarified in the published Acknowledgement section. Editorial practices and decision making will conform to COPE **http://publicationethics.org/resources/guidelines** and ICMJE **http://icmje.org/** best practice.

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School of Health in Social Science Research Ethics Application

The supervisor or primary investigator must complete and sign this form after checking that all relevant sections are completed, and relevant documents are attached. For all undergraduate (UG) and MSc student projects, it is the supervisor's responsibility to submit this form and all attachments. Please note that failure to do this will result in the application being returned (and not processed) causing your research to be delayed.

Supervisor (name and UUN: Professor Jo Williams	
Primary Investigator (name and UUN): Rob Joice 2137963	
List of all collaborators (with affiliated institutions in brackets):	
Student's programme of study (if applicable): Doctorate in Clinical Psychology	
Project Title: Risky Loot Box Spending– An Exploration of Risk and Protective Factors in Young People	
Case Number (if known – assigned by Administrator at time of 1st submission):	
Proposed Project Start Date:March/April 2023	**Proposed Project End Date:August 2023**

Please indicate whether the primary investigator on this project is staff or student and select your subject area:

☐ Staff ☐UG or MSc Student ☒DClin Student ☐PhD Student

☐ CPASS Studies ☒Clinical Psychology ☐ Nursing

This is a:

☒New application for ethical review– first submission
☐Resubmission following reviewer comments
☐ Resubmission with requested amendments

Has been reviewed by an external ethical board, such as NHS IRAS or a UK HEI (multi-site studies only) with a favourable opinion? Level 1 *

☐ IRAS (NHS research ethics) ☐ Other: ____n/a_____

Please tick one option that best describes your application:

☒ Collecting or generating new data involving other people: Level 2

☐ Extracting, re-coding and analysing existing data that contains sensitive information (i.e. identifiable information): Level 2

☐ Analysing secondary (archival) data that is routinely collected or is an existing anonymised dataset: Level 1

☐ Collecting new data BUT an external ethical review board (such as NHS IRAS; UK HEI – for multi-site studies; etc) has fully reviewed this project and generated a favourable opinion: Level 1

This application is complete with the following attachments (tick <u>all</u> that apply):

Advert/flyer ☒	Caldicott application stating what data was requested ☐	Caldicott signed approval ☐		Consent form/s ☒
Data collection tools (e.g. interview guides) ☐	Debrief with signposting ☒	IRAS application ☐	IRAS opinion letter☐	NGO or local authority letters ☐
Participant Information Sheet/s ☒	Participant Information Sheet (young person version) ☒	R&D application ☐	R&D approval ☐	Researcher Checklist (C-19) ☒
Risk assessment ☒	Standardised recruitment email ☒	Sponsorship Letter OR Email to confirm no sponsorship needed / statement explaining why sponsorship is not needed. ☒		

Other attachments (please specify):

- Participant Questionnaire-based Survey

To be completed by primary investigator or project supervisor

By signing this front sheet, I confirm that I have prepared and/or reviewed this ethics application and related documents in accordance with ethical guidelines. I also confirm I have checked that all relevant sections of the application form are completed and relevant documents are attached.

Supervisor or/PI Signature:

J. Williams

Student signature:

R. Joice

Date: 21/04/23

On completion, this Word document along with the relevant attachments should be submitted to ethics.hiss@ed.ac.uk.

Note:**Please note all undergraduate and MSc applications MUST been signed and submitted by the project supervisor.**

Contents

This section is to be completed after review only

ISSUES ARISING FROM THE PROPOSAL – to be completed by Ethics Reviewer

Thank you for your application. The review process has generated the following queries regarding your application. Please address the following items, and provide a note underneath each comment letting us know how you have addressed them:

Main application **Please view Bookmarks to quickly go to comments/responses in main application, labelled per item #.**

1. Please have your supervisor sign this form above.
2. I would like to ask you to seek active consent from parents instead of an opt-out.
3. Do you need approval from the council to approach schools? If so, please explain this in the application.
4. Could the researcher clarify how long any paper copies of documents will be stored (this includes consent forms as well as questionnaires)?
5. Under Q25 I'm a bit confused how any of the measures used would indicate child abuse. If it were to, how would the researcher be able to identify the participant to handle the issue?
6. It's good that a power calculation has been conducted, but if there are 9 independent variables then why are there 11 predictors? Was a medium effect size based on previous research or an estimate?
7. Q34 it makes sense to enter the data into SPS S from paper surveys, but the study outline implies that the researcher will enter responses into Qualtrics – please make this consistent.
8. Q33: is there a reason to have "male and female biological sex" as an inclusion criteria?

Documents

9. Please include a consent form for the parents.
10. Might be worth adding to the consent that the person's data up to the point of withdrawal will be retained (if I'm correct in saying that!)
11. Please write a specific section on how data will be stored and used, so that it is clear and explicit to the young participant, especially since it is one of the clauses of the informed consent right afterwards.
12. The PIS explains they can stop taking part for any reason at any point and their answers will be deleted. Can they withdraw their data from the study once data has been collected? If so, how is data linked to their names and how is that kept confidential? If not, please specify.
13. Will/Can data be used for future ethically approved research? How long will data be stored?
14. Please include lead researcher, independent researcher and head of school contact details in the debrief sheet as well in the debrief sheet.
15. Protocol: This and the ethics form are the only document that mentions participants' contact details. Please make it explicit, here and elsewhere, how these details (name, email), will be stored, and whether they will be linkable to their collected data.

Signature: Zsofia Garai-Takacs (sig)

Position: Ethics & Integrity Lead

Date: 18/04/2023

APPLICANT'S SIGNATURE FOLLOWING REVISIONS – <u>to be completed by applicant</u>

I confirm that I have addressed all of the queries generated during the ethical review process of my application. I have outlined in the box above underneath each comment how each request was addressed and/or provided further clarification.

Supervisor/PI Signature:

Student signature:

Date: 09/05/2023

CONCLUSION TO ETHICAL REVIEW – <u>to be completed by Ethics Lead</u>

Thank you for providing responses to our comments. Some outstanding questions remain:

-It is unclear how the recruitment will be conducted. Will the forms be sent out to parents first and only children whose parents consented will be approached?

Yes – Bookmarked as "SummaryPConsent" and also updated Q43 & Q45

-Please indicate on the application and all the forms for how long the anonymized data will be kept.

Included at end of Project Summary. Updated Q46

All forms previously sent clarify that their responses will be securely deleted at a maximum of 12 months after participation.

-Please sign and have your supervisor sign the box above.

Done

Signature: Zsofia Garai-Takacs

Position: Ethics & Integrity Lead

Date: 04/05/2023

NOTE: Once reviewed please include the page on which this box appears as a formal document demonstrating that favourable opinion has been provided for this project (for example as an attachment to MSc dissertations).

The application satisfies the requirements for ethical practice and it has therefore received a favourable opinion.

Signature: Zsofia Garai-Takacs

Position: Ethics & Integrity Lead

Date: 11/05/2023

NOTE: Once reviewed please include the page on which this box appears as a formal document demonstrating that favourable opinion has been provided for this project (for example as an attachment to MSc dissertations).

If you are applying for amendments to a previously reviewed and processed project, please use the below form to detail the amendments you wish to make:

This section is to be completed for amendments only
AMENDMENT/S: REQUEST FOR APPROVAL – to be completed by applicant

I would like to apply for the following amendments to this previously processed project which had generated a favourable opinion:
 	
I am hoping to modify the project in the following ways:
 	
• To recruit an online-only sample to complete the survey
  ○ These participants would be aged 16-18 and live in Scotland
  ○ Recruited via Facebook/Instagram ads (sample attached)
  ○ I hope to seek only participant consent for this group – The participant consent form and debrief have been modified to reflect this (both attached)
 	
Supervisor/PI Signature:
 	
Student signature:
 	
Date: 30/06/23

CONCLUSION TO ETHICAL REVIEW OF AMENDMENT – to be completed by Ethics Lead

The requested amendment satisfies the requirements for ethical practice and it has therefore received a favourable opinion.

Signature: Zsofia Garai-Takacs (sig)

Position: Ethics & Integrity Lead

Date: 06/07/2023

NOTE: Once reviewed please include the page on which this box appears as a formal document demonstrating that favourable opinion has been provided for this project (for example as an attachment to MSc dissertations).

LEVEL 1 and 2 – Confidentiality and Handling of Data

Section 1: Introduction

External Research Ethics Approval:

Does your research project require the approval of any other institution and/or ethics committee, nationally or internationally?

Note: It is each researcher's responsibility to check whether their project requires Sponsorship, Caldicott Approval, R&D approval, and/or IRAS (see https://www.ed.ac.uk/health/research/ethics/sponsorship-and-governance). The principal investigator is responsible for ensuring compliance with any additional ethical requirements that might apply, and/or for compliance with any additional requirements for review by external bodies.

☐This research project does not require external ethics approval.

OR

If you require external approval, please state the name of the review body:

☐ IRAS (NHS research ethics) ☒Local Authority ☐ Other: _____

NB: If you require external approval from IRAS/NHS/Caldicott, **you must have external approval before submitting your application for School of Health in Social Science Research Ethics approval**. You can only submit your application to us once external approval has been obtained, and you must include all documentation including your application to and approval of external approval as an attachment.

If you require approval from a **local authority**, you must first receive ethics approval from the School of Health in Social Science Research Ethics Committee, before submitting your application to the local authority.

Q1. Project summary

Please provide a brief summary of your proposed study. Do not exceed 1500 words. Our interest is in areas of your methodology where ethical issues may arise so please focus your detail on areas such as recruitment, consent, describing your participants and the nature of their involvement, and data handling.

In-Game Spending: A Social and Policy Concern

Since 2009, the video game industry hasprogressively introduced a controversial monetization strategy into video games. This strategy is known as “loot boxes,” which are defined as “any game-related purchase with a chance-based outcome” (Close and Lloyd, 2021).

The loot box component of in-game spending was a £21 billion industry in 2021 with profits projected toincrease to over £35 billion by 2022 (De Camp, 2021). Around 93% of children in the UK play video games (Children’s Commissioner, 2019.)Around 49-78% of adults who game have engaged in loot box purchases (Zendle and Cairns, 2018; Brooksand Clark, 2019). De Camp (2021) suggests this figure may be lower for children and adolescents, between17-24.9%.

Loot boxes have become a controversial topic from a social, psychological, economical, and ethical perspective. They are accused of facilitating behaviour akin to gambling due to similarities in the use of intermittent reinforcement, whereby the user pays money for a “chance” at acquiring a desirable in-game item, usually against poor odds (Close and Lloyd, 2021). Popular games that focus heavily on loot box purchases such as FIFA (Pan European Game Information, 2021) and Pokémon Go (Google Play Store, 2021) are rated as appropriate for ages 3+ and 7+ respectively. However, PEGI declares that games which contain gambling mechanics are automatically rated as appropriate for 18+, with some older titles prior to 2020 rated as 12+ or 16+ (Pan European Game Information, 2021) and yet appear to deem loot boxes as appropriate to the “in-game purchases” category and not akin to simulation of gambling.

Research linking problematic gambling with higher loot box engagement has led some governments to ban the practice for under 18s, such as Belgium in 2018 (Gerken, 2018) and China in 2019 (Xiao, 2020), with several countries considering regulation, such as the UK (UK Government, 2020) and the Netherlands (Dutch Government, 2018).

Loot boxes are relatively new phenomena,and the psychological literatureis still in its infancy. While psychological research has explored impact of video/gaming violence, screentime and internet safety, the issue of in-game spending has received little psychological research attention.However, several studies (such as Close et al, 2021) have found positive correlations between problem gamblingbehaviours and “risky loot box” engagement. Drummond and Sauer (2018) also argue that empiricalassessments are needed to understand whether loot boxes and gambling have the same “addiction-likequalities”.

González-Ortega et al (2013) suggest that “impulsivity, maladjustment in everyday life and age at gambling onset were the best predictors” of pathological gambling. Emond and Griffiths (2020) found that adolescents who exhibited problem gambling behaviours tended to be lower in self-esteem, have parents who gamble, are supervised by their parents less frequently, consume more alcohol than their peers and have a history of hyperactivity and impulsivity. De Camp (2021) found additional risk factors of gender, victimization, and substance use. Loot box purchasing was poorly predicted by these predictive models of problematic gambling. There appears to be agreement that a “link” between problem gambling and loot box purchasing is “robustly verified” (Close and Lloyd, 2021) but limited in distinguishing between correlation and causation in more specific predictive domains.

Clinical Psychology Perspectives on In-Game Spending

Clinical psychology has a key role in developing research around correlates of in-game spending, risk factors for high spending and associations with gambling. This is a new and under-researched area, and gaming developers are moving more quickly than research. There is also lack of awareness of the loot box phenomenon in CAMHS settings.

Furthermore, the emerging diagnostic category of “Internet Gaming Disorder” (IGD) in the DSM-V appears to share symptomatic overlap with other mental health difficulties and is also being considered a “non-substance addiction” (American Psychiatric Association, 2015). Thisleads to consideration of how underlying risk factors for the condition may elevate risk with problem gambling and/or risky loot box engagement. It is not well understood how this diagnosis may affect engagement with loot boxes. In London, the Centre for Gaming Disorders launched in 2019 alongside the Children and Young People gambling addiction service (NHS England, 2019; NHS Central and North West London NHS Foundation

Trust, 2021) with involvement of Clinical Psychologists.

Research in the area of loot box riskbrings us closer to understanding these phenomena to inform risk assessment and development of specific treatment pathways, for instance in specialist Gaming Disorders services or CAMHS.

Correlates of In-Game Spending

There is evidence of positive correlation between "problem gambling behaviours"and frequency of engagement with in-game loot boxes. About 37% of gambling related variables predicted variance in "Risky Lootbox Index" scores (Close et al, 2021), and in the UK Wardle and Zendle (2020) found that loot box buyers in the emerging adult population (16-24 years) were 11.4 times more likely to be problem gamblers. There is a lack of evidence yet that there is direct causality between specific risk factors, however, and much of this research is with adults.

IGD is a condition for further study in the DSM-V with several criteria that appear linked to risky loot box engagement (Zendle, 2020), and sharessymptomatic overlaps with other disorders. It is also being considered a "non-substance addiction." Biegun et al (2020) suggests that "social alienation" may also be a risk factor for IGD.

Child and Adolescent Risk Factors for In-Game Spending

Approximately half of loot box revenue is generated by the top 5% of spenders (those spending over £100 per month) (Close et al, 2021). Some risk factors have been identified for engagement in "risky" spending on loot boxes amongst young people: younger age,male gender, and high impulsivity (De Camp, 2021, Wardle and Zendle 2020).

There is little evidence that some specific populations that we may consider vulnerable to loot box mechanics (e.g., ASD, LD, OCD, ADHD symptoms) are engaged in higher loot box spending - the research has simply not been done yet. This study aims to develop our understanding of transdiagnostic symptoms contributing to the phenomena in the general population.

Proposed Project

Research Question

Multiple regression – What psychological risk factors (Gaming addiction, behavioural & emotional problems, and behavioural inhibition) are associated with high Risky Lootbox Index (RLI) score and high weekly spend on loot boxes?

Demographic Variables:

- Date of Birth
- Biological Sex
- Additional Support Needs status
- Free School Meal status
- Gaming platforms played
- Most played video game in last month
- Hours per week spent gaming

IVs – Risk Factors assessed through Psychometric Responses:

- Gaming Addiction Scale (GAS-7) (Lemmens et al, 2011)
- Strengths and Difficulties Questionnaire (SDQ 11-17) (Goodman, 2005)
    - Internalising Problems
    - Externalising Problems
    - Prosocial Scale
    - Total Difficulties Score
- Behavioural Inhibition & Activation System (BIS/BAS) (Carver & White, 1994)
    - Behavioural Inhibition System
    - Behavioural Activation System
        - Drive
        - Fun Seeking
        - Reward Responsiveness

DV:

- Weekly spend on loot boxes
- Risky Loot Box Index (RLI) (Brooks & Clark, 2019)

Hypotheses

- High gaming addiction is associated with high RLI score and weekly loot box spend;
- High total difficulties score (SDQ) is associated with high RLI score and weekly loot box spend;
- Low behavioural inhibitionand high behavioural activation system scores (BIS/BAS) is associated with high RLI score and weekly loot box spend;

Children in Scottish Borders schools in years S1 to S4 will be invited to participate in the study. A poster will advertise the project within schools prior to conducting data collection. Scottish Borders summary statistics data from 2020 indicates that approximately 4823 children across S1 to S4 would be able to participate from secondary schools in the Scottish Borders e.g. Peebles High, Earlston High, and Galashiels Academy. Approval from Scottish Borders Council will also be sought through the Educational Psychology department in order to approach schools.

Information forms have been developed for schools, participants, and their parents. A consent form for participants has also been developed and will be provided prior to taking part. Parents will also be provided with a consent form to include their child in the study. Information and consent forms would primarily be provided to parents through the school's email address. Responses will be collected and managed directly by the participating school. Schools will be responsible for ensuring that potential participants have parental consent, and in handling this data in adherence with their own data protection policy. Names and contact details of parents or children will not be shared with the lead investigator, nor will they be linkable with collected data.

Parental consent forms will be sent to parents in advance, and only children with this consent (as identified by school staff) will be invited to participate.

There is flexibility to conduct the survey either digitally or via paper form to meet logistical needs of schools. Participants will be provided with an information and consent form prior to taking part. Data collection will be conducted by the lead investigator and supported by teaching staff, for example in a classroom setting or school hall. The survey will take 15-20 minutes for most participants to complete. The Qualtrics survey is designed to be completed via mobile, tablet or PC. All digital responses will be recorded and stored on Qualtrics. In schools where paper surveys are preferred, all participants will be required to submit their completed forms in a "ballot box" for anonymity. These surveys will then be entered into Qualtrics by the lead investigator. The remaining paper forms will then be temporarily stored in a locked pilot case prior to transferring them to locked storage at the University of Edinburgh. All responses inputted into Qualtrics will then be transferred to Excel and SPSS for statistical analysis. Paper forms will be held for a maximum of 12 months following completion of the study and then securely disposed of. This includes consent forms as well as questionnaires. Individual online survey responses will also be securely deleted at a maximum of 12 months after study completion . Participants will be provided with a debrief sheet when they complete the study or decide to withdraw during participation.

Q2. Will you collect or use NHS data?

☐ Yes ☒ No

If "yes" – what NHS data will you collect or use?

Q3. What information about participants/data subjects will you collect and/or use?

No identifiable data will be collected in this study.

Q4. What training will staff who have access to the data receive on their responsibilities for its safe handling? Have all staff and students who have access completed the mandatory data protection training on the self-enrolment page of Learn?

The Primary Investigator has completed the following training:

- NIHR Good Clinical Practice (May 2022 Release)
- MANTRA

Q5. Will the information include special categories of personal data (health data, data relating to race or ethnicity, to political opinions or religious beliefs, trade union membership, criminal convictions, sexual orientations, genetic data and biometric data)?

☐ Yes ☒ No

If "yes" – Explain what safeguards e.g. technical or organisational you have in place; including any detailed protocols if this requires special and/or external processing, storage, and analysis.

Q6. Please indicate how your research is in the public interest:

☒ Your research is proportionate

☐ Your research is subject to a governance framework

☐ Research Ethics Committee (REC) review (does not have to be a European REC)

☐ Peer review from a funder

☐ Confidentiality Advisory Group (CAG) recommendation for support in England and Wales or support by the Public Benefit and Privacy Panel (PBPP) for Health and Social Care in Scotland

☐ Other

Q7. It is essential that you identify, and list all risks to the privacy of research participants. You will then need to consider the likelihood of the risks actually manifesting and the severity of harm if the risks actually manifest.

Risk	Likelihood of risk manifesting			Severity of harm		
	Remote	Possible	Probable	Minimal	Significant	Severe
Identifiable due to data linkage	☒	☐	☐	☒	☐	☐
Identifiable due to low participant numbers	☒	☐	☐	☒	☐	☐
Identifiable due to geographical location	☒	☐	☐	☒	☐	☐
Identifiable due to transfer of data	☒	☐	☐	☒	☐	☐
Identifiable due to access of data	☒	☐	☐	☒	☐	☐
Insert more rows as appropriate	☐	☐	☐	☐	☐	☐

Please use this text box to record any other risks and the likelihood of them occurring, along with the severity of harm. Please also use this when dealing with secondary data.

Please identify measures you could take to reduce or eliminate risks identified as possible/significant or probable/severe.

Q8. Will information containing personal, identifiable data be transferred to, shared with, supported by, or otherwise available to third parties outside the University?

☐ Yes ☒ No

If "yes" - Please explain why this necessary and how the transfer of the information will be made secure. If the third party is based outside the European Economic Area please obtain guidance from the Data Protection Officer.

Q9. Other than the use by third parties, will the data be used, accessed or stored away from University premises?

☒ Yes ☐ No

If "yes" - Describe the arrangements you have put in place to safeguard the data from accidental or deliberate access, amendment or deletion when it is not on University premises, including when it is in transit, and (where applicable) it is transferred outside the EEA.

Data obtained via paper format will be held securely off site in a secure pilot case and transferred to locked storage at the University of Edinburgh. Digital data will be maintained in Excel and SPSS on secure University servers and accessed remotely.

Q10. Will feedback of findings be given to your research project participants or data subjects?

☒ Yes ☐ No

If "yes" - How and when will this feedback be provided?

Overall findings from the participant sample will be disseminated, as per below, following submission of final thesis. Possible dissemination in September 2023.

If "no" - Please provide rationale for this.

Q11. How do you intend to use/disseminate the results of your research project?

Findings will be disseminated within a CAMHS setting as a presentation to professionals and potentially also to teaching staff, participants, and their parents through participating schools. This will take the format of a lay report, poster, and presentation to discuss the implications of the research. Findings will also inform completion of doctoral thesis, with a view to potential publication.

Section 2: Security-sensitive material

The Terrorism Act (2006) outlaws the dissemination of records, statements and other documents that can be interpreted as promoting or endorsing terrorist acts.

Q12. Does your research involve the storage on a computer of any such records, statements or other documents?

☐ Yes ☒ No (if you answered no to this question please jump to section 3)

If "yes" - Please type 'Yes' to indicate that you agree to store all documents on that file store

Q13. Might your research involve the electronic transmission (for example, as an email attachment) of such records or statements?

☐ Yes ☒ No

If "yes" - Please type 'Yes' to indicate that you agree not to transmit electronically to any third party documents stored in the file store

Q14. Will your research involve visits to websites that might be associated with extremist, or terrorist, organisations?

☐ Yes ☒ No

If "no", please proceed to Question 15.

If "yes" - You are advised that such sites may be subject to surveillance by the police. Accessing those sites from University IP addresses might lead to police enquiries. Please type 'Yes' to acknowledge that you understand this risk

By submitting to the ethics process, you accept that your School Research Ethics Officer and the convener of the University's Compliance Group will have access to a list of titles of documents (but not the contents of documents) in your document store. *Please type 'Yes' to acknowledge that you accept this.*

Please confirm that you have contacted your School Research Ethics Officer to discuss security-sensitive material by ticking 'Yes'

☐ Yes, I have contacted my School's Research Ethics Officer

☐ No, I have not contacted my School's Research Ethics Officer

Section 3: Copyright

Q15. Does your project require use of copyrighted material?

☐ Yes ☒ No

If "yes" please give further details

Section 4: Good conduct in collaborative research

Q16. Does your project involve working collaboratively with other academic partners?

☐ Yes ☒ No (if you answered no to this question please jump to section 5)

If "yes" - Is there a formal agreement in place regarding a collaborative relationship with the academic partner(s)?

If "no" - Please explain why there is no formal agreement in place

Not required

Q17. Does your project involve working collaboratively with other non-academic partners?

☐ Yes ☒ No

If "yes" - Is there a formal agreement in place regarding a collaborative relationship with the non-academic partner(s)?

If "no" - Please explain why there is no formal agreement in place.

Not required

Q18. Does your project involve employing local field assistants (including guides/translators)?

☐ Yes ☒ No

If "yes" - Is there a formal agreement in place regarding the employment of local field assistants (including guides and translators)?

If "no" - Please explain why there is no formal agreement in place

Not required

Q19. Will care be taken to ensure that all individuals involved in implementing the research adhere to the ethical and research integrity standards set by the University of Edinburgh?

☒ Yes ☐ No

If "no" - Please explain why care will not be taken

Q20. Have you reached agreement relating to intellectual property?

☐ Yes ☒ No

If "no" - Please explain why you have not reached agreement

Not required

Section 5: Good conduct in publication practice

In publication and authorship, as in all other aspects of research, researchers are expected to follow the University's guidance on integrity. https://www.ed.ac.uk/governance-strategic-planning/content-to-be-removed/research-integrity. By ticking yes, you confirm that full consideration of the items described in this Section will be addressed as applicable

☒ Yes ☐ No

If you intend to collect new data, please continue completing the Level 2 application in the next page.

If you are NOT collecting any new data, you have now completed the Level 1 application. Please submit this document alongside all attachments to

LEVEL 2 ONLY – Participant Risk and Information

The following Sections are to be completed if you are collecting new data. Please do not complete it if you are using existing data.

Section 6: Potential risks to participants and researchers

Q21. Is your research project likely or possible to induce any psychological stress or discomfort in the participants or others, indirectly associated with the research?

☐ Yes ☒ No

If "yes" state the types of risk and what measures will be taken to deal with such problems

However, participants will be made aware that they can cease participation in the study at any point. A debrief sheet will also be provided to the participant when they complete the survey or withdraw during participation.

Q22. Does your research project require any physically-invasive or potentially physically harmful procedures?

☐ Yes ☒ No

If "yes" give details and outline procedures to be put in place to deal with potential problems.

Q23. Does your research project require the use of privacy-invasive technology, such as CCTV, biometrics, facial recognition, vehicle tracking software?

☐ Yes ☒ No

If "yes" - Give details and outline procedures to be put in place to deal with potential problems.

Q24. Does your research project involve the investigation of any illegal behaviour or activities?

☐ Yes ☒ No

If "yes" - Give details of any illegal behavior or activities you may investigate

Q25. Is it possible that your research project will lead to awareness or the disclosure of information about child abuse or neglect?

☐ Yes ☒ No

If "yes" - Indicate the likelihood of disclosure and the procedures to be followed if you become aware that a child has been or may be at risk of harm

Q26. Is it likely that dissemination of research findings or data could adversely affect participants or others indirectly associated with the research?

☐ Yes ☒ No

If "yes" - Describe the potential risk for participants/data subjects of this use of the data. Outline any steps that will be taken to protect participants.

Q27. Could participation in this research adversely affect participants and others associated with the research in any other way?

☐ Yes ☒ No

If "yes" - Describe the possible adverse effects and the procedures to be put in place to protect against them.

Q28. Is this research expected to benefit the participants, directly or indirectly?

☒ Yes ☐ No

If "yes" - Give details of how this research is expected to benefit the participants.

Findings are intended to inform the potential development of more effective psychological assessment and intervention for vulnerable groups who may be more prone to high loot box spending. It is hoped that this research will enhance the understanding of protective/risk factors involved, and boost awareness in clinical practice with a view to improving risk assessment and effective interventions. Presentation of findings to schools will also raise awareness of this contemporary issue.

Q29. Will the true purpose of the research be concealed from the participants/data subjects?

☐ Yes ☒ No

If "yes" - Explain what information will be concealed and why.

Q30. Will participants/data subjects be debriefed at the conclusion of the study?

☒ Yes ☐ No

If "no" – Why will participants / data subjects not be debriefed?

Q31. At any stage in this research could researchers' safety be compromised, or could the research induce emotional distress in the researchers?

☒ Yes ☐ No

If "yes" - Give details and outline procedures to be put in place to deal with potential problems.

Likelihood is very low. However, the lead investigator may at times be required to provide additional support, alongside teaching staff, to a participant who becomes distressed, out with a "formal" clinical practice setting. Any potential for this to occur will be explored in supervision and monitored as the project progresses.

Please tick to confirm you agree with the following:

I will adhere to School guidance on risk assessment and health and safety and will seek advice on project and travel insurance prior to project commencement.

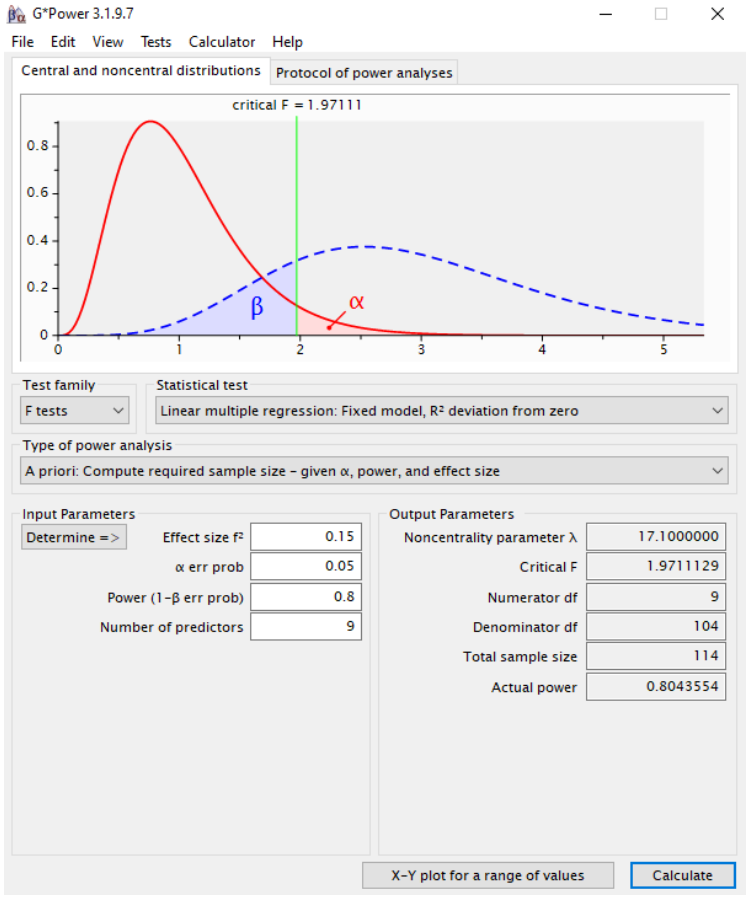
☒ I agree

☐ I do not agree

☐ Not applicable

Section 7: Participants and data subjects.

Q32. How many participants or data subjects are expected to be included in your research project?



Power: 0.8
Effect Size: 0.15 (medium) – based on previous research
Confidence level: 95%
Number of predictors: 9
Total sample size: 114

Q33. What criteria will be used in deciding on the inclusion and exclusion of participants/data subjects in your research project?

Inclusion:

- S1 to S4 pupils in mainstream secondary schools in Scottish Borders
- First language is English, or considered fluent by school staff

Exclusion:

- Pupils with a formal diagnosis of intellectual disability whom teaching staff have identified as unable to provide informed consent and complete the survey

Q34. Are any of the participants or data subjects likely to be under 16 years of age?

☒ Yes ☐ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

We will use identification numbers for participants to identify specific participants for data analysis. Digital responses will be stored using Qualtrics and then transferred to Excel and SPSS for analysis. Paper responses will be inputted into Qualtrics and transferred to Excel and SPSS for analysis.

Q35. Are any of the participants or data subjects likely to be children in the care of a Local Authority?

☒ Yes ☐ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

Some participants may be Looked After Children (LAC) within the mainstream school population and will have mainstream school support for all activities in schools. The lead investigator and school staff will be available to support LACs during data collection, and they will be provided with the same participant information and consent forms, and any concerns regarding risk of harm to self or others would be managed in the same way as for other participants.

Q36. Are any of the participants or data subjects likely to be known to have additional support needs?

☒ Yes ☐ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

Additional completion time will be offered where appropriate. The lead investigator and teaching staff will be available to support those with ASNs during the data collection sessions (e.g., to clarify survey questions).

Q37. In the case of participants with additional support needs, will arrangements be made to ensure informed consent?

☐ Yes ☒ No ☐ N/A

If "yes" – What arrangements will be made?

If "no" – Please explain why not

Parental consent will be sought for all particiants. All participants will be provided with a participant information form and consent form.

Q38. Are any of the participants or data subjects likely to be physically or mentally ill?

☒ Yes ☐ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

Any physical or mental illness will not be explicitly recorded though some psychometric scores may indicate mental health or neurodevelopmental symptoms of clinical concern. However, such measures would not be used as formal diagnostic assessment tools. All participant responses will remain confidential and anonymous, and participants will be readily supported by school for concerns with physical or mental illness that they directly disclose to school staff or the lead investigator. Concerns that are only highlighted through survey responses will only be reported back to school at the level of school cohort.

Q39. Are any of the participants or data subjects likely to be vulnerable or likely exposed to harm in other ways?

☐ Yes ☒ No

If "yes" - Explain and describe the nature of the vulnerability and the measures that will be used to protect and/or inform participants/data subjects.

Q40. Are any of the participants or data subjects likely to be unable to communicate in the language in which the research is conducted?

☐ Yes ☒ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

Q41. Are any of the participants or data subjects likely to be in a relationship (i.e., professional, student-teacher, other dependent relationship) with the researchers?

☐ Yes ☒ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

Q42. Are any of the participants or data subjects likely to have difficulty in reading and/or comprehending any printed material distributed as part of the study?

☒ Yes ☐ No

If "yes" - Explain and describe the measures that will be used to protect and/or inform participants/data subjects.

Principal Investigator/ facilitator and school staff will be able to provide more individualised support in the completion of the survey, and in clarification of participant information forms, consent forms, and debrief forms.

Q43. Describe how the sample will be recruited.

Once ethical approval has been granted, Borders LA and mainstream secondary schools in the Scottish Borders will be contacted via email and provided with an overview of the study. Those schools who agree to participate will be provided with information posters to advertise the study. The lead investigator will liaise with schools to identify the most effective way of conducting data collection, including the date/time/location that data collection will take place, as well as the prime method of data collection (digital vs paper completion) according to their resources. Parental consent forms will be sent to parents through the participating school in advance of data collection. Those children with parental consent, as identified by school staff, will be invited to participate. Data collection will take place during the school day during class time. Schools will also be provided with an e-mail or letter to provide parents with participant information and consent forms.

Q44. Will participants receive any financial or other material benefits as a result of participation?

☐ Yes ☒ No

If "yes" - What benefits will be offered to participants and why?

Section 8: Participant or data subject information and consent

Q45. Will written or oral consent be obtained from all participants or data subjects?

☒ Yes ☐ No

If "yes" – attach participant information sheet and consent form and detail the process you will follow.

If "no" – explain why not and what process you will follow regarding consent, or if consent cannot or should not be sought for some reason, please provide a clear case and rationale for this (e.g. in international contexts where speaking to foreign researchers is prohibited).

Following LA approval, secondaryschools will be approached with a study information sheet and invitation for their pupils to participate. Following discussion with the school hard copy of electronic methods of data collection will be confirmed.

A parent information and consent form will be provided to parents either via email or letter by the school.
Children with parental consent will be invited to participate, and provided with the participant information and consent form prior to commencing the survey, either on paper or digitally according to school preference.

Please see all attached information and consent forms.
Standardised e-mails are also attached.

Q46. Have you made arrangements to tell participants what information you will hold about them and for how long?

☒ Yes ☐ No

If "yes" - what arrangements have been made?

Discussed in the participant and parent information forms. Information will be retained for a maximum of 12 months.

If "no" – why not?

Q47. Have you made arrangements to tell participants whether you will disclose the information to other organisations?

☒ Yes ☐ No ☐ N/A

If "yes" - What arrangements have been made?

Discussed in the participant and parent information forms.

If "no" – why not?

Q48. Have you made arrangements to tell participants whether you will combine that information with other data?

☐ Yes ☐ No ☒ N/A

If "yes" - What arrangements have been made?

Q49. In the case of children participating in the research, will the consent or assent of parents be obtained?

☒ Yes ☐ No ☐ N/A

If "yes" - Explain how this consent or assent will be obtained

Parents will be provided with consent form in advance of the survey.

If "no" – Please explain why you won't be obtaining consent

Q50. Will the consent or assent of children participating in the research be obtained?

☒ Yes ☐ No ☐ N/A

If "yes" - Explain how this consent or assent will be obtained

Participants will be required to read the participant information form and provide written or digital consent according to survey format (paper/digital).

If "no" – Please explain why not

Q51. In the case of participants who are not proficient in the language in which the research is conducted, will arrangements be made to ensure informed consent?

☐ Yes ☐ No ☒ N/A

If "yes" – What arrangements will be made?

If "no" – Please explain why not

Will be excluded from study

Q52. Does the activity involve using cookies or tracking individual's activity on a website or the Internet in general?

☐ Yes ☒ No

If "yes" – Describe the arrangements you have put in place to obtain informed consent for the use of these tools

You have now completed the Level 2 application. Please submit this document alongside all attachments to ethics.hiss@ed.ac.uk .