Jak číst vědeckou literaturu

Mgr. Lukáš Hejtmánek, Ph.D.
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Pozitivní info na úvod

První články jsou těžké

Čím víc čtete, tím snazší čtení je

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Typy akademických článků

Originální/empirická studie

- Experiment, kazuistika, korelační studie atd.
- Odpovídají na nové otázky, přináší nové informace

Meta-analýza

- Analytické zpracování mnoha předchozích studií
- Snaží se najít pravdu v desítkách článků, které mají trochu jiné výsledky

Metodologické články

- Jak konkrétně dělat výzkum v oboru (jak funguje EEG, jak dělat faktorovou analýzu)
- Jak funguje vědecká metoda (problémy se vzorkem, proč je nutné dělat výzkum tak a tak)

Review/rešerše/přehledová studie

- Aktuální přehled literatury k danému tématu

Názor/opinion/commentary

- Většinou na pozvání
- Reakce na zajímavé či netradiční nálezy
- Reakce na sociální či politické situace z pohledu odborníků

Commentary

Virtual reality: A new track in psychological research

Stephan de la Rosa* and Martin Breidt

Department for Human Perception Cognition and Action, Max Planck Institute for Biological Cybernetics, Tübingen, Germany

One major challenge of social interaction research is to achieve high experimental control over social interactions to allow for rigorous scientific reasoning. Virtual reality (VR) promises this level of control. Pan and Hamilton guide us with a detailed review on existing and future possibilities and challenges of using VR for social interaction research. Here, we extend the discussion to methodological and practical implications when using VR.

A central goal of psychological research is to understand real-life human behaviour. Yet, scientific reasoning requires psychologists to examine behaviour under highly controlled conditions, ideally with only a few manipulations at a time to allow rigorous scientific inferences. Hence, researchers find themselves in a dilemma: Experimenters often need to choose between experimental control and ecological validity. How can psychologists overcome this impasse?

In their review paper, Pan and Hamilton (2018) outline how this challenge can be tackled using virtual reality (VR) in social interaction research. VR allows to create complex and realistic social environments that are under full experimental control and enable participants to behave naturally. Hence, VR offers the best of both worlds: full experimental control required for scientific reasoning and natural behaviour and realistic environments to boost ecological validity of the results. Pan and Hamilton provide a very nice summary of the advantages and future challenges that occur on several levels of experimentation when using VR for social interaction research.

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Current Opinion in Psychology

Guidelines for immersive virtual reality in psychological research

Madis Vasser[1] and Jaan Aru[1,2]

Virtual reality (VR) holds immense promise as a research tool to deliver results that are generalizable to the real world. However, the methodology used in different VR studies varies substantially. While many of these approaches claim to use 'immersive VR', the different hardware and software choices lead to issues regarding reliability and validity of psychological VR research. Questions arise about quantifying presence, the optimal level of graphical realism, the problem of being in dual realities and reproducibility of VR research. We discuss how VR research paradigms could be evaluated and offer a list of practical recommendations to have common guidelines for psychological VR research.

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This review comes from a themed issue on **Cyberpsychology**

Edited by **Jon Elhai** and **Dmitri Rozgonjuk**

https://doi.org/10.1016/j.copsyc.2020.04.010

generation' devices offer low latency, wide field of view and unprecedented level of both interactivity and data gathering [6••,7,8•], differing clearly from 'non-immersive', 'desktop' or projection-based VR solutions. However, there still exists a large heterogeneity among various contemporary approaches. We argue that considerations regarding hardware capabilities and software limitations should be taken into account when conducting and reporting psychological VR studies to resolve the situation that some experts have described as the 'Wild West' with a 'lack of clear guidelines and standards' [9••].

Ensuring reliability

The ultimate aim of a VR system is to technologically immerse the user into virtual worlds, inducing a sense of presence — the illusion of being in the virtual world and behaving accordingly [5]. A basic modern VR lab is relatively easy and affordable to set up with minimal prior knowledge [1••,6••]. However, not all immersive VR systems provide the same level of presence [10]. This is a problem, as two studies, both using 'immersive VR' might arrive at different results because the setups provided a different level of presence. Unfortunately, presence is hard to quantify. State of the art methods for measuring presence are mainly subjective self-report questionnaires and many popular scales developed before the new generation VR era are incapable of assessing qualitative differences between various modern immersive techniques [11••].

An immersive VR setup can physically have many different

frontiers in Psychology

PERSPECTIVE
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doi: 10.3389/fpsyg.2015.01451

Issues and advances in research methods on video games and cognitive abilities

Bart Sobczyk[1], Paweł Dobrowolski[2], Maciek Skorko[2], Jakub Michalak[1] and Aneta Brzezicka[1]*

[1] GamesLab, Department of Psychophysiology of Cognitive Processes, Faculty of Psychology, SWPS University of Social Sciences and Humanities, Warsaw, Poland, [2] Institute of Psychology, Polish Academy of Sciences, Warsaw, Poland

The impact of video game playing on cognitive abilities has been the focus of numerous studies over the last 10 years. Some cross-sectional comparisons indicate the cognitive advantages of video game players (VGPs) over non-players (NVGPs) and the benefits of video game trainings, while others fail to replicate these findings. Though there is an ongoing discussion over methodological practices and their impact on observable effects, some elementary issues, such as the representativeness of recruited VGP groups and lack of genre differentiation have not yet been widely addressed. In this article we present objective and declarative gameplay time data gathered from large samples in order to illustrate how playtime is distributed over VGP populations. The implications of this data are then discussed in the context of previous studies in the field. We also argue in favor of differentiating video games based on their genre when recruiting study samples, as this form of classification reflects the core mechanics that they utilize and therefore provides a measure of insight into what cognitive functions are likely to be engaged most. Additionally, we present the Covert Video Game Experience Questionnaire as an example of how this sort of classification can be applied during the recruitment process.

Keywords: video games, cognition, cognitive training, transfer of training, methodology

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Introduction

frontiers in Psychology

OPINION
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The Future of Action Video Games in Psychological Research and Application

*Harun Karimpur * and Kai Hamburger*

Department of Psychology, Experimental Psychology and Cognitive Science, Justus Liebig University, Giessen, Germany

Keywords: ageing (aging), attention, visual perception, spatial cognition, treatment, dyslexia, action video games, gaming

INTRODUCTION

In recent years, much research has been conducted in order to understand the effects of action video games on mind and behavior. For example, it has been tried to investigate potential links between playing action video games and aggressive behavior (Anderson and Bushman, 2001; Ferguson, 2011), visual selective attention (Green and Bavelier, 2003) or gender differences in spatial cognition (Feng et al., 2007). What we see is that playing certain types of video games in the right doses might enhance several cognitive skills. This can be used in the long run to help those with deficits in these areas, for example the elderly. This article shall emphasize the importance of a holistic and unbiased view in regards to the impact of video games and their possible use. Therefore, it is essential that we desist from antiquated concepts of "typical gamers," understand the advantages and disadvantages of playing action video games and try to step up efforts in application-oriented research. From our understanding, any physically challenging video game in which reaction time plays a crucial role can be described as an action video game. While there is no generally accepted definition, others define action video games as characterized by the use of violence within these games.

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  - Dobrý začátek pro rešerši
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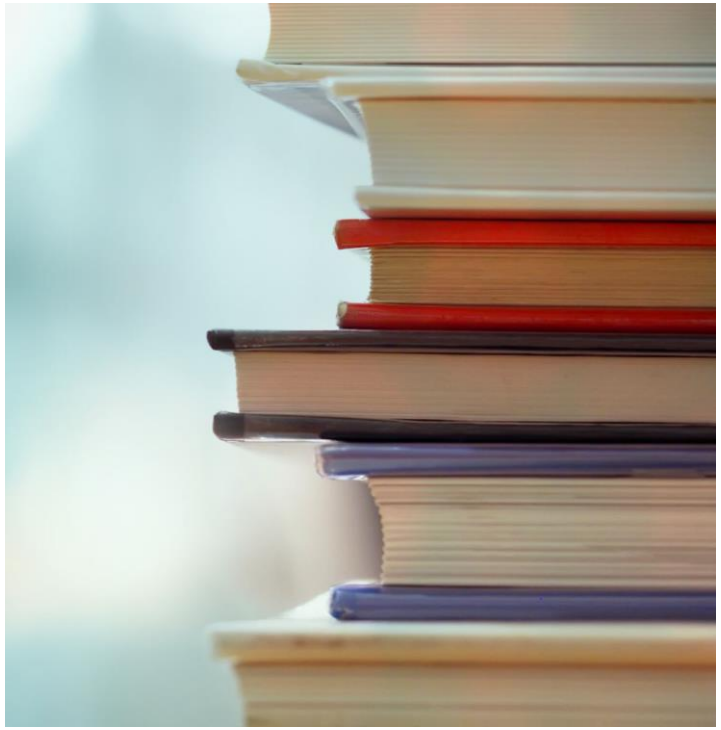

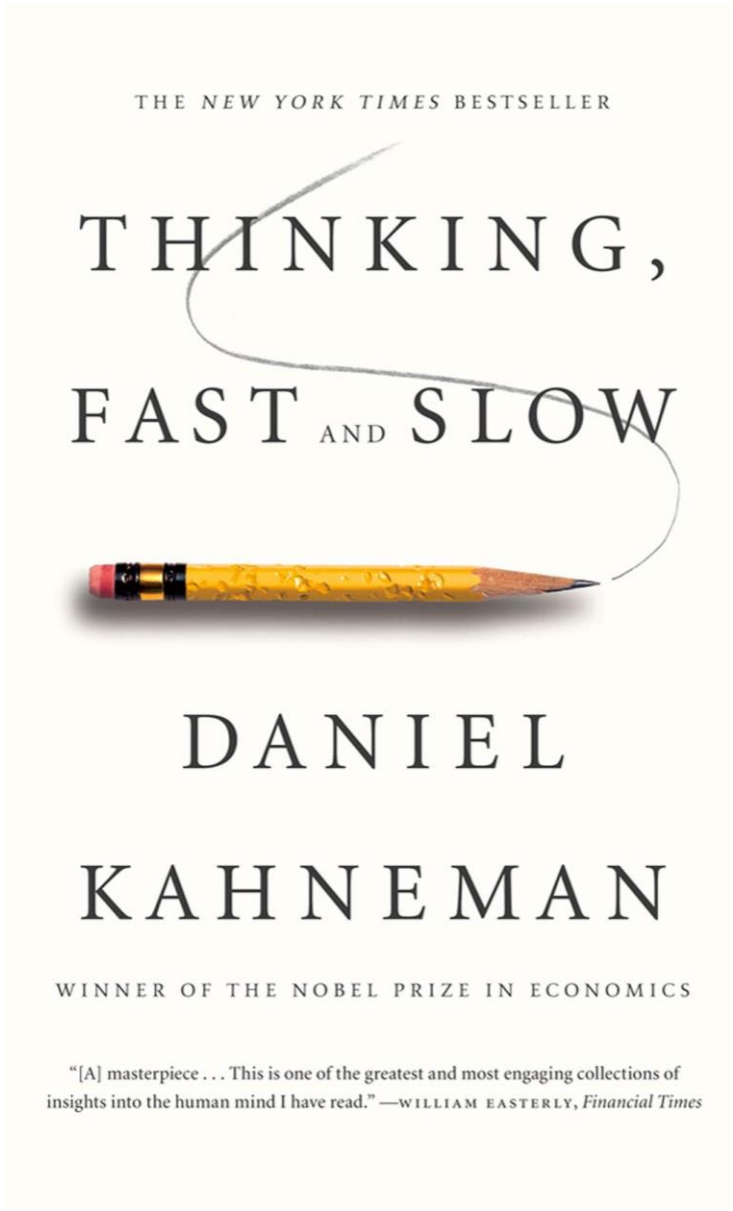
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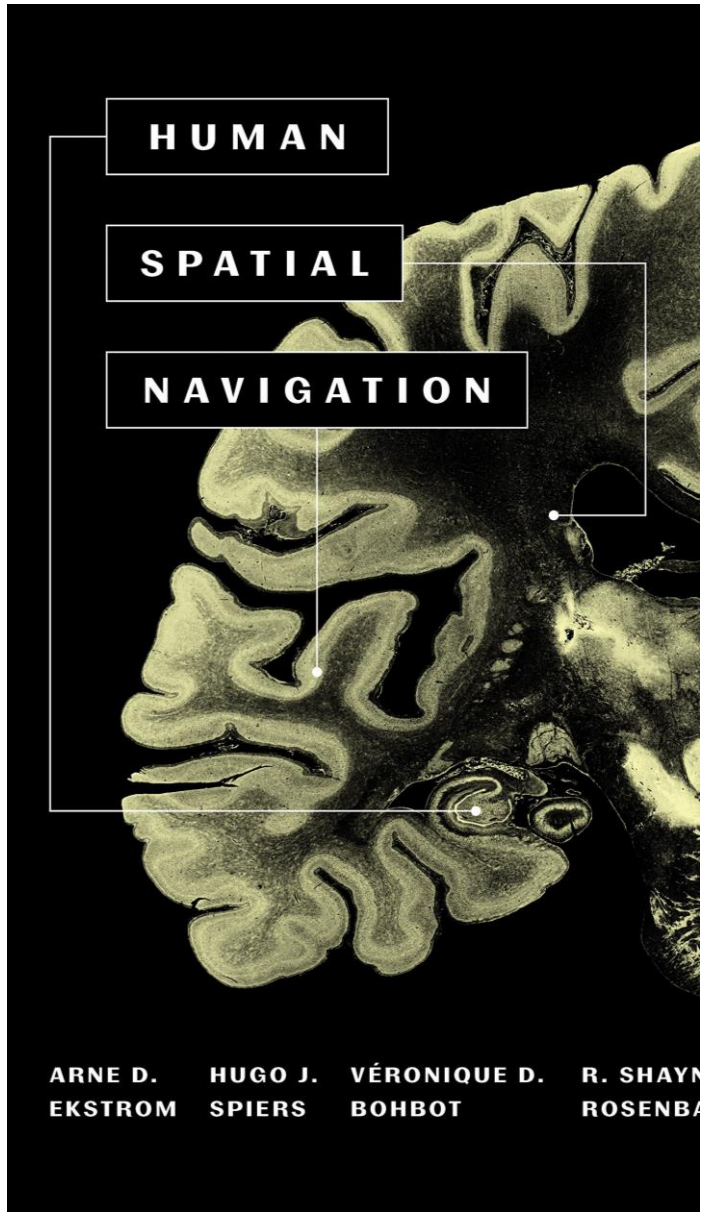
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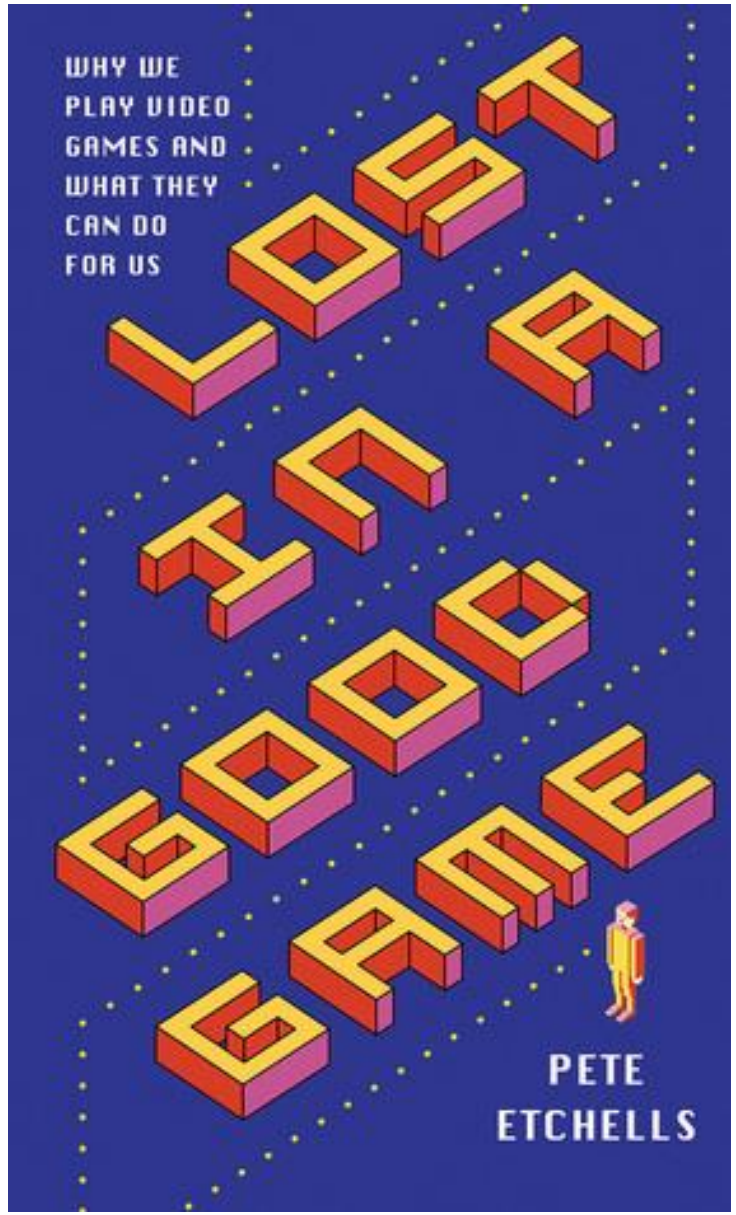
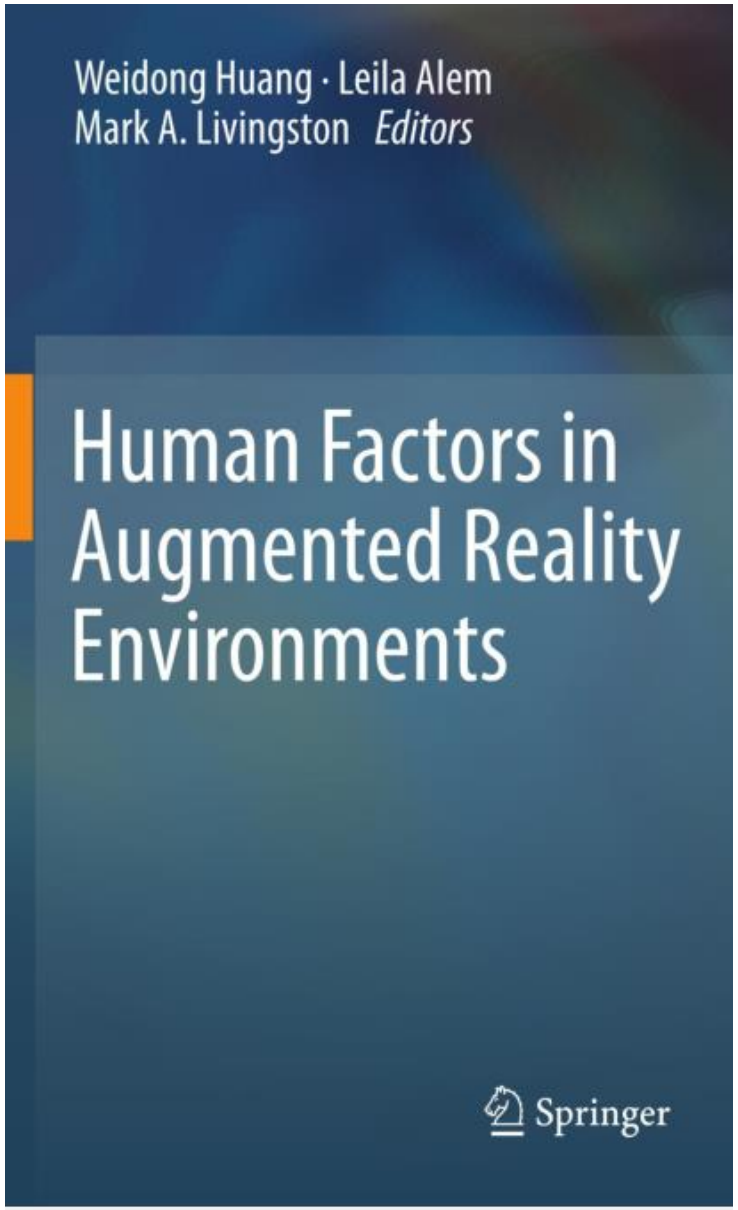

WHY WE PLAY VIDEO GAMES AND WHAT THEY CAN DO FOR US
LOST IN A GOOD GAME
PETE ETCHELLS



Chapter 1
Issues in Human Factors Evaluations of Augmented Reality Systems

Mark A. Livingston

1 Importance of Human Factors to Augmented Reality

In his widely-accepted definition of augmented reality (AR), Azuma [1] cited three components of AR applications. First is the combination of real and virtual imagery. Second is the *registration* (alignment) of computer graphics with objects or locations in the real 3D environment. Third, and perhaps of primary concern in this volume, is that AR systems must be interactive in real time. As one focuses on this third component, the importance of human factors for AR systems may be considered an obvious and critical component of research in AR. One might think that the human factors of AR systems would thus be heavily studied; however, as this volume shows, there is a paucity of investigations regarding human factors in AR systems compared to the enabling technologies.

There may be good reasons for this. The technology, notably in tracking of the user's viewpoint (often the primary contributor to the success or failure of registration between real and virtual objects), has yet to meet the minimum requirements for success in many applications. This is likely due to one or both of two key factors. First, the tracking problem, described extensively in the literature [18], has no simple solution that can solve all the varied tracking instances. However, there are many good technologies (which are still being improved). This helps give rise to the second key factor in meeting the minimum tracking requirements for application success: a relative lack of exploration of what those minimum requirements are. While there are some examples of such human factors evaluations [9, 12, 13], each application and perhaps each tracking technology, with varied performance capabilities in diverse measures such as (static) accuracy, noise, and—most critically [7]—latency

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W. Huang et al. (eds.), *Human Factors in Augmented Reality Environments*,
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Chapter 3
Basic Perception in Head-Worn Augmented Reality Displays

Mark A. Livingston, Joseph L. Gabbard, J. Edward Swan II, Ciara M. Sibley, and Jane H. Barrow

1 Introduction

For many first-time users of augmented reality (AR) displays, the experience suffers compared to their expectations. While several human factors issues are responsible for this disconnect, abundant anecdotal evidence and numerous controlled laboratory studies have shown that part of the performance gap is in the low perceptual quality of the graphical presentation. Despite extensive research in producing photorealistic graphics, little work in AR has been demonstrated to have that level of visual realism. Reviewing the literature and our own experiences and research, we identified four fundamental areas in which basic perception of the virtual and real elements in the merged world may be lacking. Visual acuity captures issues of geometric resolution, limited contrast and distorted perception of colors reveal issues of color resolution and presentation. These challenges lead naturally to issues of text legibility. In many applications, depth segmentation raises issues regarding the quality of stereo imagery. In this chapter, we examine these four issues as they apply to head-worn AR displays.

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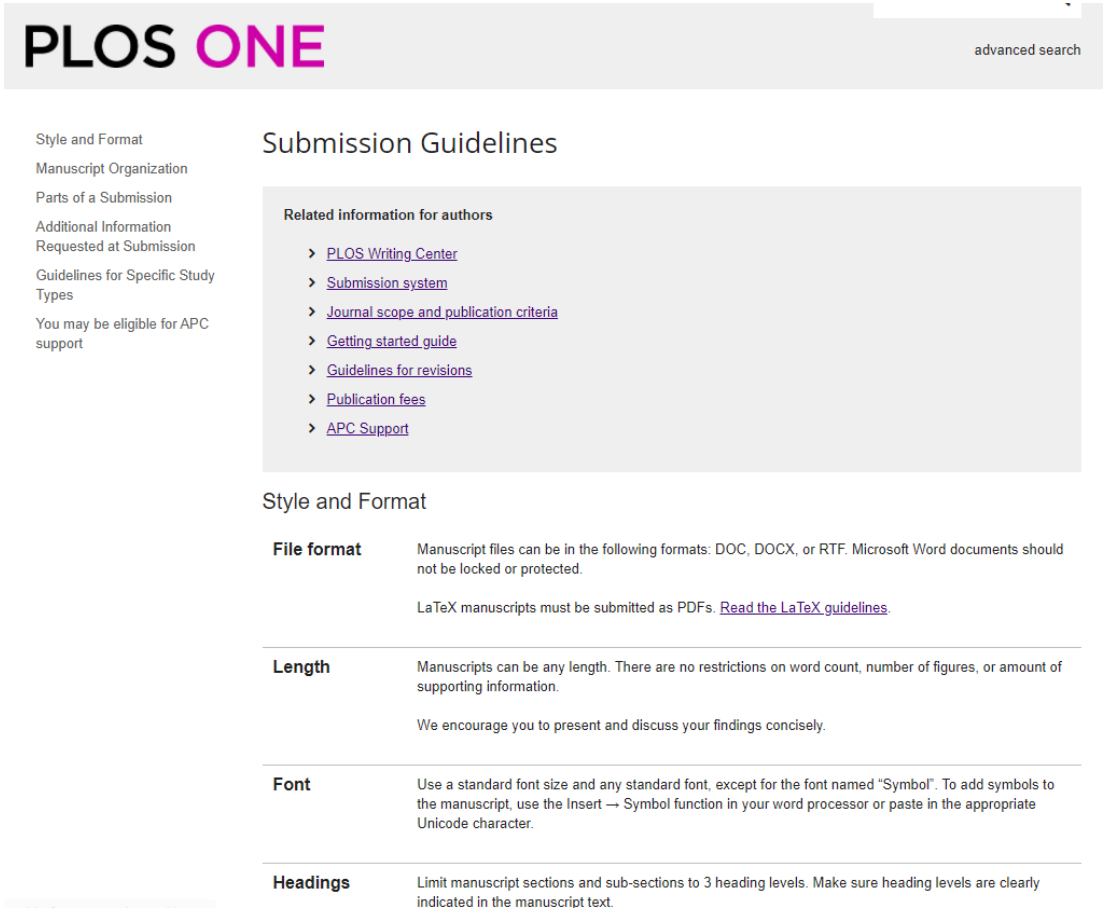
Struktura článku

Vědecké články mají (téměř) vždy stejnou strukturu:

- Introduction
- Methods
- Results
- Discussion

Občas se lehce mění dle počtu experimentů či požadavků žurnálu

Struktura je jednotná, aby se v článku odbře hledalo



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Headings	Limit manuscript sections and sub-sections to 3 heading levels. Make sure heading levels are clearly indicated in the manuscript text.

Co si z odnést z čtení originální studie

Po přečtení byste měli být schopni odpovědět na následující otázky

Co vědci studovali?

Proč to studovali?

Na co přišli?

Jak na to přišli?

Jaké jsou implikace výsledků?

Jaké jsou limitace výsledků?

Co článek studuje?

Popis problematiky

Uvedení do kontextu problému

Co se o problematice ví a kde jsou stále mezery v chápání

Pomocí citací mnoha cizích autorů se snaží utvořit komplexní náhled na problematiku

- Správný úvod má i pohledy, které s cíly nemusí souviset
- Článek argumentující, že videohry jsou špatné, obsahuje často i citace, jak mohou být užitečné

Proč to studuje?

Zdůvodnění, proč by se tím měla věda zabývat

- Věda se zabývá testovatelnými a důležitými otázkami
- Někdy důležitost není zcela „očividná“
  - *je úkolem autora ji vysvětlit*

XY people suffer from XY. Better understanding might help these people as well as reduce medical costs and shift them to other areas of healthcare

Playing videogames by elderly population might improve their cognitive decline and provide easy and each early intervention in individuals with mild cognitive impairement

Using video games and eytracking might train people with eye disease train their ocular muscles and inprove accomodation properties

McGillNews ALUMNI MAGAZINE

McGill News / Discovery

Let me prescribe you a video game for that

by Diana Kwon

Adults with amblyopia, or lazy eye, have long been told that their condition might be untreatable. A group of McGill researchers, in collaboration with the gaming company Ubisoft, have now developed an unexpected remedy: a video game.

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PMCID: PMC4130645
NIHMSID: NIHMS220972
PMID: 25126043

Cognitive benefits of computer games for older adults

Elizabeth M. Zelinski, PhD and Ricardo Reyes, BA

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Abstract

Go to:

The purpose of this paper is to develop a basis for the hypothesis that digital action games may produce cognitive benefits for older adults. First, a discussion of the relationship between cognitive and physical health shows the increasing weight given to the role of declines in cognition in the development of dependency in older adult population studies. Second, evidence that cognitive training produces 'far transfer' in elders is presented. The key issue is that one approach, known as extended practice training, has

https://mcgillnews.mcgill.ca/s/1762/news/interior.aspx?pgid=613&gid=2

Na co se přišlo?

Výsledková sekce je bez interpretací

U většiny článků doprovázená grafy, tabulkami

Analysis of accuracy using the same model also revealed a main effect of switch, F(1,84) = 24.29, p < .001, with lower accuracy on switch trials than on repetition trials (87.6% ± 1.0% vs. 91.0% ± 1.1%). No interaction between trial type and group was found (p = .504). A congruency effect was also present in our accuracy data, F(1,84) = 86.28, p < .001, indicating greater accuracy for congruent (96.4% ± .4%) vs incongruent trials (83.6% ± 1.6%). No other main effects or interactions were significant (see Fig. 1).

Table 1
Mean weekly hours played of each video game genre. *SD* in parentheses.

Video game genre	FPS players	RTS players	NVGP's
First-person shooter	18.83 (6.55)	1.87 (1.83)	.50 (.82)
Real-time strategy	.70 (1.51)	19.10 (8.62)	.20 (.55)
Platform	1.20 (2.64)	.27 (.58)	.13 (.35)
Fighting	1.23 (2.05)	.50 (1.57)	.10 (.40)
Adventure	1.97 (3.62)	.90 (2.34)	.30 (.88)
Turn-based strategy	4.03 (4.78)	6.27 (8.77)	.27 (.58)
Role-playing	4.53 (7.71)	5.43 (7.56)	.33 (1.03)
Racing	3.23 (4.09)	1.43 (2.85)	.37 (.77)
Puzzle	1.23 (1.78)	1.33 (2.59)	.27 (.69)
Multiplayer online battle arena	.30 (1.64)	.93 (2.99)	.17 (.91)

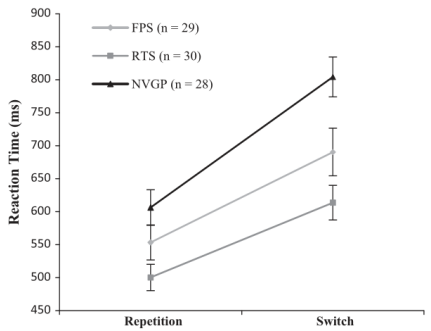


Fig. 1. Task switching reaction times on repetition and switch trials. Error bars denote SEM.

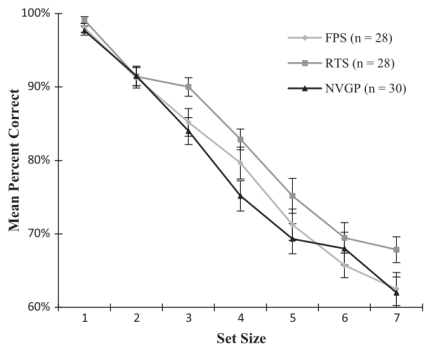


Fig. 2. Multiple object tracking accuracy across all set sizes. Error bars denote SEM.

Jak se na to přišlo?

Metodologický postup

- Soupis vzorku
- experimentální procedury
- výpis dotazníků a materiálů
- popis statistických postupů

Postup by měl být dostatečně popsaný, aby se dal zopakovat

U moderních studií často i odkaz na ukázky stimulů, experimenty ke stažení

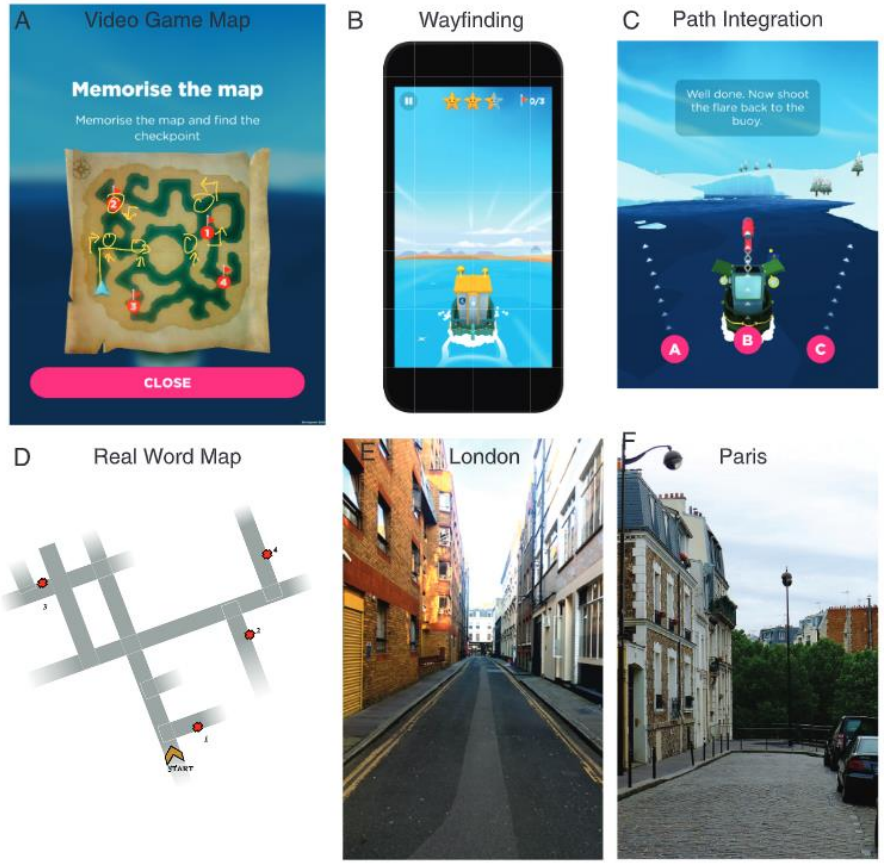


Fig 1. Task in real world (bottom row) vs virtual environment (top row). (A–B) Wayfinding task in the video game: participants had to memorize a map and navigate as fast as possible toward an ordered set of goals. Participants played Sea Hero Quest on a tablet. (C) Path Integration task in the video game: participants had to navigate in a maze until they find a flare and shoot it back toward their starting position. (D) Wayfinding task in the real world. Identical as the virtual task, but takes place in the streets of (E) London and (F) Paris. All

Coutrot, A., Schmidt, S., Coutrot, L., Pittman, J., Hong, L., Wiener, J. M., Hölscher, C., Dalton, R. C., Hornberger, M., & Spiers, H. J. (2019). Virtual navigation tested on a mobile app is predictive of real-world wayfinding navigation performance. *PloS One*, *14*(3), e0213272.

Co to znamená?

01

Jaké mají výsledky implikace pro reálný svět?

02

Jaké mají výsledky implikace pro vědu?

03

Na co nebyli schopni vědci odpovědět?

04

Jakým směrem může výzkum pokračovat?

Jaké to má limitace?

Kritické zhodnocení výsledků	Jak sedí do stávajících znalostí?	
Metoda	Je metoda validní? Měří opravdu to, co autoři tvrdí, že měří?	EXTRÉMNĚ DŮLEŽITÉ V PSYCHOLOGII
Vzorek	Je vzorek vhodný na vyvození závěrů?	Platí závěry ze vzorku 50ti studentů psychologie UK i pro ženy na mateřské v Japonsku?
Analýza	Byla data analyzována správně?	Extrémní hodnoty, předpoklady testů (probíráte na statistice)

Nejčastější problémy závěrů v psychologii

Operacionalizace pojmů
- Co je to agrese? Paměť? Pozornost?

Na kom se výzkum studoval a je přenositelný?
- Studují se pouze studenti psychologie
- Většina výzkumů je z anglicky/německy mluvících zemí
- Problémy překladů dotazníků atd.

Jak probíhala statistická analýza a mohla být chybná?
- Vyžaduje znalosti
- Za čísly, kterým nerozumíme, se může skrývat lež
- Ne vždy jsou statistické chyby „cílené“

Jak funguje psaní a publikování článků

Stanovení cíle a hypotézy, sběr dat, analýza dat

Výběr žurnálu

Formátování dle požadavků žurnálu

Zaslání článku + cover letter

Editorial decision
- Accept for revision
- Editorial reject

Review decision
- Reject, Major or Minor review, Accept

Článek akceptuje či zamítá Editor

https://authorservices.wiley.com/Reviewers/journal-reviewers/what-is-peer-review/the-peer-review-process.html

Recenzní řízení

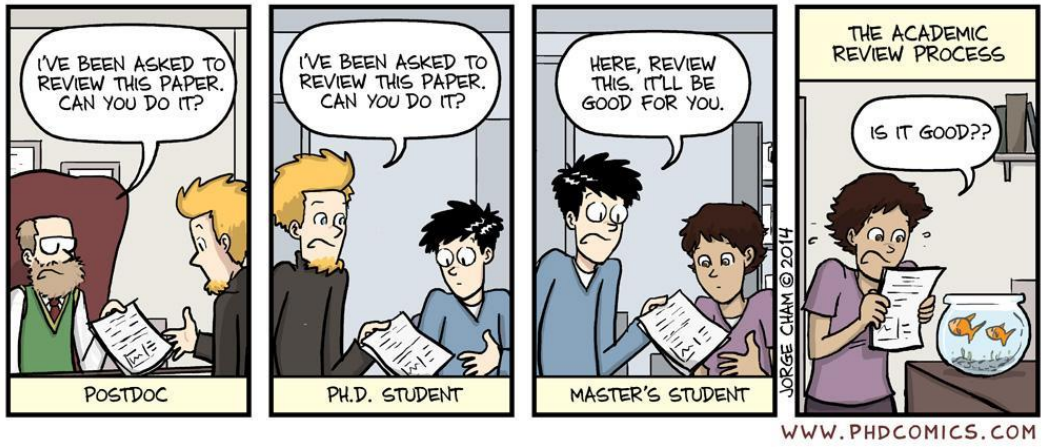
Časté připomínky

- Upravit jazyk
- Doplnit literaturu
  - *Autoři neudělali dobrou rešerši a na něco zapomněli*
  - *Jejich výsledky lze interpretovat jinak*
- Doplnit analýzy
  - *Jinak vyhodit outliery, jiné analýzy kompletně*

Méně časté

- Doplnit experiment

Ne všechny aspekty recenzního řízení jsou vždy veřejné



Co může za následující jevy?

Dítě ve školce povídalo, že bude mít sestřičku. Učitelka pogratulovala, máma si udělala test a zjistila, že to dítě vědělo dřív, než ona.

Fotbalový tým prohrává 10 her za sebou, dokud se jednoho dne neseberou, a neabsolvují starý slovanský rituál. Poté následující 3 hry za sebou vyhrají.

Publikační bias

Editoři chtějí články, které se budou citovat a které budou lidé číst

Většinu lidí nezajímá nález „ničeho“

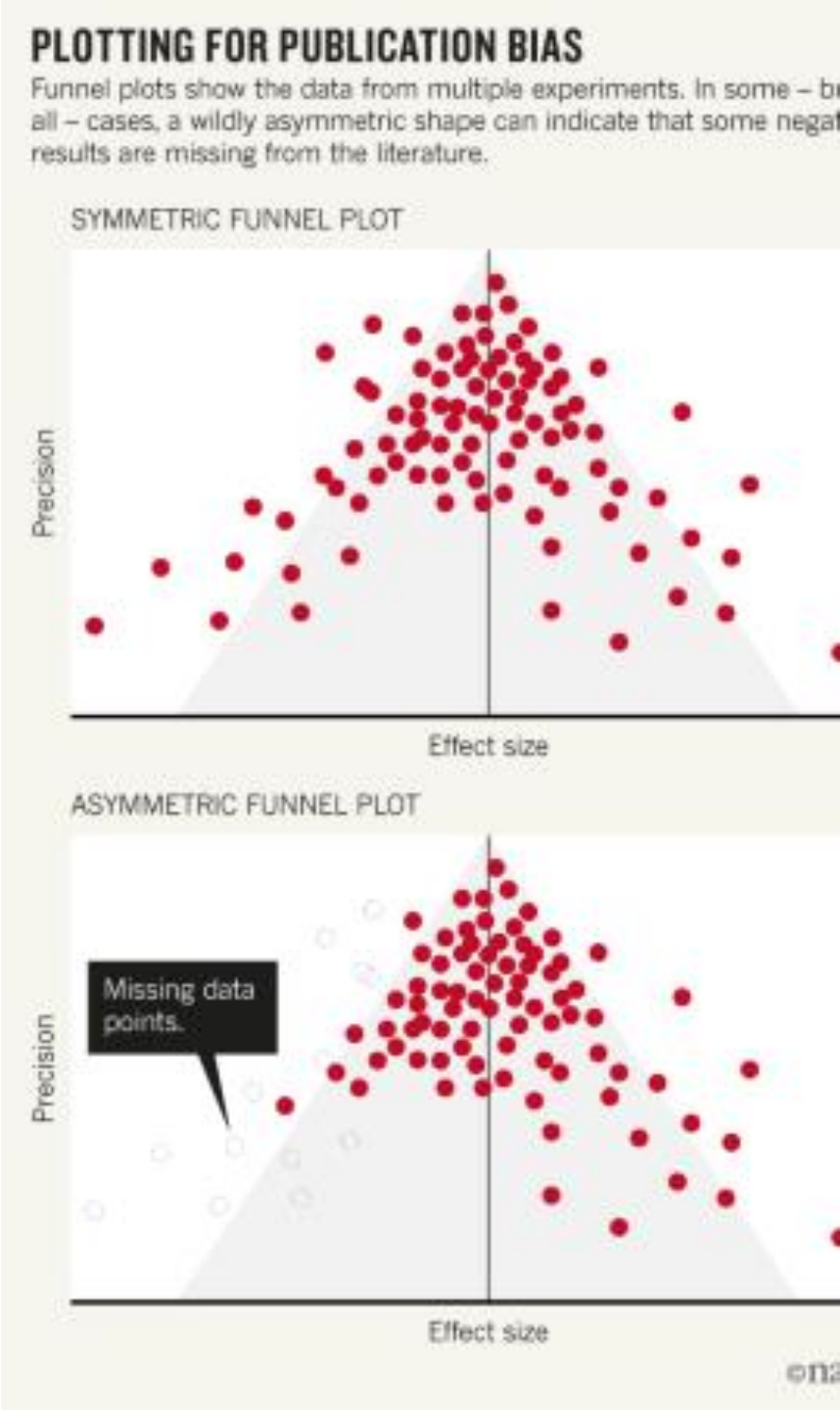
- Věděli jste, že modrá barva v obýváku nikoho neuklidňuje?
- Hraní her nemá žádný vliv na agresivitu lidí?
- Usmívání se nezvyšuje vaše pocity štěstí?

Nijaké výsledky jdou do šuplíku

To samé platí pro „buzz“ na internetu

- Informace o tom, že avokádo pomáhá na paměť se šíří snadněji, než že avokádo nic nedělá

https://www.nature.com/articles/nature.2017.21728



Jak to vyřešit?

Replikační studie

Studie pokoušející se zopakovat výzkum a dospět ke stejným výsledkům

V psychologii otázka posledních 10ti let

- Mnoho experimentů se nepodařilo replikovat

Nevěřte vždy starým článkům

- Ale i knihám a čemukoli na internetu, co psali laici

Ověřujte i nové informace

- Pokud není na dané téma ještě více studií, není nutně pravdivé

https://www.vox.com/science-and-health/22360363/replication-crisis-psychological-science-accelerator
https://www.theatlantic.com/science/archive/2018/11/psychologys-replication-crisis-real/576223/
https://www.psychologytoday.com/us/basics/replication-crisis

Na závěr

Existuje mnoho druhů článků, každý má za cíl něco trochu jiného

Zdroje mohou být buď recenzované či nerecenzované

Struktura originálních studií je vždy stejná (IMRaD)

Recenzované články prochází několika koly editací

I u akademických článků je nutné být skeptický

Nikdy nevěřte jednomu zdroji, ověřte si problematiku u různých výzkumníků