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社会比较如何预测网络游戏障碍

——战利品箱风险指数的中介作用

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摘　要

研究旨在探讨网络游戏障碍(Internet gaming disorder, IGD)的发生机制及其与社会比较和战利品箱风险指数(Risky loot box index, RLI)的相互关系。通过在线的方式进行数据收集，所有参与的游戏玩家报告了他们的社会人口特征，并对玩家的社会比较倾向、战利品箱风险指数和IGD风险程度进行了标准化评估。利用SPSS Process4.1分析了社会比较对RLI介导的游戏玩家IGD的影响。711名参与者成功完成了在线数据收集，其中634名被试(Female = 211)的有效数据被保留,平均年龄21.31，63.1%为在校大学生。结果显示社会比较以及RLI可以预测玩家的IGD水平；同时，RLI在社会比较对IGD的影响中起着部分中介的作用。这为未来网络游戏中的战利品箱监管提供了参考。

关键词

网络游戏障碍，社会比较，战利品箱风险指数

How Does Social Comparison Predict Internet Gaming Disorder?

—The Mediating Role of Risky Loot Box Index

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Abstract

This study aimed to investigate the mechanisms of Internet Gaming Disorder (IGD), examining its

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associations with social comparison and the Risky Loot Box Index (RLI). Data collection was conducted online. All participants reported their demographic characteristics and underwent standardized assessments for social comparison, IGD and RLI. SPSS Process 4.1 was used to analyze the mediating effects. A total of 711 participants completed our online survey, from which 634 eligible datasets (211 female) were retained for subsequent analysis. The mean age was 21.31 ± 2.07 years, and 63.1% were college students. The results suggest that both social comparison and RLI significantly predict the risk of IGD among players. Additionally, RLI serves as a partial mediator in the relationship between social comparison and IGD, demonstrating its intermediary role in this psychological process. These findings offer valuable insights for future regulatory frameworks concerning loot boxes in online gaming environments.

Keywords

Internet Gaming Disorder, Social Comparison, Risky Loot Box Index

1. 引言

在当代社会，问题游戏的使用已经成为一个值得关注的社会健康问题。网络游戏是一把双刃剑[1]，适度的游戏可以改善心理健康，增加个体的心理幸福感[2]-[4]，同时在改善认知功能、营造良好家庭关系和促进同伴社交等方面也发挥着作用[5] [6]。然而，一旦玩网络游戏越过了适度的界限，便会引发个体一系列内部或外部的问题[7]，过度的网络游戏会导致各种短期或长期的负面后果[8]，例如睡眠障碍、社会功能障碍(职业、学业、人际关系等)、情绪障碍(抑郁、焦虑等)、认知功能障碍(抑制控制、工作记忆等)等[9]-[12]。

2013 年，《精神障碍诊断与统计手册》(DSM-5)第五版引入了网络游戏障碍(Internet gaming disorder, IGD)的研究附录[13]。随后，越来越多的研究证实了其负面后果。2018 年，国际疾病分类(ICD-11)正式将这种由过度网络游戏引起的疾病纳入其中。先前的研究表明，在全球范围之内，IGD 的发病率大约维持在 3.05%，并且存在显著的地区差异[14]。在中国，2023 年游戏用户规模已经 6.68 亿，几乎超越了中国总人口的一半。鉴于大量的游戏用户，IGD 所带来的影响需要重视。因此，研究 IGD 及其潜在机制显得至关重要，这有助于我们更好地理解 IGD 背后的复杂性。

为了更好地揭示 IGD 的发病机制并且开发相应的治疗方法，过去的研究发现，IGD 的发生发展与多种心理生理因素相关，如遗传因素、性别、年龄、认知、人格、情绪情感等[15]-[18]。Brand 等人[19]基于互联网使用相关障碍建构出了 I-PACE 模型，成瘾行为的发展是易感变量(如人格、动机)、对特定刺激(例如游戏线索)的情感和认知反应以及执行功能(如抑制控制和决策)之间相互作用的结果[20]。

鉴于 I-PACE 模型以及先前的研究，首先，与个人特质相关的人格因素(例如冲动、强迫攻击性、竞争性等)是 IGD 的风险因素之一[7] [21]-[23]。先前的研究揭示了大五人格与 IGD 之间的关联，高度神经质和低责任心与 IGD 相关[24]。Carlisle 等人[25]的研究表明 IGD 的重要预测因素包括神经质和内向的人格特质。并且，IGD 与物质使用障碍在人格特征上高度共生[26]，内向、抑制、多愁、不守规矩、强迫倾向、偏执和边缘倾向特征等人格相关的因素同样与 IGD 相关[27] [28]。

除了人格因素，之前的元分析也表明，某些游戏相关因素是 IGD 的潜在贡献者[16]。最近的研究表

明，游戏中的战利品箱(Lootboxes, LBs)已经开始将两种不同的问题行为联系起来，即 IGD 和在线赌博障碍(Online Gambling Disorder) [29]。这种来自游戏机制的虚拟随机奖励同样可能会引发情绪和认知反应[30]，增加 IGD 的风险。

因此，本研究在 I-PACE 模型框架内探讨社会比较和特定游戏刺激战利品箱对 IGD 的影响。这将为未来的干预和游戏政策发展提供见解。

1.1. 社会比较

在日常生活中，个体不断地使用关于他人意见和能力的信息来评估自己的意见和能力，这是社会比较的核心概念[31]。通过与他人的比较，个人可以保持稳定和准确的自我评价，并维护自尊和自我价值[32] [33]。在社交媒体的使用中，社会比较更常出现，因为与比较有关的信息(点赞、评论)是即时且显著的，个人可以快速便捷的获取[34] [35]。尽管有些研究表明，社会比较是有益的，因为它可以激发良性嫉妒(通过对他人的成功感到嫉妒，进而激发自身成功的动机，通过模仿或学习，逐渐接近甚至赶超被嫉妒者的成就)，增加自我提升意愿，或者是得到社会支持，减少孤独感[35] [36]。但大量证据表明，社会比较通常会诱发负面后果。例如，社会比较可能会增加社交媒体成瘾的可能性[36] [37]，减少幸福感[38]，降低自尊[39]，导致消极的身体意向[39] [40]和抑郁[41] [42]、焦虑([43]等负面情绪，社会比较也被认为是有问题的智能手机使用的预测因素之一[44]。在社交网站上，向上的社会比较还可以正向预测在线强迫性购买行为[45]。虽然基于社会比较与问题性使用或者是成瘾之间的研究十分丰富，但是，目前探讨社会比较与 IGD 的研究仍然是空白，仅有的研究也只是探讨了游戏玩家在高低群体认同之下社会比较的神经生理学差异[46]。鉴于社会比较对社会总体健康的负面影响，我们有必要初步探索社会比较与 IGD 之间的关联。

1.2. 战利品箱使用

战利品箱(Lootboxes, LBs)是网络游戏中的一种道具，可以产生随机的游戏内物品奖励[47]。当打开战利品箱时，玩家会获得游戏中的随机道具，这些道具被按稀有程度划分(例如普通、稀有、传说)，普通的最易获得，而稀有程度最高的获得的概率最小。玩家需要在游戏中支付一定的货币(这种虚拟货币通常可以从游戏中直接获得，或者是以真实货币兑换)以兑换战利品箱。这种通过战利品箱以获得机会奖励的机制类似于操作性条件反射理论中的变比强化，这种不确定的奖励可能导致多巴胺系统与成瘾有关的激励敏化过程[48]。并且与赌博(例如老虎机)的相似性可能导致潜在的风险，如战利品箱的过度使用，或者是其他高风险的战利品箱相关行为，甚至加重 IGD 风险[49]。

为什么玩家不断投资购买战利品箱？对动机的研究表明，使用战利品箱的个人可能更多地受到游戏技能发展和竞争动机的驱动[50]。此外，享受动机、获胜和游戏进展也是参与战利品箱的原因[51]。研究表明，战利品箱和 IGD 存在显著的正相关关系[52] [53]，而另一些研究却表明两者之间的相关不显著[54] [55]，购买和使用战利品箱更频繁个体的游戏时间更多，并且面临更高的 IGD 风险[56] [57]，这暗示战利品箱可能是 IGD 风险的潜在预测因素[50]。与此同时，在购买和使用战利品箱时，IGD 得分与参与者的生理唤醒指标(如皮肤电导和心率)呈负相关[58]，强化了两者之间的联系。

1.3. 当前研究

尽管大量研究表明，社会比较是过度使用社交(SNS)的预测因素之一[36] [59] [60]，但社会比较在 IGD 中的具体作用机制仍然不明确。特别是，社会比较如何直接或间接影响个体发展出 IGD 的倾向，以及在什么条件下其作用最为显著，需要进一步的深入研究。最近的综述显示，大多数基于 IGD 风险的研究都基于个体因素，例如人格、过往经历、教育程度、情绪调节、心理因素等[61] [62]，很少有研究纳入游戏

内因素(如战利品箱)，战利品箱是现代游戏中的一个普遍元素，其与赌博行为的联系已引起关注[63]-[66]。然而，战利品箱使用与 IGD 之间的确切关系如何，如前文所述，部分研究表明两者之间存在正相关关系，而一些研究则没有，因此需要进一步研究战利品箱如何影响个体对游戏的依赖性和 IGD 的发展。

研究假设(图 1)：

H1：社会比较可以预测玩家的 IGD 风险程度。

H2：RLI 可以中介社会比较对 IGD 的影响。

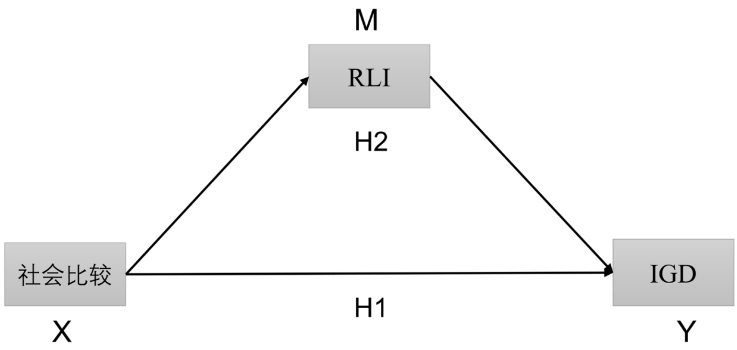

Figure 1. Mediation model
图 1. 中介模型假设

2. 方法

2.1. 样本采集

2024 年 10 月至 12 月，我们利用问卷星平台进行数据分发和收集。所有参与者都有游戏经验，并在游戏中使用过带有战利品箱性质的虚拟商品。711 名参与者填写了我们的问卷，通过 2 道强迫选择题(“地球是圆的，请选择不符合”、“太阳从东方升起，请选择赞同”)排除 62 份不认真作答被试的数据，我们还询问了被试最经常玩的 3 款游戏，排除了 15 名非游戏玩家(如常玩游戏中填写非游戏选项：如不玩、支付宝、微信等等，或者每日游戏时长大于 24 小时的)。最终，保留了 634 份有效答复。

2.2. 问卷

2.2.1. 社会比较

爱荷华－荷兰比较取向测量(The Iowa-Netherlands Comparison Orientation Measure, INCOM)用于测量社会比较取向的个体差异[67]。使用 5 点 Likert 量 B 计分，共对 11 个项目进行评分，总分从 11 分到 55 分不等，分数越高，表明收集他人信息和/或将他人与自己联系起来的倾向越大。当前研究中 Cronbach α = 0.79。

2.2.2. 网络游戏障碍

使用网络游戏障碍量表(The Internet Gaming Disorder Scale, IGD-20test) [68]评估有问题的网络游戏的严重程度，该量表基于 DSM-5 的九个标准来评估网络游戏障碍的症状，包括显著性、情绪调节、耐受性、戒断症状等。使用 Likert 5 分评分法，共对 20 个项目进行评分，评分范围从 20 到 100。分数越高，出现网络游戏障碍的可能性就越高。当前研究中的 Cronbach α = 0.93。

2.2.3. 风险战利品箱指数

风险战利品箱指数(Risky Loot Box Index, RLI)被用来衡量战利品箱的使用及其负面后果[69]。旨在衡

量玩家在游戏中对战利品箱的使用情况。使用 Likert 5 分评分法，共对 5 个项目进行评分，评分范围从 5 到 20。分数越高，表明玩家对战利品箱的依赖越高。RLI 被广泛使用并翻译成不同的语言[53] [70] [71]。在当前的研究中，RLI 量表被翻译成中文，并显示出高可靠性(Cronbach α = 0.87)。

2.3. 统计分析

社会科学统计软件 IBM SPSS Statistics 26.0 用于数据分析。我们首先描述了受试者的人口统计学特征，包括性别、年龄、是否在校等。然后进行相关分析和回归分析，探讨社会比较、RLI 和 IGD 之间的关系。然后，我们使用 IBM SPSS Process4.1 中的 Model 4 进行中介效应分析，最大似然用于检查测量和结构模型。在所有分析的数据中，显著性水平设置为 α = 0.05 (双尾)。

3. 结果

3.1. 社会学人口统计

表 1 显示了参与本研究的 634 人的社会人口统计数据，表 2 提供了每个变量的初步描述性统计数据。大多数参与者是男性(65.1%)，年龄集中在 18~21 岁之间(62.5%)，大多数是大学生(63.1%)。所有参与者都参与游戏行为超过六个月(在过去的六个月里，每周至少玩一次游戏)，并遇到过与战利品箱有关的游戏内容。偏斜和峰度数据表明，除了游戏时间外，本研究中涉及的变量都是相对正态分布的[72]。

Table 1. Socio-demographic characteristics
表 1. 社会学人口统计

	特征	人数	比率(%)
性别	男	413	65.1%
	女	221	34.9%
年龄	18~21	396	62.5%
	22~25	220	34.7%
	>25	18	2.8%
是否在校	是	400	63.1%
	否	234	36.9%

Table 2. Descriptive statistics
表 2. 描述统计

变量	描述统计			
	均值(Mean)	标准差(SD)	*Skew.*	*Kurt.*
工作日游戏时间	3.09	1.90	1.96	6.40
非工作日游戏时间	5.02	2.42	0.82	1.00
社会比较	37.98	6.96	−0.72	0.93
IGD	66.14	15.85	−0.50	−0.52
RLI	17.34	4.71	−0.82	−0.06

3.2. 皮尔逊相关分析

对社会比较、IGD 和 RLI 三个变量进行皮尔逊相关分析发现(表 3)，三者之间均存在显著相关关系，其中社会比较与玩家的 IGD 程度显著相关($r = 0.46$, $p < 0.01$)，社会比较也与 RLI 显著相关($r = 0.39$, $p < 0.01$)。此外，IGD 与 RLI 存在较强的相关关系($r = 0.71$, $p < 0.01$)。当考虑到游戏时间，结果显示无论是工作日游戏时间还是非工作日，都与 RLI 和 IGD 存在显著的相关关系，而与社会比较无关。

Table 3. Correlation analysis
表 3. 相关分析

	工作日游戏时间	非工作日游戏时间	社会比较	RLI	IGD
工作日游戏时间	1				
非工作日游戏时间	0.58**	1			
社会比较	0.07	0.08*	1		
RLI	0.17**	0.23**	0.39**	1	
IGD	0.22**	0.29**	0.46**	0.71**	1

注：*p < 0.05；**p < 0.01。

3.3. 回归分析

以 IGD 为因变量，以性别、社会比较、RLI 为自变量进行线性回归(表 4)。结果表明，回归方程具有显著性($F = 243.56$, $p < 0.001$)。其中，RLI ($\beta = 0.62$, $p < 0.001$)和社会比较($\beta = 0.21$, $p = 0.061$)显著正向预测 IGD。然而，性别($\beta = -0.81$, $p = 0.37$)不能预测 IGD 风险。此外，调整后的 $R^2 = 0.535$，表明这些变量解释了因变量中 53.5%的方差。该回归方程的 Durbin-Waterson 为 1.9，满足数据的独立性假设。所有可变通货膨胀系数(VIF)均小于 10，表明数据中不存在多重共线性。根据残差直方图、P-P 图和残差图，数据满足正态性和同方差的假设。

Table 4. Regression analysis
表 4. 回归分析

因变量	预测变量	*B*	*β*	*t*	*F*	*Adjusted* R^2
IGD	性别	−0.81	−0.02	−0.90	243.56***	0.535
	社会比较	0.48	0.21	7.17***		
	RLI	2.10	0.62	21.08***		

Note: ***p < 0.001.

3.4. 中介效应检验

最后我们建立了一个以社会比较为自变量(见表 5)，IGD 为因变量，RLI 为中介变量的中介模型。模型显示社会比较对 IGD 的总影响显著($\beta = 1.04$, 95%CI [0.89, 1.20])。社会比较对 IGD 的直接影响显著($\beta = 0.48$, 95%CI [0.36, 0.62])，直接影响显著。同时，社会比较通过 RLI 中介间接影响 IGD 同样是显著的($\beta = 0.56$, 95%CI [0.43, 0.70])。这表明，RLI 的中介效应为部分中介。

Table 5. Mediated effect (N = 634)
表 5. 中介效应

社会比较→RLI→IGD	Effect	BootSE	95%CI		*t*
			BootLLCI	BootULCI	
总效应	1.04	0.08	0.89	1.20	12.97***
直接效应	0.48	0.07	0.36	0.62	7.27***
间接效应	0.56	0.07	0.43	0.70	

Note: Effect = non standardized coefficient; BootSE = Bootstrap Standard Error; BootLLCI = Bootstrap Lower Limit Confidence Interval; BootULCI = Bootstrap Upper Limit Confidence Interval.

4. 讨论

4.1. 社会比较与 IGD

依据相关分析的结果，我们的研究首次证实社会比较与 IGD 之间存在中等强度的相关关系，这填补了社会比较与 IGD 之间的研究空白，同时揭示了社会比较可能是 IGD 被忽视的成因，在之后的回归分析中，研究发现社会比较可以预测 IGD 的严重程度。这支持了 H1。

如前所述，社会比较与 IGD 显著相关，IGD 作为一种行为成瘾中的子类，其特征包括对游戏的强烈沉迷，以至于影响到个体的日常生活、职业和社交功能[8]。鉴于目前研究的空白，我们类比了在社交媒体成瘾领域的研究，Kim, Schlicht, Schardt and Florack [59]的研究表明，社交媒体成瘾与社会比较相关的心理结构密切相关，向上社会比较导致更低的自尊，而向下社会比较则相反[73]，除此之外，社会比较还能引发嫉妒、焦虑、抑郁等负面情绪[74]-[77]。一个可能的解释是，在互联网游戏的环境中，社会比较的机会和形式可能与传统的社交环境有所不同，但其基本原理仍然适用。玩家可能会通过比较自己的游戏技能、游戏成就或虚拟财富与其他玩家来评估自己在游戏中的地位和表现[78]。当玩家感到他们在游戏中的表现不足以与其他玩家相比时，可能会出现挫败感，引发负面情绪[79]。这种比较可能会导致一种强烈的竞争压力和对游戏中表现的过度关注，从而进一步加剧对游戏的沉迷和依赖。

4.2. RLI 的部分中介作用

社会比较与 RLI 之间存在较强的相关关系，并且回归分析表明，RLI 可以显著正向预测个体的 IGD。这表明在游戏中战利品箱粘性更高的个体 IGD 的严重程度更高，这与之前的研究一致[53] [56] [57]。同时与 H2 一致，中介分析结果表明 RLI 部分中介社会比较与 IGD。因此，社会比较会增加玩家战利品箱的使用，进而可能增加 IGD 程度。

战利品箱中通常包含着随机的游戏奖励[80]，这种变比强化的奖励会导致个体在游戏更容易上瘾[54] [81]，当个体没有从战利品箱中获得心仪的道具时，一方面，这通常预示者内疚与更大的情绪困扰[82]，而过度游戏可能成为玩家适应负面情绪的发泄方式之一[83]-[85]。另一方面，他们会在游戏中花费更多的时间以赚取游戏中的货币或者使用真实货币来兑换战利品箱[86]，以此来获得满足感，这同样会增加个体 IGD 的严重程度。当个体偶然从战利品箱中获得心仪的道具时，这种随机奖励能最大限度激活多巴胺系统，增加成瘾程度[87]。

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