RESEARCH ARTICLE

Psychopathic Sims: Testing the Cheater-Hawk Hypothesis in a Video Game

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Abstract
We investigated the Cheater-Hawk Hypothesis of psychopathy in a sample of 205 undergraduate students. Participants played The Sims 3 video game with four pre-made same-sex roommate characters whose personalities were selected to represent a cheater, a hawk, a cooperator, and a dove. Interactions between game characters were coded for charm, friendliness, and provoked/unprovoked aggression ("mean" and "fight" behaviors). Overall, people with psychopathic traits used more hawk behaviors (mean and fight behaviors), irrespective of character, but they did not use more of the cheater-related behaviors ("friendly," "funny," and "complimenting" behaviors). With respect to specific characters, participants with psychopathic traits used primarily hawk behaviors with the cheater and dove and cheater behaviors with the hawk (in keeping with predictions). Overall, there was some support for the Cheater-Hawk Hypothesis. As well, people higher on psychopathic traits appear to engage in different behaviors depending upon the target of their behavior. Overall, the study also lends support to the use of video game paradigms for investigating behavior.

Keywords Psychopathy · Aggression · Sims · Video game · Cheater-Hawk

Psychopathy is often described as a personality disorder, consisting of interpersonal, affective, and behavioral deficits (e.g., Blair 2001; Yang and Raine 2009). However, other researchers (e.g., Krupp et al. 2013; Mealey 1995) have focused on psychopathy as adaptive, which would have been associated with some advantages in our evolutionary past. Book and Quinsey (2004) proposed that psychopathy could be seen as a Cheater-Hawk strategy, in that psychopaths are both exploitive (cheaters) and aggressive (hawks). In the current study, we investigated the Cheater-Hawk Hypothesis in relation to psychopathy, using interactions in a "real-life" style video game called The Sims 3 (Electronic Arts 2009).

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Disorder Versus Adaptation

The language of "disorder" is common in the psychopathy literature. Many researchers have focused explicitly on the possible associations between psychopathy and dysfunction in the brain. Some studies suggest that psychopathy is a neurodevelopmental disorder with associated brain abnormalities and behavioral deficits (e.g., Gao et al. 2009; Raine et al. 2018; Yang and Raine 2009). Other research has generally focused on amygdala dysfunction as underlying psychopathy (e.g., Blair 2001; 2003).

However, not all researchers have viewed psychopathy as a disorder. Krupp et al. (2013), for example, argued that psychopathy is better viewed as an evolutionary adaption than a disorder. These authors claimed that although psychopaths are different from other people, and that they undoubtedly cause much harm to others, there is little evidence that psychopathy is associated with dysfunction. This group of authors (Krupp et al. 2012) found that psychopathy was associated with avoidance of using violence against genetic relatives, again suggesting some adaptive benefit. Further, in a comparison of psychopathic and nonpsychopathic offenders, there neither was evidence of greater disruptive prenatal, perinatal, and neonatal events in the psychopaths nor were there differences

in current fluctuating asymmetry (considered an indicator of developmental disruptions; Lalumière et al. 2001). Such findings suggest a need to look beyond psychopathological explanations for psychopathy (see Glenn et al. 2011, for a review of pathological and evolutionary models of psychopathy).
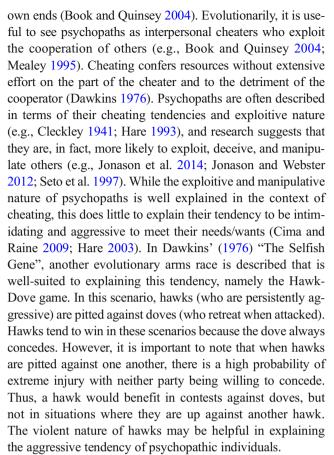
Numerous studies have shown positive associations between psychopathy and numbers of sexual partners in student samples (Kastner and Sellbom 2012; Visser et al. 2015; 2010b). Precocious sexual activity with many partners is considered an indicator of a "fast" life history strategy (LHS; Figueredo et al. 2006), which is associated with immediate versus delayed benefits. Although LHS has been used to describe differences across species in allocating resources to various demands, the theory has also been applied within species to describe differences in human strategies (see Del Giudice 2019 and Zietsch and Sidari 2019 for critiques of this approach), with some describing psychopathy as an alternative LHS (e.g., Lalumière et al. 2001). In a large ($N = 512$) sample of sex offenders, early, frequent, and coercive sexual behavior was found to be a core aspect of psychopathy (Harris et al. 2007), supporting this alternative LHS theory. In studies incorporating measures of LHS, psychopathy has been consistently related to a fast LHS (Davis et al. 2019; Gladden et al. 2009; Jonason et al. 2010).

Psychopathy is normally conceptualized as consisting of two correlated but distinguishable factors: factor 1 (or primary psychopathy) and factor 2 (or secondary psychopathy; Hare 2003). Factor 1 consists of traits such as manipulativeness, deceptiveness, and lack of empathy or remorse. Factor 2 consists of traits such as irresponsibility and antisocial and aggressive behaviors. Both factors 1 and 2 would seem to have evolutionary costs and benefits. For example, the deception, superficial charm, and lack of empathy characteristics associated with factor 1 would be beneficial in gaining resources, attracting mates, and exploiting others without experiencing negative emotions, such as anxiety and depression. Costs could include social sanctions, reputational harm, and lack of long-term alliances. The aggression, risk-taking, and promiscuity of factor 2 would have benefits of mating success and resource acquisition, but costs would include reputational harm, punishment, and physical harm/death (see Glenn et al. 2011 for a review of psychopathic costs and benefits).

Psychopathy is therefore generally described as including both exploitive or cheating elements and aggressive and risk-taking elements. One theoretical approach that has attempted to explain the cheating and aggressive tendencies inherent in psychopathy is the Cheater-Hawk Hypothesis (Book and Quinsey 2004).

The Cheater-Hawk Hypothesis

The Cheater-Hawk Hypothesis suggests that people with psychopathic traits can be described as cheaters (exploiting the cooperation of others) and hawks (using aggression to their own ends (Book and Quinsey 2004). Evolutionarily, it is useful to see psychopaths as interpersonal cheaters who exploit the cooperation of others (e.g., Book and Quinsey 2004; Mealey 1995). Cheating confers resources without extensive effort on the part of the cheater and to the detriment of the cooperator (Dawkins 1976). Psychopaths are often described in terms of their cheating tendencies and exploitive nature (e.g., Cleckley 1941; Hare 1993), and research suggests that they are, in fact, more likely to exploit, deceive, and manipulate others (e.g., Jonason et al. 2014; Jonason and Webster 2012; Seto et al. 1997). While the exploitive and manipulative nature of psychopaths is well explained in the context of cheating, this does little to explain their tendency to be intimidating and aggressive to meet their needs/wants (Cima and Raine 2009; Hare 2003). In Dawkins' (1976) "The Selfish Gene", another evolutionary arms race is described that is well-suited to explaining this tendency, namely the Hawk-Dove game. In this scenario, hawks (who are persistently aggressive) are pitted against doves (who retreat when attacked). Hawks tend to win in these scenarios because the dove always concedes. However, it is important to note that when hawks are pitted against one another, there is a high probability of extreme injury with neither party being willing to concede. Thus, a hawk would benefit in contests against doves, but not in situations where they are up against another hawk. The violent nature of hawks may be helpful in explaining the aggressive tendency of psychopathic individuals.

The cheater and hawk scenarios are both necessary, then, to explain the exploitive and aggressive tendencies of the psychopath, and previous research does provide support for this hypothesis (Book and Quinsey 2004; Book et al. 2019). Another test of the Cheater-Hawk Hypothesis found that psychopathic traits were related to aggression (direct and indirect) and cheating (Coyne and Thomas 2008). Interestingly, relationships were present for primary but not secondary psychopathy.

Implications for Victim Selection

Despite considerable evidence that psychopathy is consistent with exploitive and aggressive behaviors, there has been less research addressing how psychopathic individuals decide *who* to exploit or aggress against. Victim selection would necessarily involve evaluation of others and decisions regarding which individuals would make the "best" targets. However, there is evidence that psychopathic individuals have certain deficits in assessing other individuals accurately. Psychopathic individuals may have limitations in the ability to accurately assess the emotional states of others (as indicated by lower scores on emotional intelligence ability; e.g., Ermer et al. 2012; Visser et al. 2010a). Likewise, there is literature suggesting psychopathy-related deficits in facial recognition, particularly in recognizing sad and fearful faces (e.g., Blair et al. 2001; Hastings et al. 2008; but

Book et al. 2007). Although psychopathic individuals may have some deficits in these particular areas, it seems possible that psychopathic traits are associated with niche skills specific to assessing vulnerability in potential victims. For example, in one study, inmates' psychopathy scores were positively (albeit not significantly) associated with accuracy in rating a target's assertiveness (Book et al. 2007).

Several studies suggest that those who are higher in psychopathy are better able to judge vulnerability in others. Psychopathic offenders were more accurate in assessing vulnerability in women through gait cues than were nonpsychopathic offenders (Book et al. 2013). Likewise, in a small sample of male undergraduate students, those with higher levels of psychopathic traits were more accurate than students with lower levels of psychopathic traits in assessing vulnerability using gait cues (Wheeler et al. 2009). Further, one study found that superior accuracy in detecting vulnerability to violent victimization was specific to male students who were higher in psychopathic traits; female students with higher psychopathic traits did not demonstrate higher accuracy (Ritchie et al. 2018). Cumulatively, these studies suggest that psychopathic traits may relate to higher accuracy in assessing vulnerability, particularly for men.

What is not clear from these studies is whether psychopathic traits are related to behaving differently depending on the *other person's* characteristics. That is, although the more psychopathic individuals were effective at evaluating vulnerability (Ritchie et al. 2018; Wheeler et al. 2009), these studies did not provide evidence regarding the behavior of the psychopathic individuals toward vulnerable and less-vulnerable others.

The Current Study

In the current study, we examined whether individuals with higher levels of psychopathic traits would demonstrate different behavioral tendencies depending on the type of target character within a video game context. For the current study, we used The Sims 3, a video game that uses a simple point-and-click interface. Several aspects of this game make it ideal for the current research. First, it features a "real-life" style of game play, which increases correspondence to real-world behavior. Second, it allows players to create realistic characters by choosing both their appearances and personality traits and to control them in the game world. Third, interactions between characters are selected from a menu of choices, including "friendly," "mean," and "romantic" behaviors, which allow for a high level of behavioral choice. Fourth, the game is easy to learn and requires no particular gaming ability or experience. Fifth, player-selected interactions are visible and easy to count for the purposes of analysis.

In The Sims 3, each character has a set of traits that affect how the character behaves in the game. For example, the game

allows characters with the "evil" trait to use the mean behavioral category earlier on in interactions with other characters. Characters with the friendly trait, on the other hand, have more specific behaviors available to them within the friendly behavioral category. Therefore, characters with different traits are likely to have different interactive tendencies. Previous research using The Sims 3 has shown that individuals with higher levels of psychopathic traits tend to use fewer friendly and more mean behaviors compared with those who are lower in psychopathic traits (Worth 2015).

For the current study, we created four different in-game characters with personality traits specifically selected in order to represent a cheater (i.e., deceptive, sneaky, charming), a hawk (i.e., aggressive, rude, mean), a dove (i.e., submissive, nervous, shy), and a cooperator (i.e., nice, trusting, cooperative). Participants were able to interact with these characters via their own character, that is, participants were asked to control only their own characters, while the other characters were controlled by the game.

Given the previous findings showing that psychopathic traits are related to both cheater and hawk behaviors, our first prediction was that psychopathic traits would be positively correlated with the use of cheater and hawk behaviors, irrespective of the specific character involved in the interaction. We also expected that these behaviors may differ depending on the specific character being interacted with.

Character-Specific Predictions

When interacting with the cheater character, we expected that participants' psychopathic traits would be positively correlated with the use of hawk behaviors (mean and fight interactions), but not cheater behaviors (friendly, "funny," and "complimenting" behaviors). On the other hand, given that the hawk character is quite aggressive, we expected that participants with psychopathic traits would tend to engage in cheater behaviors toward the hawk. We did not expect psychopathy to be related to the use of hawk behaviors when interacting with the hawk character. With respect to the dove character, we expected that people with higher levels of psychopathic traits would engage in more hawk behaviors (especially unprovoked fight and mean behaviors). Finally, we expected participants with psychopathic traits to engage in more cheater behaviors when interacting with the cooperator. We did not have any predictions relating to hawk behaviors toward the cooperator.

Methods

Participants

The sample was comprised of 205 undergraduate students (124 women, 74 men, 7 missing/prefer not to say) from a

medium-sized university (64.4% Caucasian) who participated in the study for course credit. The participants ranged in age from 16 to 43 years ($M = 20.47$, $SD = 3.46$). A condition of participation was prior experience in playing any of The Sims video games. This study was approved by Institutional Research Ethics Boards, and all students provided informed consent prior to beginning their study participation.

Measures

Psychopathy The Self-Report Psychopathy 4 (SRP-4; Paulhus et al. 2016), a 64-item self-report questionnaire, was developed to assess Psychopathy Checklist Revised (PCL-R; Hare 2003) factors in forensic, community, and student samples. Participants responded on a scale from 1 (strongly disagree) to 5 (strongly agree). We calculated total SRP scores, scores for factor 1 and factor 2, and scores for each of the four subscales: interpersonal manipulation, callous affect, erratic lifestyle, and antisocial behavior. In the current study, the Cronbach's alpha for the subscales were .83, .77, .80, and .77 respectively.

Video Game The Sims 3 (Electronic Arts 2009) is a video game in which the player controls realistic virtual characters in a "real-life" simulation. The characters live in houses and can interact with other characters. For the purposes of the current study, we created four characters, as described in the introduction. Characters were created to be alike in appearance, apart from differing hair and shirt colors. The four characters were created with personality traits that would reflect the cheater (deceptive, sneaky, charming), hawk (aggressive, rude, mean), dove (submissive, nervous, shy), and cooperator (nice, trusting, cooperative). More specifically, from among the 64 possible traits provided by the game, we chose three traits for each character that seemed to best represent these qualities. Although five traits can be selected for each character, examination of the available traits suggested that just three were best representative of each character type. To fill the remaining two trait slots for all four pre-made characters, we selected two traits with minimal influence on the game play (i.e., "frugal" and "light sleeper"). All character trait names and definitions are provided by the game, and therefore do not perfectly match any personality traits described in psychological research. Our aim was to select the best possible traits given the limitations of the game. A complete list of traits is provided in Table 1 (note: all trait definitions are taken directly from the Sims 3 game).

In addition, we modified a house provided by the game to provide a complete enclosed play area (characters were not

Table 1 List of The Sims 3 characters, traits, and definitions for the four characters

Character	Trait name	Trait definition
Cheater	Charismatic	Charismatic Sims are skilled socializers and also love to throw parties!
	Evil	Evil Sims love the dark, take great delight in the misfortune of others, and prefer to lead a life as far away from goodness as possible.
	Schmoozer	Schmoozers are really good at befriending neighbors, co-workers, and sucking up to their bosses. They love to flatter and are very good at it.
Hawk	Daredevil	Daredevils seek the extreme side of life, even if it means making an everyday chore extreme. They also love fire.
	Hot headed	Hot-headed Sims are quick to anger. Broken household items, conversations gone awry, or even the slightest negative Moodlet[a] will all send them into a boiling rage.
	Mean-spirited	Mean Sims love to fight, mostly because they never lose in a brawl. They take satisfaction with every new Enemy made and dream of new ways to be nasty to others.
Dove	Coward	Cowards are terrified of everything that can and will go bump in the night. They are scared of the dark and will frequently faint in "dire" situations.
	Good	Good Sims go out of their way to help friends and family in need, are charitable with their money, and frequently comfort those around them.
	Neurotic	Neurotic Sims will freak out at the most minor of provocations. They become stressed easily and can be difficult to mellow. Luckily they take solace in sharing their worries with others.
Cooperator	Excitable	Excitable Sims get excited about... pretty much everything. They enjoy an extra dose of self-satisfaction when good things happen for them in life.
	Friendly	Friendly Sims love being around friends and are great at making and keeping friendships.
	Good	Good Sims go out of their way to help friends and family in need, are charitable with their money, and frequently comfort those around them.

All trait names and definitions are quoted from The Sims 3 (Electronic Arts 2009). *a.* "Moodlet" refers to a character's temporary feeling or state

able to leave the house unless the player modified the house itself). Although the game normally allows players to direct their characters to explore a town, pursue careers, and engage in other activities, we limited the use of the game to a single household in order to encourage participants to focus on interacting with the pre-made characters. Participants were asked to create a character to represent them, and this character was placed in the house with the other four pre-made characters. Participants were asked to control only their own character and to focus on having their character interact with the other characters in the house. The other four characters were controlled by the game.

Interactions Interactions between the participant's character and the pre-made Sims characters were coded as the outcome variables. Participants could choose a number of interactive options during gameplay. Positive interactions included friendly, funny, "compliment appearance," and "compliment personality." We refer to the "compliment" behaviors as "charm." Compliment behaviors are collectively referred to as charm. Negative interactions included fight and mean options, which were both considered to be aggressive interactions. We also coded whether participant selection of fight or mean interactions was provoked or unprovoked. Aggression was considered to be "provoked" if the characters had a negative reaction to the previous interaction. Otherwise, aggression was coded as unprovoked. Some examples of each type of interaction are given in Table 2.

Coding of the behaviors consists of reviewing the recorded gameplay footage and counting behaviors for each participant. Each behavior category (e.g., friendly) that is selected by the participant is visibly highlighted when the participant clicks on it. Reactions to the behaviors appear as blue plus signs (for positive reactions) and red negative signs (for negative reactions) over the heads of the characters after a behavior has been completed. Coding for both behaviors and reactions therefore consists of counting each behavior and noting the reaction that occurs once it is completed—thus, there is no aspect of subjectivity to the coding.

Table 2 Sample behaviors within categories for in-game interactions in The Sims 3

Category	Examples of specific behaviors
Friendly	Chat, get to know
Funny	Tell joke
Romantic	Compliment appearance, compliment personality
Mean	Insult
Fight	Fistfight

Procedure

Students participated in the study individually. First, the participant completed a consent form and demographic items. Second, the researcher provided instructions on creating a character in The Sims and asked the participant to create one character to represent themselves (i.e., choose the character's appearance and five personality traits that are consistent with their own personality). Third, the researcher placed the participant's character into the house with the other pre-made characters. During this time, the participant completed the SRP-4. Fourth, the researcher instructed the participant in the basic elements of gameplay, instructing the participant to control only their own character and to focus on interacting with the pre-made characters. Fifth, the participant played the game for 20 min. The game play was recorded for later coding.

Results

A total of 194 (122 women, 69 men, 3 unspecified) participants logged at least one interaction with the other characters while playing The Sims 3 game. Means and standard deviations for age, psychopathy, and behavior categories are presented by sex in Table 3. As is seen in Table 3, men scored significantly higher on psychopathic traits and were less likely to use friendly, funny, and charming (using compliments) interactions with other characters in the game. There was also a trend toward men engaging in more unprovoked meanness and fighting ($p = .07$). Table 4 details the number of participants that engaged in each of the behaviors that were coded for the study. A power analysis was conducted using GPower 3, resulting in a required sample size between 67 and 153 (for effects ranging from small/medium ($r = .20$) to medium ($r = .30$).

The relative infrequency of negative interactions (and relative frequency of friendly and funny interactions) resulted in severe skew (L- and J-shaped distributions). Because of this deviation from normality, we chose to use Spearman's Rho rather than Pearson's r. Spearman's Rho is more robust in situations where there is nonnormality (Howell 2012). Another method used in cases of severe skew is to dichotomize the variable (Bradley 1982), so we dichotomized each of the coded behaviors and conducted t tests. The results were the same as our correlational analyses, and, as such, we are reporting the correlational analyses only.

We began by examining partial Spearman's Rho correlations between psychopathic traits and behaviors toward each character (controlling for the total number of interactions with that particular character). Further, to examine whether behaviors were used more/less often for one character (versus others), we conducted follow-up chi-square tests. More specifically, we dichotomized psychopathic traits into low and high with a median split. We then calculated difference scores

Table 3 Descriptive statistics for behavior categories by participant sex

		Number	Mean	SD	Min	Max	t	p
Age	Women	122	20.19	2.94	17	35	− 1.16	.25
	Men	69	20.78	4.09	15	43		
SRP-F1	Women	122	73.17	13.82	42.47	107.67	− 5.26	< .001
	Men	69	84.45	15.01	39.2	114.43		
SRP-F2	Women	122	66.19	13.40	41	113	− 2.02	.05
	Men	68	70.44	14.81	34	114		
SRP-total	Women	122	139.36	24.36	89.67	209.27	− 4.02	< .001
	Men	68	154.51	25.84	73.2	217.07		
Friendly	Women	122	12.56	10.71	0	62	5.25	< .001
	Men	69	5.22	5.92	0	34		
Funny	Women	122	4.58	3.66	0	19	4.34	< .001
	Men	69	2.55	1.73	0	8		
Provoked aggression	Women	122	0.30	1.05	0	6	− 0.78	.43
	Men	69	0.43	1.39	0	6		
Unprovoked aggression	Women	122	0.24	0.68	0	5	− 1.8	.07
	Men	69	0.68	2.57	0	20		
Compliment (appearance)	Women	122	0.46	1.18	0	6	2.44	.02
	Men	69	0.10	0.39	0	2		
Compliment (personality)	Women	122	0.44	1.04	0	5	2.21	.03
	Men	69	0.14	0.52	0	3		

SRP-F1 factor 1, *SRP-F2* factor 2, *SRP-total* self-report psychopathy total, *Min* minimum score, *Max* maximum score

for each of the behaviors toward each character. For each behavior, we subtracted the average number of similar interactions with other characters. The resulting "difference" variables were dichotomized, with a 0 assigned to people who used the behavior less than (or equal to) other characters and a 1 assigned to those who used the behavior more than with other characters.

Testing the Cheater-Hawk Hypothesis

We first examined the correlations between psychopathic traits and each of the behaviors, across all character targets (see Table 5). When the particular character is not taken into account, there was mixed support for the Cheater-Hawk Hypothesis. As expected, psychopathic traits were significantly and positively correlated with engaging in mean and aggressive behaviors (provoked and unprovoked). Contrary to prediction, however, people with higher levels of psychopathic traits were significantly less likely to use friendly interactions (factor 1, factor 2, and total SRP) and humor (factor 1 only) and the relationships between psychopathic traits and the use of compliments or humor were nonsignificant (though the relationship between factor 2 and complimenting appearance was marginal ($p = .06$)).

Character-Specific Analyses

To determine whether people with psychopathic traits tended to use certain behaviors more with certain characters, we dichotomized psychopathy (high and low based on median split) and created variables reflecting whether the participant chose to use this behavior with this character *more* than with other characters (0 = less than or the same, 1 = more than). We then conducted chi-square analyses. Cross tabs details are given in Supplemental Materials. Table 6 gives the results of all chi-square tests for all of the characters.

Table 4 Number of participants who used each type of interaction in The Sims 3

Behavior	No	Yes	Total
Friendly	6	188	194
Funny	9	185	194
Compliment appearance	164	30	194
Compliment personality	159	35	194
Provoked meanness or aggression	173	21	194
Unprovoked	160	36	194

No = did not engage in the stated behavior. Yes = engaged in the stated behavior

Table 5 Spearman Rho correlations between psychopathic traits and cheater/hawk behaviors in The Sims

Psychopathy	Friendly	Humor	Provoked	Unprovoked	Compliment appearance	Compliment personality
Factor 1	− .25**	− .15*				− .01
			.15*	.14*	.02	
Factor 2	− .17*	− .02				.10
			.16*	.21**	.13ᵃ	
Total SRP	− .23**	− .09				.04
			.18**	.20**	.08	

$N = 194$

*$p < .05$; **$p < .01$; ᵃ $p = .06$

Cheater For the cheater character, we expected that psychopathic traits would be positively correlated with the use of hawk behaviors (mean and aggressive interactions), but not cheater behaviors (friendly, funny, complimenting). Correlational analyses (Spearman's Rho) are provided in Table 7. As expected, psychopathic traits were positively correlated with unprovoked meanness/aggression. However, the relationships were nonsignificant for provoked meanness/aggression, and thus, the prediction was only partially supported. It is also interesting that there were significant negative correlations between psychopathic traits and friendly interactions with this character, though this finding may be due to the general tendency for psychopathic traits to be associated with fewer friendly interactions (see first hypothesis).

As expected, follow-up chi-square analyses showed that those who were above the median on the SRP were more likely to have used MORE unprovoked meanness and aggression with the cheater character (when compared with other characters). Overall, the correlational and chi-square analyses provide some support for the prediction that people scoring higher on psychopathic traits would tend to use hawk behaviors when dealing with the cheater character, particularly unprovoked meanness and aggression.

Hawk Given that the hawk character is quite aggressive, we expected that participants with psychopathic traits would be more likely to utilize cheater behaviors with the hawk character (i.e., use of charm: friendly interactions, compliments). We did not expect psychopathy to be related to the use of hawk behaviors (aggression/meanness) with this character. Spearman's Rho partial correlations (controlling for total number of interactions with the hawk character) are given in Table 8. There was mixed support for the prediction that participants with psychopathic traits would engage in more cheater behaviors with this character. Unexpectedly, psychopathic traits were negatively related to the use of friendly interactions with this character. However, there was a significant positive relationship between factor 2 of the SRP and the use of compliments (of appearance, specifically). As expected, psychopathic traits were not significantly related to meanness/aggression (provoked or unprovoked).

It is possible that the negative relationship with friendly interactions is accounted for by the general tendency for psychopathic traits to be negatively related to friendly interactions, regardless of the character (Hypothesis 1). In fact, follow-up chi-square analyses showed that participants with psychopathic traits used friendly interactions with the hawk character more often than with other characters (note $p = .06$). Similarly, they complimented the hawk's appearance more often than they did for other characters, supporting our prediction that participants scoring higher on psychopathic traits did use cheater behaviors with the hawk more than with other characters (i.e., friendly interactions and complimenting appearance).

Dove We expected psychopathic traits to be positively correlated with hawk behaviors toward the dove character, especially unprovoked aggression/meanness which is integral to the Hawk-Dove game described by Dawkins (1976). As expected, Spearman's Rho correlations (Table 9) revealed significant positive correlations between psychopathic traits and the use of provoked and unprovoked meanness/aggression. Unexpectedly, psychopathic traits were negatively related to friendly interactions with the dove. As with other characters, the negative relationships with friendly interactions are likely due to a general tendency to use fewer friendly interactions, irrespective of the character. Follow-up chi-square analyses confirm that people in the high psychopathy group were more likely to use unprovoked meanness/aggression (note $p = .06$) but not provoked aggression.

Cooperator Finally, we expected that participants with higher levels of psychopathic traits should engage in more cheater-related behaviors when interacting with the cooperator (friendly, funny, complimenting). We did not have any specific expectations with regard to the use of hawk-related behaviors for this character. As with the other characters, and in line with the general tendency to use fewer friendly interactions, psychopathic traits were negatively related to the use of friendly behaviors with the cooperator. In keeping with the prediction, psychopathic traits (factor 1) were correlated

Table 6 Chi-square tests for frequency of interaction compared with other characters

Character	Behavior	Chi-square	p value (one-tailed)	Phi
Cheater	Friendly	1.21		.08
			.27	
	Funny	0.005		.005
			.94	
	Compliment appearance	0.23		− .03
			.63	
	Compliment personality	0.05		.02
			.82	
	Unprovoked meanness/aggression	*5.2*		*.16*
			.02	
	Provoked meanness/aggression	0.88		.07
			.35	
Cooperator	*Friendly*	*6.89*		*−.19*
			.01	
	Funny	0.79		.06
			.37	
	Compliment appearance	1.12		.08
			.29	
	Compliment personality	0.55		.05
			.46	
	Unprovoked meanness/aggression	1.12		.07
			.29	
	Provoked meanness/aggression	0.01		−.005
			.94	
Hawk	**Friendly**	**3.2**		**.13**
			.06	
	Funny	2.56		.12
			.10	
	Compliment appearance	*4.33*		*.15*
			.04	
	Compliment personality	0.53		.05
			.47	
	Unprovoked meanness/aggression	2.33		.10
			.12	
	Provoked meanness/aggression	2.76		.12
			.10	
Dove	Friendly	0.02		.01
			.90	
	Funny	1.37		−.08
			.24	
	Compliment appearance	0.02		−.01
			.90	
	Compliment personality	2.45		−.11
			.12	
	Unprovoked meanness/aggression	**3.35**		**.13**
			.06	
	Provoked meanness/aggression	1.88		.09
			.17	

Variables were (a) low vs high SRP score (median split) and (b) whether participant used this particular behavior with this character more than with other characters or less than/same as other characters. Italics: $p < .05$. Bold: $p = .06$. Cross-tab tables are provided in Supplemental Materials

positively with the use of humor (funny interactions; see Table 10). However, the relationships with complimenting either appearance or personality were nonsignificant. Follow-up chi-square analyses were, for the most part, nonsignificant, suggesting that people scoring higher on psychopathic traits were no more/less likely to use any of the coded behaviors with the cooperator (compared to other characters). It does appear, however, that participants in the "high"

psychopathy group used significantly more provoked meanness/aggression with the cooperator (compared to the other characters).

Discussion

Overall, there was mixed support for the Cheater-Hawk Hypothesis in the context of our Sims 3 scenario.

Table 7 Partial Spearman Rho calculations (controlling for total number of interactions with cheater character) between psychopathic traits and behaviors with the cheater character

	Factor 1	Factor 2	Total SRP
Friendly	− .18*	− .06	− .14*
Funny	− .06	− .06	− .07
Unprovoked mean/fight	.18*	.20*	.21*
Provoked mean/fight	.12	.08	.11
Compliment (appearance)	− .02	.001	− .01
Compliment (personality)	.01	− .02	− .001

Psychopathic traits were significantly positively correlated with provoked and unprovoked meanness/aggression (hawk-related behaviors). However, participants with psychopathic traits were significantly less friendly than other participants and did not show the "charming" cheater behaviors we had predicted. With regard to the first hypothesis, then, there was support for the prediction that people with psychopathic traits would engage in hawk behaviors, but no indication that they are more likely to use the cheater-related behaviors. However, because our hypothesized cheater behaviors (complimenting others, being funny and friendly to others) are generally prosocial behaviors, it seems likely that any calculated friendliness/charm was less common than the presumably genuine prosociality of the participants who reported lower psychopathic traits. Further, these findings of general behavioral tendencies within the Sims 3 environment mirror the results of a previous study (Worth 2015).

In terms of interactions with specific characters in the game, we also found mixed support for our predictions. As was noted above, psychopathic traits were significantly *negatively* related to the use of friendly interactions, irrespective of character. This negative tendency was borne out for all of the specific characters, as well. We expect that this might be due to the prosocial nature of that behavior, making it significantly more likely that people with lower psychopathy scores would make more use of the behavior.

With the cheater character, participants with psychopathic traits did tend to use hawk behaviors, as expected. Also as

predicted, there was a tendency for participants with psychopathic traits to use cheater behaviors when interacting with the hawk character (friendly, complimenting appearance). We expected that hawk behaviors would be utilized when interacting with the dove character, and this was borne out by the main and follow-up analyses. Finally, there was only limited support for the use of cheater-related behaviors when interacting with the cooperator. Specifically, factor 2 traits were significantly related to the use of funny interactions with the cooperator. However, the follow-up chi-squares were mostly non-significant, with the exception of provoked aggression (people scoring high on psychopathic traits use more provoked aggression with this character than with other characters).

One limitation to this research, and a possible explanation for the lack of cheater behaviors, was the lack of any inducement to cheat. Although players with psychopathic traits were antisocial in their interactions with other characters, there was no motivation for the characters to compliment or be friendly to other characters. This behavior might mimic the real-world behavior of psychopathic individuals, in that they will not engage in charm without some prospect of future benefit. Further research might incorporate a game or prize that might elicit cheater tactics.

On a similar note, there was also considerable consistency between factor 1 and factor 2 in their relations to interactions with other characters. It seems likely that in requiring participants to simply interact with their Sims "roommates" for 20 min as opposed to completing a challenge or competing for some gain, which we did not provide a situation that elicited more nuanced aspects of psychopathy. Such a scenario might also make the characteristic traits of the cheater and the cooperator more salient to participants. Whereas some research has shown that individuals with psychopathic traits demonstrate enhanced ability for deception detection, at least in men (Lyons et al. 2013), other research has shown no such advantage (Martin and Leach 2013; Jones 2015). In one study, emotional intelligence (EI) and social intelligence (SI) moderated the relations between psychopathy and trustworthiness detection, such that both primary and secondary psychopathies were related to lower performance in trust recognition

Table 8 Partial Spearman Rho calculations (controlling for total number of interactions with hawk character) between psychopathic traits and behaviors with the hawk character

	Factor 1	Factor 2	Total SRP
Friendly	− .13	− .14*	− .16*
Funny	.012	.03	.03
Unprovoked mean/fight	.08	.13	.11
Provoked mean/fight	.10	.11	.12
Compliment (appearance)	.02	.15*	.09
Compliment (personality)	.02	.08	.05

Table 9 Partial Spearman Rho calculations (controlling for total number of interactions with dove character) between psychopathic traits and behaviors with the dove character

	Factor 1	Factor 2	Total SRP
Friendly	− .14*	− .15*	− .13
Funny	− .01	.08	.02
Unprovoked mean/fight	.16*	.16*	.19*
Provoked mean/fight	.18*	.17*	.19*
Compliment (appearance)	.05	.08	.06
Compliment (personality)	.003	.02	− .01

Table 10 Partial Spearman Rho calculations (controlling for total number of interactions with cooperator character) between psychopathic traits and behaviors with the cooperator character
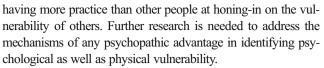
	Factor 1	Factor 2	Total SRP
Friendly	− .17*	− .18*	− .20*
Funny	.08	.14*	.13
Unprovoked mean/fight	.08	.12	.11
Provoked mean/fight	.03	.08	.06
Compliment (appearance)	.06	.01	.05
Compliment (personality)	−.05	.05	.003

when low SI/EI was present (Sacco 2016). Given that both factor 1 and 2 psychopathies are associated with lower EI (Visser et al. 2010a, b), these results would seem to suggest that people with psychopathic traits might be slower to recognize cheater behaviors. It seems possible that in the current study, the "cheater" character was not recognized as such by participants with psychopathic traits.

The use of a video game in the current research presents both advantages and disadvantages. Rather than simply asking participants how they interact with other people, we were able to observe and rate their video game interactions, adding validity to previous self-report research (Book et al. 2019). However, it could certainly be the case that our participants act quite differently in gaming situations than in real life. We attempted to mitigate this concern by requesting that our participants create a character that was consistent with their real-life personality. Further, Worth (2015) reported that the personalities of players' avatars in both The Sims and World of Warcraft tended to be consistent with players' own personality traits.

A related concern is that video game interactions could be quite different from real-life interactions. Indeed, there are numerous Internet discussions focused on players' "worst things they did to their Sims" (e.g., Strunk 2017). The existence of such discussions might suggest that our participants who have more experience playing The Sims might engage in extreme violence simply because they are aware of the possibilities and consequences in this particular game environment. Despite this concern, the occurrence of negative behaviors was rather low. Only 38 participants engaged in negative behavior (mean and fight behaviors) suggesting that, as in real life, aggression is a fairly low prevalence occurrence. Thus, there is likely to be some correspondence between the ways that participants in the current study behaved in-game and their typical behavior in the real world.

Another limitation to this research (and previous research) is that it does not shed light on how individuals with psychopathic traits develop skills in victim selection. Given lower emotional intelligence abilities, it seems possible that more psychopathic individuals devote greater attentional resources to indicators of vulnerability. Alternatively, they may have refined their skills by having more practice than other people at honing-in on the vulnerability of others. Further research is needed to address the mechanisms of any psychopathic advantage in identifying psychological as well as physical vulnerability.

Overall, the current research provides support for the use of video games, such as The Sims 3, in psychopathy investigations. This research also offered some important information on the ways that individuals with higher levels of psychopathic traits may choose to interact with others. Our findings may suggest that psychopathic individuals view the absence of aggressive behaviors as an indicator of weakness and are prepared to exploit or aggress against individuals who show this kind of weakness. Further research will be necessary to determine whether this pattern holds in real-life situations.

Compliance with Ethical Standards

This study was approved by Institutional Research Ethics Boards, and all students provided informed consent prior to beginning their study participation.

Conflict of Interest The authors declare that there is no conflict of interest.

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