

Success Will Be the Best Revenge: Revenge as Motivation for Goal Pursuit

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PURSUIT

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Approved on 5/14/19
(Date)

Submitted in partial fulfillment for the Master of Arts degree
in Psychology at SUNY New Paltz

Abstract

In much of the published literature, revenge and goal achievement are studied as disparate fields. The present study attempts to unify these two fields by investigating whether motivation to get revenge can spur goal achievement. University students ($N = 130$) were randomly assigned, in an online-survey format, to play an economic game with a fair or unfair partner. Previous study showed playing with an unfair partner, unlike playing with a fair partner, can lead to revenge motivation. Uniquely, rather than using real currency like most studies with economic games, valueless “virtual units” were used. Next, participants were offered the chance to compete against their economic game partner in completing anagrams, some of which were impossible. Then, revenge motivation, goal complex, and task enjoyment measures were collected. As expected, participants that played with an unfair partner were more likely to harbor feelings of revenge than those who played with a fair partner. However, counter to expectations, motivation to get revenge did not significantly predict perseverance on impossible anagrams. While these findings are unable to establish the hypothesized link between revenge motivation and goal achievement, they do show that virtual currencies can be used in economic games in some circumstances, opening up new avenues for future research.

Success Will Be the Best Revenge: Revenge as Motivation for Goal Pursuit

Artists, philosophers, and theologians have contemplated revenge for millennia. From *The Iliad*, to *Moby Dick*, to *The Godfather*, humans have been thinking about revenge as long as they have been writing. Revenge is an immensely important topic, cited as the driving force behind emerging trends like revenge porn (Short, Brown, Pitchford, & Barnes, 2017) and longstanding problems like homicide and gang violence (Daly & Wilson, 1988; Mouzos, 2005; Wilson & Daly, 1985). The academic study of revenge occurs across a variety of different fields, each using slightly different definitions. Even within psychology, definitions vary both by study and investigator. Nonetheless, what all acts of revenge have in common is the intent to harm or punish another for a perceived wrongdoing (Osgood, 2017; Schumann & Ross, 2010).

The psychological literature draws a distinction between revenge and similar concepts, like anger. It is clear that revenge and anger are related, as feelings of anger are predictive of goals to commit revenge (Roseman, Wiest, & Swartz, 1994). Spielberg (1988) defines anger as a subjective emotional experience that often follows provocation. In contrast, revenge refers explicitly to the motivation to act aggressively toward the source of a perceived harm (Wilkowski, Hartung, Crowe, & Chai, 2012). In short, anger is an affective state, while revenge is a motivation. While anger can exist independent of a goal or even a target, revenge always includes an objective and a target. This conceptual difference extends to empirical findings. For example, revenge, but not anger, has been found to mediate sex differences in violence (Wilkowski et al., 2012). As such, the present paper will refer to revenge as a motivation, and anger as an emotion.

While motivation to enact revenge has been a matter of study for some time, it is less clear what impact it has on goal achievement. Revenge facilitating goal achievement is popularly

portrayed in films like *The Count of Monte Cristo* and *V for Vendetta*, and is captured in sayings like “Success will be the best revenge.” Despite its commonality as a theme, the phenomenon has, to our knowledge, not been the subject of any published empirical research. As such, it may be useful to examine the effects of revenge as a reason for goal pursuit through the lens of achievement motivation. In this pursuit, this paper will first review achievement motivation theory before reviewing possible reasons for revenge seeking. Next, the two concepts will be integrated to generate hypotheses for the present study.

Achievement Goal Complexes

Achievement motivation is the drive an individual has to seek outcomes that they view as desirable (Dweck & Leggett, 1988). In research on achievement motivation, one popular framework is referred to as achievement goal theory (Nicholls, 1984). Achievement goal theory concerns two separate types of goals. Performance goals are externally focused, centering on outperforming peers or impressing others (i.e. “One of my goals in this class is to get a better grade than other students”) (Senko, Hama, & Belmonte, 2013). In contrast, mastery goals are internally focused and centered on self-improvement (i.e. “One of my aims is to learn the material presented in class as well as I can”) (Senko et al., 2013). While individuals often hold these goals simultaneously, they are nonetheless associated with different learning approaches as well as different outcomes (Barron & Harackiewicz, 2001). As such, achievement goal theory posits separate kinds of goals: performance goals, which are pursued for external reasons or self-presentation concerns, and mastery goals, which are done in order to acquire knowledge, skill, and competence in a given domain.

While early research found that mastery goals were superior to performance goals on a number of dimensions (Ames, 1992; Elliott & Dweck, 1988), an alternative approach suggests

that outcomes vary based on reasons for goal pursuit (Elliot & Thrash, 2001). Expanded by Vansteenkiste, Lens, Elliot, Soenens, & Mouratidis (2014), the *goal complex model* suggests that, when followed for controlling reasons, goal pursuit leads to detrimental outcomes; however, when followed for autonomous reasons, goal pursuit leads to beneficial outcomes. Controlling reasons involve a feeling of internal or external pressure, and tend to be those that seek the approval of others, avoid shame, or focus on external rewards. Further, controlling reasons often involve what Ryan, Koestner, and Deci (1991) termed ego-involved persistence, or the feeling that one's self-concept or self-image is at stake. Instead of pressure or ego-involvement, autonomous reasons are those that are fully endorsed by the goal-taker, and tend to be personally meaningful, challenging, or fun. Recent research has found robust support for the goal complex model. Senko & Tropicano (2016) found that, when pursued for controlling reasons, performance goals predicted negative outcomes like self-handicapping and help avoidance. Alternatively, when pursued for autonomous reasons, performance goals predicted positive outcomes such as academic interest and feelings of self-efficacy. Likewise, Sommet & Elliot (2017) extended the benefits of autonomous goal pursuit to other beneficial constructs like positive emotion, satisfaction, deep learning, and long-term persistence.

Motives for Revenge

Various reasons for goal pursuit have been studied; however, as stated earlier, revenge as a rationale has not yet been investigated. While new to the academic literature, in other areas of life, like sports, revenge spurring motivation is not a novel concept. At the start of the 2015 NBA playoffs, each member of the Los Angeles Clippers was handed a piece of paper (Markazi, 2015). Each piece of paper showed the predictions of over 30 sports analysts and media personalities picking the Clippers' rivals to beat them in their first-round series. This

motivational tactic used by the team coach, Doc Rivers, reportedly had its intended effect on the players, as Small Forward Matt Barnes summarized the team's reaction, "It fuels us to know that 46 out of 47 people picked us to lose" (Markazi, 2015). In fact, despite being huge underdogs, the Clippers went on to win that series. This idea is so pervasive in sports that it has a name. So called 'bulletin board material' is any perceived diss or snub by an outside source that fuels one to prove them wrong (Smith, 2018).

To review, all revenge has two things in common: (1) a perceived wrongdoing and (2) an intent to harm the transgressor. It is clear from the previous quote that speech which becomes bulletin board material constitutes a perceived wrongdoing. However, skeptical readers might wonder if a desire to prove the source of the material wrong is really an intent to harm. In answering this question, a quote from NE Patriots Linebacker Andre Tippett is instructive, "At some point after a victory, you make note of [the bulletin board material] to him. You just go up and whisper in their ear to make them think about it: 'I remember what you said. What do you think about it now?'" (Graham, 2009). This illustrates that bulletin board material often elicits not only a desire to prove someone wrong, but a desire to rub their nose in it as well; in other words, an intent to harm. As such, there is at least some account of revenge motivation facilitating goal achievement in the real world.

Myriad motivations to enact revenge have been explored by the empirical literature. While by no means the only possible hypotheses, the three predominant explanations are to repair mood/self-image, to act as a deterrent to future harm, and to restore justice (for a recent review, see Osgood, 2017). Revenge as retribution states that humans are motivated to take revenge in order to restore a sense of justice in the world. The revenge as mood repair hypothesis argues that people enact vengeance to mend their hurt feelings. Finally, the revenge as deterrence

hypothesis contends that revenge functions to dissuade the victim from causing future harm by attaching consequences to their actions. The merits of each hypothesis will be briefly reviewed and are summarized in Table 1.

Retribution motives. Supporters of the revenge as retribution hypothesis marshal a number of arguments. First, people with a strong desire for revenge report feeling a number of “moral emotions,” such as righteous anger, indignation, and contempt (Fehr & Gächter, 2002). Second, revenge seekers often say that by enacting revenge they are seeking justice, and report their actions or the actions of others seeking vengeance as “doing the right thing” (Bies & Tripp, 1996; Boon et al., 2009). Third, when determining appropriate levels of punishment for offenders, people tend to weigh justice-related information more heavily than deterrence-related information (Carlsmith, Darley, & Robinson, 2002). Finally, people will punish others not only without direct benefit, but even at cost to oneself (Eckel & Grossman, 1996).

These final points in favor of revenge as retribution are worth examining more closely. Carlsmith, Darley, and Robinson (2002) asked participants to calculate their preferred amount of revenge/punishment in hypothetical scenarios. By manipulating different attributes in the presented situations (e.g. blameworthiness, likelihood of reoffense, mitigating factors) they tested which factors led participants to distribute more or less punishment. In a series of experiments, participants were more sensitive to justice-related information, such as culpability, than to deterrence related information, such as likelihood of recidivism. Another point in favor of revenge as retribution comes from economic games. For example, players who learn that their new game partner was previously unfair to someone else will sometimes punish their partner, even if they know they are only playing one game (Eckel & Grossman, 1996; Fehr & Gächter, 2000). Further, this can happen at direct monetary cost to the punishers, who sacrifice payout so

that their partner's payout is less. Since such players know that the game is a one-off, their behavior cannot be interpreted as a deterrent.

Self-repair motives. Those arguing that revenge takers seek to repair damaged emotions or self-concept draw on three main points. First, surveys asking people why they take revenge consistently find mood improvement to be among the top motivations listed (Bies & Tripp, 1995; Boon, Deveau, & Alibhai, 2009). Second, fantasizing about revenge is cited as emotionally satisfying by self-report (Barber, Maltby, & Macaskill, 2005), and has been shown to activate reward circuits in neuroimaging studies (de Quervain et al., 2004; Witvliet et al., 2008). Third, strong feelings of anger and contempt consistently predict a desire for revenge (Bradfield & Aquino, 1999; Darley & Pittman, 2003; Martin & Watson, 1997). Finally, some argue that an element of self-threat is a main component that distinguishes anger and revenge. Elshout, Nelissen, and van Beest (2014) used autobiographical recalls to examine the differences between anger- and revenge-driven responses. These researchers found that, compared to stimuli that elicit anger, stimuli that elicit revenge involve more negative self-conscious emotions and more rumination. Thus, advocates of the mood repair hypothesis contend that revenge, by definition, involves self-conscious emotions, and that revenge-based responses attempt to resolve these hurt feelings.

Deterrence motives. Among the proponents of the revenge as deterrence hypothesis are evolutionary psychologists. Such theorists contend that, if revenge indeed has a deterrent effect on harmful behaviors, this could be an adaptive trait passed down selectively through generations (McCullough, Kurzban, & Tabak, 2013; Tomasello & Vaish, 2013). Indeed, there is evidence for a deterrent effect of revenge. In a prolonged series economic games, a "tit-for-tat" punishment strategy (in other words, responding to harm with harm, cooperation with cooperation) was the

most effective strategy by a substantial margin (Axelrod, 1980a; Axelrod, 1980b). In addition to such “direct” deterrence, evolutionary theorists posit the fitness benefits conferred from third-party deterrence. Third-party deterrence argues that others may be reluctant to cause harm not only if they have received retaliation themselves, but if they have heard of their potential victims’ proclivity for retaliation (McCullough, Kurzban, & Tabak, 2013). Such a reputation may be, inherently, enough to deter harm in the first place. Third-party deterrence impacts fitness much in the same way as direct deterrence: those that successfully avoid harm, and therefore loss of resources (like time, mates, kin, or food) are more likely to survive and reproduce.

Overview of Present Study

Having reviewed prospective reasons to seek revenge, it may be helpful to classify the aforementioned reasons into the autonomous/controlled paradigm. To review, the revenge as retribution hypothesis says that people seek revenge to satisfy a personal moral imperative. Given that the source of the moral imperative is cited to be internal, it is logical to classify revenge for retribution as an autonomous reason. Alternatively, the revenge as mood repair hypothesis states that people seek revenge to escape negative self-image. Such motivation closely resembles introjected motivation, a subcomponent of controlled motivation which constitutes reasons like avoiding guilt/shame and boosting one’s ego. While the classification of mood repair and retributive reasons into the autonomous/controlled paradigm is fairly straight forward, deterrence reasons are more complex. The evolutionary argument for deterrence focuses on the utility of demonstrating that one is not an easy target. Since it is focused on proving something to an external party, this argument seems to favor a controlled classification. However, one may also wish to dissuade their target from hurting others in the future. This morally driven, internal motive would classify as autonomous. Therefore, deterrence reasons for

revenge seeking can classify as either controlled or autonomous, depending on the exact nature of the reason.

Previous research has not yet studied the possible impact of revenge motives on goal achievement; the present study is the first to do so. Further, the current study could shed light on the impact of goal complexes in competitive contexts. Previous research shows that competition tends to lead to the adoption of performance goals (Hangen, Elliot, & Jamieson, 2016; Murayama & Elliot, 2012). When the goal focus is on outperforming others (so-called *performance-approach goals*), competition seems to enhance performance. However, in a competitive context, it is unknown what effect goal reasons might have on these *performance-approach goals*. For reasons covered previously, it is possible that when pursued for controlling reasons, performance-approach goals predict less positive outcomes than when pursued for autonomous reasons. As such, this study is uniquely setup to investigate both revenge motives on goal achievement and goal complexes in competitive contexts.

Much of the experimental research on revenge includes the use of economic games, a commonly used method to study human behavior in specific scenarios in the social sciences (Dawes, 1980). While varying in form and complexity, all economic games pit a public/group interest against individual interest (Dawes, 1980). In other words, participants must choose between an option that benefits themselves and an option that benefits their group as a whole. In the context of the study of revenge, participants often play multiple rounds of an economic game (Eckel & Grossman, 1996; Fehr & Gächter, 2000). In earlier rounds, they encounter a selfish player that consistently favors their self-interest over a public interest. When given the opportunity, many participants retaliate against selfish players, even at their own expense.

However, when the opportunity to get revenge directly is removed, might participants, in the way of the Los Angeles Clippers, channel their revenge through achievement?

To test this idea, one group of participants (the Revenge condition) was ostensibly snubbed by a player in an economic game, while another group (the Control condition) ostensibly played against a fair opponent. Next, participants completed a competitive task in which they were told they were playing against the person from the economic game. Then, participants attempted to solve unsolvable anagram puzzles. Measures on amount of time spent on the anagrams, reasons for getting revenge/not getting revenge, and measures of task enjoyment were collected.

The present study has four predictions. Hypothesis 1 is that participants in the Revenge condition will spend more time on a competitive task than those in the Control condition. Hypothesis 2 is that both more controlled and autonomous motivations will predict greater persistence, and there will be no significant difference between their predictive power. This is based on research that suggests that controlled reasons produce comparable results to autonomous reasons in terms of task effort (Ryan et al., 1991, Vansteenkiste et al., 2014). Based on previous research, Hypothesis 3 states that autonomous reasons to get revenge will predict high task enjoyment, while controlled reasons will not predict task enjoyment (Sommet & Elliot, 2017). Finally, there is some research suggesting that revenge motivation is more common in males than females (Miller, Worthington, & McDaniels, 2008; Wilkowski, Hartung, Crowe, & Chai, 2012). Therefore, Hypothesis 4 is that men will score higher on a Revenge inventory than women.

Pilot Study

Concerns about the believability of the cover story were addressed via a pilot study. Specifically, the pilot study was designed to address concerns that participants might not believe they were playing against a human participant. If participants believe they are playing against a fake participant, or automated program, they may be less inclined to harbor feelings of revenge when receiving an unfair amount in the Dictator game.

Method

Participants. Participants were recruited by word of mouth. The primary investigator asked 15 acquaintances unfamiliar with the study if they would be willing to fill out a 15 minute survey. If they agreed, the primary investigator sent them an anonymous link to Qualtrics, a website for designing and conducting survey research. Of the 15 asked, there were nine responses. The sample had a mean age of 23.23, and was mostly female (77.8%).

Procedure and materials. Participants followed directions identical to those laid out in the main study (see “Main Study” below for details), with three additional questions at the end. These questions were open-ended, and were designed to give participants an opportunity to assess the believability of the cover story. Since the cover story was important to the revenge manipulation, all pilot test participants played with an unfair partner. The following open-ended questions were asked: 1) Do you have any general thoughts or concerns about the survey? 2) What are your thoughts about the person you participated in the tasks with? Did they seem trustworthy? Fair? 3) Did anything in the survey feel strange or odd to you? If so, what was it?

Results. The three open-ended questions were coded on a single dimension: did participants say anything to indicate they suspected they might not be playing against a real person? Of nine participants, six did not indicate any suspicion that they were playing against a

fake person, while three voiced at least some suspicion. Among those that voiced suspicion, there was substantial variance in the degree of certainty with which the suspicion was expressed. For example, on the certain side, when asked about their thoughts about their partner (number “2”) above), one participant said, “I guess I just assumed it was programmed responses designed to make someone mad.” On the uncertain side, another participant said, “I was a little confused in the beginning because I wasn’t sure if my opponent was supposed to be an actual person I’m competing against or a computer.”

Implications for the main study. All in all, 33% of the participants that were pilot tested indicated at least some suspicion that they were not playing against a real person. As such, feedback was added at two points in the study aimed at convincing the participants they were playing against a real person. First, before they began the survey, participants saw a digital stopwatch counting up, and directions that asked them to please wait while they were matched with another participant. They were shown an estimated wait time of under 2 minutes to keep them engaged. In reality, the timer always counted up to 23 seconds, which was designed to seem random, while not taking so long that participants disengaged with the task. Second, to convince participants that they were playing with a real person, feedback was added to the Dictator Game, such that the survey dialogue reflected back what the participant chose to share. For example, if the participant chose to share 5 virtual units with their partner, the next page would say “You chose to give 5 out of 10 virtual units to your partner.” The aim was to make participants feel like they were engaged with a task that genuinely registered their input. Providing evidence of this to participants may have helped convince them that the task they were engaging with was real, and as such, that they were playing with a genuine person.

Main Study

Method

Participants. Participants were recruited using the SUNY New Paltz Psychology Subject Pool, a website that helps students receive class or course credit for participation in research. Participants were also recruited via an email that was sent to all students at SUNY New Paltz. Approximately 130 out of 157 responses were used (more details in “Preliminary Analyses” below). The sample had a mean age of 20.43, and was mostly female (88.5%). Further, participants were randomly assigned to conditions (58.5% Fair).

Procedure. Participants started by clicking on an anonymous link to Qualtrics, an online tool used to create and host surveys and experiments. First, they filled out demographic information. Next, participants were randomly assigned to Revenge and Control conditions (see “Materials” section below for details on tasks and conditions). Ss in the Revenge condition received an unfair offer by what was ostensibly another participant in a Dictator Game, which previous studies showed can lead to vengeful behavior. Controls played the same game with the ostensible participant providing a fair offer. Both groups saw the following directions before playing the Dictator Game:

This part of the survey assesses financial decision making in a cooperative task using a virtual currency. You will be playing together with another participant. In the upcoming task there will be a certain amount of money to split between the two of you. Your task is to suggest how much virtual currency you want to give to your partner and how much you want to keep for yourself. You are both asked to split the amount as fairly as possible.

After playing the Dictator Game, to ensure participants attended to the manipulation, they were asked how much they shared with their partner, and how much their partner shared with them.

Next, participants were told they were engaging in a competitive task against the same player that either played fairly or unfairly with them during the previous game. This came in the form of a competition in which, following previous research (Aspinwall & Richter, 1999), participants attempted to complete unsolvable anagram puzzles. Unbeknownst to the participants, the dependent variable was persistence, operationalized as the total amount of time spent on the unsolvable anagrams. The following directions were given to both groups before completing the competitive anagram task:

In the next part of the survey, you will be engaged in a competitive task against the participant from the previous game. The goal is to perform as best you can on a challenging test of verbal intelligence: solving anagram puzzles. An anagram puzzle is a scrambled set of letters than can be rearranged to form a word. For example, the letters in the anagram puzzle “ocesH” can be rearranged to form the word “chose.” You and the student from the previous game will be presented with a series of anagrams and tasked with solving as many as possible. At any point, you can skip to the next anagram by clicking the "Next" button at the bottom of the screen. Please note that you cannot go back to an anagram once skipped. There are 4 anagrams in total.

Finally, participants completed goal complex, revenge assessment, and task enjoyment measures about their motivations and feelings during the tasks in the study. The study concluded with debriefing, and overall, took an average of approximately six minutes.

Materials.

The Dictator Game. The Dictator Game is an economic game in which one person, the “Dictator,” is given an amount of money and asked to distribute it between themselves and a partner as they choose. The game partner has no choice but to accept the payment as the Dictator distributes it. To identify payment amounts that participants would find fair vs. unfair, we turned to research on a similar social dilemma, the ultimatum game. In this game, the non-distributor can choose to either reject or accept the offer given to them. If the offer is accepted, the sum is apportioned as the distributor offered. If the offer is rejected, both participants receive nothing. Past research found that offers that are perceived as “fair” (typically 30-50% of the sum) are accepted, while offers perceived as “unfair” (typically less than 20% of the sum) are rejected (Maier et al., 2018; Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003). As such, participants in the Revenge condition were given an unfair distribution (1 virtual unit), while participants in the Control condition were given a fair distribution (5 virtual units) out of a total possible sum of 10 virtual units. Virtual units are an imaginary currency that the players engaged with during the study.

Persistence. Participants were told they were competing against their Dictator Game partner on a separate competitive task. Following previous research, this task was a mix of solvable and unsolvable anagram puzzles (Aspinwall & Richter, 1999). Anagram puzzles are a series of letters that can be rearranged to make a word. For example, the puzzle “ehosc” can be rearranged to spell “chose.” However, while the typical anagram has a solution, two of the anagrams used in the present study do not: “amoos” and “rtean”. Unsolvable anagrams are a common method of measuring persistence in research, and generally use about one to four unsolvable puzzles (Aspinwall & Richter, 1999; Friedman & Elliot, 2008; Sommer &

Baumeister, 2002). Further, to encourage engagement in participants, puzzles are typically framed as a test of verbal skills or intelligence (Aspinwall & Richter, 1999; Sommer & Baumeister, 2002). The dependent variable was persistence, operationalized as sum total *Time Spent on Impossible Anagrams (TSIA)* in seconds. Only time spent on impossible anagrams, but not time spent on possible anagrams, was used for analyses. Further, following Messay & Marsland (2015), to encourage effort, two solvable anagrams were included: “tlanp” (plant) and “torms” (storm).

Anderson’s Revenge Motivation Index (ARMI). To assess whether the manipulation of revenge was effective (the cooperative task), motivation to take revenge was measured using Anderson’s Revenge Motivation Index (Anderson & Murphy, 2003). This 4-item subscale is part of a larger motivation inventory measuring reasons for retaliatory aggression, and has been used in past lab studies on revenge (Anderson & Murphy, 2003; Anderson, Carnagey, Flanagan, Benjamin, Eubanks, & Valentine, 2004). All items were measured from (1) “Strongly Agree”, to (7) “Strongly Disagree.” Therefore, lower scores indicated higher revenge motivation. The ARMI has been found to be reliable, with a coefficient alpha of .8. The items are as follows: (1) I wanted to make my opponent mad; (2) I wanted to hurt my opponent; (3) I wanted to pay back my opponent for their behavior; (4) I wanted to blast him/her harder than he/she blasted me. This final item was omitted for lack of relevance to the current study. Scale items were summed to attain an aggregate score for each participant, which were used for hypothesis testing.

Goal complexes and reasons (The RMRS). As covered earlier, a goal complex is the conjunction of goal content (mastery or performance) and a reason for goal pursuit (autonomous or controlled). While goal content and reason have been measured together before (see Sommet and Elliot, 2017), no available measure has used revenge motives as reasons. The configuration

of goal content + reason was adapted from Sommet and Elliot (2017) to create the Revenge Motivation Reasons Scale (RMRS). In constructing the RMRS, goal reasons were obtained from Carlsmith, Darley, and Robinson (2003), while goals themselves were made in light of the present experiment (questions answered after completing a competitive task). Considering the context of the experiment (a competitive task, the goal of which was to win), all goals measured were performance goals.

Participants responded to eight items on a 7-point Likert scale, ranging from (1) “Strongly Agree” to (7) “Strongly Disagree.” As such, lower scores represented stronger endorsement of particular goal complexes. Given that factor analysis revealed a one-factor solution for the RMRS, scores were summed to achieve an aggregate value for each participant. The full scale can be found in Appendix A.

Task enjoyment. Task enjoyment was measured via a subscale of Ryan's (2004) Intrinsic Motivation Inventory. Participants responded to seven items on a 7-point Likert scale, ranging from (1) “Strongly Agree” to (7) “Strongly Disagree.” As such, lower scores represented higher task enjoyment. The scale has been found to be reliable $\alpha = .92$ (Donovan, Hafsteinsson, & Lorenzet, 2018). Scale items were summed to attain an aggregate score for each participant, which was used for hypothesis testing. The full measure can be found in Appendix B.

Results

Data Cleaning.

Careless survey respondents. Previous research has found that internet surveys are vulnerable to careless responding, particularly *content nonresponsivity*, or responding that is not contingent on item content (Meade & Craig, 2012). Careless respondents, identified as approximately 10%-12% of undergraduates in survey research taken for course credit (Meade &

Craig, 2012), can lead to spurious within-group variability and lower reliability (Clark, Gironde, & Young, 2003). Luckily, techniques exist to identify careless respondents, such as Response Time, Maximum LongString index, and Mahalanobis D (Meade & Craig, 2012). Response Time (measured here in seconds) is one of the most frequently used and straight-forward indicators of careless respondents (Meade & Craig, 2012). An extreme high score indicates participants took much longer than average to complete the survey, which may mean that participants were distracted or not fully engaged with the task. On the other hand, an extreme low score means participants completed the survey much quicker than average, which may indicate a lack of engagement with the content of the measures/manipulations. Additionally, a Maximum LongString index was calculated, which seeks to identify respondents that answer the same response option for multiple consecutive items.

Outlier Analyses. Another indicator of careless responding is Mahalanobis D, defined as the multivariate distance between a respondent's response vector and the vector of sample means. In simpler terms, Mahalanobis D indicates unusual combinations of responses. While Mahalanobis D has unique guidelines and cutoffs depending on the number of independent variables used, Maximum LongString and Response Time indices require defined cut-off points. To this end, scores that were more than 1.5 standard deviations from the mean were classified as extreme scores (Pallant, 2016), and were removed. Univariate outlier analyses were also performed on measures of Total Revenge Motivation, Task Enjoyment, and Time Spent on Impossible Anagrams. All extreme scores were removed from the study. While analyses began with 157 unique respondents, the aforementioned techniques indicated 27 respondents with troubling scores, which were removed.

Other Normality Tests. Anderson's Revenge Motivation Index, Task Enjoyment, Time Spent on Impossible Anagrams, and Revenge Motivation Reasons Scale scores were assessed for normality. Normality tests for the first three will be covered in this section, while that of the Revenge Motivation Reasons Scale will be covered under measurement construction.

Anderson's Revenge Motivation Index (ARMI). Tests of normality indicated ARMI scores to be in violation of the assumption of normal distribution. The Kolmogorov-Smirnov test indicated this violation, with score of .208, $p < .001$. As did the Shapiro-Wilk test, with a score of .818, $p < .001$. An inspection of the histogram for ARMI scores confirmed these tests, with a visually asymmetrical distribution. Measures of skewness (-.892, $SE = .212$) and kurtosis (-.472, $SE = .422$) reaffirmed what was seen on the histogram. However, as defined by Kline (1998), these scores fall within tolerable limits of ± 3 for skewness and ± 5 for kurtosis. As such, no transformations were performed.

Task Enjoyment (TE). Tests of normality indicated TE to be normally distributed. The Kolmogorov-Smirnov test indicated normal distribution, with score of .068, $p = .2$. As did the Shapiro-Wilk test, with a score of .98, $p = .058$. An inspection of the histogram for TE confirmed these tests, with a roughly bell-shaped curve. Further, measures of skewness (.333, $SE = .212$) and kurtosis (-.280, $SE = .422$) were within acceptable limits.

Time Spent on Impossible Anagrams (TSIA). Tests of normality indicated TSIA to be in violation of the assumption of normal distribution. The Kolmogorov-Smirnov test indicated this violation, with score of .152, $p < .001$. As did the Shapiro-Wilk test, with a score of .857, $p < .001$. An inspection of the histogram for TSIA confirmed these tests, with a visually asymmetrical distribution. Measures of skewness (1.474, $SE = .212$) and kurtosis (2.018, $SE = .422$) reaffirmed what was seen on the histogram.

Measurement Construction: Revenge Motivation Reasons Scale (RMRS).

Reliability. A reliability analysis was run on the constructed 8-item RMRS. Standing out from other items, one item was only weakly, rather moderately-strongly, correlated with other items in the scale, and as such, was taken out. Without this item, the scale scored a Cronbach's alpha of .875.

Factor Analysis. The seven included items of the RMRS (one was removed during reliability analysis, see above for details) were subjected to Principal Axis Factoring (PAF) Analysis using SPSS version 24. Prior to performing factor analysis, the suitability of the data for the procedure was assessed. Inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The Kaiser-Meyer-Olkin value was .814, exceeding the recommended minimum value of .6 (Kaiser, 1970) and Bartlett's Test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix.

Principal Axis Factoring (PAF) Analysis was forced to extract three factors on theoretical grounds, with components explaining 52.4%, 15.3%, and 11.2% of the variance, respectively. However, as illustrated in Figure 2, the Scree plot revealed a clear break after the first component, with another, smaller break after the second component. To assess whether the second component should be retained, Parallel Analysis was performed, which showed only one component with eigenvalues exceeding the corresponding criterion values for a randomly generated data matrix of the same size (7 variables x 130 respondents). The one-component solution explained a total of 52.4% of the variance. Since only one component was included, the solution could not be rotated. These results contradict our assumption that three factors (types of revenge reasons) would emerge from the analysis.

Normality. As factor analysis revealed that a one-factor, rather than the hypothesized three-factor solution most suited the RMRS, all items were summed to one score. Tests of normality indicated the RMRS to be normally distributed. The Kolmogorov-Smirnov test indicated normal distribution, with score of .064, $p = .2$. As did the Shapiro-Wilk test, with a score of .983, $p = .102$. An inspection of the histogram confirmed these tests, with a roughly bell-shaped curve. Further, measures of skewness (.047, $SE = .212$) and kurtosis (-.446, $SE = .422$) were within acceptable limits.

Participant Allotment. As reviewed earlier, previous research shows that participants who receive unfair offers in Dictator Games often harbor revenge motives toward their economic game partners. However, it is possible that if participants not only receive, but allot unfair amounts to their partner, revenge motives may not be created. Using the criteria of 20% the total amount covered earlier, the frequency of participants' allotments was analyzed, and is summarized in *Figure 1*. As only two participants allotted amounts that would be constituted as unfair, no further analyses were performed.

Manipulation check. An independent-samples t-test was conducted to compare total scores on Anderson's Revenge Motivation Index (ARMI) of those in the Unfair condition and those in the Fair condition. There was a statistically significant difference in scores between those in the Unfair condition ($M = 15.833$, $SD = 4.25$) and those in the Fair condition ($M = 18.829$, $SD = 3.14$; $t(92.329) = 4.395$, $p < .001$, two-tailed). On average, those in the Unfair condition scored 2.996 points lower on Total Revenge than those in the Fair condition, with a 95% confidence interval ranging from 1.642 to 4.349. The Cohen's d statistic (.83) indicated a large effect size. Since lower scores indicated stronger agreement with statements about wanting

revenge, this means, as predicted, those in the Unfair condition were more likely to want Revenge than those in the Fair condition.

Main analyses.

Table 2 provides the means, standard deviations, and correlations among all key measures.

Hypothesis 1. Hypothesis 1 was that individuals in the Revenge condition would persist longer on a competitive task than participants in the Control condition. Hierarchical multiple regression was used to assess the ability of group membership (Unfair/Fair) to predict persistence (time spent on impossible anagrams), after controlling for the influence of gender. Gender was entered at Step 1, as previous research indicates that gender has an impact on revenge motivation. Gender was entered at Step 1, and did not account for a significant percentage of the variance. After entry of condition (Unfair/Fair) at Step 2, the total variance explained by the model was not statistically significant, $F(2,127) = .716, p = .491$ (see Table 3). This means that motivation to get revenge did not predict persistence (time spent on impossible anagrams).

Hypotheses 2 and 3. Hypothesis 2 argued that both more controlled and autonomous motivations would predict greater persistence times, and there would be no significant difference between their predictive power. Hypothesis 3 states that autonomous reasons to get revenge will predict high task enjoyment, while controlled reasons will not predict task enjoyment. As factor analysis of the Revenge Motivation Reasons Scale revealed a one-factor solution, this contradicted the key assumption upon which these hypotheses depended. Consequently, the planned regression analyses were not performed.

Hypothesis 4. Hypothesis 4 was that men will score higher on Anderson's Revenge Motivation Index than women. An independent-samples t-test was conducted to compare the Total Revenge scores of males and females. There was a statistically significant difference in scores between men ($M = 15.4, SD = 4.793$) and women ($M = 17.87, SD = 3.722; t(128) = -2.335, p = .021$). On average, men scored 2.47 points lower than women, with a 95% confidence interval of -4.563 to -.376. The Cohen's d statistic (.65) indicated a medium effect size. Since lower scores indicated stronger agreement with statements about wanting revenge, this means, as predicted, men were more likely to want revenge than women.

Discussion

The results of the present study were mixed. On the significant side, the basic manipulation worked: those randomly assigned to play a mock unfair Dictator Game were more likely to harbor revenge motives than those randomly assigned to play a fair game. Further, in line with previous research, men scored significantly higher in measures of revenge motivation than women (Miller, Worthington, & McDaniels, 2008; Wilkowski, Hartung, Crowe, & Chai, 2012). While these two results were significant, the main analysis (Hypothesis 1) was not. While those randomly assigned to the Unfair condition were more likely to want revenge than those assigned to the Fair condition, this difference did not translate into greater persistence. Further, factor analysis of the RMRS revealed a violation of our hypothesis that it measures at least two distinct constructs. Therefore, we could not proceed to test hypotheses about autonomous/controlled motivations in the present study.

The revenge manipulation. The manipulation of revenge used in the present study was based on past research that those given unfair offers in Dictator Games often harbor revenge motives against those that snub them. This is typically explained by normative theory, which

states that it is the violation of the norm of fairness which motivates retributive behavior in economic games (Engels, 2011; Maier et al., 2018). However, previous interpretations of the research have been saddled with a confound: namely, that participants could be reacting to the loss of potential capital, rather than fairness norms. Unlike past research, which gave real currency to participants, the “virtual units” used in the present study were worthless. Yet, it was found that revenge motives were created by unfair distribution of said units. As such, the revenge motives could not have been created by a perceived loss of value, as virtual units have no value. Therefore, the present study supports the normative theory of retribution in economic games.

The finding that economic games can be fruitfully played with a valueless “currency” has implications for future research. Research on economic games, while popular, is an expensive endeavor, requiring funding for participants to play games. However, the present research suggests that this may not be necessary, as virtual units appear to be sufficient to trigger feelings of retribution. If this finding generalizes to other features of economic games, the barriers to conducting economic game research may be considerably reduced. Future research should focus on exactly what effects can be reproduced using virtual units.

Gender differences in revenge motivation. Consistent with previous studies, males scored significantly higher on measures of revenge motivation than females (Miller, Worthington, & McDaniels, 2008; Wilkowski, Hartung, Crowe, & Chai, 2012). Miller, Worthington, and McDaniels (2008) argue that this is due to socialization, as men are encouraged to be aggressive and hands-on in pursuing justice, while women are encouraged to appease and work things out. This is borne out in research suggesting men are more drawn to Kohlberg’s (1984) justice-based morality, while women are drawn to Gilligan’s (1994) ethic of care. Socialization influences are further highlighted in cross-cultural research, as Kadiangandu,

Mullet, and Visonneau (2001) found gender differences in vengeance motivation in France, but not in the Congo. Future research should focus on the exact mechanisms by which, in some cultures, men are socialized to be more revenge-oriented.

Revenge and persistence. While those randomly assigned to the Unfair condition were more likely to want revenge than those assigned to the Fair condition, this difference did not translate into greater persistence. There are a number of reasons this might be the case. First, it is possible that revenge spurs goal achievement, but only in specific populations. Much of the anecdotal evidence of this phenomenon comes from males in highly competitive contexts. The concept of “bulletin board material,” or critical comments that motivate one to prove the source of the comments wrong, comes from male professional athletes, mainly in the NBA and NFL. While examples can be found outside of the NBA and NFL (DBLTAP Media, 2018), it is possible that revenge spurring goal achievement manifests only in specific sorts of populations. Future research on this topic might search for the effect in highly competitive men, preferably athletes.

Second, it is important to acknowledge the possibility that revenge does not, in any population, motivate goal achievement. In this account, the motivating power of bulletin board material is a myth, a concept to which players attribute their success, but which does not play a causal role. Supporting this notion, there is research that indicates people are poor judges of the determinants of their own behavior (Wilson & Nisbett, 1978). Third, it is possible that revenge does lead to goal achievement, but only if that goal is seen as a means of exacting revenge. In this present study, it was crucial that the participants conceptualize the anagram task as a competition. While participants were told that the nature of the task was competitive throughout the experiment, there was no confirmatory feedback present. For example, as they completed

anagrams, they could not track their own points scored or the score of their opponent. How the competition would be adjudicated was also left ambiguous, which may have led participants to doubt whether they were competing with anyone at all. Future experiments may wish to allow participants to track scores, observe their opponent, or explain scoring rules before the competition begins to create a more convincing competitive environment. Finally, in order for the competitive task to be motivating, participants need to be personally invested in the task. However, it is possible that anagrams, even if framed as a measure of verbal intelligence, was not sufficiently central to participants' identity to motivate participants to do well.

The Revenge Motivation Reasons Scale. Factor analysis of the RMRS revealed a violation of our hypothesis that it measures at least two distinct constructs. Instead, factor analysis revealed that a one-factor solution best fits the data. The measure was intended to capture the types of revenge motives previously reviewed. Instead, it seems likely that the RMRS simply measured revenge motivation more generally. Consistent with this interpretation, scores on the RMRS correlated with scores on Anderson's Revenge Motivation Index ($r = .57, p < .001$). This may be a result of the scale questions being too convoluted, such that the reasons for getting revenge were not distinct from one another. Participants may have been able to gather that all the questions were referring to having greater feelings of revenge, but not the revenge reasons which made the questions distinct. Alternatively, it is possible that the questions were comprehensible to participants, but that reasons simply do not matter. However, given the preponderance of evidence in support of the goal complex model (Senko & Tropiano, 2016; Sommet & Elliot, 2017; Vansteenkiste et al., 2014), this seems unlikely.

Limitations. The present study has a number of limitations. First of all, while of moderate size ($N = 130$) the present sample consisted mostly of college-aged ($M = 20.43$)

women (88.5%). Future research is needed to investigate whether these results generalize to a broader population. Second, the moderate sample size may lead to questions about generalizability or inflated Type I error. These concerns may be allayed by the p-value found for the test of the revenge manipulation, which was significant at the $p < .001$ level. Further, the results concerning gender differences replicates a large body of work (Miller, Worthington, & McDaniels, 2008), and as such, is unlikely to be a statistical artifact. Another limitation of this study is the experimental nature of the design. Since revenge motivation was artificially created, it is possible that the manipulation failed to accurately capture the types of provocations that elicit revenge-motivated goal achievement in the real world.

Conclusions

Revenge and achievement motivation remain two disparate fields. While plenty of anecdotal evidence indicates that revenge motivation can spur goal achievement, this early attempt at producing the effect in the lab has not been successful. Though not the primary aim of this study, the fact that utilization of virtual units in an economic game produced similar effects as experiments that use real currency has profound implications. Future research questions may focus on comparing virtual units and real currency directly, as well as fleshing out in what contexts virtual units mirror genuine money in economic games.

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Table 1

Reasons to Commit Revenge Overview

<u>Label</u>	<u>Definition</u>	<u>Supporting Arguments</u>	<u>Dissenting Arguments</u>
Mood repair	Want to: <ul style="list-style-type: none"> ● Feel better about oneself ● Escape shame ● Escape doubt. 	<ul style="list-style-type: none"> ● Self-reported reason ● Neuroimaging data ● Correlation between negative emotions and revenge. 	<ul style="list-style-type: none"> ● Over-reliance on self-report and correlational data ● Lack of experimental evidence
Deterrence	<ul style="list-style-type: none"> ● Wants to prevent source of revenge from repeating slight to oneself or others 	<ul style="list-style-type: none"> ● Deterrence is an effective strategy in economic games ● Theoretical evolutionary advantage to strategy of deterrence 	<ul style="list-style-type: none"> ● People more sensitive to justice- than deterrence-related information
Justice/Retribution	Want to: <ul style="list-style-type: none"> ● Set things right in the world ● Restore justice 	<ul style="list-style-type: none"> ● Self-reported reason ● Correlation between revenge-seeking and “moral emotions” ● People more sensitive to justice- than deterrence-related information 	<ul style="list-style-type: none"> ● Some arguments rely on self-report or correlational data

Table 2

Correlations and Descriptives (M and SD) of Continuous Dependent Variables

Measure	1	2	3	4	
1. Time Spent on Impossible Anagrams	–				
2. Revenge Motivation	.164	–			
3. Revenge Motivation Reasons Scale	.182	.566**	–		
4. Task Enjoyment	-.051	-.095	.031	–	
	<i>M</i>	95.562	17.585	31.315	15.069
	<i>SD</i>	61.058	3.919	9.371	4.353

Note. * = $p < .05$, ** = $p < .01$.

Table 3

Summary of Hierarchical Regression Analysis for Variables Predicting Persistence

Variable	Model 1			Model 2		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Gender	-0.83	1.20	-0.06	-0.86	1.21	-0.06
Condition				-0.16	0.79	-0.02

Figure 1

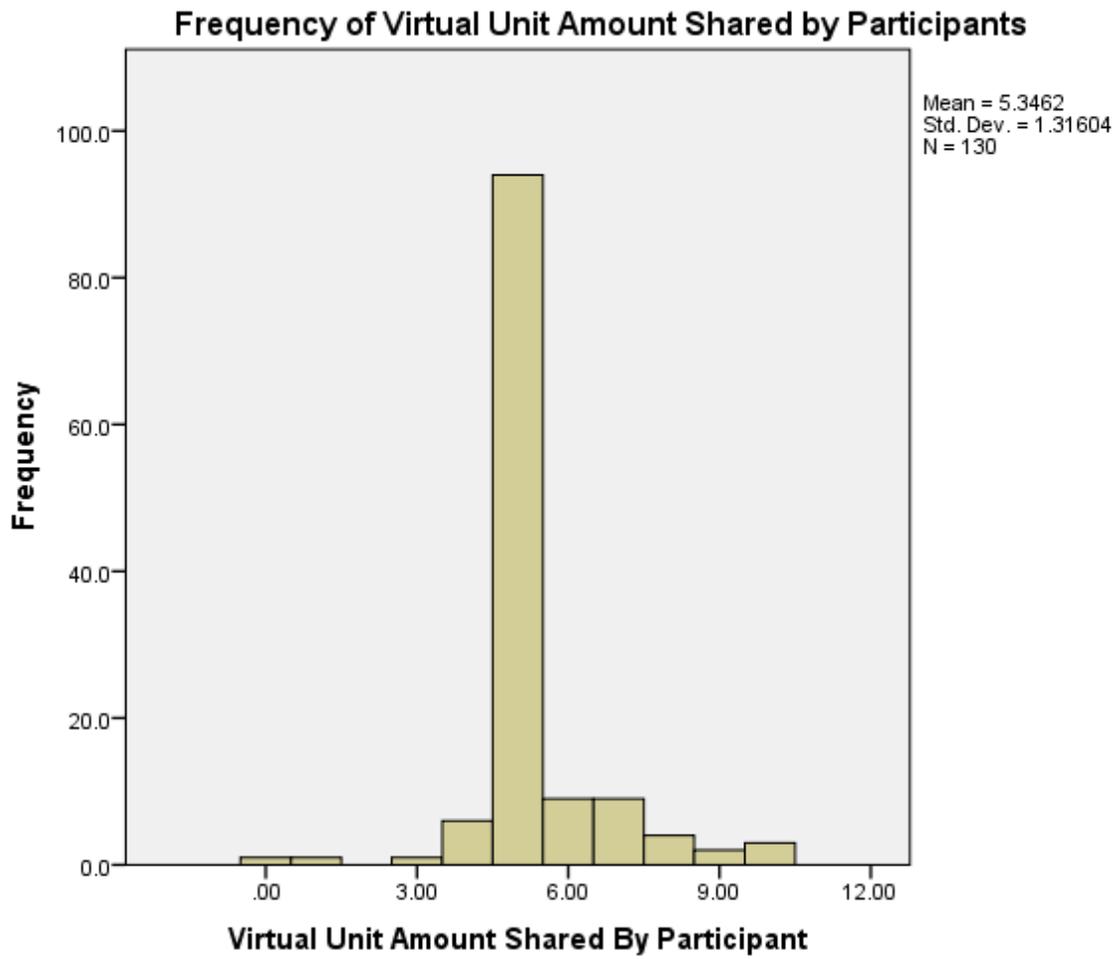
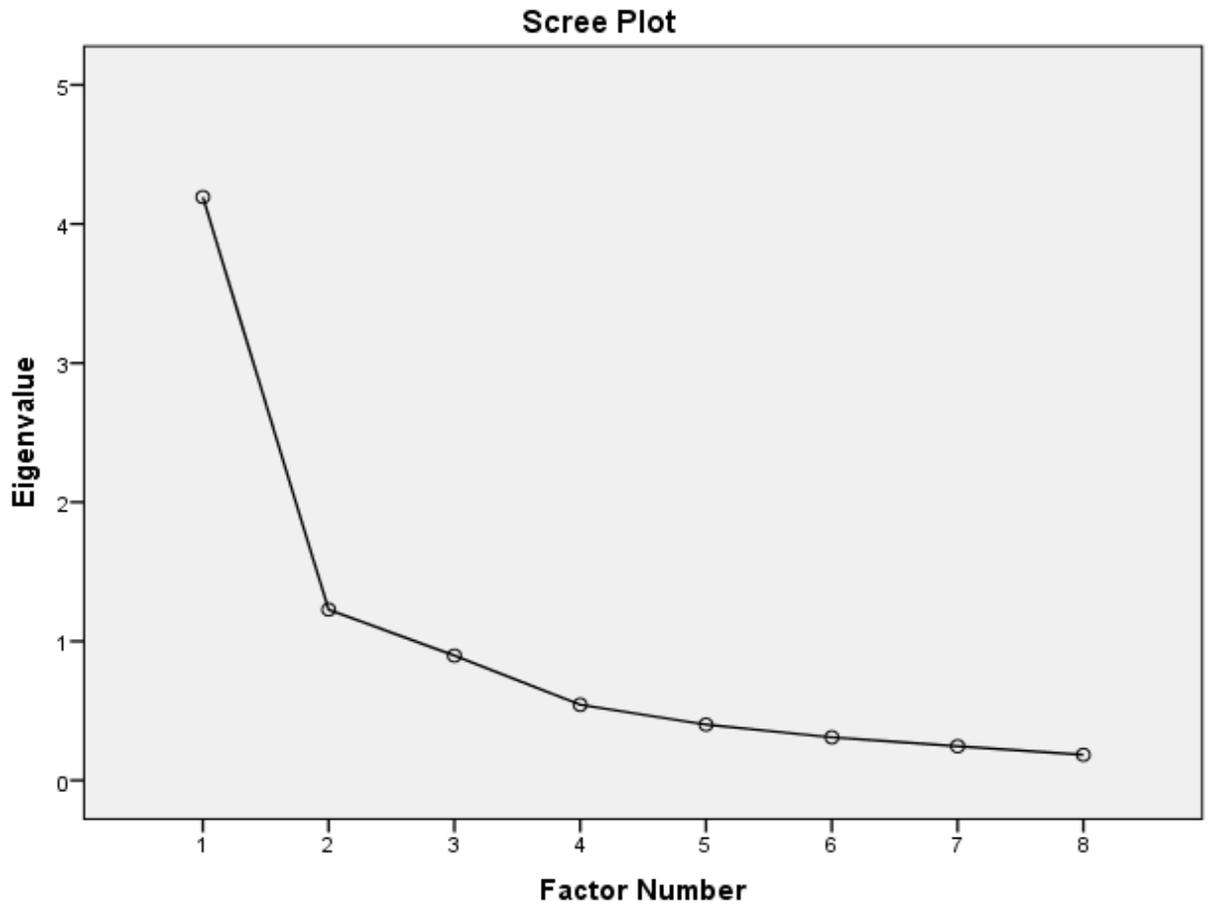


Figure 2

Principal Axis Factoring (PAF) Analysis of Revenge Motivation Reasons Scale-- Scree Plot

Showing a One-factor Solution



Appendix A

Revenge Motivation Reasons Scale

Please read each statement carefully, and indicate how true each of it is for you using the following scale:

1	2	3	4	5	6	7
Strongly						Strongly
agree						disagree

Feeling/Self-Image Restoration (Controlled)

- My goal was to win because I could only be proud of myself if I do so.
- My goal was to win because I would feel ashamed if I didn't.
- My goal was to win to make me feel better about myself.

Deterrence (Controlled or Autonomous)

- My goal was to win in order to prevent my opponent from treating others unfairly in the future. (Autonomous)
- My goal was to win in order to show my opponent they can't take advantage of me. (Controlled)

Justice Restoration (Autonomous)

- My goal was to win because it was the right thing to do.
- My goal was to win in order to give the other person what they deserve.
- My goal is to win in order to make my opponent feel bad.

Appendix B

Ryan's Task Enjoyment Scale

For each of the following statements, please indicate how true it is for you, using the following scale:

1	2	3	4	5	6	7
Strongly						Strongly
agree						disagree

1. I enjoyed doing this activity very much
2. This activity was fun to do.
3. I thought this was a boring activity. (R)
4. This activity did not hold my attention at all. (R)
5. I would describe this activity as very interesting.
6. I thought this activity was quite enjoyable.
7. While I was doing this activity, I was thinking about how much I enjoyed it.