


Comparison of Reaction Time Between eSports Players of Different Genres and Sportsmen

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ABSTRACT

Quick reactions are considered important in both traditional and electronic sports, and research findings suggest that reaction time can be optimized by both sports activity and playing action video games. In this study, reaction and motor times of 18 professional and 21 non-professional eSports players from different genres and 36 non-professional traditional sportsmen were compared using the Vienna Test System. No differences between the groups were found in simple visual, acoustic, and choice reaction times. Differentiated by game genre, players from sports simulations had significantly shorter reaction times than MOBA players in the acoustic and choice reaction test. The results of this study suggest that traditional sports and eSports may improve reaction times to a similar amount. Furthermore, various game genres require different reaction times or may affect related abilities in different ways.

KEYWORDS

Acoustic Reaction, Athletes, Choice Reaction, eSports, Motor Time, Professional Players, Reaction Time, Traditional Sports, Visual Reaction

INTRODUCTION

Electronic sports (eSports) represents a growing market while a large number of people invest considerable time playing video games. With an estimated revenue of \$1.1 billion and an audience up to 495 million in 2020, the business continues to grow (Newzoo, 2020). The competition for victories is also becoming increasingly intense as the number of players and prize money increases. Professional and non-professional gamers compete in different game genres such as multiplayer online battle arena (MOBA), real time strategy (RTS), first-person shooter (FPS), Fighting Games, or sports simulations (Bányai et al., 2019). Most of these eSports titles require high speed reactions. The players are required to react to different visual and acoustic stimuli before making the correct decision as quickly as possible (Kowal et al., 2018). Acting quickly seems to be important, because responding incorrectly or too

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slowly can lead to defeat in a matter of seconds. The importance of being fast is also shown by the fact that gamers outperform non-gamers in terms of simple reaction times (Richardson et al., 2014). Nevertheless, little is known about performance parameters of the players or how to improve them (Green, 2018; Pedraza-Ramirez et al., 2020). On the other hand, in traditional sports, research into performance parameters has already progressed further. Just as in eSports, fast reaction times can be a decisive factor (Dykiert et al., 2012) and are significant for better performance of athletes (Ghuntla et al., 2014) for instance in short sprints (Paradisis, 2013). Additionally, perceptual and attentional skills are important for performance in sports-related tasks like quick decision-making (Hüttermann et al., 2019). Therefore, it comes to no surprise that sportspeople also showed significantly shorter reaction times than non-sportspeople in numerous studies (Atan & Akyol, 2014). Thus, similar to eSports, traditional sports can positively affect one's reaction times and vice versa.

Various studies have already compared reaction times of gamers and non-gamers or sportspeople and non-sportspeople (e.g., Atan & Akyol, 2014; Richardson et al., 2014), but none of them actually compared gamers and sportspeople. Therefore, this study compares reaction times of participants from both traditional and electronic sports. In contrast to most studies, which divided gamers according to their videogame playing time, participant selection in the present study was based on the professional level of the players. Simple visual, acoustic, and choice reaction times of non-professional traditional sportspeople (TS), professional (PP), and non-professional eSports players (NPP) were measured in three different tests. In a further analysis, the eSports players' reaction times were additionally compared regarding their game genre. Comparable studies, such as Li et al. (2020), have more participants from a single game genre (MOBA). This study, on the other hand, compares different eSports players and traditional sportspeople in a variety of areas and thereby serves as a pilot study. Since the number of participants especially in the different game genres was quite small, these results should be interpreted as first insights into this research area. For future work, results from this study should be used to compare targeted abilities like reaction time of eSports players or traditional sportspeople of specific areas.

BACKGROUND

In the context of this study, eSports is defined as competitive gaming. Players train and improve mental and physical abilities to improve their chances of success against other players on electronic devices such as computers or gaming consoles (Wagner, 2006). Competition in eSports is often implemented in tournaments, but can also take place within a game, for instance through a ladder system. In recent years, the scientific acceptance of eSports has also increased in different fields of research. The subjects investigated include the eSports market and sponsoring (Mangeloja, 2019), consumption motives (Bányai et al., 2019), motivational and participation factors (Braun et al., 2016), or the competition of eSports (Lipovaya et al., 2018). Research was also conducted on the characteristics of eSports players and essential skills for high performance. Along with in-game skills, for instance a sound knowledge of the game or "mechanical skills" (Donaldson, 2015), eSports players require high cognitive skills (Happonen & Minashkina, 2019; Himmelstein et al., 2017), to meet the games' requirements, for instance quick decision making or high attentional skills, in fast paced eSport titles (Voss et al., 2010).

The actual field of game performance in eSports titles, however is relatively unexplored (Pedraza-Ramirez et al., 2020). Depending on the game genre, there are several factors that can give information on the players' performance, such as the kill/death ration in FPS games or gold per minute and kill/death ratio in MOBA games (Parshakov et al., 2018). But these parameters are linked to several problems. Similar to traditional sports, the own performance in competitions always depends on the opponent's performance. A parameter like shooting power in soccer, which can be measured without the influence of the opponent, does not exist in eSports. Additionally, in multiple eSports titles such as MOBAs, players take on different roles with different tasks. In soccer, the performance of a defender

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