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LETTER TO THE EDITOR

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Letter to the Editor for ‘Current Addiction Reports’—Game Transfer Phenomena and Dissociation: a Reply to Guglielmucci et al. (2019)

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Angelica B. Ortiz de Gortari^{1,2} · Mark D. Griffiths³

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To the Editor,

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It was with great interest that we read Guglielmucci et al.’s [6] paper ‘*Dissociation in Problematic Gaming: a Systematic Review*’ in *Current Addiction Reports*. Their systematic review of empirical studies examined associations between problematic gaming and phenomena considered to be on the continuum between normal and pathological forms of dissociation. Literature with this focus is scarce and we thank the authors for their contribution. However, the purpose of this letter is to discuss the authors’ conceptualisation of our research on Game Transfer Phenomena (GTP) as dissociative phenomena.

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... excessive video game use is linked to a variety of dissociative phenomena (e.g. depersonalisation experiences, escapism, psychotic-like experiences, game transfer phenomena) (p.1).

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Guglielmucci et al.’s conceptualization of our research on GTP was too simplistic. Game Transfer Phenomena are both more detailed and more nuanced. GTP are involuntary phenomena that comprise sensory, perceptual, cognitive, and self-agency transient changes or intrusions in direct relationship to (i) videogame content/features, (ii) subjective phenomena experienced while playing (e.g.

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immersion, embodiment, telepresence), and (iii) game-related hardware or peripherals [9]. Specific manifestations include perceptual distortions (distortions of objects, environments, sounds, body, or time), pseudo-hallucinations (e.g. images overlaying game-related objects or sounds coming from objects associated with the game), imagery (e.g. imagining game elements), sensations of unreality and disembodiment (e.g. out-of-body-like sensations and feelings), automatic mental processes (e.g. source monitoring errors, attentional bias), and involuntary actions/behaviours [11]. GTP connote the interplay of physiological, perceptual, and cognitive mechanisms and happen suddenly and outside the gamers’ control [18], although some gamers claim to be capable of controlling their GTP visualisations after a while [13].

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The inclusion of GTP as dissociative phenomena by Guglielmucci et al. [6] raises interesting questions regarding the nature of GTP. For instance, should GTP be considered dissociative in the continuum from episodic intrusions with game content (e.g. images, sounds, thoughts, urges, impulses) that can awaken feelings and sensations of unreality, to engrossment in mental actions (e.g. replays of the game) or multisensory sensations and automatic actions toward game-related stimuli that lead to absent-mindedness? Based on the broad and rather general definition of dissociative disorders according to DSM-5 [1] used by Guglielmucci et al., to describe ‘dissociations’, the intrusive nature of GTP could be arguably be considered ‘dissociative’:

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Dissociative disorders are characterised by “disruption of and/or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behaviour” ([1], p. 291).

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We acknowledge there are phenomenological similarities between GTP and diagnostic features of dissociative disorders. However, we advise caution in generalisations which may lead to overestimating the impact of GTP on gamers’

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73 lives at this early stage in the study of GTP. This is because
 74 independently, the form of dissociation (normative or patho-
 75 logical) involves absentmindedness and implies different de-
 76 grees concerning the sense of experimental disconnectedness
 77 with the self and with the environment [3].

78 Initial observations suggest there are associations be-
 79 tween failures in cognitive control (e.g. sustained atten-
 80 tion failures), inhibitory control failures, and GTP [15,
 81 17]. Mix-ups and confusion between game elements and
 82 physical stimuli that often resemble game content have
 83 also been observed [10, 12]. However, suspension of re-
 84 ality and/or self-consciousness only occur in some forms
 85 of GTP and in specific circumstances. Not all forms of
 86 GTP involve absentmindedness or appear to disrupt ongo-
 87 ing behaviours. Still, since intrusions with game content
 88 (e.g. hearing music from the game) are products of ‘a
 89 living game experience’ and are usually associated with
 90 events in the game, every intrusion can potentially awak-
 91 en memories, feelings, false expectations, urges, impulses,
 92 and (in more extreme cases) sensations to be in the game.
 93 The degree to which game intrusions and changes in per-
 94 ception can be disruptive and lead to actions without
 95 awareness requires further empirical investigation.

96 Another significant aspect of many forms of GTP is the
 97 presence of game-related stimuli as a trigger to subsequent
 98 behaviour. Consequently, GTP that occur in fully awake states
 99 when not playing the game manifest in parallel or as comple-
 100 mentary to ongoing thoughts and behaviours and do not result
 101 in zoning out. For example, experiencing an inner voice of a
 102 command from within a videogame (e.g. ‘Go, Go, Go’, a
 103 voice command from the game *Team Fortress*) while wanting
 104 individuals to move faster as they board a subway train [14].
 105 However, we acknowledge that attentional bias and
 106 hyperfocus toward game-related stimuli or memories/
 107 feelings from a videogame may come at a cost and potentially
 108 lead to absentmindedness. Moreover, GTP is not the result of
 109 volitional acts of avoiding reality as escapism; GTP can occur
 110 suddenly as a homeostatic mechanism when social situations
 111 provoke anxiety, as well as by sleep deprivation and arousal
 112 [12, 13].

113 When examining dissociation in GTP, some forms of GTP
 114 are dissociative per se, and dissociative instances have been
 115 identified from gamers’ self-reports [12–15] and when using the
 116 GTP scale [21]. We agree with Guglielmucci et al. that the
 117 forms of GTP they included in their paper involved dissociative
 118 phenomena or were intimately related because they in-
 119 volved altered body perceptions, including altered perception
 120 of time:

122 sensations of derealisation and depersonalisation trig-
 123 gered by external cues associated with the video game”,
 124 “mind disconnected from the body”, “feeling the body
 125 as different after playing a video game”, “feeling body

movement after playing”, “feeling tactile sensations 126
 ([6], p. 8). 127

128 However, some of the altered perceptions provoked by the 128
 129 virtual immersion identified in previous GTP studies are high- 129
 130 ly prevalent and it appears problematic to classify them as 130
 131 dissociative rather than as simple neural adaptative phenome- 131
 132 na, even though some of them are intrinsically related to dis- 132
 133 sociative phenomena such as vestibular adaptations to 133
 134 autoscopia [2, 18]. An example of this is “feeling body move- 134
 135 ment after playing” (i.e. whole body self-motion such as feel- 135
 136 ing the illusion of movement from the game) [18], which is 136
 137 one of the most common body-related phenomena reported 137
 138 (47–51%) among studies with general games [4, 17]. This 138
 139 mainly happens when trying to fall asleep and appears to be 139
 140 explained by vestibular neural adaptations similar to the Mal 140
 141 de débarquement syndrome [8]. Another example of altered 141
 142 perceptions frequently reported in GTP studies is when ob- 142
 143 jects are perceived as levitating or expanding, which typically 143
 144 happens after gamers look away from the screen when playing 144
 145 dance/music games [12]. This appears to be explained by 145
 146 motion aftereffects of a waterfall type [5, 18]. Moreover, it is 146
 147 well-known that immersion in virtual reality (VR) when indi- 147
 148 viduals are wearing VR headsets is capable of overriding top- 148
 149 down knowledge with bottom-up perceptual mechanisms giv- 149
 150 ing rise to illusions of transfer of body ownership [24]. Even 150
 151 acute dissociative symptomatology can be induced via VR 151
 152 immersion [25]. 152

153 A broader examination of GTP by Ortiz de Gortari and 153
 154 Larøi [19] includes additional and redefined items that assess 154
 155 altered body-related phenomena and relate dissociative phe- 155
 156 nomena: (i) out of body/autoscopia (i.e. perceiving the self in 156
 157 third-person perspective as in a videogame), (ii) derealisation, 157
 158 (iii) depersonalisation, (iv) stupor-like phenomena (i.e. remain- 158
 159 ing immobile, unable to articulate words or being verbally un- 159
 160 responsive due to being stuck in the mindset of a videogame), 160
 161 (v) sensation of ownership of virtual limbs, (vi) perceiving 161
 162 changes in the characteristics of one’s own body (e.g. sizes, 162
 163 heaviness), (vii) involuntary movements of limbs (toward a 163
 164 game-related stimuli or jerk or twitch), and (viii) mimicking 164
 165 game characters (e.g. postures, gestures). Consequently, a clas- 165
 166 sification of dissociations manifesting in GTP is as follows: 166

- 167 • *Sensory/perceptual neural adaptations and other physical* 167
 168 *aftereffects* (e.g. visual distortions, loss of visual acuity, 168
 169 uncoordinated movements, vertigo) most probably height- 169
 170 ened by prolonged gaming sessions and mental fatigue, 170
 171 interpreted as still being in the game or being the game 171
 172 character usually soon after playing. 172

173 I was playing ... about four hours straight. When I stood 173
 174 up, I had a massive head rush. I thought I was a Jedi in a 174
 175 cave for about five seconds. I was worried that the giant 175
 176 176

177 birds in the game's caves were going to attack me. I was
 178 confused and afraid ([18], p. 111).

179 • *Automatic responses toward game-related stimuli* either
 180 sensory/perceptual intrusions of game elements, usually
 181 manifesting externally, (e.g. seeing images in the periph-
 182 ery, hearing sounds coming from objects or nowhere) or
 183 misinterpretation and/or confusion of objects and/or
 184 events associated with the game that have become condi-
 185 tioned stimuli capable of eliciting conditioned responses
 186 (impulsive and mainly emotional responses), which sub-
 187 sequently can end in dissociative reactions such as sensa-
 188 tions and/or feelings of being back in the game and/or
 189 impulsive acts without awareness toward the game-
 190 related stimuli.

192 After days of playing ... I was at the gas station. There
 193 were two cars by each other, and I thought there would
 194 be enough room to squeeze through. I got all the way up
 195 to the cars and then realized that this was real life ([15],
 196 p. 444).

197 • *Engrossment in automatic mental actions with game-*
 198 *related stimuli* characterised by replaying the game in
 199 one's mind in a stereotypical manner (e.g. looking for
 200 patterns, scanning for game objects, applying game strat-
 201 egies) that can lead to episodes of absentmindedness. In
 202 more extreme cases—typically after ceasing play—
 203 thoughts appeared and lowered cognitive flexibility to
 204 switch from virtual to real life tasks as in perseverative
 205 mental states [15].

206 I played ... and got all the hidden packages at once.
 208 When I quit playing, I was looking in the corners of
 209 the rooms for hidden packages. It was really odd ([15],
 210 p. 439).

211 • *Engrossment in vivid imagery of the game*, which beyond
 212 thoughts and imagination of the game, also occurs when
 213 gamers experience visual sensations of relatively
 214 prolonged duration when they close their eyes and feel
 215 like they are replaying the game (i.e. closed-eye halluci-
 216 nations, sometimes even accompanied with sound). This
 217 tends to can occur not only in the liminal state between
 218 wakefulness and sleep (i.e. hypnagogia) but also during
 219 periods of wakefulness (i.e. parahypnagogia) [7], which
 220 can lead to episodes of absentmindedness.

222 I don't usually play it in the evening now ... When I go
 223 to bed, I can see Tetris shapes on the back of my eyelids,
 224 and I try to make the shapes all fit together ... It's sort of
 225 fun for a while but then I think "I need to sleep!" ([13],
 226 p. 100).

Guglielmucci et al. noted the potential association between
 the video-terminal dissociative trance (VTDT) and the "trans-
 lation of gaming experience to real life" (p. 10). The VTDT
 was proposed by Schimmenti and Caretti [23] as a clinical
 construct "characterized by clusters of symptoms in the psy-
 chological domains of addiction, regression, and dissociation
 in the individual's interaction with the computer and its appli-
 cations" (p.64). According to the authors, the VTDT "may
 involve significant disturbances in the states of consciousness,
 identity, and memory, the dilution of self-awareness and self-
 integrity, and the replacement of the customary sense of per-
 sonal identity by a new virtual identity" (p. 64). Regarding the
 transfer of experience to real life, Guglielmucci et al. went on
 to say:

In their study, [17] found that a high prevalence of
 gamers experienced GTP at some point. This might be
 consistent with the video-terminal dissociative trance
 hypothesis, which predicts that an alteration of mental
 and behavioural functioning may occur in the individual
 at extreme levels of absorption into the game, due to an
 alteration in cognitive and affective processing of infor-
 mation linked to the excessive gaming and a consequent
 translation of gaming experience to real life (p.10).

Our research has showed that there is a significant relation-
 ship between GTP, immersion, and playing to escape from the
 real world [10, 16]. More specifically, engaging in activities
 that involve focusing the attention on specific game elements
 by exploring and customising appear to be relevant for GTP
 [16]. Regarding problematic and excessive playing, GTP is
 correlated with fulfilment of gaming disorder criteria [19].
 Frequency of playing and session length predicts severe
 GTP (i.e. experiencing GTP many times and/or experiencing
 two or more types of GTP) [20]. However, gaming habits are
 not always consistent because most gamers experience mild
 levels of GTP [19, 20]. For instance, session length in different
 dimensions of GTP only shows significant differences in altered
 body perceptions and behaviours (e.g. verbal outbursts,
 involuntary movement of limbs), but not visual perceptions,
 auditory perceptions, or thought-related experiences.

In summary, a more in-depth understanding is needed
 concerning the relationship between dissociations in
 videogame playing and problematic gaming. This can only
 emerge from research that examines underlying mechanisms
 (e.g. physiological, behavioural) involved in dissociative
 trance-like states (during playing) and dissociations manifest-
 ing after playing, instead of only focusing on the relationship
 between dissociative disorders/traits and gaming and prob-
 lematic gaming. It is important to bear in mind that GTP is
 almost ubiquitous among gamers (81–97%; $N > 6000$; 15–
 60 years old) (Dindar & [10, 17, 19]). GTP are mostly ap-
 praised as positive by gamers [17]. Most gamers who report

279 GTP do not have any mental disorder nor were they under the
 280 influence of psychoactive substances when they experienced
 281 GTP [10, 16]. The most common forms of GTP do not appear
 282 to affect ongoing behaviours or lead to sensation of unreality
 283 of self and body [11]. However, when GTP become severe
 284 (i.e. several forms and frequently), 58% reported distress and/
 285 or dysfunction in one study [20]. The impact of GTP appears
 286 to be related to how sensory/perceptual changes or intrusions
 287 are interpreted and appraised, what subsequent behaviour they
 288 lead to, and under what circumstances they manifest. Since
 289 most GTP manifest in diurnal contexts, it is crucial to evaluate
 290 when GTP can genuinely affect normal functioning (e.g. disrupt
 291 task performance, and in extreme cases, lead to potential
 292 accidents) and psychological health (e.g. from awkward moments
 293 to questioning self-identity and mental stability).
 294

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