***Interpersonal Counterproductive Workplace Behaviour and Machiavellianism: A Latent Variable Model***

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**Abstract**

The interpersonal side of Counterproductive Workplace Behaviour (CWB) is little understood. Using a latent variable approach, this research sought to investigate underlying factors contributing to Antisocial Workplace Behaviour (AWB). Machiavellians pose a threat to organisations in their propensity to engage in CWB, with specific traits which directly align with the underlying factors expected to contribute to AWB. The Five Factor Machiavellian Inventory was therefore evaluated as a predictive measure of AWB. A custom battery of classic economic games was used to measure behaviours hypothesised to underlie AWB. Results gave tentative support to the hypothesised latent variable model, with the measured behaviours contributing to 38.4% variance of a shared factor, conceptualised as AWB. Total FFMI score was not found to be a valid predictive measure for AWB. However, FFMI factor score Antagonism was (accounting for 10.8% variance). The research found significant support for the impact of contextual information regarding opponents and type of opponent on behaviour. These findings are promising support to the existence of AWB and a useful preliminary investigation into a valid measurement. Expanding on other contributing factors will allow researchers to build a comprehensive model, which when paired with a valid measurement could equip organisations with means of understanding and measuring the risk of Antisocial Workplace Behaviour.

**Introduction**

Bad behaviour in organisations can be dangerous. From interpersonal conflicts to committing white collar crime, the impacts can be felt across teams, throughout an organisation and into the surrounding community. Counterproductive Workplace Behaviours have been identified in organisational research for over 30 years, officially termed as such by Campbell in 1990 and regarded as “voluntary behaviour that violates significant organisational norms, and, in doing, threaten the well-being of the organisation or its members, or both” (Robinson & Bennett, 1995, p.13). Research estimates that the financial impact of extreme work behaviours such as manipulation, intimidation, coercive social control and decreased organisational productivity is as much as several hundred billion dollars every year in the United States (McGee & Fillon, 1995; Murphy, 1993).

Counterproductive Workplace Behaviours (CWBs) that target organisations (CWB-O) have been differentiated from those aimed at individuals (CWB-I) (Robinson & Bennett, 1995; Gruys & Sackett, 2003). The theory of psychological contracts (Rousseau, 1989), the reciprocity norm (Gouldner, 1960) and social exchange theory (Thibaut & Kelley, 1959) are used widely in literature to explain the reasons why individuals might engage in CWBs. According to these theories, employees engage in CWBs in response to dissatisfactory working conditions, interactions, and outcomes, as a means of harming the organisation (Dalal, 2005). These justifications however do not address the reasons for individuals engaging in CWB-I - those targeted against individuals. CWB-Is can include discrimination, exclusion of others, interpersonal conflict, harassment, and manipulation (Gruys & Sackett, 2003). These individually oriented CWBs contain a distinctly antisocial and antagonistic element which threaten to disrupt trust, cooperation, and collaboration in organisations, as well as the wellbeing of employees. Dissatisfactory working conditions, interactions and outcomes are not satisfactory explanations for individuals to engage in interpersonally targeted harmful behaviour in the workplace. Understanding what motivates individuals to engage in CWB-Is, particularly those which are antisocial in nature, is therefore of vital importance to organisations to mitigate the risks of such behaviours and manage them when they do arise.

**Personality, CWB & the Dark Triad**

It has long been established that personality traits have a direct influence on overt behaviour (Allport, 1937), and they have been proven to be predictive of both job performance (Oh et al., 2011) and counterproductive workplace behaviour (Schaumburg & Flynn, 2017; Berry et al., 2007). Research by O’Boyle and colleagues examined the implications of the so-called Dark Triad personality traits on CWB and found a positive association between each of the 3 components and CWB (2011). The Dark Triad traits are a set of three personality traits: narcissism, Machiavellianism, and psychopathy, clustered by Paulhus & Williams in 2002 and deemed dark for their shared malevolent and antagonistic characteristics. These traits are often characterised by a lack of empathy, manipulative tendencies, and a focus on self-interest and personal gain. Although conceptually distinct, the three traits have been empirically found to be interrelated due to the callous central tenant that exists in each (Paulhus & Williams, 2002).  The traits have been studied in a variety of settings, including organisational psychology, clinical and social contexts and have been related to antisocial behaviour, involvement in criminal activities, and substance use (Paulhus & Williams, 2002; Baughman, 2012; Furnham, Richards & Paulhus, 2013). In organisational settings, those who have high scores on dark triad traits are likely to cause social distress, disrupt peace within an organisation and commit white collar crime (Shoemaker, 2018).

Machiavellianism (Mach) is characterised by manipulation, selfishness, deceit, and a strategic approach to achieving one's goals. Those high in Mach tend to have a cynical view of the world (Jones & Figueredo, 2013) and are strategically calculating with a tendency to exploit others (Vize et al., 2018). They have been found to be focused on achieving their objectives, even if it means using dishonest or unethical tactics (Szijjarto & Bereczkei, 2015). Machs in the workplace are more likely to engage in manipulation, deception, and exploitation for personal gains, without the motivation of factors used to explain CWB-Os.

Machs have been found to be more likely to make choices that are ethically unsound (Kish-Gephard, Harrison & Treviño, 2010), and to have inflated perception of their own emotional intelligence (Dahling, Whitaker & Levy, 2009), and ability to successfully politic (Ferris et al., 2005). Those high in Mach are more likely to betray others, lie and cheat (Jones & Paulhus, 2009). Those who are high in Mach tendencies report a high probability of engaging in CWBs, in pursuit of personal goals at the cost of organisational goals (Hunt & Chonko, 1984), even if it means being amoral (Chen & Tang, 2006; Granitz, 2003). More likely to lie regularly, even to friends (Kashy & DePaulo, 1996) and to take revenge against others (Nathanson, Paulhus & William, 2006), Machs pose a distinct threat in engaging in CWB-Is in the workplace. It is a presentation of an “agentic but exploitative social strategy” (O’Boyle et al., 2013, p. 3) that is focussed on individualistic goals and undermines effective social exchange. Given the selfish, antisocial, strategic and manipulative element of Mach, connections can be made to the motivations behind antisocial CWB-Is, or Antisocial Workplace Behaviours (AWB), which are theorised as being underpinned by selfishness, cynical views of the intentions of others, low empathy for others, and a high individualistic achievement drive. Mach is the least understood of the Dark Triad traits which is largely due to the widespread criticism and unreliability of the most widely used measurement scale, the Mach-IV (Christie & Geis, 1970).

**History of Mach measurement**

Machiavellianism was first conceptualised as a personality construct by Christie and Geis, who used the writings of Italian politician Nicolo Machiavelli to develop a self-report measure of the construct called Mach-IV (1970). The Mach-IV scale is constructed of 20 items rated on a Likert scale and were designed to capture core facets of Mach. These items were taken directly from Machiavelli’s original journals or were considered to address the same constructs identified in these writings (Grabovac & Dinic, 2022), and were split across three dimensions: tactics (for manipulation and justifying immoral means in achieving a goal), views (belief that others are untrustworthy and selfish, and cynical worldview) and morality (embracing immoral behaviours to achieve a goal) (Christie & Geis, 1970). The Mach-IV scale has been the most widely used in research examining Mach since its design in 1970, however there have been vast criticisms of its validity as a psychometric instrument which can largely be surmised under the following categories: reliability, poor item choices and dimensionality.

*Reliability & validity*

Multiple reviews of Mach IV have found large variability in the reliability of the scale across demographic groups measures (Fehr et al., 1992; Vleeming, 1979). Estimates of internal consistency for the Mach-IV are poor and fluctuate largely, which is particularly evident with women and children (Kraut & Price, 1976; Jones & Paulhus, 2009; Vleeming, 1979). Oksenberg found the scale to be almost half as reliable for women as compared to men (alpha coefficient of 0.39 for women compared with 0.73 for men) (1971).  These differences in reliability across gender were replicated cross-culturally (Oksenberg, 1971; Starr, 1975; Geis & Moon, 1981).

*Poor Item Choices*

The items included in the 20-item measure have been criticised to be vague and abstract (Dahling, Whitaker & Levy, 2009) and provide little information about Mach as a trait (Rauthmann, 2013). There are also an unequal number of pro-trait and con-trait items, meaning the measure fails to account for acquiescent responding (Furr, 2011). Dahling, Whitaker and Levy have criticised items on the Mach-IV scale of being “needlessly provocative” (p. 227) and assessing multiple ideas (2009). The items included also use gendered language and use idiomatic expressions and ‘archaic’ references (Miller, Nichols & Konopaske, 2019). These criticisms are in direct opposition to Spector’s guidance for constructing effective, valid, and reliable summated rating scales (1992).

*Dimensionality*

Mach was originally conceptualised by Christie and Geis as comprising three aspects, views, tactics, and morality. However, only two aspects have been consistently found in contemporary factor analysis research; interpersonal views and personal tactics (Fehr, Samson & Paulhus, 1992; Monaghan, Bizumic & Sellbom, 2018; Hunter, Gerbing & Boster, 1982), and the Mach-IV is scored as a unidimensional scale (Dahling, Whitaker & Levy, 2009). Morality was represented by only two items on the Mach-IV scale, one of which was found to have psychometric failings (see previous point on ‘poor item choices’ and so was recommended for removal from the instrument, further weakening the case to include morality as a third, valid aspect to the model (Ahmed & Stewart, 1981). Directionality of specific items has shown to skew the results of factor analysis on the Mach IV (Vleeming, 1984) and items on interpersonal views and personal tactics have been found to load onto the same factors in some early cross-cultural studies (Kwang & Marsella, 1977).

Dahling, Whitaker and Levy, who published an effective criticism of the Mach-IV, developed their own measure as a proposed new direction for Mach research - the Machiavellian Personality Scale (MPS), containing four dimensions: amorality, desire-for-control, desire-for-status, and distrust-of-others (2009). However, this measure has come into criticism of its own. Miller and colleagues found that the four dimensions in the MPS had low reliability and inconsistent relations with empathy (2015). As such, it has not been widely used in research since its creation.

**Five Factor Machiavellian Inventory**

In 2018 a new measure of Mach was developed and proposed by Collison, Vize, Miller and Lynam, the Five Factor Machiavellian Inventory (FFMI), developed using expert estimation and ratings of the structure of Mach, modelled against the five-factor model of personality. The aim of the development of the FFMI was to present a new measure which was more in line with theory and ensured Mach was distinguishable from psychopathy, which it did successfully, as the FFMI was more consistent with expert ratings of Mach than pre-existing measures, and less similar to the expert five-factor model profile for psychopathy (Collison et al., 2018). The FFMI contains three superfactors: antagonism (surmised of facets: immodesty, selfishness, manipulativeness, cynicism, and callousness), planfulness (surmised of facets: order and deliberation), and agency (surmised of facets: activity, competence, invulnerability, self-confidence, achievement, and assertiveness), capturing all relevant characteristics of Mach suggested by Rauthmann and Will in 2011.

The Five Factor Model has received extensive empirical support regarding convergent and discriminant validity, cross-cultural validity, and behavioural genetic support (Costa & McCrae, 1988; Ashton & Lee, 2001; Yamagata et al., 2006), and is a primary model used in trait-based approaches in the study of personality. Research based on the FFM has been used as the framework upon which both DSM-IV personality disorders (Bagby et al., 2005; De Fruyt et al., 2006; Trull et al., 2003) and non-DSM-IV personality disorders such as psychopathy (Miller, Lynam, Widiger & Leukefeld 2001) and narcissism (Glover et al., 2012) have been mapped and understood. Inventories have since been developed using the FFM framework to measure schizotypal PD (Edmundson et al., 2011),

borderline (Mullins-Sweatt et al., 2012), histrionic PD (Tomiatti et al., 2011), obsessive–compulsive PD (Samuel et al., 2012), avoidant PD (Lynam, Loehr, Miller, & Widiger, 2012), dependent PD (Gore et al., 2012), narcissistic PD (Glover et al., 2012), psychopathy (Lynam et al., 2011) and narcissism (Miller, Gentile & Campbell, 2013). Utilising the established and substantiated Five Factor Model of personality as a framework upon which to understand and measure complex personality traits has proved successful as it allows new measures and conceptualisations to benefit from both the extensive and comprehensive lexicon of facets, and from the extensive empirical support for the model. The FFMI related to measures of the FFM, existing Machiavellian measures, narcissism, ambition, impulsivity and psychopathy as expected (Collison et al,. 2018) and has been shown to be a promising alternative Machiavellian measure, with comprehensive construct coverage and distinctiveness of the Mach profile in relation to other Dark Triad constructs (Kuckelhaus et al., 2021). The presentation of this new and promising measure of Mach facilitates new avenues of development in the field by giving researchers access to a valid tool to evaluate Mach traits.

**Economic Games & theoretical interpretation of gameplay**

Economic games originated in behavioural economics and offer a theory-driven way in which to measure prosocial behaviours in psychological research (Baumard et al., 2013), by providing a ”coherent, substantive model of many actual encounters'' (Murnighan & Wang, 2016, p.80). Game theory, as posed by Von Neumann and Morgenstern in their seminal text “Theory of Games and Economic Behaviour'', posits that economic games are composed of three basic components: multiple players, strategies, and pay-offs (1944). Classic economic games, and variations of them have been well established in personality psychology to analyse behaviours in relation to specific traits or personality profiles (Thielmann et al., 2020). In fact, numerous games can and have been combined to investigate complex trait profiles and isolate specific social motivations (Haesevoets et al., 2018; Thielmann & Hilbig, 2018). Where classic game theory assumes that players are rational and deploy strategies most likely to maximise their own earning, interdependence theory can provide analysis of interpersonal interactions, as can be seen through economic games (Thibaut & Kelley, 1959). Thielmann and colleagues propose that combining these theories to establish a comprehensive framework for interpreting game behaviour, and simply, utilising an understanding of interdependence theory can add psychological meaning to game theory (Thielmann et al., 2021).

Interdependence is the pattern of mutual control individuals have over outcomes for themselves and others. It encompasses conflict of interests, relative power, mutual dependence, and coordination vs. social exchange (Columbus & Molho, 2022). Research using economic games has found perceptions of interdependence to be associated with prosocial behaviour (Columbus, Münich & Gerpott, 2020; Halevy, Chou & Murnighan, 2012), with 25%-50% of variance in economic game behaviour being explained by perceptions of interdependence across multiple studies (Columbus, Thielmann & Balliet, 2019). Research has also probed into individual differences in subjective interdependence perceptions. A meta-analysis by Thielmann and colleagues found the association between prosocial personality traits and prosocial behaviour depended upon the evaluation of individuals regarding the conflict of interests included in the interaction (an example of interdependence) (2020). This evidence supports the assumption that economic game batteries can be developed to test complex and nuanced behavioural profiles, which can then be evaluated in regard to which personality traits may underpin and elicit such behaviour.

In the present research, the following economic games will be deployed: the Ultimatum Bargaining Game (Rubinstein, 1982), the Dictator Game (Kahneman, Knetsch, & Thaler, 1986), and the Trust Game (Berg, Dickhaut, & McCabe, 1995). Each of these games are prevalent in psychological research and investigate whether individuals are motivated by selfish gains (as assumed by classic game theory) or by other means, such as cooperation and fair division of resources, as assumed by interdependence theory and psychological research (Thielmann et al., 2021). Each of these games are sequential and differ regarding the power of the player to assign the payoffs (instructions for gameplay can be seen in *Figures 1-4).* The deployment of these games is iterative for this study, to allow researchers to examine the gameplay behaviour under varying conditions such as the participants playing both roles in an interaction (in the Trust Game) and with and without additional context and information regarding their opponent, intended to evaluate how interdependent evaluations are made by participants differ across high Mach vs low Mach individuals. Interpretation of behaviour in each of the games used can be seen in *Table 1.*

**Aims & Rationale**

The aim of this research is to evaluate whether the FFMI can be used to predict Antisocial Workplace Behaviour (AWB), as hypothesised to be a combination of selfishness, cynicism, achievement, and empathy. Scores on selfishness, cynicism, achievement, and empathy will be collected through a custom designed battery of classic economic games intended to target these specific behaviours. Understanding how scores on the FFMI can predict AWB would be a critical development in establishing means of managing, predicting, and protecting against antisocial behaviour as a result of Machiavellian traits. Understanding the relationship between individual differences and displays of AWB, a hypothesised model of CWB-Is, will support further research and investigation into this aspect of counterproductive workplace behaviour.

**Methodology**

**Research Design**:

This study utilises a within-subjects design where the independent variable is score on FFMI and the dependent variables are behavioural responses in a series of classic economic games.

**Participants**:

Participants were recruited via social media channels and through existing organisational networks. Participants had to be over the age of 18 and able to provide informed consent to take part in the research. Participants needed to be fluent in English to ensure understanding of study instructions and materials.

In total, 73 participants were included in this study, 17 participants (23.29%) identified as male, 55 (75.34%) as female, and 1 participant (1.37%) did not disclose their gender. The majority of participants had a university degree or similar, with 22 (30.14%) holding a Bachelor’s degree or similar, and 39 (53.42%) holding a graduate or professional degree. The most represented age group in the participant sample was 25 to 34, with 46.58% of participants (34), followed by 55 to 64 (15 participants, 20.55% of sample).

**Materials/Instruments:**

Qualtrics, a web-based survey and data management platform, was utilised to design and administer the online questionnaires and store the collected data. Participants were invited to take part in the research via a link to a Qualtrics survey. The survey comprised two sections: 

**FFMI**

The 52-item version of the Five Factor Machiavellian Inventory, developed by Collison, Vize, Miller and Lyman in 2018 was used in full, producing total scores for participants as well as scores on 3 factors and 13 subscales. Participants responded to each of the 52-items on a five-point Likert scale, with the option not to respond to particular items (see section on *Missing Data Imputation*). The inventory was built in Qualtrics, with reverse scoring where required. The full inventory and scoring guide can be seen in *Appendix 1.*

**Economic Games**

Participants played three different classic economic games against several fictitious opponents. Participants did not play these games against live opponents but instead programmed responses from the Qualtrics survey as the research was interested only in one-side of the gameplay interaction, and therefore standardised the opponent responses to reduce noise in the data (as suggested by Thielmann, Böhm & Hilbig, 2021). Programmed responses were informed by meta-analytic research on gameplay behaviour for each game which reported average gameplay behaviour in these opponent roles (for the Ultimatum game: Oosterbeek et al., 2004; for the Dictator game: Engel, 2011; and for the Trust Game: Johnson & Mislin, 2011). These average gameplay behaviours were used to set minimum acceptance levels in programmed responses from the fictitious opponents. Gameplay was built and thoroughly tested in Qualtrics prior to deployment to ensure all elements were functioning appropriately. The structure of the survey can be seen in *Appendix 2*, including samples of the information provided to participants, formulas, rationale, and calculations used.

*Ultimatum Game*

How to play: Player 1 receives a sum of money and is to decide how much to keep, and how much to offer to Player 2. Player 2 must decide whether to accept or reject the offer. If the offer is rejected, neither player receives any money. If the offer is accepted, Player 2 receives the offered amount, and Player 1 keeps the remaining amount. See visual representation in *Figures 1 & 2.*

A diagram of a game

Description automatically generatedA diagram of a person and a group of people

Description automatically generated

*Figure 1: Visual representation of gameplay of Ultimatum Game with acceptance of offer.*

*Figure 2: Visual representation of gameplay of Ultimatum game with rejection of offer.*

*Dictator Game*

How to play: Player 1 receives a sum of money and decides how much to keep, and how much to give to Player 2.  Player 2 has no contribution in the interaction. See visual representation in *Figure 3.*

A diagram of a game

Description automatically generated

*Figure 3: Visual representation of gameplay of Dictator Game.*

*Trust Game*

How to play: Player 1 receives a sum of money and is to decide how much to keep, and how much to pass on to Player 2. They keep the remaining money. Player 2 receives this value multiplied by 3 and is to decide how much of the total value to return to Player 1, keeping the remaining money. See visual representation in *Figure 4.*

A diagram of a game

Description automatically generated

*Figure 4: Visual representation of gameplay of Trust Game*

**Procedure:**

Participants followed the link to the Qualtrics study to participate. They were first provided information about the research, and information regarding data processing and storage before being asked to provide informed consent. When consent was provided, participants proceeded to complete the FFMI. Following completion of the FFMI, participants were given an overview of the games they were to play. Before starting the games, they were asked to set a saving goal, between £0 and £2,470 (the maximum possible earning across all games). They then played the following rounds of each economic game: 

*Ultimatum Game*

Participants completed a test round to familiarise themselves with the process and then played 4 rounds as Player 1 (see *Figures 1 & 2*).

* + Round 1: Player 2 is an unnamed individual, and no context is given to their saving goals. £100 is given to the participant to split. Opponent accepts offers over £35 and rejects lower offers.
  + Round 2: Player 2 is a named individual and their reason for saving is explained. £200 is given to the participant to split. Opponent accepts offers over £70 and rejects lower offers.
  + Round 3: Player 2 is an unnamed group, and no context is given to their saving goals. £250 is given to the participant to split. Opponent accepts offers over £100 and rejects lower offers.
  + Round 4: Player 2 is a named group and their reason for saving is explained. £300 is given to the participant to split. Opponent accepts offers over £120 and rejects lower offers.

*Dictator Game*

Participants again completed a test round and then proceeded to play the following 4 rounds as Player 1 (see *Figure 3*).

* + Round 1: £100 given to split with unnamed individual.
  + Round 2: £150 given to split with named individual.
  + Round 3: £250 given to split with unnamed group.
  + Round 4: £350 given to split with named group.

There were no opponent responses programmed given the design of this game.

*Trust Game*

Participants played 2 rounds as Player 1 and 2 rounds as Player 2 (see *Figure 4*).

* Round 1: Participants were in the role of Player 1 and were given £100 to split between themselves and Player 2, who was an unnamed individual, and no context was given to their motivations for saving. Player 2 received 3 times the value that the participant offered. When £70 or more was given by the participant (Player 1), Player 2 returned 1.7 times the value. When it was between £30 and £69, Player 2 returned 1.3 times the value. When the participant gave less than £30, Player 2 returned the exact value.
* Round 2: Participants were in the role of Player 2. Their opponent, Player 1, was an unnamed individual and there was no context given to their motivation for saving. Player 1 received £100 and gave the participant, Player 1, £40. This value was tripled to £120. The participant had to decide how much to return to their opponent, Player 1.
* Round 3: Participants were in the role of Player 2. Their opponent, Player 1, was a named individual and context was given regarding their motivations for saving. Player 1 received £150 and gave the participant, Player 2, £75. This value was tripled to £225. The participant had to decide how much to return to their opponent, Player 1.
* Round 4: Participants were in the role of Player 1. Their opponent, Player 1, was a named individual and context was given regarding their motivations for saving. The participant received £150 and had to decide how much to give to their opponent, Player 2. When £100 or more was given by the participant, the responder returned 1.7 times that value, when it was between £50 and £99 1.3 times the value was returned. When it was less than £50 the exact value was returned.

The total earned by participants was calculated and shown after the end of each round of each game alongside their saving goal, as declared before the start of gameplay. A sample of the formulas written to calculate this in Qualtrics can be seen in *Appendix 2.*

**Variables**:

Data was collected on the FFMI and economic gameplay. Economic gameplay measured selfishness, cynicism, achievement, and empathy. Scores were interpreted as detailed in *Table 1*, and were calculated as detailed in the *Results* section.

*Table 1: Economic gameplay behaviour interpretation*

|  |  |  |  |
| --- | --- | --- | --- |
| **Behaviour** | **Economic Game** | **Round** | **Interpretation** |
| Selfishness | Ultimatum Game | 1-4 | Low offer equates to high selfishness |
| Dictator Game | 1-4 | Low offer equates to high selfishness |
| Trust Game | 2 & 3 | Low return to Player 1 equates to high selfishness |
| Cynicism | Trust Game | 1 & 4 | Low offer equates to high cynicism as it anticipates low return from Player 2 |
| Achievement | Savings Goal | N/A | High savings goal equates to high achievement |
| Low empathy | All | All | Increase in average offer in rounds with opponent context and in rounds with individual opponents as opposed to groups equates to high empathy. No change, or decrease, in average offer equates to low empathy. |

**Data Analysis:**

As this research looks to investigate whether the FFMI can be used as a predictor of Antisocial Workplace Behaviour, a latent variable model was adopted to establish the existence of AWB, and generate scores on this latent variable. Given both the latent and observable variables were continuous, factor analysis was selected as the appropriate approach, assuming normally distributed variables. Despite some a priori assumptions regarding the measurement model, exploratory factor analysis was deemed the most appropriate method given this was a preliminary investigation into the theorised latent variable. Exploratory multiple factor analysis allowed researchers to investigate the factor structure of the gameplay output expected to measure Antisocial Workplace Behaviour. Scores were then to be calculated based on the factor structure found through EFA. Once these scores were calculated, a linear regression was run to analyse whether FFMI score could be used to estimate Antisocial Workplace Behaviour.

**Missing Data Imputation**

Where participant data sets were incomplete, the following processes were followed:

*Demographic data:* Where demographic data was missing, it was simply omitted from summary demographic overview.

*Missing FFMI item scores:* Following the advice of Cohen & Cohen, the missing data was determined to be random and not follow a pattern which caused concern regarding computation method (1983). This meant the data was more amenable to simple substitution techniques (Raymond & Roberts; 1987). As such, the advice of Downey & King was followed, and missing FFMI values were assigned using the person mean substitution method (1998).

*Missing game responses:* Participants could not proceed with gameplay without submitting a response, so there was no need to impute gameplay scores. In the event participants completed some of the economic games but not all their data was be to be omitted from analysis due to incompleteness.

**Pilot Study:**

Prior to data collection, a pilot study was conducted with a small group of participants (n = 5) to assess the face validity of the economic game scenarios. Feedback from pilot participants indicated that the game instructions were clear, relevant, and easily understandable. Some feedback was received that calculation of total amount saved was not shown in all rounds and so further testing and refinement of formulas used for these calculations on the Qualtrics platform took place.

**Ethical Considerations:**

Prior to participation, all participants were provided with a Participant Information form that outlined the purpose of the study, the procedures involved, confidentiality measures, and their right to withdraw at any time without penalty. Participants were required to read the Participant Information form and provide informed consent before proceeding with the study. The study was intentionally designed to exclude the collection of identifying information from participants, thereby eliminating the need for data anonymization post-collection. The data collected from participants was securely stored on a cloud-based server, with restricted access limited solely to the researcher.

The study was designed to minimise any potential risks to participants. The survey questions and game scenarios were non-intrusive and did not require participants to disclose sensitive or distressing information. Upon completion of data collection, participants were provided with debriefing information. The debriefing included a summary of the research objectives, some information regarding the tools used, links to additional resources of information, and an opportunity for participants to ask questions or provide additional feedback to the research team. Ethical approval for this research was obtained from the Goldsmiths, University of London Psychology Research Ethics Committee.

**Results**

**Participants**

Of the 113 participants who engaged with the study, 25 (22%) were excluded as they did not provide consent to have their data included in the research. 13 of the remaining 88 participants (15%) did not complete the FFMI or submit any responses in the economic games and were therefore also removed from the results. 1 of the remaining 75 participants submitted responses on less than one third of the FFMI items (32.7%) and therefore was also removed from the dataset. A further participant was removed as they did not submit responses on any of the economic games. Following data screening and removals of participants with significant missing data, 73 participants remained. There was missing data on only one FFMI item of the remaining participant pool. This was populated using the person mean substitution method (as discussed in the *Methodology* section). Histograms and boxplots on each of the variables were assessed and there were found to be no univariate outliers. Mahalanobis distance values showed that the data contained no multivariate outliers.

**Descriptives**

*FFMI:* Individual responses were collected on the 52-item FFMI on a 1-5 Likert scale. 22 items were reverse scored (as outlined in the full scoring guidance from Collison et al., 2018 in *Appendix 1).* A score was calculated for each participant the three factors (Antagonism, Agency, Planfulness) and the subscales (Achievement, Activity, Selfishness, Assertiveness, Competence, Deliberation, Invulnerable, Immodesty, Order, Self-Confidence, Manipulative, Callousness, Cynical) by summing associated item scores, and a total score was also calculated. Descriptive statistics of the total and factor FFMI scores can be seen in *Table 2* and for the subscale scores in *Table 3.* Antagonism and Planfulness factor scores were found to be normally distributed (Antagonism W = .956, p = .012, Planfulness W = .938, p = .001), whereas FFMI total score and Agency were not normally distributed (FFMI total W = .991, p = .891, Agency W = .982, p = .403). However, FFMI total nor Agency were found to be significantly skewed nor suffering from kurtosis.

*Table 2: Descriptive statistics for FFMI factor scores and total score.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | FFMI TOTAL | Planfulness | Agency | Antagonism |
| N | 73 | 73 | 73 | 73 |
| Mean | 156 | 29.6 | 81.0 | 45.0 |
| Standard deviation | 17.2 | 5.85 | 12.5 | 10.8 |
| Minimum | 113 | 15 | 52 | 23 |
| Maximum | 201 | 39 | 106 | 79 |
| Skewness | 0.122 | -0.721 | -0.234 | 0.506 |
| Kurtosis | 0.199 | -0.238 | -0.604 | 0.738 |
| Shapiro-Wilk W | 0.991 | 0.938 | 0.982 | 0.956 |
| Shapiro-Wilk p | 0.891 | 0.001 | 0.403 | 0.012 |

*Table 3: Descriptive statistics for FFMI subscale scores.*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Achievement** | **Activity** | **Selfishness** | **Assertiveness** | **Competence** | **Deliberation** | **Invulnerable** | **immodesty** | **Order** | **Self-confidence** | **Manipulative** | **Callousness** | **Cynical** |
| N | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 |
| Mean | 10.1 | 14.4 | 6.47 | 13.6 | 15.8 | 14.5 | 13.8 | 10.1 | 15.1 | 13.3 | 9.95 | 7.85 | 10.7 |
| SD | 2.44 | 2.83 | 1.83 | 3.39 | 3.27 | 3.35 | 3.92 | 2.99 | 3.27 | 3.15 | 3.58 | 3.09 | 3.35 |
| Minimum | 5 | 8 | 4 | 5 | 6 | 6 | 6 | 4 | 8 | 7 | 4 | 4 | 4 |
| Maximum | 16 | 20 | 13 | 19 | 20 | 19 | 20 | 17 | 20 | 19 | 18 | 17 | 19 |
| Skewness | -0.095 | -0.017 | 0.751 | -0.493 | -0.855 | -0.747 | -0.104 | 0.239 | -0.603 | -0.530 | 0.113 | 0.848 | 0.0936 |
| Kurtosis | -0.501 | -0.389 | 1.30 | -0.338 | 0.358 | -0.178 | -1.02 | -0.214 | -0.802 | -0.579 | -0.923 | 0.351 | -0.0695 |
| Shapiro-Wilk W | 0.972 | 0.979 | 0.916 | 0.962 | 0.928 | 0.923 | 0.959 | 0.976 | 0.913 | 0.936 | 0.964 | 0.919 | 0.982 |
| Shapiro-Wilk p | 0.106 | 0.259 | < .001 | 0.028 | < .001 | < .001 | 0.019 | 0.175 | < .001 | 0.001 | 0.033 | < .001 | 0.379 |

Participant economic gameplay behaviour was used to calculate scores on selfishness, cynicism, achievement, and empathy as follows:

*Selfishness:* The amount offered to the opponent by participants in the following games was calculated as a percentage of the available funds to generate standardised scores, and an average of all was calculated: Ultimatum Game rounds 1-4, Dictator Game rounds 1-4, Trust Game rounds 2 and 3.  Low scores equated to high selfishness, as on average this meant the participant offered a low proportion of available funds to their opponents, and kept a high proportion for themselves. The mean selfishness score was 42.3 (SD 10.3).

*Cynicism:* The amount given by participants to their opponents in the trust game when playing the role of Player 1 was again calculated as a percentage of the available funds, to generate a standardised score, and an average was calculated of these scores across Trust Game rounds 1 and 4. Low scores were conceptualised to mean high cynicism, as participants were not trusting that they would receive a fair sum in return from their opponent, signifying a cynical view of their opponents intentions. The mean cynicism score 38.4 (SD 21.8).

*Achievement:* The savings goal set by participants was calculated as a percentage and this was used as the participants achievement score. A high score was conceptualised as a high achievement drive in participants as it showed an intention to save a high proportion of the available funds throughout the games. The mean achievement score was 72.3 (SD 23.9).

*Empathy:* Participant scores on empathy were calculated by examining both the impact contextual information about opponents and the impact of whether opponents were a group or individual had on the amount participants offered during economic games. The difference between the average percentage of funds offered to opponents by participants across the rounds of each game in which no context was provided was calculated, as was the average percentage of funds offered when context was provided. The difference between these two scores was established as Empathy: Context score. The same process was followed to calculate the difference in average scores when playing against an individual or a group (Empathy: Individual) for each participant.

A paired samples t-test was conducted to evaluate whether the presence of context as opposed to in the absence of context had a significant effect on gameplay behaviour. There was a significant difference in scores for Context (M = .422, SD = .1) and No Context (M = .371, SD = .12); t(72) = -4.70, p = <.001. The magnitude of difference between conditions was medium, d = -0.55. These results indicate that the presence of context regarding opponents had a significant effect on participant gameplay behaviour, with the addition of contextual information regarding opponents increasing offers on average from participants. A second paired samples t-test was conducted to estimate the significance of the effect playing against a group versus an individual had on participant gameplay behaviour. Again, a significant difference in scores was found for Individual (M = .427, SD = .104) and Group (M = .382, SD = .135); t(72) = -3.34, p = .001, supporting the assumption that the type of opponent (individual versus group) had a significant effect on participants’ gameplay behaviour.

The average of Empathy: Context and Empathy: Individual scores was calculated to produce the Empathy score for participants. A low score on Empathy was conceptualised as the participant having low empathy, as the presence of context regarding their opponent, and whether the money they offered was to go to a group or an individual, had little impact on the amount that they offered. The mean Empathy score was .301 (SD 6.71).

**Exploratory Factor Analysis**

Exploratory Factor Analysis (EFA) is used to calculate the extent to which the set of observed variables represent an underlying latent factor, which could not be measured through a single observed variable. In the case of this research, the underlying latent factor that was in question was Antisocial Workplace Behaviour, conceptualised as a combination of selfishness, cynicism, achievement, and empathy, as measured through economic gameplay. The structure of this model, including the economic game measurement can be seen in *Figure 2.*

Prior to conducting exploratory factor analysis, several assumption tests had to be conducted to ensure the data was suitable. A correlation matrix including the Selfishness, Cynicism, Achievement and Empathy was inspected. Cynicism and Empathy were found to be significantly positively correlated (r(71) = .313, p=.007), as were Selfishness and Cynicism (r(71) = .427, p<.001). Achievement and Selfishness (r(71) = -.362, p=.002) were found to be significantly negatively correlated (see *Table 4*). As the Pearson’s r values for each of these correlations were below 0.8, these correlations were not deemed problematic for conducting EFA (Navarro & Foxcroft, 2022).

Bartlett’s test for sphericity was used to check if the observed correlation matrix diverged significantly from null. As it was found to be significant (χ²(6) = 38.1, p< .001), the data was found to be suitable for EFA, as the variables were not correlated to a problematic extent. Sampling adequacy was checked using the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy, which measured the proportion of variance among the observed variables included which may be common. The KMO values were found to be low (<0.5) across all variables, therefore the data was transformed to z-scores in an attempt to normalize scores. This did not have a positive impact on KMO values therefore analysis was conducted to examine the individual effects of each variable, and subsequently, Empathy was excluded from the analytical model. After the removal of Empathy, the KMO values on each of the remaining variables were at an adequate level (Selfishness = .567, Cynicism = .602, Achievement = .644).

*Figure 2: Hypothesised latent variable model for Antisocial Workplace Behaviour.*

A diagram of a group

Description automatically generated

*Table 4: Correlation Matrix of behavioural scores calculated from economic gameplay behaviour.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Empathy | Achievement | Cynicism | Selfishness |
| Empathy | Pearson's r | — |  |  |  |
| p-value | — |  |  |  |
| Achievement | Pearson's r | 0.008 | — |  |  |
| p-value | 0.947 | — |  |  |
| Cynicism | Pearson's r | 0.313 | -0.218 | — |  |
| p-value | 0.007 | 0.065 | — |  |
| Selfishness | Pearson's r | -0.127 | -0.362 | 0.427 | — |
| p-value | 0.285 | 0.002 | < .001 | — |

An exploratory factor analysis (EFA) was conducted using the minimum residuals method of extraction, due to the small sample size and non-normality of data, and with an oblimin rotation, as the items were (Selfishness, Cynicism & Achievement) assumed to be related conceptually. Both the scree plot and parallel analysis (Horn, 1965) suggested a one-factor solution, which explained 38.4% of variance. Factor loadings can be seen in *Table 5.* Reliability analysis suggested that the common factor warrants further examination and development as it was under the acceptance level (α = .511).

Scores on this latent variable, Antisocial Workplace Behaviour (AWB) were estimated using the Harman method due to the simple structure of the model. The Harman method provides more robustness in factor scores and was therefore suitable given the intention to use these scores in further analysis (Costello & Osborne, 2005). The new variable, AWB, was found to be normally distributed as indicated by the Shapiro-Wilk test (W = .989, p = .784). The mean AWB score was .00, with a standard deviation of .867. The mean score of 0 is to be expected given the process by which the Harman method estimates factor scores.

*Table 5: Factor Loadings for EFA model*

|  |  |  |
| --- | --- | --- |
|  | **Factor** |  |
|  | **1** | **Uniqueness** |
| Achievement | -0.430 | 0.815 |
| Cynicism | 0.506 | 0.744 |
| Selfishness | 0.842 | 0.290 |

*Note.* 'Maximum likelihood' extraction method was used in combination with an 'oblimin' rotation.

*Figure 6: Latent variable model for Antisocial Workplace Behaviour with factor loadings*

A diagram of a work flow

Description automatically generated

This research aimed to investigate whether Antisocial Workplace Behaviour could be predicted by FFMI scores, therefore a linear regression was run with the newly generated AWB scores and the FFMI Total Scores. Assumptions of normality (AWB W = .989, p = .784; FFMI total W = .991, p = .891), no multicollinearity (VIF = 1), and independence of residuals (d = 1.75, p = .322) were met. Scatterplots which plotted AWB and FFMI Total Scores against residuals showed that the assumption of homogeneity was met for both AWB and FFMI total score. AWB and FFMI total score were not found to be significantly correlated (r = -.177, p = .134). AWB was regressed on FFMI total score. The model was not found to be statistically significant, F(1, 71) = 2.302, p = .134, meaning FFMI total score did not have predictive validity for AWB, which is to be expected given the lack of relationship between the predictor and dependent variable.

FFMI factor scores were inspected to evaluate their predictive validity for AWB. Correlations between the FFMI factor scores (Antagonism, Agency and Planfulness) and AWB were inspected and only Antagonism and AWB were significantly correlated (r(71)= -.328, p = .005) (Planfulness r(71) = .037, p = .754; Agency r(71) = .023, p = .859). Planfulness and Agency were therefore not included in the second linear regression model. Assumptions of normality (W = .989, p = .791), multicollinearity (VIF = 1.026), independence of residuals (d = 1.754, p = .298), and homogeneity of variance were again met. The overall model was statistically significant, F(1, 71) = 8.572, p = .005, with Antagonism accounting for approximately 10.8% of the variance in AWB, R2 = .108.

Further investigation was done into the predictive validity of FFMI sub-scale scores which contributed to the Antagonism factor score, Selfishness, Immodesty, Manipulative, Callousness, Cynical. However, assumption tests were not met, and it was deemed inappropriate to conduct regression analyses at this level of FFMI score. A correlation matrix including AWB, measured dependent variable scores (Achievement, Empathy, Cynicism & Selfishness), FFMI total score, FFMI factor scores and FFMI subscale scores can be found in *Appendix 3.*

**Discussion**

In this study, the primary aim was to address a critical workplace concern: the prediction of antisocial workplace behaviour among employees. This matter is of utmost importance, as the quality of workplace environments greatly impacts productivity and well-being, and the motivations for engaging in interpersonal Counterproductive Workplace Behaviours are little understood. This investigation centered around whether the "Five Factor Machiavellian Inventory" (FFMI) could serve as a valuable predictive tool for predicting antisocial behaviour within organizational settings. While the research question addressed holds significant implications for human resource management and the cultivation of harmonious workplace dynamics, it also extends its reach into the realm of forensic psychology, as such behaviours in their extreme can take criminal form. In the ensuing discussion, the research outcomes will be discussed alongside their alignment with existing literature, and the broader implications for both workplace psychology and the field of forensic psychology discussed. Recommendations for future research will be made.

The findings of the exploratory factor analysis conducted in this research lends tentative evidence to the existence of the latent variable conceptualised as Antisocial Workplace Behaviour, made up of scores on selfishness, cynicism, and achievement. Whilst this is a promising finding, it is regarded as tentative given the small size of the current sample (n = 73), and the low score produced by reliability analysis (α = .511). Confirming the existence of a common variable, which contributes to over a third of the variance in the three measured variables, is of significant value in understanding why and how people might engage in damaging interpersonal behaviours, specifically in the workplace. As mentioned in the introduction, such behaviours have a large impact on productivity, trust and cooperation, and in their extreme presentations can be criminal (e.g. harassment, fraud). Selfishness, cynicism, and achievement have been proven to be connected as behaviours contributing to a larger profile. However, as Cynicism and Achievement were not found to be significantly correlated, the theoretical structure of AWB should be reconsidered. Understanding the additional behaviours which contribute to Antisocial Workplace Behaviour would allow researchers to build out the picture of this phenomenon, and then to investigate why individuals engage in these behaviours.

This research sought to understand whether the FFMI, a newly produced and thus-far empirically sound measure of Machiavellianism, could be used to predict AWB. Initial results did not yield a significant regression model in which the total score produced for each participant on FFMI was a valid predictor of AWB (F(1, 71) = 2.302, p = .134). Further investigation found FFMI factor score, Antagonism, comprised of subscales Selfishness, Immodesty, Manipulative, Callousness, Cynical, to be a significant predictor of AWB. Given that AWB encompasses Selfishness and Cynicism, these findings align conceptually and supports the validity of this predictive factor. It should be noted that while Antagonism exhibited a statistically significant relationship with AWB, it accounted for only 10.8% variance in this regression model. This suggests that there are other factors not included in this model which play a significant role in explaining the variation in AWB, warranting further investigation and incorporations into future analyses. Should further investigation which looks to grow our understanding of AWB produce factor scores for which FFMI Antagonism is a larger predictor, then developing a short-form FFMI which simply addresses the Antagonism aspect of the existing model should be considered. Such a tool could equip practitioners with means to test for likelihood of individuals to engage in AWB and allow for risk mitigation strategies and intervention methods to be developed.

One measured variable, Empathy, was removed during EFA due to failing assumption testing and reducing the proportion of shared variance among observed variables. As the scores on this variable were calculated as a difference score measuring the impact of (i) contextual information regarding opponents and (ii) group vs individual opponents on gameplay behaviour, it is understandable that these scores were not suitable for inclusion in such a model. Removal of these scores was due to the type of measurement as opposed to any conceptualisation that Empathy should not be included in the model, or that low Empathy does not contribute to the latent variable, AWB. Future research should look to model scores on Empathy in a way which does not cause multicollinearity, but instead is derived from separate datapoint and is structured in a comparable way to other observed variables.

Analysis of the impact of the two components comprising Empathy scores found that both contextual information regarding opponents, and playing against an individual versus a group had a significant impact on behaviour. The finding regarding contextual information supports the expectation that the presence of information regarding an opponent, and context regarding their need for the money which you are in control of dividing impacts behaviour. This research hypothesised that those high in Mach would be less impacted by the presence of such information. While findings support the impact, they do not support the hypothesis that those who score higher on the FFMI, and therefore are high in Machiavellian tendencies, are less effected by the presence of such context, as estimated from the lack of a significant correlation between Empathy score and FFMI score (r(71) = -.036, p = .762). The type of opponent, group or individual, having a significant impact on behaviour lends support to the bivariate model of counterproductive workplace behaviour which exists in research, and gives an operationalised presentation of this division which as of yet has not been shown in research. This model posits that CWBs which target organisations (CWB-Os) are distinct from those which target individuals (CWB-I) (Robinson & Bennett, 1995; Gruys & Sackett, 2003). The findings of this research confirm the hypothesis that individual behaviour in regard to resource sharing varies depending on the audience with whom resources are to be shared, with individuals acting more selfishly when sharing with groups. Investing this finding further can be of interest in the understanding of CWBs.

There are concerns around the power of this preliminary study regarding exploratory factor analysis. Guidance varies regarding the sample size required to conduct robust EFA, Kline suggests that 100 subjects is sufficient (1994), Tabachink and Fiddell’s recommend 300 as being a more appropriate target (2011). There is some preliminary support of small samples being sufficient in EFA where the factor structure is clear, and few factors are extracted (de Winter, Dodou & Wieringa, 2009). However, it would be beneficial for further research to increase the sample size to address this issue and allow the results of EFA to be more heavily relied upon to prove the existence of the hypothesised latent variable, Antisocial Workplace Behaviour.

There was a disparity of items loaded onto each measured variable (Selfishness, Achievement, Cynicism & Empathy). The behavioural Selfishness score was determined by examining gameplay responses across 10 rounds of games, whereas the Achievement score was determined purely by the savings goal set by participants, and Cynicism by two rounds of the Trust Game. The scores on Achievement and Cynicism are particularly sensitive to fewer data points and easily skewed. Further research could address this by expanding on the current battery of games to include further iterations of the rounds which measured Cynicism, and to further test individuals’ Achievement orientation to better balance the items measuring each variable and therefore strengthen the measurements of those items. The score on Empathy was also generated from only two data points, however the specific limitations of this method and recommendations for future research have been previously discussed. Where a new measure of Empathy is required to include in future EFA to examine its contribution to the latent variable identified in this research it is recommended that it too is generated using a similar number of data points.

Given the iterative design of the economic gameplay, the request for participants to submit their saving goal, and the presentation throughout gameplay of the ‘total saved’, it is possible that participant behaviour may change in relation to the closeness of achieving their goal. For instance, should a participant be close to reaching their goal, they may start to act in more selfish ways as a means to achieve their goal. This achievement orientation may therefore take priority over other considerations the battery of games is looking to assess. Future research should consider this impact and use an alternative measure of achievement which is less likely to have a compounding effect on gameplay behaviour.

Recommendations for future research have been included throughout this discussion. Investigating a new way to measure Empathy should be a priority so that it can be evaluated whether it contributes to AWB in a meaningful way, alongside Selfishness, Achievement, and Cynicism. Further development of the economic game battery will strengthen the preliminary measures used in this research, and in turn allow for increased reliability and validity of this as a measure of the intended behaviours. Consideration should be made for additional contributing factors for AWB, as the existing behaviours included in this research are by no means exhaustive, but instead a preliminary model which will benefit from further consideration and research. Finally, future research should continue to endeavour to find a predictive measure for AWB, whether that is a short-form version of FFMI focussed on the Antagonism factor, or a separate measure that better aligns with the further developed conceptualisation of the variable which has not been considered in this research.

In conclusion, this research has provided preliminary support for the existence of the variable, Antisocial Workplace Behaviour, as understood thus far as a summation of selfishness, achievement, and cynicism. There is also preliminary support that the Antagonism items of the FFMI produce a score which has some predictive validity for AWB and should be explored further as the understanding and conceptualisation of AWB is developed.

**References**

Ahmed, S. M. S., & Stewart, R. A. C. (1981). Factor analysis of the Machiavellian scale. *Social Behavior and Personality: An International Journal*, 9, 113–115, https://doi.org/10.2224/sbp.1981.9.1.113

Allport, G. W. (1937). Personality: *A Psychological Interpretation*. Holt.

Alsheikh Ali, A. S. (2020). Delinquency as predicted by dark triad factors and demographic variables. *International Journal of Adolescence and Youth*, 25(1), 661–675.<https://doi.org/10.1080/02673843.2020.1711784>

Azizli, N., Atkinson, B. E., Baughman, H. M., Chin, K., Vernon, P. A., Harris, E., & Veselka, L. (2016). Lies and crimes: Dark Triad, misconduct, and high-stakes deception. *Personality and Individual Differences*, 89, 34–39, https://doi.org/10.1016/j.paid.2015.09.034

Bagby, R. M., Costa, P. T., Jr., Widiger, T. A., Ryder, A. G., & Marshall, M. (2005). DSM–IV personality disorders and the five-factor model of personality: A multi-method examination of domain-and facet-level predictions. *European Journal of Personality*, 19, 307–324, https://doi.org/10.1002/per.563

Barlett, C. P. (2016). Exploring the correlations between emerging adulthood, Dark Triad traits, and aggressive behavior. *Personality and Individual Differences*, 101, 293–298.<https://doi.org/10.1016/j.paid.2016.05.061>

Baughman, H. M., Dearing, S., Giammarco, E., & Vernon, P. A. (2012). Relationships between bullying behaviors and the Dark Triad: A study with adults. *Personality and Individual Differences*, 52, 571–575, https://doi.org/10.1016/j.paid.2011.11.020

Baumard, N., André, J.-B., & Sperber, D. (2013). A mutualistic approach to morality: The evolution of fairness by partner choice. *Behavioral and Brain Sciences*, 36(1), 59–78.<https://doi.org/10.1017/S0140525X11002202>

Beller, J., & Bosse, S. (2017). Machiavellianism has a dimensional latent structure: Results from taxometric analyses. *Personality and Individual Differences*, 113, 57–62.<https://doi.org/10.1016/j.paid.2017.03.014>

Berg, J., Dickhaut, J., & McCabe, K. (1995). Trust, reciprocity, and social history. *Games and Economic Behavior*, 1, 122–142, <https://doi.org/10.1006/game.1995.1027>

Berry, C. M., Ones, D. S., & Sackett, P. R. (2007). Interpersonal deviance, organizational deviance, and their common correlates: A review and meta-analysis. *Journal of Applied Psychology*, 92(2), 410-424, [https://doi.org/10.1037/0021-9010.92.2.410](https://psycnet.apa.org/doi/10.1037/0021-9010.92.2.410)

Bianchi, R., & Mirkovic, D. (2020). Is Machiavellianism associated with depression? A cluster-analytic study. *Personality and Individual Differences*, 152,<https://doi.org/10.1016/j.paid.2019.109594>

Brugués, G., & Caparrós, B. (2022). Dysfunctional personality, Dark Triad, and moral disengagement in incarcerated offenders: Implications for recidivism and violence. *Psychiatry, Psychology and Law*, 29(3), 431-455.<https://doi.org/10.1080/13218719.2021.1917011>

Campbell, J. P. (1990). Modeling the performance prediction problem in industrial and organizational psychology. In M. D. Dunnette and L. M. Hough (Eds.), *Handbook of Industrial and Organizational Psychology* (Vol. 1, pp. 687–732). Palo Alto, CA: Consulting Psychologists Press.

Camerer, C. F. (2003). *Behavioral game theory: Experiments in strategic interaction*. Russell Sage Foundation.

Chen, Y.-J., & Tang, T. L.-P. (2006). Attitude toward and propensity to engage in unethical behavior: Measurement invariance across major among university students. *Journal of Business Ethics*, 69(1), 77–93, https://doi.org/10.1007/s10551-006-9069-6

Christie, R., & Geis, F. L. (1970). *Studies in Machiavellianism*. Academic Press.

Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd ed.). Erlbaum.

Columbus, S., Molho, C., Righetti, F., & Balliet, D. (2021). Interdependence and cooperation in daily life. *Journal of Personality and Social Psychology*, 120, 626–650.<https://doi.org/10.1037/pspi0000253>

Columbus, S., Münich, J., & Gerpott, F. H. (2020). Playing a different game: Situation perception mediates framing effects on cooperative behavior. *Journal of Experimental Social Psychology*, 90, 104006.<https://doi.org/10.1016/j.jesp.2020.104006>

Columbus, S., Thielmann, I., & Balliet, D. (2019). Situational affordances for prosocial behavior: On the interaction between honesty-humility and (perceived) interdependence. *European Journal of Personality*, 33, 655–673.<https://doi.org/10.1002/per.2224>

Costello, A. & Osborne, J. (2005). *Exploratory Factor Analysis: Four recommendations for getting the most from your analysis.* Practical Assessment, Research, and Evaluation, 10(7), 1-9. <https://doi.org/10.7275/jyj1-4868>

Crysel, L. C., Crosier, B. S., & Webster, G. D. (2013). The Dark Triad and risk behavior. *Personality and Individual Differences,* 54(1), 35–40. https://doi.org/10.1016/j.paid.2012.07.029

Dalal, R. S. (2005). A meta-analysis of the relationship between organizational citizenship behavior and counterproductive work behavior. *Journal of Applied Psychology*, 90(6), 1241–1255. https://doi.org/10.1037/0021-9010.90.6.1241

De Fruyt, F., De Clercq, B. J., Van de Wiele, L., & Van Heeringen, K. (2006). The validity of Cloninger’s psychobiological model versus the five-factor model to predict DSM–IV personality disorders in a heterogeneous psychiatric sample: Domain, facet, and residualized facet descriptions. *Journal of Personality*, 74, 1–32. <https://doi.org/10.1111/j.1467-6494.2006.00382.x>

de Winter, J. C., Dodou, D., & Wieringa, P. A. (2009). Exploratory Factor Analysis With Small Sample Sizes. *Multivariate behavioral research*, *44*(2), 147–181. https://doi.org/10.1080/00273170902794206

Downey, R., & King, C. (1998). Missing data in Likert ratings: A comparison of replacement methods. *The Journal of General Psychology*, 125, 175–191.<https://doi.org/10.1080/00221309809595542>

Edmundson, M., Lynam, D. R., Miller, J. D., Gore, W. L., & Widiger, T. A. (2011). A five-factor measure of schizotypal personality traits. *Assessment*, 18, 321–334, https://doi.org/ 10.1177/1073191111408228

Engel, C. (2011). Dictator games: A meta study. *Experimental Economics*, 14(4), 583–610.<https://doi.org/10.1007/s10683-011-9283-7>

Fehr, B., Samsom, D., & Paulhus, D. L. (1992). The construct of Machiavellianism: Twenty years later. In C. D. Spielberger & J. N. Butcher (Eds.), *Advances in Personality Assessment* (Vol. 9, pp. 77–116). UK: Routledge.

Ferris, G. R., Treadway, D. C., Kolodinsky, R. W., Hochwarter, W. A., Kacmar, C. J., Douglas, C., & Frink, D. D. (2005). Development and validation of the political skill inventory. *Journal of Management*, 31, 126-152. <https://doi.org/10.1177/0149206304271386>

Flexon, J. L., Meldrum, R. C., Young, J. T. N., & Lehmann, P. S. (2016). Low self-control and the Dark Triad: Disentangling the predictive power of personality traits on young adult substance use, offending, and victimization. *Journal of Criminal Justice*, 46, 159–169.<https://doi.org/10.1016/j.jcrimjus.2016.05.006>

Furr, M. (2011). *Scale construction and psychometrics for social and personality psychology*. London, UK: Sage.

Geis, F., & Moon, T. (1981). Machiavellianism and deception. *Journal of Personality and Social Psychology*, 41, 766-775, https://doi.org/10.1037/0022-3514.41.4.766

Glover, N., Miller, J. D., Lynam, D. R., Crego, C., & Widiger, T. A. (2012). The Five-Factor Narcissism Inventory: A five-factor measure of narcissistic personality traits. *Journal of Personality Assessment*, 94, 500–512, https://doi.org/10.1080/00223891.2012.670680

Gore, W. L., Presnall, J. R., Miller, J. D., Lynam, D. R., & Widiger, T. A. (2012). A five-factor measure of dependent personality traits. *Journal of Personality Assessment*, 94, 488–499, https://doi.org/10.1080/00223891.2012.670681

Gouldner, A. W. (1960). The norm of reciprocity: A preliminary statement. *American Sociological Review*, 25, 161–178, https://doi.org/10.2307/2092623

Granitz, N. A. (2003). Individual, social, and organizational sources of sharing and variation in the ethical reasoning of managers. *Journal of Business Ethics*, 42(2), 101–124, https://doi.org/10.1023/A:1021973305783

Gruys, M. L., & Sackett, P. R. (2003). Investigating the dimensionality of counterproductive work behavior. *International Journal of Selection and Assessment*, 11, 30–41, <https://doi.org/10.1111/1468-2389.00224>

Haesevoets, T., Reinders Folmer, C., Bostyn, D. H., & Van Hiel, A. (2018). Behavioural consistency within the prisoner's dilemma game: the role of personality and situation. *European Journal of Personality*, *32*(4), 405-426, https://doi.org/10.1002/per.2158

Hardyns, W., Ponnet, K., Hauspie, T., & Pauwels, L. J. R. (2022). How well do the dark triad characteristics explain individual differences in offending in a representative non-clinical adult sample? *Current Research in Behavioral Sciences*, 3, 100084, <https://doi.org/10.1016/j.crbeha.2022.100084>

Halevy N, Chou EY, Murnighan JK: Mind games: the mental representation of conflict. J Pers Soc Psychol 2012, 102: 132–148, https://doi.org/10.1037/a0025389

Hunt, S. D., & Chonko, L. B. (1984). Marketing and Machiavellianism. *The Journal of Marketing*, 48(3), 30-42, https://doi.org/10.1177/002224298404800304

Hunter, J. E., Gerbing, D. W., & Boster, F. J. (1982). Machiavellian beliefs and personality: Construct invalidity of the Machiavellianism dimension. *Journal of Personality and Social Psychology*, 43, 1293-1305, https://doi.org/10.1037/0022-3514.43.6.1293

Ickes, W., Reidhead, S., & Patterson, M. (1986). Machiavellianism and self-monitoring: As different as "me" and "you." *Social Cognition*, 4, 58-74, https://doi.org/10.1521/soco.1986.4.1.58

Johnson, N. D., & Mislin, A. A. (2011). Trust games: A meta-analysis. *Journal of Economic Psychology*, 32(5), 865–889.<https://doi.org/10.1016/j.joep.2011.05.007>

Jones, D. N., & Figueredo, A. J. (2013). The core of darkness: Uncovering the heart of the Dark Triad. *European Journal of Personality*, 27(6), 521–531.<https://doi.org/10.1002/per.1893>

Jones, D. N., & Paulhus, D. L. (2011). The role of impulsivity in the Dark Triad of personality. *Personality and Individual Differences*, 51(5), 679–682.<https://doi.org/10.1016/j.paid.2011.04.011>

Jones, D. N., & Paulhus, D. L. (2014). Introducing the short Dark Triad (SD3): A brief measure of dark personality traits. *Assessment*, 21(1), 28–41.<https://doi.org/10.1177/1073191113514105>

Jöreskog, K. G. (1969). A general approach to confirmatory maximum likelihood factor analysis. *Psychometrika*, 34(2), 183-202.

Kahneman, D., Knetsch, J., & Thaler, R. H. (1986). Fairness and the assumptions of economics. *Journal of Business*, 59, 285–300.

Kish-Gephart, J., Harrison, D. A., & Treviño, L. K. (2010). Bad apples, bad cases, and bad barrels: Meta-analytic evidence about sources of unethical decisions at work. *Journal of Applied Psychology*, 95, 1-31. https://doi.org/10.1037/a0017103

Kraut, R. E., & Price, J. D. (1976). Machiavellianism in parents and their children. *Journal of Personality and Social Psychology*, 33, 782–786. [https://doi.org/10.1037//0022-3514.33.6.782](https://doi.org/10.1037/0022-3514.33.6.782)

Kückelhaus, B. P., Blickle, G., Kranefeld, I., Körnig, T., & Genau, H. A. (2021). Five Factor Machiavellianism: Validation of a New Measure. *Journal of Personality Assessment*, 103(4), 509-522.<https://doi.org/10.1080/00223891.2020.1784182>

Lainidi, O., Chalili, V., Maliousis, I., Spiliou, M., Tzioti, E., Koutsimani, P., & Montgomery, A. (2023). Perspective Chapter: The Dark Triad in the Organization: A review of the evidence and future recommendations. *IntechOpen*. https://doi.org/ 10.5772/intechopen.1001365

Lynam, D. R., Gaughan, E. T., Miller, J. D., Miller, D. J., Mullins-Sweatt, S., & Widiger, T. A. (2011). Assessing the basic traits associated with psychopathy: Development and validation of the Elemental Psychopathy Assessment. *Psychological Assessment*, 23, 108–124, https://doi.org/10.1037/a0021146

Lynam, D. R., Loehr, A., Miller, J. D., & Widiger, T. A. (2012). A five-factor measure of avoidant personality: The FFAvA. *Journal of Personality Assessment*, 94, 466–474, https://doi.org/10.1080/00223891.2012.677886

Miller, J. D., Gentile, B., & Campbell, W. K. (2013). A test of the construct validity of the Five-Factor Narcissism Inventory. *Journal of Personality Assessment*, 95(4), 377-387. <http://dx.doi.org/10.1080/00223891.2012.742903>

Miller, J. D., Lynam, D. R., & Campbell, W. K. (2016). Measures of narcissism and their relations to DSM-5 pathological traits: A critical re-appraisal. *Assessment*, 23(1), 3–9, https://doi.org/10.1177/1073191114522909

Miller, J. D., Lynam, D. R., Siedor, L., & Campbell, W. K. (2017). Consensual lay profiles of narcissism and their connection to the Five-Factor Narcissism Inventory. *Psychological Assessment*, In press.<https://doi.org/10.1037/pas0000460>

Miller, J. D., Lynam, D., Widiger, T. A., & Leukefeld, C. (2001). Personality disorders as an extreme variant of common personality dimensions: Can the five-factor model represent psychopathy. *Journal of Personality*, 69, 253–276, https://doi.org/10.1037/0021-843X.110.3.401

Miller, B. K., Nicols, K., & Konopaske, R. (2019). Measurement invariance tests of revisions to archaically worded items in the Mach IV scale. *PLoS ONE*, 14(10), e0223504.<https://doi.org/10.1371/journal.pone.0223504>

Monaghan, C., Bizumic, B., & Sellbom, M. (2018). Nomological network of two-dimensional Machiavellianism. *Personality and Individual Differences*, 130, 161–173.<https://doi.org/10.1016/j.paid.2018.03.047>

Mullins-Sweatt, S. N., Edmundson, M., Sauer, S. E., Lynam, D. R., Miller, J. D., & Widiger, T. A. (2012). Five factor measure of borderline personality traits. *Journal of Personality Assessment*, 94, 475–487, https://doi.org/10.1080/00223891.2012.672504

Murnighan, J. K., & Wang, L. (2016). The social world as an experimental game. *Organizational Behavior and Human Decision Processes*, 136, 80–94.<https://doi.org/10.1016/j.obhdp.2016.02.003>

Navarro, D. J., & Foxcroft, D. R. (2022). *Learning statistics with jamovi: A tutorial for psychology students and other beginners* (Version 0.75).<https://doi.org/10.24384/hgc3-7p15>

O'Boyle, E. H., Jr., Forsyth, D. R., Banks, G. C., & McDaniel, M. A. (2012). A meta-analysis of the Dark Triad and work behavior: A social exchange perspective. *Journal of Applied Psychology*, 97, 557-579. <https://doi.org/10.1037/a0025679>

Oh, I. S., Wang, G., & Mount, M. K. (2011). Validity of observer ratings of the five-factor model of personality traits: A meta-analysis. *Journal of Applied Psychology*, 96(4), 762-773, https://doi.org/10.1037/a0021832

Oksenberg, L. (1971). Machiavellianism in traditional and Western Chinese students. In W. W. Lambert & R. Weisbrod (Eds.), *Comparative perspectives on social psychology* (pp. 92-99). Boston: Little, Brown.

Oosterbeek, H., Sloof, R., & van de Kuilen, G. (2004). Cultural differences in ultimatum game experiments: Evidence from a meta-analysis. *Experimental Economics*, 7(2), 171–188.<https://doi.org/10.1023/B:EXEC.0000026978.14316.74>

Pailing, A., Boon, J., & Egan, V. (2014). Personality, the Dark Triad, and violence. *Personality and Individual Differences*, 67, 81–86, https://doi.org/10.1016/j.paid.2013.11.018

Patterson, G. R., DeBaryshe, B. D., & Ramsey, E. (2017). A developmental perspective on antisocial behavior. *American Psychologist*, 44, 329–335.

Paulhus, D. L., & Williams, K. M. (2002). The Dark Triad of personality: Narcissism, Machiavellianism, and psychopathy. *Journal of Research in Personality*, 36(6), 556–563. <https://doi.org/10.1016/S0092-6566(02)00505-6>

Pechorro, P., Curtis, S., DeLisi, M., Maroco, J., & Nunes, C. (2022). Dark Triad Psychopathy Outperforms Self-Control in Predicting Antisocial Outcomes: A Structural Equation Modeling Approach. *European Journal of Investigative Health Psychology and Education*, 12(6), 549-562. <https://doi.org/10.3390/ejihpe12060041>

Sackett, P. R., Berry, C. M., Wiemann, S. A., & Laczo, R. M. (2006). Citizenship and counterproductive behavior: Clarifying relations between the two domains. *Human Performance*, 19(4), 441-464. <https://doi.org/10.1207/s15327043hup19047>

Shafer, W. E., & Simmons, R. S. (2008). Social responsibility, Machiavellianism, and tax avoidance. *Accounting, Auditing & Accountability*, 21, 695–720.<https://doi.org/10.1108/09513570810872978>

Rauthmann, J. F. (2013). Investigating the MACH-IV with item response theory and proposing the trimmed MACH\*. *Journal of Personality Assessment*, 95, 388–397.<https://doi.org/10.1080/00223891.2012.742905>

Rauthmann, J. F., & Will, T. (2011). Proposing a multidimensional Machiavellianism conceptualization. *Social Behavior and Personality: An International Journal*, 39, 391–403.<https://doi.org/10.2224/sbp.2011.39.3.391>

Raymond, M. R., & Roberts, D. M. (1987). A comparison of methods for treating incomplete data in selection research. *Educational and Psychological Measurement, 47*, 13-26, https://doi.org/10.1177/0013164487471002

Robinson, S. L., & Bennett, R. J. (1995). A typology of deviant workplace behaviours: A multidimensional scaling study. *Academy of Management Journal, 38*, 555–572, https://doi.org/10.5465/256693

Rousseau, D. M. (1989). Psychological and implied contracts in organizations. *Employee Responsibilities and Rights Journal, 2*, 121–139.

Rubinstein, A. (1982). Perfect equilibrium in a bargaining model. *Econometrica, 50*, 97–109, https://doi.org/10.2307/1912531

Samuel, D. B., Riddell, A. D. B., Lynam, D. R., Miller, J. D., & Widiger, T. A. (2012). A five-factor measure of obsessive–compulsive personality traits. *Journal of Personality Assessment, 94*, 456–465, https://doi.org/10.1080/00223891.2012.677885

Schaumberg, R.L. & Flynn, F.J. (2017). Clarifying the link between job satisfaction and absenteeism: The role of guilt proneness. *Journal of Applied Psychology, 102*(6), 982-992, https://doi.org/10.1037/apl0000208

Serenko, A., & Choo, C.W. (2020). Knowledge sabotage as an extreme form of counterproductive knowledge behavior: The role of narcissism, Machiavellianism, psychopathy, and competitiveness. *Journal of Knowledge Management, 24*(9), 2299–2325.<https://doi.org/10.1108/JKM-06-2020-0416>

Shoemaker, D. J. (2018). *Theories of delinquency: An examination of explanations of delinquent behavior* (6th ed.). Oxford: Oxford University Press.

Spector, P. E. (1992). *Summated rating scale construction: An introduction*. Newbury Park, CA: Sage.

Starr, P. (1975). Machiavellianism among traditional and Westernized Arab students. *Journal of Social Psychology, 96*, 179-185, https://doi.org/10.1080/00224545.1975.9923283

Szijjarto, L., & Bereczkei, T. (2015). The machiavellians’ “cool syndrome”: They experience intensive feelings but have difficulties in expressing their emotions. *Curr. Psychol. 34*(2), 363–375.<https://doi.org/10.1007/s12144-014-9262-1>

Vize, C.E., Lynam, D.R., Collison, K.L., & Miller, J.D. (2018). Differences among dark triad components: A meta-analytic investigation. *Pers. Disord. Theory Res. Treat. 9*(2), 101–111.<https://doi.org/10.1037/per0000222>

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2013). *Using multivariate statistics* (Vol. 6, pp. 497-516). Boston, MA: Pearson.

Thibaut, J. W., & Kelley, H. H. (1959). *The social psychology of groups*. Transaction Publishers.

Thielmann, I., & Böhm, R. (2016). Who does (not) participate in intergroup conflict? *Social Psychological and Personality Science, 7*(8), 778–787.<https://doi.org/10.1177/1948550616660160>

Thielmann, I., & Hilbig, B. E. (2018). Is it all about the money? A re-analysis of the link between Honesty-Humility and Dictator Game giving. *Journal of Research in Personality*, *76*, 1-5, https://doi.org/10.1016/j.jrp.2018.07.002

Thielmann, I., Spadaro, G., & Balliet, D. (2020). Personality and prosocial behavior: A theoretical framework and meta-analysis. *Psychol Bull, 146*, 30–90.<https://doi.org/10.1037/bul0000217>

Thielmann, I., Böhm, R., Ott, M., & Hilbig, B. E. (2021). Economic games: An introduction and guide for research. *Collabra: Psychology*, 7(1), 19004, https://doi.org/10.1525/collabra.19004

Tomiatti, M., Gore, W. L., Lynam, D. R., Miller, J. D., & Widiger, T. A. (2011). A five-factor measure of histrionic personality traits. In A. M. Columbus (Ed.), *Advances in psychology research* (Vol. 87, pp. 113–138). Hauppauge, NY: Nova Science.

Trull, T. J., Widiger, T. A., Lynam, D. R., & Costa, P. T., Jr. (2003). Borderline personality disorder from the perspective of general personality functioning. *Journal of Abnormal Psychology, 112*, 193–202, https://doi.org/10.1176/foc.3.3.453

Von Neumann, J., & Morgenstern, O. (1944). *Theory of games and economic behavior*. Princeton University Press.

Zhao, K., & Smillie, L. D. (2015). The role of interpersonal traits in social decision making: Exploring sources of behavioral heterogeneity in economic games. *Personality and Social Psychology Review, 19*(3), 277–302.<https://doi.org/10.1177/1088868314553709>

**Appendix 1: Five Factor Machiavellian Inventory**

**Five Factor Machiavellianism Inventory (FFMI;** Collison, Vize. Miller, & Lynam, in press**):**  The following statements deal with how you think, feel, and act. Please read each item carefully and circle the number that best corresponds to your agreement or disagreement. If you **disagree strongly circle** **1**, if you **disagree a little** **circle** **2**, if you **neither agree nor disagree** **circle 3**, if you **agree a little** **circle 4**, and if you **strongly agree circle** **5**.  There are no right or wrong answers, and you need not be an expert to complete this questionnaire.

**Disagree Disagree Neither agree Agree   Agree**

**strongly a little nor disagree a little strongly**

**1     2 3       4       5**

|  |  |
| --- | --- |
| 1.     I am not an ambitious person. | 1             2              3              4             5 |
| 2.     My friends would call me lazy. | 1             2              3              4             5 |
| 3.     I will go out of my way to help other people. | 1             2              3              4             5 |
| 4.     In meetings, I typically let others do the talking. | 1             2              3              4             5 |
| 5.     I don't seem to be completely successful at anything. | 1             2              3              4             5 |
| 6.     I like to carefully consider the consequences before I make a decision. | 1             2              3              4             5 |
| 7.     People would describe me as emotionally stable. | 1             2              3              4             5 |
| 8.     Humility is overrated. | 1             2              3              4             5 |
| 9.     I like to map out my projects before I begin. | 1             2              3              4             5 |
| 10.  I am confident interacting with others. | 1             2              3              4             5 |
| 11.  Sometimes you have to lie to get things done. | 1             2              3              4             5 |
| 12.  I would rather be known as "practical" than "kind." | 1             2              3              4             5 |
| 13.  It is important to be wary of others' motives. | 1             2              3              4             5 |
| 14.  I have a strong drive for power. | 1             2              3              4             5 |
| 15.  I work hard to pursue my goals. | 1             2              3              4             5 |
| 16.  I try to help those who are less fortunate. | 1             2              3              4             5 |
| 17.  I am a very persuasive person. | 1             2              3              4             5 |
| 18.  People look to me to “get the job done.” | 1             2              3              4             5 |
| 19.  "Act first, think later," describes me well. | 1             2              3              4             5 |
| 20.  When I'm under a great deal of stress, sometimes I feel like I'm going to pieces. | 1             2              3              4             5 |
| 21.  I am more intelligent than most people my age. | 1             2              3              4             5 |
| 22.  I like having everything in its own, proper place. | 1             2              3              4             5 |
| 23.  I feel inferior to others. | 1             2              3              4             5 |
| 24.  I'm not crafty or sly. | 1             2              3              4             5 |
| 25.  I'm not a particularly sympathetic person. | 1             2              3              4             5 |
| 26.  I think that most people try to be honest. | 1             2              3              4             5 |
| 27.  I aspire for greatness. | 1             2              3              4             5 |
| 28.  I have lots of energy most days. | 1             2              3              4             5 |
| 29.  I think it is important to be charitable to others. | 1             2              3              4             5 |
| 30.  I do not have a problem with speaking my mind. | 1             2              3              4             5 |
| 31.  I am efficient and effective at my work. | 1             2              3              4             5 |
| 32.  I tend to jump right into things without thinking very far ahead. | 1             2              3              4             5 |
| 33.  I get so emotional that I can't think straight. | 1             2              3              4             5 |
| 34.  It’s easy for me to outsmart my peers. | 1             2              3              4             5 |
| 35.  I never seem to be able to get organized. | 1             2              3              4             5 |
| 36.  I am very sure of myself. | 1             2              3              4             5 |
| 37.  I use flattery to get what I want. | 1             2              3              4             5 |
| 38.  I don’t worry about other people’s needs if they conflict with my own. | 1             2              3              4             5 |
| 39.  I have a great deal of faith in human nature. | 1             2              3              4             5 |
| 40.  I want to be an important person. | 1             2              3              4             5 |
| 41.  A lot of other people are more active than I am. | 1             2              3              4             5 |
| 42.  I view others as tools to be used and manipulated. | 1             2              3              4             5 |
| 43.  People would say that I have trouble standing up for myself. | 1             2              3              4             5 |
| 44.  I am often unsure of how to proceed in my life. | 1             2              3              4             5 |
| 45.  I don’t make many spur of the moment decisions. | 1             2              3              4             5 |
| 46.  I am not easily flustered. | 1             2              3              4             5 |
| 47.  I am better than others. | 1             2              3              4             5 |
| 48.  I prefer to be spontaneous rather than planning everything out. | 1             2              3              4             5 |
| 49.  I am not easily embarrassed. | 1             2              3              4             5 |
| 50.  Being honest all of the time won’t lead to success. | 1             2              3              4             5 |
| 51.  Other people describe me as cold-hearted. | 1             2              3              4             5 |
| 52.  I tend to assume the best about people. | 1             2              3              4             5 |

Collison, K.L., Vize. C.E., Miller, J.D. & Lynam, D.R. (in press). Development and preliminary validation of a Five Factor Model measure of Machiavellianism. *Psychological Assessment*.

**Scoring Key:**

An “r” next to an item indicates that it should reverse-scored (i.e., 5 = 1, 2 =4, 3 = 3, 4 = 2, and 5 = 1) before being summed or averaged with the rest of the items.

Subscales

Achievement: 1r, 14, 27, 40

Activity: 2r, 15, 28, 41r

Selfishness (low Altruism):  3r, 16r, 29r, 42

Assertiveness: 4r, 17, 30, 43r

Competence: 5r, 18, 31, 44r

Deliberation: 6, 19r, 32r, 45

Invulnerable: 7, 20r, 33r, 46

Immodesty: 8, 21, 34, 47

Order: 9, 22, 35r, 48r

Self-confidence: 10, 23r, 36, 49

Manipulative: 11, 24r, 37, 50

Callousness: 12, 25, 38, 51

Cynical: 13, 26r, 39r, 52r

The Total Score is computed by averaging or summing the 13 scales above.

Three factor scores can also be computed:

Antagonism: Selfishness (low Altruism), Immodesty, Manipulative, Callousness, Cynical

Agency: Achievement, Activity, Assertiveness, Competence, Self-confidence, Invulnerable

Planfulness: Deliberation, Order

**Appendix 2: Qualtrics Survey Build**

**Figure 1: Survey Flow**

A screenshot of a computer

Description automatically generatedA screenshot of a chat

Description automatically generated

A screenshot of a computer

Description automatically generatedA screenshot of a computer

Description automatically generatedA white rectangular object with a black background

Description automatically generated with medium confidence

*Note:* For Trust Game round 4, responses had to be split across three blocks depending upon threshold of offer due to calculations required to display total saved. See *Example 3* below for further detail.

Figure 2: Block Structure Example 1, Ultimatum 2 (total 5 questions)

***Figure 2 Block Structure Example 1: Ultimatum Game Round 2***

A screenshot of a computer

Description automatically generated

**Question**

*Figure 3* shows an example of the information and question provided to participant, in this case for the second round of the Ultimatum Game.

*Figure 3: Ultimatum Game, Round 2, Information & Question for participant*

A screenshot of a computer

Description automatically generated

**Responses**

For the question displayed in *Figure 3,* 4 responses were programmed. The response provided to participants was dictated by the following:

1. Ultimatum game round 2 offer accepted or rejected.
2. Ultimatum game round 1 offer accepted or rejected.

*Figure 4: Programmed response 1 to Ultimatum Game Round 2 (question seen in Figure 2).*

A screenshot of a computer

Description automatically generated

Above response provided where both offers in rounds 1 and 2 were rejected.

*Figure 5: Programmed response 2 to Ultimatum Game Round 2 (question seen in Figure 2).*

A close-up of a computer screen

Description automatically generated

Above response provided where offer in round 2 was accepted but the offer in round 1 was rejected.

*Figure 6: Programmed response 3 to Ultimatum Game Round 2 (question seen in Figure 2).*

A screenshot of a computer

Description automatically generated

Above response provided where both offers in rounds 1 and 2 were accepted.

*Figure 7: Programmed response 2 to Ultimatum Game Round 2 (question seen in Figure 2).*

A close-up of a text

Description automatically generated

Above response provided where offer in round 1 was accepted but the offer in round 2 was rejected.

*Figure 8: Block Structure Example 2, Trust 3 (total 50 questions)*

A screenshot of a computer

Description automatically generated

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**Question**

*Figure 9* shows an example of the information and question provided to participant, in this case for the third round of the Trust Game.

*Figure 9: Trust Game Round 3, Information & Question for participant acting as Player 2 (responder)*

A screenshot of a computer

Description automatically generated

**Responses**

For the question displayed in *Figure 9,* 47 responses were programmed. The response provided to participants was dictated by the following:

1. Ultimatum game round 1 offer accepted or rejected.
2. Ultimatum game round 2 offer accepted or rejected.
3. Ultimatum game round 3 offer accepted or rejected.
4. Ultimatum game round 4 offer accepted or rejected.
5. Dictator game round 1 is complete (any response submitted).
6. Dictator game round 2 complete (any response submitted).
7. Dictator game round 3 complete (any response submitted).
8. Dictator game round 4 complete (any response submitted).
9. Trust game round 1 offer high, medium or low.
10. Trust game round 2 complete (any response submitted).

*Figure 10: Programmed response example 1 for Trust Game Round 3 (question seen in Figure 9).*

A screenshot of a computer

Description automatically generated

Above response provided where the following is true:

1. Ultimatum game round 1 offer accepted.
2. Ultimatum game round 2 offer accepted.
3. Ultimatum game round 3 offer rejected.
4. Ultimatum game round 4 offer rejected.
5. Dictator game round 1 complete (any response submitted).
6. Dictator game round 2 complete (any response submitted).
7. Dictator game round 3 complete (any response submitted).
8. Dictator game round 4 complete (any response submitted).
9. Trust game round 1 offer medium.
10. Trust game round 2 complete (any response submitted).

*Figure 11: Programmed response example 2 for Trust Game Round 3 (question seen in Figure 9).*

A close-up of a text

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Above response provided where the following is true:

1. Ultimatum game round 1 offer rejected.
2. Ultimatum game round 2 offer accepted.
3. Ultimatum game round 3 offer accepted.
4. Ultimatum game round 4 offer accepted.
5. Dictator game round 1 complete (any response submitted).
6. Dictator game round 2 complete (any response submitted).
7. Dictator game round 3 complete (any response submitted).
8. Dictator game round 4 complete (any response submitted).
9. Trust game round 1 offer low.
10. Trust game round 2 complete (any response submitted).

*Figure 12: Block Structure Example 3, Trust 4 LOW (1 of 3 blocks for Trust 4, 48 questions)*

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The above structure is repeated on two additional blocks, Trust 4 MEDIUM, Trust 4 HIGH due to constraints for number of responses on the Qualtrics system. Participants would receive only one response across these three blocks depending upon the offer they made in Trust Game and whether it was deemed Low (<£50), Medium (£50-£99), High (£100+).

**Question**

*Figure 13* shows an example of the information and question provided to participant, in this case for the third round of the Trust Game.

*Figure 13: Trust Game Round 4, Information & Question for participant acting as Player 1 (proposer)*

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**Responses**

For the question displayed in *Figure 13,* 144 responses were programmed split across three question blocks depending upon level of offer on Round 4 (low/medium/high). The response provided to participants was dictated by the following:

1. Ultimatum game round 1 offer accepted or rejected.
2. Ultimatum game round 2 offer accepted or rejected.
3. Ultimatum game round 3 offer accepted or rejected.
4. Ultimatum game round 4 offer accepted or rejected.
5. Dictator game round 1 is complete (any response submitted).
6. Dictator game round 2 complete (any response submitted).
7. Dictator game round 3 complete (any response submitted).
8. Dictator game round 4 complete (any response submitted).
9. Trust game round 1 offer high, medium or low.
10. Trust game round 2 complete (any response submitted).
11. Trust game round 3 complete (any response submitted).
12. Trust game round 4 offer high, medium or low.

*Figure 14: Programmed response example 1 for Trust Game Round 4 (question seen in Figure 13).*

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Above response provided where the following is true:

1. Ultimatum game round 1 offer accepted.
2. Ultimatum game round 2 offer accepted.
3. Ultimatum game round 3 offer rejected.
4. Ultimatum game round 4 offer accepted.
5. Dictator game round 1 complete (any response submitted).
6. Dictator game round 2 complete (any response submitted).
7. Dictator game round 3 complete (any response submitted).
8. Dictator game round 4 complete (any response submitted).
9. Trust game round 1 offer high.
10. Trust game round 2 complete (any response submitted).
11. Trust game round 2 complete (any response submitted).
12. Trust game round 4 offer low.

*Figure 15: Programmed response example 2 for Trust Game Round 4 (question seen in Figure 13).*

A screenshot of a computer

Description automatically generated

Above response provided where the following is true:

1. Ultimatum game round 1 offer accepted.
2. Ultimatum game round 2 offer rejected.
3. Ultimatum game round 3 offer rejected.
4. Ultimatum game round 4 offer rejected.
5. Dictator game round 1 complete (any response submitted).
6. Dictator game round 2 complete (any response submitted).
7. Dictator game round 3 complete (any response submitted).
8. Dictator game round 4 complete (any response submitted).
9. Trust game round 1 offer medium.
10. Trust game round 2 complete (any response submitted).
11. Trust game round 2 complete (any response submitted).
12. Trust game round 4 offer low.

**Appendix 3: Correlation matrix including AWB and sub-factor scores, FFMI total, factor and subscale scores, and total saved across economic gameplay**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **FFMI Subscales** | | | | | | | | | | | | **FFMI Factors** | | | **Behavioural Scores** | | | | |
|  |  | **AWB** | **FFMI TOTAL** | **Achievement** | **Activity** | **Selfishness** | **Assertiveness** | **Competence** | **Deliberation** | **Invulnerable** | **Immodesty** | **Order** | **Self-confidence** | **Manipulative** | **Callousness** | **Achievement** | **Agency** | **Planfulness** | **tEmpathy** | **tAchievement** | **tCynicism** | **tSelfishness** | **TOTAL SAVED** |
|  |
| **AWB** | Pearson's r | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| df | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| p-value | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **FFMI TOTAL** | Pearson's r | -0.177 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| df | 71 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.134 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Achievement** | Pearson's r | -0.254 | 0.33 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.03 | 0.004 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Activity** | Pearson's r | 0.087 | 0.461 | 0.008 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.463 | < .001 | 0.948 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Selfishness** | Pearson's r | -0.202 | 0.304 | 0.184 | -0.202 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.087 | 0.009 | 0.119 | 0.087 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Assertiveness** | Pearson's r | -0.034 | 0.585 | 0.187 | 0.296 | -0.104 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.777 | < .001 | 0.112 | 0.011 | 0.381 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Competence** | Pearson's r | 0.03 | 0.609 | 0.016 | 0.555 | -0.116 | 0.57 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.799 | < .001 | 0.89 | < .001 | 0.33 | < .001 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Deliberation** | Pearson's r | 0.188 | 0.196 | -0.147 | 0.201 | -0.191 | 0.034 | 0.136 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.112 | 0.097 | 0.216 | 0.088 | 0.106 | 0.776 | 0.25 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Invulnerable** | Pearson's r | 0.202 | 0.406 | -0.139 | 0.39 | -0.168 | 0.226 | 0.379 | 0.136 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.087 | < .001 | 0.241 | < .001 | 0.156 | 0.055 | < .001 | 0.251 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Immodesty** | Pearson's r | -0.195 | 0.598 | 0.355 | 0.102 | 0.242 | 0.2 | 0.275 | -0.114 | -0.014 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.099 | < .001 | 0.002 | 0.392 | 0.039 | 0.09 | 0.019 | 0.335 | 0.904 | — |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Order** | Pearson's r | -0.125 | 0.348 | -0.064 | 0.181 | -0.003 | 0.055 | 0.211 | 0.562 | -0.012 | 0.161 | — |  |  |  |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.291 | 0.003 | 0.588 | 0.126 | 0.982 | 0.645 | 0.073 | < .001 | 0.917 | 0.174 | — |  |  |  |  |  |  |  |  |  |  |  |  |
| **Self-confidence** | Pearson's r | -0.044 | 0.545 | 0.13 | 0.446 | -0.079 | 0.546 | 0.427 | -0.019 | 0.452 | 0.117 | -0.115 | — |  |  |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.71 | < .001 | 0.274 | < .001 | 0.508 | < .001 | < .001 | 0.871 | < .001 | 0.323 | 0.331 | — |  |  |  |  |  |  |  |  |  |  |  |
| **Manipulative** | Pearson's r | -0.325 | 0.389 | 0.219 | -0.164 | 0.484 | 0.062 | -0.061 | -0.39 | -0.08 | 0.419 | -0.168 | 0.096 | — |  |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |  |  |
| p-value | 0.005 | < .001 | 0.063 | 0.166 | < .001 | 0.601 | 0.606 | < .001 | 0.502 | < .001 | 0.155 | 0.418 | — |  |  |  |  |  |  |  |  |  |  |
| **Callousness** | Pearson's r | -0.162 | 0.468 | 0.181 | -0.126 | 0.585 | -0.047 | -0.025 | -0.094 | 0.026 | 0.427 | 0.064 | 0.037 | 0.418 | — |  |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |  |
| p-value | 0.171 | < .001 | 0.125 | 0.287 | < .001 | 0.692 | 0.836 | 0.427 | 0.825 | < .001 | 0.593 | 0.754 | < .001 | — |  |  |  |  |  |  |  |  |  |
| **Cynical** | Pearson's r | -0.275 | 0.259 | 0.19 | -0.263 | 0.46 | 0.048 | -0.186 | -0.203 | -0.292 | 0.258 | -0.01 | -0.175 | 0.44 | 0.348 | — |  |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |  |
| p-value | 0.018 | 0.027 | 0.107 | 0.025 | < .001 | 0.69 | 0.116 | 0.085 | 0.012 | 0.028 | 0.932 | 0.138 | < .001 | 0.003 | — |  |  |  |  |  |  |  |  |
| **Antagonism** | Pearson's r | -0.328 | 0.561 | 0.314 | -0.178 | 0.709 | 0.06 | -0.028 | -0.284 | -0.142 | 0.66 | 0.004 | 0.007 | 0.787 | 0.752 | 0.706 | — |  |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |  |
| p-value | 0.005 | < .001 | 0.007 | 0.131 | < .001 | 0.616 | 0.812 | 0.015 | 0.23 | < .001 | 0.976 | 0.951 | < .001 | < .001 | < .001 | — |  |  |  |  |  |  |  |
| **Agency** | Pearson's r | 0.021 | 0.75 | 0.24 | 0.687 | -0.141 | 0.731 | 0.77 | 0.1 | 0.648 | 0.243 | 0.065 | 0.779 | 0.006 | 0.005 | -0.194 | -0.013 | — |  |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |  |
| p-value | 0.859 | < .001 | 0.041 | < .001 | 0.236 | < .001 | < .001 | 0.402 | < .001 | 0.038 | 0.583 | < .001 | 0.963 | 0.966 | 0.101 | 0.911 | — |  |  |  |  |  |  |
| **Planfulness** | Pearson's r | 0.037 | 0.307 | -0.12 | 0.216 | -0.111 | 0.05 | 0.196 | 0.886 | 0.071 | 0.024 | 0.881 | -0.076 | -0.317 | -0.018 | -0.122 | -0.16 | 0.094 | — |  |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |  |
| p-value | 0.754 | 0.008 | 0.312 | 0.066 | 0.351 | 0.674 | 0.096 | < .001 | 0.551 | 0.837 | < .001 | 0.525 | 0.006 | 0.877 | 0.304 | 0.175 | 0.431 | — |  |  |  |  |  |
| **tEmpathy** | Pearson's r | -0.046 | -0.036 | 0.246 | -0.033 | -0.009 | 0.003 | -0.023 | -0.153 | -0.056 | -0.095 | -0.227 | 0.109 | 0.024 | -0.079 | 0.158 | 0.007 | 0.045 | -0.215 | — |  |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |  |
| p-value | 0.7 | 0.762 | 0.036 | 0.779 | 0.938 | 0.978 | 0.848 | 0.195 | 0.635 | 0.424 | 0.053 | 0.36 | 0.838 | 0.508 | 0.181 | 0.955 | 0.706 | 0.068 | — |  |  |  |  |
| **tAchievement** | Pearson's r | -0.496 | 0.199 | 0.113 | -0.004 | 0.096 | 0.214 | 0.096 | 0.082 | -0.127 | 0.114 | 0.076 | 0.024 | 0.137 | 0.168 | 0.149 | 0.188 | 0.07 | 0.089 | 0.008 | — |  |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |  |
| p-value | < .001 | 0.092 | 0.341 | 0.973 | 0.419 | 0.069 | 0.417 | 0.492 | 0.284 | 0.338 | 0.523 | 0.84 | 0.248 | 0.157 | 0.207 | 0.112 | 0.554 | 0.453 | 0.947 | — |  |  |  |
| **tCynicism** | Pearson's r | 0.584 | -0.057 | 0.065 | 0.09 | -0.04 | 0.027 | 0.065 | -0.116 | 0.077 | -0.046 | -0.217 | 0.005 | -0.052 | -0.114 | -0.049 | -0.085 | 0.083 | -0.188 | 0.313 | -0.218 | — |  |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |  |
| p-value | < .001 | 0.635 | 0.587 | 0.447 | 0.738 | 0.824 | 0.583 | 0.328 | 0.517 | 0.701 | 0.065 | 0.966 | 0.664 | 0.338 | 0.68 | 0.477 | 0.487 | 0.112 | 0.007 | 0.065 | — |  |  |
| **tSelfishness** | Pearson's r | 0.972 | -0.163 | -0.299 | 0.083 | -0.215 | -0.008 | 0.038 | 0.267 | 0.201 | -0.202 | -0.086 | -0.05 | -0.353 | -0.137 | -0.292 | -0.34 | 0.019 | 0.105 | -0.127 | -0.362 | 0.427 | — |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | — |  |
| p-value | < .001 | 0.168 | 0.01 | 0.487 | 0.067 | 0.947 | 0.746 | 0.022 | 0.088 | 0.087 | 0.472 | 0.675 | 0.002 | 0.247 | 0.012 | 0.003 | 0.874 | 0.377 | 0.285 | 0.002 | < .001 | — |  |
| **TOTAL SAVED** | Pearson's r | -0.745 | 0.101 | 0.309 | -0.122 | 0.151 | 0.01 | -0.036 | -0.187 | -0.153 | 0.091 | 0.031 | 0.091 | 0.262 | 0.056 | 0.179 | 0.209 | 0 | -0.09 | 0.235 | 0.248 | -0.132 | -0.818 |  |
| df | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 |  |
| p-value | < .001 | 0.396 | 0.008 | 0.303 | 0.204 | 0.932 | 0.761 | 0.114 | 0.195 | 0.445 | 0.797 | 0.445 | 0.025 | 0.639 | 0.129 | 0.076 | 0.997 | 0.45 | 0.046 | 0.035 | 0.267 | < .001 |  |