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The role of auditory features within slot-themed social casino games and online slot machine games

Abstract   Over the last few years playing social casino games has become a popular entertainment activity. Social casino games are offered via social media platforms and mobile apps and resemble gambling activities. However, social casino games are not classified as gambling as they can be played for free, outcomes may not be determined by chance, and players receive no monetary payouts. Social casino games appear to be somewhat similar to online gambling activities in terms of their visual and auditory feature   s, but to date little research has investigated the cross over between these games. This study examines the auditory features of slot-themed social casino games and online slot machine games using a case study design. An example of each game type was played on three separate occasions during which, the auditory features (i.e, music, speech, sound effects, and the absence of sound) within the games were logged. The online slot-themed game was played in demo mode. This is the first study to provide a qualitative account of the role of auditory features within a slot-themed social casino game and an online slot machine game. Our results found many similarities between how sound is utilised within the two games. Therefore the sounds within these games may serve functions including: setting the scene for gaming, creating an image, demarcating space, interacting with visual features, prompting players to act, communicating achievements to players, providing reinforcement, heightening player emotions and the gaming experience. As a result this may reduce the ability of players to make a clear distinction between these two activities, which may facilitate migration between games.

Introduction

New technology and media is increasingly used for entertainment purposes and many traditional offline forms of entertainment are now widely used online. Video games and gambling activities have traditionally been distinct activities used by different consumer groups, particularly since gambling is typically restricted as an adult activity. Gambling requires individuals to pay to play and individuals are given the opportunity to receive a predetermined monetary return or prize that is in part decided by chance (Gainsbury, Hing, Delfabbro & King, 2014). In contrast, gaming may require individuals to pay to play but games do not offer players the opportunity to receive a monetary prize. Both gaming and gambling are now available online and through social media sites making them highly accessible, increasingly similar and in some cases linked. Social casino games are offered through social networking sites, and mobile applications (apps) and simulate gambling activities (Gainsbury, Hing et al., 2014). In addition to being visually similar, these social casino games appear to use comparable auditory features to online gambling games. Within this study we seek to understand whether the auditory features of social casino games and online gambling differ, and the roles sound and music play within these types of games.

Social casino games are an extremely popular online activity, estimated to be played by 173 million monthly players in 2012 (Morgan Stanley, 2012). This activity has achieved substantial growth over the past few years as indicated by gross revenues reaching US$1.98 billion in 2013, a 52% increase year on year (Krejcik, 2014). Social casino games offer users the opportunity to play simulated gambling activities including slots, poker, roulette, blackjack, bingo, and sports wagering. Social casino games are free to play, and do not pay out monetary prizes, and outcomes may not be determined by chance, as such they are not classified as gambling activities (Gainsbury, Hing et al. 2014). However, despite these differences, social casino games have many similarities with gambling activities, and particularly online gambling, which is now also available on social networking platforms and mobile apps (King, Delfabbro & Griffiths, 2010a). Social casino game players can purchase virtual credits using real money to access features, upgrades or bonuses. The success of social casino games in generating revenue has resulted in the games being offered as standalone games and as a marketing tool to encourage users to migrate to gambling activities, including Internet gambling (Gainsbury, Hing et al., 2014). Despite the impressive revenue as free-play games, social casino games represent a fraction of the size of the Internet gambling market (Morgan Stanley, 2012).

The apparent similarities between social casino games and gambling users has resulted in partnerships with and direct purchases of social casino game companies by gambling companies (Gainsbury, Hing et al., 2014). Although the underlying game mechanics may differ, the games can be visually very similar and the extent to which consumers are aware of the differences between social casino games and online gambling is not well understood. Because they are not regulated, social casino games are available to children, games can have varied payout rates to entice continued play with elevated wins, and encourage users to share the games with their online networks. It is possible that

players may not understand the differences between social casino games and online gambling and migrate to gambling in the hopes of experiencing similarly high levels of wins and monetary payouts (Rose, 2014). A survey of 2,010 gamblers found that 13% played social casino games and these gamblers were most likely to be younger, use Internet gambling and have high levels of engagement with gambling (Gainsbury, Russell, & Hing 2014). This study demonstrated that there is a cross over in those who play social casino games and online gambling. Regulators in several international jurisdictions, including Australia, the UK and Belgium have considered social casino games and whether they represent an extension of online gambling or pose significant potential risks, including for children and adolescents. Research is needed to compare the characteristics of social casino games with those of online gambling to determine the extent to which these games offer different player experiences.

Auditory features are important structural characteristics which may initiate, reinforce and maintain gambling behaviour, and are incorporated into the design of video games (Collins, 2008), gambling environments (Bramley, Dibben & Rowe, 2013) and electronic gambling machines (EGMs, Griffiths & Parke, 2005; Livingstone et al., 2008). The auditory features associated with gambling include music, sound effects, and vocal cues emitted by gaming equipment (Husain et al., 2013). Gambling-operator selected recorded background music or live music can create atmosphere and demarcate space within gambling environments (Bramley et al., 2013; Griffiths & Parke, 2005). Background music is considered by some machine gamblers to create an appropriate atmosphere for gambling (Husain et al., 2013). Furthermore, sounds heard during play are considered to be appealing and promote feelings of comfort and relaxation (Husain et al., 2013). The functions of music within gambling machines include portraying the quality of the machine, aiding gamblers to become familiar with the machine, creating an identity for the machine, and signifying winning (Griffiths & Parke, 2005).

Sounds are emitted by EGMs in a number of instances. These include when they are not being played in order to advertise the machine, notifying individuals when they win or lose, and during bonus features. In a laboratory study, 24 regular gamblers rated machines as more exciting during play and preferred to play on machines when sounds were heard compared to when sounds were muted (Delfabbro, Falzon & Ingram, 2005). However, sound did not actually influence play duration or number of plays, whereas playing machines set at the maximum level of screen brightness, led to longer gambling sessions (Delfabbro et al., 2005). This is consistent with other studies of adults and adolescents (Dixon, Harrigan et al., 2013; Griffiths, 1990) suggesting that auditory cues may be a factor which gamblers consider when deciding which game to play and may maintain gambling behaviour because sound is a preferred feature of the machines.

There is evidence that sounds can influence gamblers' perceptions of events within a gambling session and their subsequent behaviour. Dixon and Harrigan et al. (2013) found that sound emitted from a simulated slot machine played within a laboratory situation led participants to overestimate the number of wins they had experienced. In another study Dixon and Collins et al. (2013) found that sounds led participants to miscategorise losses disguised as wins[1] (LDWs) as wins when they were paired with winning sights and sounds. However, when LDWs were accompanied by a "negative sound" most participants were able to categorise these accurately (i.e. as losses) (Dixon, Collins et al., 2013). The study demonstrates that players can use sound as a tool to determine their success during gambling sessions (Dixon, Collins et al., 2013). During land-based slot machine play Husain et al. (2013) found that players listened to the sounds emitted from their machine and machines played by others in the same gambling environment. Such sounds assisted gamblers to re-engage with the machine if they had become distracted (Husain et al., 2013). Additionally, specific music and sound effects were played during bonus features - machines emitted more noises as players progressed towards the jackpot and players perceived the auditory features to add to the excitement of playing (Husain et al., 2013). Sounds emitted from other machines in the environment were considered to maintain gambling behaviour as players spent more money, changed the game that they were playing and experienced negative feelings because other players were winning (Husain et al., 2013).

Researchers have found that gambling and video game playing share some structural characteristics. For example sound can be emitted by video games, with some video game players considering its presence to be enjoyable and important to the playing experience (King, Delfabbro & Griffiths, 2011). Audio within video games may facilitate immersion (Collins, 2008). Immersion,

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[1] Losses disguised as wins refer to the event in which a small win occurs, but this is less than the bet made. The win is celebrated by the game, despite the player actually losing money (Harrigan et al., 2010)

dissociation and escapism are associated with gambling and video games, and may motivate some individuals to participate in these activities (GfK NOP Social Research, 2009; Ledgerwood & Petry, 2006; Wood, Griffiths, Chappell & Davies, 2004). Playing video games or gambling can lead individuals to experience dissociative states which involve losing track of time or being in a trance-like state (Wood et al., 2004). Losing track of time can impact video game players both positively (e.g., facilitating relaxation) and negatively (e.g., feeling guilty about wasting time) (Wood, Griffiths & Parke, 2007). For some individuals, spending long periods of time gambling can led them to experience gambling-related harm (Gainsbury & Blaszcyznski, 2012).

Similarly to gaming machines, video games employ speech, music and sound effects to structure a game, attract a player's attention, focus players towards a certain aspect, and interact with the visual aspects of the game (Collins, 2008). Sounds played in response to a player's action is classified as a "player-generated event" (Collins, 2013: 32) and its purpose may be to acknowledge actions performed by players so that when actions are repeated, either that sound or a similar one is heard. The sound played by the video game itself is classified as a "game-generated event" and is initiated by the game's algorithms, but may or may not require a response from a player (Collins, 2013). Although music and sound effects may feature in social casino games and online gambling, it is important to note that the auditory features do not have to be heard by the player in order for a game to be played. Furthermore in some Internet-based gaming and gambling activities players can alter the volume of the sound or turn it off completely as preferred (Collins, 2008). In summary, the sounds and music incorporated within the design of slot-themed social casino games and online slots may potentially help gamblers to decide which game or gambling activity to play, influence cognitive processes, and induce affective responses (Dixon, Harrigan et al., 2013; Delfabbro et al., 2005; Griffiths & Parke, 2005; Husain et al., 2013).

In this study we examine the convergence of auditory features by comparing the sound present within slot-themed social casino games with sounds emitted by slot machines available via online gambling websites. The study will improve knowledge about the role of auditory features within these games. This is an exploratory study using a case study design and therefore no specific hypothesises are offered regarding the utilisation of auditory features within slot-themed social casino games and online slot machines.

Materials and Method

Selection of games for analysis

A case study approach was adopted for this study and therefore an example of each game was chosen for analysis. The game chosen to represent a slot-themed social casino game was available via Zynga. Zynga is one of the largest and most successful social casino gaming companies with around 10% market share. Hit it Rich! Casino Slots is a popular game with 3.2 million monthly active players and 470,000 daily active players in December 2013 (Krejcik, 2014). "Hit it Rich!", available on Facebook and launched as an iOS app in December 2013, offers 25 different slot machine social casino games (Figure 1). The specific game analysed for this study was "Cupid's Kiss" accessed via the Hit it Rich! Application (Figure 2). "Cupid's Kiss" is a slot-themed social casino game with 5 reels and 40 paylines. Additionally it offers arrow wilds and super symbol free spins to players.

The game "Thunderstruck II" was chosen as the game to represent an online slot machine (Figure 3). "Thunderstruck II" was accessed via www.roxypalace.com online casino website and played in demo mode meaning that the game was not played for money. "Thunderstruck II" is a 5 reel pokie which offers 243 winning combinations. The online casino website offers players the opportunity to play casino games for free in the "practice play" mode. In the "Help" section of the online casino website it stated that the games in "practice play" mode used exactly the same random number generator as the one used within real money play, therefore odds of winning were the same as those during real money play (Roxy Palace Casino, n.d.). The games were chosen because their content was similar in that they did not feature film or video clips.

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Procedure

To analyse the features of the games both the slot-themed social casino game and the online slot machine game were played on three occasions, over five days at different times by the first author. The first author is a musician, has received extensive musical training and has completed a Music Degree. Therefore the first author is qualified to assess and analyse the auditory features. Therefore no participants were included in this study, however the study was completed in accordance with ethical protocols. Playing the games on a number of occasions ensured a representative of sounds within the games was achieved.

Each game was played until the bonus features were activated. The bonus features were randomly activated by each game. The games were accessed via an Apple™ laptop computer, which ran the OS X 10.8.5 operating system. Bonus features were activated after 65, 31 and 166 spins for the online slot machine game and after 145, 191 and 41 spins for the slot-themed social casino game. Session times were on average 9 minutes and 58 seconds for the online slot machine game and 14 minutes and 17 seconds for the slot-themed social casino game. During play a log was kept of the auditory features heard. Specific records were made for the music, sound effects, speech, and absence of sound to differentiate between the different types of auditory features heard. The play session was divided into four sections - Pre-play, Within Session play, Achievement and Bonus Features. The Pre-play stage of game play refers to the point from when either the application or the website opens to when a game was chosen to be played. Within Session play refers to the time from when the game has loaded and during normal play (not including Bonus Features of the game). Achievement relates to the ways in which players are rewarded during game play. Bonus Features are when the game deviates from normal play (Husain et al., 2013).

Results

This section describes the music, sound effects, speech, and absence of sound heard during game play. A summary of the auditory features utilised within the online slot machine game and the slot-themed social casino game is presented in Table 1.

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Social casino game – "Cupid's Kiss"

Pre-play

Upon opening the application "Hit it Rich!", players entered the lobby area, where sound was first heard. The name of the application was vocalised and a specifically composed piece of instrumental background music was present which featured realistic sound effects (i.e. sound which you might expect to hear in a casino, for example, talking, cheers, coin sounds and reels spinning). The background music was distinctive and its tempo was approximately 123 beats per minute (bpm). Bpm was measured by counting the number of beats within a 15 second period and multiplying the number by four to give the average bpm of the music. The background music was a constant presence - it played whilst players browsed in-application features until the player's chosen game had loaded.

A sound effect was heard whilst players browsed the "friend zone", an area of the lobby which permitted players to connect with their Facebook friends. The same sound effect was played when hovering over in-application options such as buying coins, viewing their "High Roller Status", customising the game in terms of turning the sound off or on, changing the game to full-screen mode, sorting or browsing games and entering either the "High Limit Room" or "Tournaments" areas.

Alternative sound effects were utilised to differentiate between other functions, including visual messages appearing and areas relating to player rewards. For example, the sound effect heard

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when hovering over the games differed to the sound effect heard when the player clicked on the arrow to browse games. A unique sound effect accompanied pop-up messages which appeared after players clicked to view offers pertaining to buying coins at a promotional rate. Coins could be purchased using real money to increase players' spending power within "Hit it Rich!". When clicking onto the "Buy Coins" option sound effects were heard which functioned as a fanfare. In addition, upon entering the area of "Hit it Rich!" where players viewed information about their "High Roller Status" players heard unique sound effects, based on the sound of coins. As the player's points were displayed, another sound effect, again based on the sound of coins was played but its duration varied according to the number of points the player had achieved – longer for more points and shorter for less points.

"Hit it Rich!" offered players the opportunity to play selected slot-themed social casino games within a virtual "High Limit Room". The machines available within the "High Limit Room" were described by "Hit it Rich!" as "looser than our regular slots, so you can bet more to win more!" (Chrystalyn, 2013). The lobby area for the "High Limit Room" differed from the main lobby of "Hit it Rich!" in terms of its background music. The background music was unique, its tempo was approximately 115bpm and had not been heard prior to entering this area. The background music featured synthesised instruments including a piano, drums and cymbals. The music was composed within a jazz genre.

Additionally "Hit it Rich!" offered players the opportunity to enter in tournaments. Clicking onto the "Enter Now" button led players into a different area of "Hit it Rich!" and "Welcome to the Hit it Rich! Tournament" was announced by a female voice. This area of the application was accompanied by unique background music, which had not been heard previously. Its tempo was approximately 115bpm and performed by synthesised electric guitars, drums, wind instruments and string instruments. In addition, ascending and descending stylised coin sounds were heard. The music was composed within a rock genre.

Within session play

During this stage of game play the slot-themed social casino game, "Cupid's Kiss", was situated in the middle of two banners, one at the top and the other at the bottom of the screen. The top banner contained the buttons which allowed players to return to the lobby, view their "High Roller Status", "Experience Level", their remaining coins, buy coins, turn the sound off and on, and play the game in full screen mode. The bottom banner contained the "friend zone". Hovering and clicking onto the options contained within the two banners were accompanied by the same sound effects as discussed previously within the pre-play section of the game. This sound effect was also employed when hovering over game-related functions such as the "pay table" button, adjusting bet size, using the "auto spin", "spin" and "max bet" buttons.

Once the game had loaded, a specific piece of background music played and repeated until the player pressed the "spin" button to the start the game. The tempo of the background music was approximately 160bpm and was in triple (Waltz) time. The sounds heard when players changed their stake had different pitches (degree of highness or lowness) - increases to bet size were acknowledged by the game playing a higher-pitched sound effect and vice versa. In this instance pitch was associated with concepts of more and less in relation to betting expenditure. Clicking the "max bet" button was acknowledged by the game playing a variation of the sound effects heard when adjusting bet size.

Once the "spin" button was pressed, the background music developed and the melody (tune) of the music was heard. The event frequency of the game could be adjusted by players by pressing the "stop" button to halt the reels before the spin cycle had completed. This action was accompanied by a unique sound effect. During a normal spin cycle specific sound effects were heard as each reel came to a halt. The appearance of certain symbols, for example the "bonus" symbol were accompanied with unique sound effects that had a short attack. The sound effects were louder compared to the background music. When more than one "bonus symbol" appeared specific sound effects were played including voices which said "Oh" and rose in pitch and volume, the reels also appeared to spin faster. If three "bonus symbols" appeared then the bonus feature of the game was activated. No sound was emitted from the game when waiting for the player to press spin during the normal game.

Achievement

Players experienced two types of achievement when playing "Cupid's Kiss", firstly, players were rewarded as a result of progressing through levels within "Hit it Rich!". Players' progression was defined as their "experience level", which increased each time the player spun the reels, regardless of which slot-themed social casino game they played via "Hit it Rich!". Sounds were played when

players progressed to the next "experience level" within "Hit it Rich!" and also when they received bonuses either as coins or a "High Roller Bonus".

Secondly, players experienced wins and LDWs during game play. Wins experienced during play were signified by specific sound effects based on the sound of coins. The duration of the sound effects differed according to the amount of coins that the player had won - a bigger win led to the sound effects being played for longer and vice versa. Wins and LDWs were not differentiated by the use of specific sound.

Aside from coin sound effects accompanying wins, other wins were accompanied by music and speech. Phrases were spoken by a female character which referred to the theme of the game and the symbols which produced the win. Music and speech were also sometimes heard simultaneously to announce when players had experienced a win. In contrast losing was not signified by any additional sound being heard or by sound being removed from the game.

Bonus features

The bonus feature of "Cupid's Kiss" was where players received "free spins", meaning that players did not spend their coins to make bets. Access to the bonus feature was announced by sound effects including cheers and whistles, which the player may associate with being praised for their achievement. Speech in combination with music and sound effects were used to inform the player that they had won during the bonus feature. For example "kiss" sounds were utilised which corresponded to the theme of the game and music was heard which had not previously been heard during the game. During bonus features, combinations of music and speech were heard to indicate when the player has received free spins and collected their bonus winnings. "Big wins" experienced during the game were also notified by unique music and sound effects.

Following the completion of a bonus feature, previously heard sound effects (i.e. those heard when pop-up windows were displayed) were played. Players were then offered the opportunity to engage in social aspects of the game such as by giving gifts to their friends (e.g., "free spin bonus") or by sharing their "big win". In this instance the sound effect played was a "game-generated event" and required a response from the player – either to engage in social interaction or to refuse this opportunity. No sound was emitted from the game after the bonus feature had concluded.

Online slot machine game – Thunderstruck II

Pre-play

The website that hosted the online slot machine game - "Thunderstruck II" did not play any sound. Therefore player actions including browsing, hovering over options and choosing a game to play, were performed in silence. Additionally, during the time taken to load the online slot machine game no sound was heard. Therefore no auditory features were present during the pre-play section of game play.

Within session play

An original piece of background music was played throughout game play. The tempo of the background music was 80bpm and arguably it was composed in a film music style. The music was somewhat understated, did not have a prominent melody and was played at a lower volume compared to other music and sound effects employed by the game. Sound effects, such as "thunderclaps", were heard intermittently and corresponded with the game's theme. During within session play there were no periods of silence, the background music played constantly, although it was at a lower volume compared to the sound effects which featured more prominently and were louder.

Hovering over the in-game features (i.e., "view pays", "demo credits", "decrease" or "increase" credits, "bet max", "spin", "options", "bank", "stats", and "regular") was not acknowledged by any sound effects or music. Clicking on the "view pays" button was accompanied by a sound effect, as was clicking the "increase" and "decrease" credits buttons, "coins" button, selecting the "bet max" facility and "spin" buttons. The same sound effect was heard when pressing the "bet max" or "spin" buttons. A different sound effect accompanied the clicking of "option", "bank", "stats" and "regular" functions.

Once the "spin" button was pressed sound effects were heard whilst the reels spun and when each reel stopped. Unique sound effects were played when the "bonus" symbol appeared and when the remaining reels were spinning as if three or more "bonus" symbols appeared then the bonus feature

was activated. When two "bonus" symbols appeared specific music was played and a visual informatic was displayed to communicate to the player that three or more "bonus" symbols were needed to activate the bonus feature.

Achievement

During "Thunderstruck II" players received achievement in one form – the receipt of credits in response to wins and LDWs. Wins were accompanied by specific music and sound effects, which were higher in the mix and louder compared to the background music. Motifs (short musical phrases) were heard during "big wins" and when a win was a result of a player matching "five of a kind". LDWs were also acknowledged by sound effects and music. The duration of the sounds effects differed according to how many credits were won - the sound effect repeated for a longer or shorter duration according to the value of the win. The win sound was arguably more interesting as it was based on arpeggios where the notes which form a chord (the simultaneous sounding of two or more notes) are played separately one after the other rather than at the same time.

Bonus features

Unique music was played to announce to the player that they had entered the bonus features. Players chose one bonus feature from four options; and sound effects were heard when the player hovered over the bonus options. For this study the first author played the "Thor" bonus feature because it offered the highest number of free spins. When the bonus feature was selected, a sound confirmed the player's choice. During the bonus feature specific music and sound effects were heard. The background music which accompanied the bonus feature was different to the background music played during the normal game in terms of its genre and the instruments used. This music was composed in a rock-style genre and featured synthesised guitars.

Wins were announced by sound effects, similar to those used within the within session stage of game play as they were created using arpeggios although played by a different instrument. The winning symbols were then removed from the reels by the game, an action that was accompanied by a sound effect. At the end of the bonus features, the background music returned to original background music heard during the within session stage of game play. This signalled the conclusion of the bonus features.

Discussion

This exploratory study investigated the similarities between the auditory features of slot-themed social casino games and online slot machines games. In these particular examples sound featured in both games within all but one stage of game play. Sound was present during the pre-play stage of game play within the slot-themed social casino game, but was absent from this stage of game play within the online slot machine game. In general sound tended to be used in similar ways although there were some nuances, which may shape play within these games.

Our analysis suggests that sound may aid players to differentiate between these two games during the pre-play stage of game play. This is because sound was absent within the pre-play stage of game play for the online slot machine game but was present within this stage for the slot-themed social casino game. In the slot-themed social casino game background music, speech, and realistic sound were employed to announce to players that they had entered the application. Realistic sound effects, together with realistic graphics and settings, are used within video games and have been considered by video game players as a feature which can initiate or maintain video game play (Wood et al., 2004). From this it may be that the designers of slot-themed social casino games may use realistic sound effects to heighten the enjoyment and social experience of social games. This is because social games are designed to be shared with friends to maximise the entertainment experience. The absence of sound within the pre-play section of the online slot machine game may communicate to players that they had to navigate directly to playing their chosen online slot machine game. From this the lack of sound may initiate gambling for the online slot machine game, and sound's presence may initiate and set the scene for gaming within the slot-themed social casino game.

Additionally, the sound heard during the pre-play stage of the slot-themed social casino game may communicate to players that they can participate in a range of activities within "Hit it Rich!" and therefore sound demarcated space. The tempo and genre of the music utilised within the slot-themed social casino game differed within the pre-play stage as within the lobby area the music was composed in a style suggestive of a game show theme tune and was faster in tempo. Fast tempo music may have

more arousal potential and cause more arousal in the listener (Berlyne, 1971). The music heard in the lobby area may lead players to feel excited and stimulate the urge to play the games offered by "Hit it Rich!". Within the "High Limit Room" and "Tournament" areas, the music was slower in tempo but composed within different musical genres – jazz for the "High Limit Room" and rock for the "Tournament" areas. Within real life gambling contexts where slot machines are located gambling-operators play different music genres in order to fit with customer demographics (Bramley et al., 2013; Griffiths & Parke, 2005) and which slot machines they played (Griffiths & Parke, 2005). The use of jazz in the "High Limit Room", where players spend more coins suggests that the designers of the slot-themed social casino game may associate this genre of music with players exhibiting different betting behaviour, as this particular music genre may prime thoughts associated with sophistication.

Furthermore, sound may provide auditory feedback to players within the pre-play stage of the slot-themed social casino game. This is because a number of player actions were acknowledged by sound effects. Such actions included hovering, clicking, and browsing using the mouse. "Player-generated" sound was used and provided auditory feedback to players (Collins, 2013). Moreover, during pre-play slot-themed social casino game players first heard a sound effect classed as an auditory icon (Gaver, 1986). The sound effect was based on a natural sound – that is, the sound of coins. The use of auditory icons may have communicated to players the importance of coins for "Hit it Rich!" and the slot-themed social casino game, because coins were used as currency and was one way in which players received rewards. The association between hearing coins and possibly receiving a reward was arguably strengthened because when players perused information about their "High Roller Status", a "game-generated" event, in the form of coin sounds was heard. Using sound effects in this manner is similar to how auditory features can be utilised in video games as earning points or achieving a goal are often accompanied by particular sounds (King et al., 2010b).

During the within session stage of game play both games utilised sound which may help to create an image, guide individuals' play, to influence players' feelings and to communicate to players. Original pieces of background music were used to create an image by both games which is similar to how land-based slot machines incorporate music into their design (Griffiths & Parke, 2005). However, there were nuances between how the games employed sound at certain stages of within session play. Firstly, in the slot-themed social casino game high pitched sounds were associated with increasing expenditure and new musical information could be heard whilst the reels were spinning. Such sounds may be considered by players as more interesting and capture their attention. In contrast the background music heard when playing the online slot machine game did not alter when the reels were spinning. Secondly, the background music ceased when the slot-themed social casino game was waiting for the player to press the "spin" button as a result the absence of sound may communicate to the player that they were required to place another bet and may therefore maintain play. This follows the suggestion by Griffiths and Parke (2005) that gamblers who like the music played by land-based fruit machines may gamble again because they are eager to hear the machine's music. In contrast within the online slot machine game the constant background music during within session play may aid players' focus and facilitate feelings of immersion. This corresponds with some video games which use a constant soundscape to assist players' focus when playing in a distracting environment (Collins, 2008). From it could be that players experience different levels of dissociation during play in relation to background music's presence.

Within both games it appeared that the sound emitted by the games during the within session stage of game play may be able to heighten players' emotions. For example when more than one "bonus" symbol appeared reels spun faster (slot-themed social casino game), specific music and sound effects were played (both games) and a visual informatic (online slot machine game) was displayed to inform players how bonus features would be activated. Within the online slot machine game, high pitched sounds were incorporated within these sound effects possibly to increase feelings of tension and excitement about getting closer to reaching the bonus features. With regards to land-based gambling, machine players have reported that listening to machines could impact upon their expenditure and stimulate their urge to gamble (Husain et al., 2013).

Achievements were signalled by sound within both games, however as the slot-themed social casino game used two forms of achievement this may lead players to receive rewards more frequently and on a more predictable basis compared to the online slot machine game. Sound signified when players progressed to the next level of the slot-themed social casino game, when they received bonuses or experienced wins or LDWs. A variety of sounds were utilised to communicate achievement to players including realistic sound effects, auditory icons (Gaver, 1986), speaking characters and background music. Furthermore, as four auditory features were sometimes heard simultaneously, these sound events may command more attention from the player because they are more interesting and possibly more arousing. In contrast online slot machines operate on random and variable ratio

schedules (Griffiths, 1999) therefore players may hear the sound which accompanies wins and LDWs on a less predictable basis. However, given that in both games wins and LDWs were not differentiated by the use of certain auditory stimuli, it may be that players may overestimate wins as has previously been observed within laboratory studies (Dixon et al., 2013b). In general both games appear to be similar to land-based slot machines as achievements were announced by sound (Griffiths & Parke, 2005).

Arguably more interesting music and sound effects were played during bonus features within both games. The games emitted sound previously unheard during normal game play and given that these noises were novel it may be that such sounds are perceived as exciting by players and capture their attention. Furthermore both games used sounds based upon the theme of the game, for example "thunderclaps" (online slot machine game) and "kiss" (slot-themed social casino game) sounds. Land-based slot machines also use distinctive and memorable sound which may maintain play (Griffiths & Parke, 2005). Within the slot-themed social casino game speech, music and sound effects notified players that they had won and "big wins" were notified by auditory icons (Gaver, 1986). The sound heard during bonus features also demarcated space within both games and within the slot-themed social casino game a "game-generated event" was utilised to prompt responses from players (Collins, 2013). This instance shows how the slot-themed social casino game used sound to inform players that they can become more involved with the game by engaging in social interaction. Following bonus features the sound emitted by the slot-themed social casino game ceased, once again signalling to players that this part of the game had ended and calling players to act in order to play the game and hear the sound again. This differs to the online slot machine game as the background music heard during bonus features finished and the background music heard during within session play returned. In both games the sound present changed at the end of bonus features which may result in players' arousal and excitement levels being returned to the level prior to this stage of game play, following the hypothesis proposed by Griffiths and Parke (2005) that the absence of background music during land-based slot machine play may limit arousal.

Conclusion

This study has investigated the auditory features utilised within a slot-themed social casino game and an online slot machine game. One of the most obvious differences between the auditory features utilised within these particular examples games is at the pre-play stage of game play. However during play the differences between audio's utilisation appear to be more slight and because they are less pronounced both games may offer players comparable experiences. Nevertheless, the findings suggest that there appears to be a degree of convergence between how both of these games utilise auditory features, which may have implications for players.

The sound within these games may serve a range of functions including: setting the scene for gaming, creating an image, demarcating space, interacting with visual features of the games, prompting players to act, communicating achievements to players, providing reinforcement and heightening player emotions. Sound may enhance gaming and gambling experiences, and this may be particularly pertinent during slot-themed social casino game play where there is no monetary incentive for motivating play as players engage with this activity in order to connect with others and be entertained. The similarities between these two games in terms of their auditory features may facilitate the migration of more naive players from one game to the other, however, this hypothesis is speculative and therefore ought to be tested together with other factors (e.g., visual features) which may play a role in player migration.

A key strength of this research is that an in-depth case study of the auditory features utilised within these specific examples of slot-themed social casino games and online slot machines games has been conducted. This methodological approach differs to previous studies, which have observed individuals playing land-based slot machines (Griffiths & Parke, 2005) and collected self-report responses from individuals (Husain et al., 2013; Livingstone et al., 2008; GfK NOP Social Research, 2009). The extent that such studies can provide insights into the auditory features utilised within land-based slot machines can be limited because players do not necessarily concentrate on auditory features and the scope of machines investigated may be limited by player choice. In the present study a trained and experienced music professional has conducted a detailed analysis of various in-game sections within a slot-themed social casino game and an online slot machine game. In doing so we have identified that within the auditory features present in slot-themed social casino games and online slot machine games there are a number of musical characteristics (e.g., genre, instrumentation, pitch, realistic sounds, tempo, volume) utilised by the designers, possibly with the aim of enhancing the gaming or gambling experience. Future research could explore how players experience auditory

features and whether auditory features influence behaviour over repeated sessions of game play. This follows previous research which found that EGM players perceived the audio emitted from machines as enjoyable but they became dissatisfied with the audio over time (Livingstone et al., 2008).

The findings of this study are somewhat limited in that they may not generalise to other slot-themed social casino games and online slot machine games. The methodology of this case study permits highly detailed findings about two games, however this has the consequence of not producing results that are necessarily representative of the wide number of games available. There are a vast number of slot-themed social casino games and online slot machine games, which may vary in terms of their design, their content, and functionality. Future studies may examine other features utilised within slot-themed social casino games and online slot machine games to investigate, for example, whether auditory and visual features interact. The first author who was musically trained conducted the analysis of the auditory features for this study. However future studies could recruit a second rater to improve reliability. This study identified that the manner in which auditory features are utilised in both online slot machines and slot-themed social casino games may converge with land-based slot machines. Future studies could assess the role of sound across these three activities. Lastly, our findings suggest the possibility that the sound heard during slot-themed social casino games may be more reinforcing to players because sound is heard more frequently because of the game's mechanics. Further research is required in order to determine to what extent auditory features reinforce, shape and maintain play within slot-themed social casino games.

In conclusion, this study is the first to suggest that there are similarities between the auditory features utilised within slot-themed social casino games and online slot machine games. Auditory features may initiate, maintain or reinforce play, and influence players' interpretations of play (i.e., estimation of wins) in these types of games. This study therefore acts as a starting point from which future research can explore how players' experience certain auditory features.

Ethical standards:

The manuscript does not contain clinical studies, participant or patient data.

Conflicts of interest:

The authors declare that they have no conflict of interest.

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