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Chapter 3

EVOLUTION RULES: CAN SIGNALING THEORY PREDICT AGGRESSIVE BEHAVIORS IN VIDEO GAMES?

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ABSTRACT

To date, much of the literature related to video games theorizes and tests functional and motivational explanations for why people choose to play video games. An alternative perspective treats play as an evolutionary adaptation designed to motivate individuals to practice survival relevant behaviors in low-cost contexts. While both perspectives are useful for understanding why people choose to play video games, they provide limited guidance for making specific predictions about player behavior. This theoretical ambiguity may explain why few communication scholars have attempted to use evolutionary theory as a predictive framework. In this chapter, we use signaling theory to make falsifiable predictions about the circumstances under which players will choose to behave aggressively as well as the magnitude and moment of such aggressive behavior. We conclude our chapter by discussing preliminary findings as well as the merits of using evolutionary theory to make falsifiable predictions about player behavior.

Video games are an ever-expanding branch of the modern entertainment industry with sales currently generating nearly 22 billion dollars in the United States alone. Today, 58% of Americans play video games. Of these players, 45% are women and 62% play with others either in person or online (Entertainment Software Association, 2013). Empirical studies tell us that gamers spend a substantial amount of time playing video games (Van Looy, Curtois, & De Vocht, 2014; Williams, Ducheneaut, Xiong, Yee, & Nickell, 2006; Williams, Yee, &

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Caplan, 2008) and, in some extreme cases, report playing in excess of 80 hours per week (Williams, 2006).

The technology used to play video games has advanced. Whereas early versions of electronic games were played on sophisticated laboratory equipment (Lowood, 2006), video games today are played on devices such as personal computers, consoles, handheld systems, smartphones, and tablets. Modern players choose from a diverse catalogue of games composed of at least ten different genres including sports, simulation, strategy, and action-adventure (Quandt, Chen, Mäyrä, & Van Looy, 2014). Indeed, there are games to suit every play-style and preference. One might rightfully ask: What motivates people to play these games? To answer this question, communication scholars often draw on two perspectives: a functional approach and a motivational approach. In this chapter, we provide a brief overview of each in order to orient readers to traditional explanations for play.

Subsequently, we shift our focus to an alternative perspective and consider how evolutionary theory can be used to account for why people play video games. According to this view, play emerged as an adaptation that allows for the practice of survival relevant skills in low risk contexts. While interesting, this explanation for play suffers limitations similar to the functional and motivational perspectives. Broadly framing play as an evolutionary adaptation offers little explanation for why people behave in certain ways when playing video games. For instance, even if play allows for the refinement of survival relevant skills such as aggressive behavior, we know that not all players use video games in the same way and that there is considerable variation in how aggressively players behave, even when playing the very same video game.

Traditionally, explanations such as skill (e.g., Matthews & Weaver, 2013) or player strategy (e.g., Weber, Behr, Tamborini, Ritterfeld, & Mathiak, 2009) have been offered to explain these findings. While we believe these are valid interpretations, we also recognize that they advocate a proximate explanation for player behavior. To our knowledge, no study has investigated ultimate explanations for these, or related, behaviors. This may be due to difficulties translating general evolutionary explanations for play into *specific*, falsifiable, predictions. To that end, the majority of this chapter focuses on how signaling theory, an evolutionary theory of communication, can be used to predict the circumstances under which players will behave aggressively as well as the magnitude and moment of such behavior. We conclude by reporting preliminary findings from our initial investigations and by reflecting on the utility of adopting an evolutionary perspective for explaining player behavior.

FUNCTIONAL EXPLANATIONS FOR VIDEO GAME PLAY

A functional approach assumes that active media users make particular choices to fulfill a variety of needs. For example, the Uses and Gratifications perspective (U&G; Katz, Blumler, & Gurevitch, 1973) argues that basic human needs, individual differences, and contextual societal factors combine to result in a variety of perceived problems and motivations to which gratifications are sought from media and elsewhere leading to different patterns of media usage (for a review, see Rubin, 2009). People choose to play video games in order to gratify specific needs (Kröger & Quandt, 2014) related to arousal, social reward, skill-testing, time displacement, stress reduction (Griffiths, 1991), competition (Vorderer, Hartmann, &

Klimmt, 2003), empowerment, aesthetic attraction (Lucas & Sherry, 2004), enjoyment (Sherry, 2004a), socialization (Jansz & Martens, 2005), diversion (Hou, 2011), and civic engagement (De Simone, 2013). Similarly, personality traits may also create certain needs that compel people to seek specific gratifications from video games. For example, research indicates that individuals who are characteristically less agreeable but more open to gaming experiences tend to prefer playing violent video games (Chory & Goodboy, 2011).

A similar approach organizes players into typologies based on the needs they seek to fulfill from particular video games. At a basic level, player typology models assume that individuals play video games in order to have fun. However, having fun is accomplished in different ways for different types of players. One early player typology categorizes users in four distinct groupings: socializers, killers, achievers, and explorers (Bartle, 1996, 2014). Each group represents a different type of player and describes how that player enjoys interacting in video games. Much research has drawn upon player typologies as a tool for explaining the ways video games facilitate enjoyment (Bromley, Mirza-Babaei, McAllister, & Napier, 2014).

For example, Yee (2006) utilized data from approximately 30,000 massively multiplayer online role-playing game (MMORPG) players to identify five primary player types within the categories of achievement, relationships, immersion, escapism, and manipulation. In a different approach, Weber and Shaw (2009) applied a social cognitive theory (Bandura, 2001) framework to link motivations for play with actual features of video games. Findings from this study organized players into six types: hedonists, competitors, organizers, rebels, team players, and socializers (Weber & Shaw, 2009).

Other typology research explains excessive video game play by organizing players into four distinct categories: active-integrated, sensation-seeking, meaning-seeking, and passive-secluded (Domahidi & Quandt, 2014). For players within the categories of active-integrated and sensation-seeking, playing video games is an activity that does not displace other obligations. On the other hand, players within the categories of meaning-seeking and passive-secluded spend considerable time playing video games and often replace other responsibilities with game play.

U&G and player typology approaches are similar in that each assumes that players select specific video games according to the functions the game facilitates and the needs the game fulfills. U&G is often used as a theoretical framework to explain why people play certain types of video games whereas player typologies are more commonly employed to inform video game design.

While useful for these purposes, the limited utility of the functional approach becomes apparent when considering player behavior. At times, a player might choose a particular video game for socialization purposes. Other times, the same player might use the same video game to satisfy competitive needs. The functional approach offers little explanation for why such behavior occurs.

Game features further complicate the picture. As an example, competition is often intertwined with socialization in multiplayer video games. Accordingly, the functional perspective may artificially categorize players into narrow typologies when broader motivations for video game play actually exist. In sum, the functional perspective is useful for generating predictions about media use and selective exposure, but not specific in-game player behavior.

MOTIVATIONAL PERSPECTIVES FOR VIDEO GAME PLAY

A related perspective explains video game usage through a motivational approach. The disciplines of communication and psychology offer an assortment of motivational models to draw from (for a review, see Beck, 2003) but one popular model commonly employed to explain why people play video games is Self-Determination Theory (SDT; Ryan & Deci, 2000). SDT assumes that motivations are enhanced and inhibited by extrinsic or intrinsic rewards. Extrinsic rewards refer to external factors (such as praise or coercion from others) whereas intrinsic rewards refer to personal feelings (such as the satisfaction of psychological needs). At its core, SDT claims that three specific psychological needs are intrinsically motivating: competence, autonomy, and relatedness. Studies show a clear association between intrinsic need satisfaction and subsequent video game enjoyment (Ryan, Rigby, & Przybylski, 2006; Tamborini, Bowman, Eden, Grizzard, & Organ, 2010). Intrinsic needs for relatedness are often satisfied through multiplayer online games (Longman, O'Connor, & Obst, 2009; van Rooij, Schoenmakers, van den Eijnden, Vermulst, & van de Mheen, 2014) whereas using video games to satisfy needs related to autonomy and competence allows players to repair negative mood states (Reinecke et al., 2012). Extrinsic needs, such as rewards, can also be satisfied through game play. For example, gold farmers within online games trade in-game resources for real-world money (Keegan, Ahmad, Williams, Srivastava, & Contractor, 2011). Additionally, other players participate in video game tournaments and compete for lucrative, real-world rewards (N. Taylor, Jenson, & De Castell, 2009; T. L. Taylor, 2012). This motivational perspective overcomes some of the limitations inherent to the functional approach. SDT more broadly categorizes player motivations within either extrinsic or intrinsic incentives and allows that players may adopt multiple strategies for fulfilling these needs. This broad scope is both a strength and limitation. In some ways, SDT is a meta theory about general human behavior. In fact, SDT has been used as a framework for investigating, among other things, cross-cultural studies, interpersonal relationships, social issues, and behavioral change (for a review, see Deci & Ryan, 2008). While useful for understanding why individuals choose to play particular types of video games, SDT provides limited insight into generating specific behavioral predictions.

Both the functional and motivational perspectives offer proximate explanations (those related to human development) for media selection use. This approach has yielded an impressive and ever growing body of literature that illuminates many important aspects of why people play video games. Still, it is difficult to derive specific behavioral predictions simply by understanding *why* people play video games. In what follows, we adopt an alternative approach by investigating ultimate questions (those related to human evolution) for why people play video games. In doing so, we gain a broad understanding of why people play video games as well as the ability to use evolutionary theory to generate novel, falsifiable, behavioral predictions.

A PRIMER ON EVOLUTIONARY COMMUNICATION

Natural selection (Darwin, 1859) is the only known scientific theory to explain complex functional design in living organisms (Dawkins, 1982; Tooby & Cosmides, 2005). All living

creatures develop in an environment that can be considered unwelcoming at best and downright hostile at worst. Within this environment, individual organisms struggle to survive. Those with heritable characteristics that are better suited to (or adapted for) their environment tend to live long enough to procreate and pass these characteristics on to their offspring. By comparison, those less adapted to a given environment are less able to reproduce at the same rate as better-adapted individuals. Over time, this individual difference in reproduction rate is reflected at the species level in that the genetic composition of a species begins to more closely reflect the genetic composition of the better-adapted individuals. This selective process is used to explain how adaptations that enhance survivability emerge within a species (e.g., large brains in humans). These adaptations are not general-purpose systems. Instead, adaptations are specialized in order to fulfill specific functions and to solve a narrow range of problems (Gaulin & Puts, 2009). Importantly, humans are subject to natural selection (Miller, 1998; Tooby & Cosmides, 1992, 2005).

Specialized psychological adaptations can also emerge as an outcome of selective pressures. This has long been a focus of various branches of the biological sciences (Tinbergen, 1963) and has more recently been extended into the study of human behavior (Tooby & Cosmides, 1992). These evolved psychological mechanisms (EPMs) regulate behavior, are genetically based and, therefore, are heritable (Tooby & Cosmides, 2005). In humans, examples of EPMs include innate morality (Haidt & Joseph, 2007; Weber, Popova, & Mangus, 2012) and pathogen avoidance (Reid et al., 2012). As will be discussed in more detail shortly, the ability for play also qualifies as an EPM. It is worth noting that organisms may be consciously aware of these mechanisms, but this is not mandatory. EPMs can exist in the absence of conscious awareness as well as when an organism misattributes the causality of a mechanism.

At this point, it is important to specify that a focus on EPMs does not abandon more traditional explanations for behavior such as those discussed at the beginning of this chapter. Instead, an evolutionary perspective seeks to *integrate* these explanations with evolutionary explanations for behavior (for excellent reviews, see Tinbergen, 1963; Tooby & Cosmides, 2005). Communication scholars interested in evolutionary explanations for human behavior advocate a complementary perspective (Koerner & Floyd, 2010; Sherry, 2004b; Weber, Sherry, & Mathiak, 2008) and our approach continues in this tradition. Even if the reasons people choose to play a particular type of video game vary at the individual level, the mechanisms that explain *why* humans play video games remain stable. This allows us to investigate how these mechanisms shape behavior. In what follows, we review the adaptive function associated with an EPM for play in order to gain a more complete understanding of why humans play games with the goal of predicting specific player behaviors.

THE EVOLUTION OF PLAY

For many mammals, humans included, play is an intrinsically rewarding experience (Csíkszentmihályi, 1975; Steen & Owens, 2001; Tooby & Cosmides, 2001) and the rewarding nature of play serves to motivate continued play behavior. Two types of play are commonly characterized as evolutionary adaptations: rough-and-tumble and pretend play. Rough-and-tumble play, which includes fighting and chasing behavior, is a phenomenon

present in most mammal species (Boulton & Smith, 1992). Different from rough-and-tumble play, pretend play involves participating in fictional storytelling, imaginative pretenses, and thinking about and sharing imaginary situations (Tooby & Cosmides, 2001). In what follows, we review the evidence suggesting that each type of play is an evolutionary adaptation and specify how an EPM for play can explain motivations for video game use.

Rough-and-tumble is a physical form of play prevalent among mammalian species, including humans, and is especially common among young mammals (Boulton & Smith, 1992). The physical actions in rough-and-tumble differ from true fighting behavior in two important ways. First, the strength of blows or kicks is minimized and controlled by the participants. Second, there is an absence of injury, distress, and annoyance from participants in rough-and-tumble play. If one of these features does occur, the perpetrator of this behavior shows signs of remorse for such an unintended (or accidental) consequence. Rough-and-tumble play behavior in humans is similar to the behaviors seen in other mammals.

Evidence from animal studies suggests that this social form of play may lead to better hunting, predator avoidance, and fighting skills (Boulton & Smith, 1992). Steen and Owens (2001) argue that these skills cannot reliably be developed in the context of actual predator escape—the risk of grievous injury or death is too high to practice these skills in an encounter with a predator. Instead, they suggest that play evolved to allow mammals to use comparatively cheap and plentiful resources to practice and develop skills for events that are both rare and costly. Because rough-and-tumble play confers fitness benefits onto individuals by allowing them to practice survival relevant strategies in low-risk environments, play is experienced as intrinsically rewarding (Steen & Owens, 2001).

If rough-and-tumble play helps to develop physical skills in a low-risk environment, what then is the purpose of pretend play in human children and adults? Several researchers have drawn parallels between the adaptive mechanisms for pretend play and the motivation to participate in fiction (Tooby & Cosmides, 2001), entertainment (Steen & Owen, 2001; Vorderer, 2001), and video games (Murray, 2006; Ohler & Nieding, 2005; Ohler & Nieding, 2006). Like physical play, sharing fictional stories through pretend play confers pedagogical benefits on individuals who participate (Steen & Owens, 2001). As further evidence of adaptation, the ability for pretend play emerges in all normally developing children, can be selectively impaired, and is not simply a byproduct of general intelligence (Tooby & Cosmides, 2001). For example, children with Autism often cannot engage in pretend play even though these children have normal IQs and their other cognitive abilities remain largely intact (Baron-Cohen, 1995).

From an evolutionary perspective, why are modern humans motivated to play video games? Answering this question requires us to consider the adaptive function of media use. Ohler and Nieding (2005) propose a broad definition of media, which they describe as "external representational systems that are organized via symbol systems" (p. 152). They argue that media emerged 40,000-50,000 years ago in the form of art and allowed for the use of external representations of the physical and social environment. They purport that the emergence of media allowed individuals who already had the capacity to create and share complex narratives and fictions orally to utilize complex external and secondary means for communicating information (including survival-relevant information) with members of their own species. Like other forms of media, video games allow humans to simulate survival-relevant scenarios in a low-risk environment.

The adaptation for play provides an evolutionary explanation for why humans invest time and resources in fictional worlds such as video games and why gameplay is intrinsically rewarding. However, framing video game play as an EPM offers only so much guidance for making specific behavioral predictions. Moreover, this viewpoint does little to advance our understanding of why players behave in particular ways. For instance, studies demonstrate that aggressive player behavior is influenced by proximate factors such as player skill (e.g., Matthews & Weaver, 2013) and strategy (e.g., Weber, Behr, Tamborini, Ritterfeld, & Mathiak, 2009). How do we reconcile these findings with an evolutionary perspective that treats gameplay as an opportunity for practicing survival relevant behavior and, as such, implies that players should be universally motivated to behave aggressively in video games? A necessary next step is to move beyond theorizing play simply as an evolutionary adaptation and instead focus our energies on using evolutionary theory to generate novel, falsifiable, behavioral predictions. Only then are we able to identify instances where ultimate explanations can (or cannot) account for player behavior.

As communication scholars, we are intrigued by the idea of finding commonalties between human and animal communication. Signaling theory (see Maynard Smith & Harper, 2003) originated in evolutionary biology and explains the mechanisms behind the maintenance of honest communication between organisms. In what follows, we use two exemplar signals, variation in male voice pitch and badges of status, to generate falsifiable predictions about aggressive behavior in video game environments.

SIGNALING THEORY: AN INTRODUCTION

As we are well aware, not all the information that is communicated to us or that we communicate to others is truthful (Burgoon & Levine, 2010). However, under certain circumstances, individuals may dependably (i.e., on average) communicate honest information and rely on the fact that others will interpret the information as honest (Harper, 1991). Such forms of communication are called signals. The first question one might ask is, what maintains the honesty of a signal? Several different mechanisms have been proposed, each embedded within the general theory of natural selection (for a review, see Maynard-Smith & Harper, 2003); however, a complete review of each is beyond the scope of this chapter. Therefore we turn our attention to instances where the threat of receiver retaliation maintains the honesty of a signal. In what follows, we discuss how two exemplar signals, variation in male voice pitch and badges of status, can be used to make specific predictions about behavior in video game environments.

The Retaliation Cost Hypothesis

Enquist (1985) was the first to mathematically model how the threat of receiver retaliation can maintain signal honesty. First, we must assume a population with an equal number of high and low motivation individuals. In conflict situations, these individuals use signals to assess the motivation of a competitor. Accordingly, each contestant will issue a signal where the intensity of each signal is dependent on the contestant's motivation to

behave aggressively. Highly motivated signalers will issue more intense signals than less motivated signalers. When there is a discrepancy between the intensity of each signal, the less intense signaler will back off and conflict will not occur. In this case, the discrepancy in signal intensity can be used to infer the eventual outcome of a physical altercation. However, when each contestant's signal is of similar intensity, then these signals no longer serve as a mechanism for determining the outcome of a competitive altercation. Accordingly, conflict is necessary to determine the outcome.

Voice pitch signals aggressive intent. In competitive contexts, receiver-dependent costs maintain the honesty of variation in male voice-pitch as a signal of momentary changes in aggressive intent (Reid, Zhang, & Anderson, 2013). If a male's voice pitch (relative to baseline) signals aggressive intent, then Enquist's retaliation hypothesis (1985) would predict that a low voice pitch used in a competitive context should cause male receivers to readily access aggressive cognitions, but only when these receivers are of equal motivation to behave aggressively. Supporting this hypothesis, Zhang and Reid (2013) observe an interaction effect between signaler motivation to aggress (voice pitch) and receiver retaliation motivation (trait dominance). In a word completion task, high trait dominance males generated more anger-related words than low trait dominance males when exposed to a low male voice. This effect was reversed when high aggression males were exposed to a raised voice pitch. A second experiment measuring reaction times for aggressive word recognition (relative to nonaggressive words) replicated this outcome.

Video games commonly employ voice over Internet protocols (VoIP) to allow players to speak with each other (e.g., Ventrilo, TeamSpeak, Xbox Live). Might players use these game features to make inferences about characteristics of their competitors? Before considering this question, we must first address a pressing concern. If the honesty of a receiver-dependent costly signal is maintained by the threat of physical retaliation, then mediation effectively eliminates this threat. Accordingly, one would expect that these signals should not predict aggressive cognitions – and subsequently aggressive behavior – in a video game context. However, a considerable body of research demonstrates that mediated stimuli are treated as real, at least initially (Blascovich & Bailenson, 2011; Lang, 2006a, 2006b; Potter & Bolls, 2011; Reeves & Nass, 1996). Accordingly, we expect that players will respond to mediated signals as real and we should be able to use receiver-dependent costly signals to generate predictions about player behavior in video game contexts.

To summarize, signals elicited in conflict situations carry information about the motivation of a contestant (Hauser, 1997; Maynard Smith & Harper, 2003). And, variation in male voice pitch signals momentary changes in motivation to aggress (Reid et al., 2013). These low voice pitch signals of aggressive intent cause high retaliation motivation receivers to become cognitively more aggressive (Zhang & Reid, 2013). Finally, we know that increased aggressive cognitions translate into shorter reaction times when engaging in aggressive behavior (Anderson & Dill, 2000; Carnagey & Anderson, 2003). Therefore, in a mediated male-male competitive context, we expect that decreases in male signaler voice pitch are associated with decreases in male receiver time to engage in combat. This relationship should be more pronounced in high trait aggression males (higher motivation to aggress) compared to low trait aggression males (lower motivation to aggress). We can also make similar predictions associated with aggressive behavior. For instance, if voice-pitch signals aggressive intention, high trait aggression players exposed to a low voice pitch should

engage in more aggressive behavior during subsequent video game play compared to low trait aggression players.

Zhang and Reid (2013) observed an interaction between trait level retaliation motivation in receivers and momentary changes in aggressive intent in signalers. A logical next-step is to observe the dynamic interaction between competitors as they signal intent to behave aggressively in a competitive context. If variation in voice pitch signals momentary changes in aggressive intent (Reid et al., 2013; Zhang & Reid, 2013), and conflict should only occur when contestants are of similar motivation to behave aggressively (Enquist, 1985), then in a mediated competitive context, decreasing differences in voice pitch between male signalers should be associated with decreased time to engage in combat and increased aggressive behavior during video game play.

Badges of Status

Whereas the previous section focused on signals specific to male players, here we turn our attention to a signal that should apply to both male and female players. Badges of status (Krebs & Dawkins, 1984) are signals that implicate characteristics such as social standing and dominance. Roper (1986) described these signals as analogous to military rank insignias (e.g., sergeants' stripes) and Maynard Smith and Harper (2003) outline the characteristics associated with badges of status. First, there is continuous variation in badge size (i.e., small to large). Second, badges maintain their honesty in two ways: (a) dishonest signaling (cheating) is uncommon as there is a mutual benefit to being of either high or low status, and (b) cheating signalers are subjected to increased punishment by intraspecific attack (Rohwer & Rohwer, 1978; Rohwer, 1977).

Given that evolutionary badge of status research has seen little application in human communication contexts, this section will draw heavily from animal communication literature. In the animal kingdom, Harris' sparrows nicely demonstrate the information communicated by badges of status (Hauser, 1997; Krebs & Dawkins, 1984). Harris' sparrows feature a patch of black feathers on their breast; more dominant birds have a larger display of black feathers whereas less dominant birds have a smaller display of these feathers. These badges can be used to predict if conflict will occur (Rohwer & Ewald, 1981). When foraging for seed, less dominant Harris' sparrows give up food to more dominant individuals. This is because the temporary loss of food is less costly than conflict with a more dominant competitor. Here, badges of status determine resource allocation in a way that avoids a physical altercation. Alternatively, two sparrows of similar badge size will engage in conflict when competing for food. This is because food is a valuable resource and the badge of status does not serve as a mechanism for determining which sparrow should get the food. In this instance, conflict (and not the badge of status) resolves which individual gets the relatively high value resource.

Importantly, both dominant and subordinate sparrows benefit from the information communicated by a badge of status. Dominant Harris' sparrows protect subordinates from attack and subordinates assist in finding food (Rohwer & Ewald, 1981). This mutually beneficial relationship diminishes the motivation to cheat (i.e., dominant sparrows behaving as if they are subordinate; subordinate sparrows behaving as if they are dominant). But what mechanism prevents cheating? Two experiments provide clues. In the first, Rohwer (1977)

dyed subordinate Harris' sparrows with dominant markings. These sparrows did not rise in status and faced increased attack from other dominants. In a follow-up experiment, Harris' sparrows that demonstrated low status in a 3-month observational field study were captured and split into three groups: (1) low status birds dyed with dominance badges, (2) low status birds injected with testosterone, and (3) low status birds dyed with dominant badges and injected with testosterone (Rohwer & Rohwer, 1978). These sparrows were then re-released back into their flock. Birds in the dye-only condition did not rise in status and suffered increased intraspecific attack. Groups injected with testosterone behaved more aggressively but only the group injected with testosterone *and* dyed with dominant markings rose in status. This outcome suggests that both behavior and markings are central to status (Krebs & Dawkins, 1984; Maynard Smith & Harper, 2003). These findings provide clues for using badges of status to predict human communication behavior in video games.

Video games commonly issue badges to symbolize player skill, rank, or expertise. For example, the hugely popular Call of Duty series of first person shooter video games assigns players various ranks based on factors such as missions completed and enemies defeated. If these markings signal dominant behavior and status, then we can generate behavioral predictions using a badge of status framework. A badge of status model predicts that conflict occurs in competitive situations when both individuals feature badges of similar size and that combat should not occur when there is a clear difference in contestant badge size (Maynard Smith & Harper, 2003). Accordingly, in competitive video game contexts, decreasing status differences between male signalers should be associated with decreases in time to engage in conflict and increased aggressive behavior during video game play.

Finally, signals are transmitted in a noisy environment; this noise may limit the effectiveness of a signal (Harper, 1991; Hauser, 1997). In some instances, just one signal may be sufficient to provoke conflict. Given the costs associated with conflict (e.g., energy expenditure, bodily injury, death), it is possible that an escalation occurs before any engagement in conflict, especially when noise or cheating is common (Wiley, 1983). Badges of status are permanent and do not reflect momentary changes in individual motivation (Maynard Smith & Harper, 2003). Voice pitch manipulation may be interpreted as an escalation, or at least an indicator of momentary intent to aggress above and beyond what information is signaled by a badge of status. As such, in competitive video game contexts, decreasing differences in status between male signalers should be associated with decreased time to engage in conflict and increased aggressive behavior during video game play. This relationship should be most pronounced when signaler voice pitch is low. We also expect that decreasing status differences between male signalers will be associated with decreases in time to engage in conflict and increases in aggressive behavior and that this relationship should be most pronounced as voice pitch differences decrease between male signalers.

Preliminary Results

Preliminary investigations (Huskey & Weber, 2013) suggest outcomes that are trending in the direction of these predictions. For instance, decreasing differences in voice pitch between male signalers are associated with decreased time to engage in combat. We also see that high status players are fastest to engage in combat against high status opponents. Contrary to the predictions, however, players are faster to engage in combat when status

differences are high and voice pitch differences are low. Here, we expected that players would be fastest to engage in combat when both status and voice pitch differences were low. While these preliminary results should be interpreted with caution, when considered from a broader perspective, they demonstrate the merit of our approach.

In this chapter, we put forward several hypotheses that lend themselves to empirical testing and falsification. If we fail to find support for our hypotheses, we might conclude that proximate factors are more appropriate for explaining player behaviors of interest. On the other hand, if we find support for our predictions, we gain a better understanding of how an evolutionary explanation can account for aggressive player behavior in video game environments. Moreover, support for our predictions would provide an important starting point for investigating the relationship between basal motivations to play video games and aggressive behavior and would allow us to ask new questions such as: Do ultimate or proximate explanations explain more variance in player behaviors of interest? Do proximate individual factors (e.g., player skill, video game experience, strategy) interact with evolutionary explanations? How might we integrate evolutionary theory into the cannon of empirical literature on video games and aggressive behavior (e.g., Anderson & Bushman, 2001)? The utility of this approach is clear. Evolutionary theory can be applied in order to explain both broad motivations for why people play video games as well as generate specific falsifiable explanations for player behavior.

CONCLUSION

Communication research has generated rich social theories that provide complex and diverse explanations for human behavior. Our hope is this chapter demonstrates that the adoption of an evolutionary perspective expands the types of questions communication scholars and video game researchers might ask. The application of evolutionary theory to video games research provides a theoretical perspective that allows for the development of falsifiable predictions related to both player motivation and behavior. If these predictions are not falsified, then we can conclude that signaling theory (and evolutionary theory more generally) offers a useful perspective for explaining player behavior. Such a contribution is important for both video game designers and scholars. Game designers gain a valuable new understanding of video game attraction as well as a new set of tools for improving player interaction. For academics, adopting evolutionary theory extends video game research by offering more ultimate explanations for behavior observed in video game environments. Perhaps we can even arrive at more unified theories of video game use through this approach.

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