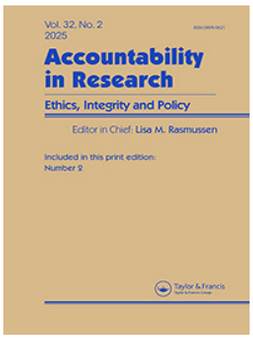

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Open minds, tied hands: Awareness, behavior, and reasoning on open science and irresponsible research behavior

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ABSTRACT

Background: Knowledge on Open Science Practices (OSP) has been promoted through responsible conduct of research training and the development of open science infrastructure to combat Irresponsible Research Behavior (IRB). Yet, there is limited evidence for the efficacy of OSP in minimizing IRB.

Methods: We asked N=778 participants to fill in questionnaires that contain OSP and ethical reasoning vignettes, and report self-admission rates of IRB and personality traits.

Results: We found that against our initial prediction, even though OSP was negatively correlated with IRB, this correlation was very weak, and upon controlling for individual differences factors, OSP neither predicted IRB nor was this relationship moderated by ethical reasoning. On the other hand, individual differences factors, namely dark personality triad, and conscientiousness and openness, contributed more to IRB than OSP knowledge.

Conclusions: Our findings suggest that OSP knowledge needs to be complemented by the development of ethical virtues to encounter IRBs more effectively.

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KEYWORDS
Open science practices; irresponsible research behavior; scientific misconduct; ethical reasoning

The candy jar in the pantry has a label that says "take one" but you saw your colleague take two candies. What do you do? In this example, the appropriate behavior is explicitly instructed by the label and can be easily observed. However, the reasoning behind this behavior is implicit; your colleague may be greedy (a less justifiable reason), or they may take the other one for a friend (a more justifiable reason), for example. This example illustrates how challenging inferring ethical reasoning is in ambiguous situations (Sternberg 2012). During research, researchers follow a series of observable steps that need to be reported in the methods section of their article. Even though these procedural steps are explicit, they vary extensively across labs and over time (Brandt et al. 2014; Klein et al. 2014). Critically, researchers

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may fail to report some of these steps due to negligence, or altogether alter these procedures for their own benefits (M. Bakker, van Dijk, and Wicherts 2012; Ioannidis 2012). The scientific community, who read the methods section, remains oblivious of this difference.

As a means to increase openness, transparency, and integrity in science, the open science movement (Banks et al. 2019; Kathawalla, Silverstein, and Syed 2021; Schmidt et al. 2018) has gained traction over the last decade. This movement has provided researchers an unprecedented amount of information on how to conduct their research accountably. Nevertheless, the presence of explicit instruction, as in the candy jar example, may not be sufficient to prevent malicious behavior. Consider, for instance, a questionable research practice such as salami slicing, i.e., splitting reports of findings from one dataset in multiple publications. This practice might be justifiable if the researchers have two or more independent research questions, but it might be less justifiable if the researchers do so exclusively to increase their academic reputation. Changing this practice requires not only openness, but also ethical reasoning skills.

Psychology and its neighboring disciplines have been through a "crisis of confidence" (Munafò et al. 2017; Nelson, Simmons, and Simonsohn 2018; Open Science Collaboration 2015) due to the unmasking of rampant irresponsible research behavior (IRB) in the past. Broadly speaking, IRB includes research misconduct and questionable research practices (Artino, Driessen, and Maggio 2019). The former includes falsification, fabrication, and plagiarism and the latter includes a wide range of behavior, which includes hypothesizing after the results are known (Kerr 1998), p-hacking (Simonsohn, Nelson, and Simmons 2014), and gifted and honorary authorships (Khezr and Mohan 2022). Researchers admitted to engage in IRB to a certain extent, although the rates of committing research misconduct were low (Agnoli et al. 2017; Fiedler and Schwarz 2016; Gopalakrishna et al. 2022; John, Loewenstein, and Prelec 2012; Krishna and Peter 2018; see Banks et al. 2016). Nevertheless, these practices tarnished the integrity of research findings that have been reported in publications, with large-scale replication studies showing that these findings were inflated (Klein et al. 2018; Open Science Collaboration 2015) and one argued that most of them were downright false (Ioannidis 2005).

As a movement to increase research accountability (Schmidt et al. 2018), Open Science Practices (OSP) can be considered as an antithesis to IRB. Broadly speaking, OSP refer to any action that promotes integrity in research. This includes transparent reporting (e.g., preregistration of hypotheses), materials sharing, and data sharing, among others (Kathawalla, Silverstein, and Syed 2021). The open science movement has been promoted globally (Munafò et al. 2017; Nosek et al. 2018) and both infrastructures (e.g., the Open Science Framework; https://osf.io/) and training series (e.g., the Framework for Open and Reproducible Research Training; https://forrt.

org/) have been developed to ease the adoption of OSP in everyday research conduct. This development has created positive impacts, too. For instance, in the journal *Cognition*, following a mandatory open data policy, the proportion of data availability statements tripled from 25% to 78%, which increased the reusability of the data and reproducibility of the findings (Hardwicke et al. 2018).

However, in spite of the development and adoption of OSP, researchers may still commit QRP. In educational science, for instance, it has been estimated that researchers commit questionable research practices 10–67% of the time, while also committing OSP 43–78% of the time (Makel et al. 2021). We argue that this somewhat paradoxical existence is possible because OSP are based on a set of ethical principles, but these principles may sometimes clash with our self-interests or situational demands. Nevertheless, following these principles is still useful since ethical principles allow us to reduce ambiguity and eliminate unfavorable options when dilemmas occur (Resnik 2012).

Open minds: The ethical principles of OSP and their implementation

As the name implies, OSP promote the ethical virtue of openness (Laine 2018; Vicente-Saez and Martinez-Fuentes 2018), which is linked to beneficence (Laine 2018) and collaboration (Vicente-Saez and Martinez-Fuentes 2018). By ensuring that research materials and findings are transparent and accessible, and allowing for scrutiny, researchers ensures fairness in the distribution of the benefits and risks of research and could provide the best possible version of their work to society, from which they have benefitted from in form of their education and research funding.

Together, OSP can be said to reflect one's level of adoption of transparent and accountable research practices that support the development of and collaboration in science. These are typically taught to researchers in Responsible Conduct of Research (RCR) training that informs researchers the types of bias and misconceptions that occur in data collection, analyses, and writing (Munafò et al. 2017).

Tied hands: Self-interests, situational demands, and IRB

Even though RCR training is mandatory for many researchers, situational demands and other factors may still lead them to commit IRB, which, as listed above, refers to research misconduct (i.e., fabrication, falsification, and plagiarism) and QRPs. Research misconducts typically stem from malevolent intent to distort research records for one's own benefits, which is especially tempting for early-career researchers who experience the highest push to publish articles and acquire prestigious grants (Rochmyaningsih 2017; Sandy

and Shen 2019). These behaviors are explicitly punishable by most regulations (Kaiser et al. 2022; Xie, Wang, and Kong 2021). QRPs, on the other hand, are more subtle and may not be motivated by malevolent intention. QRPs include any exploit of the gray area of scientific conduct (Artino, Driessen, and Maggio 2019; John, Loewenstein, and Prelec 2012). This area is notoriously large, ranging from acts of negligence such as failing to report all variables of interest, to hypothesizing after looking at study results (HARKing (Kerr 1998) and adding/removing "outliers" to fish for statistically significant results (Simmons, Nelson, and Simonsohn 2011).

Both research misconduct and QRPs negatively impact scientific development and collaboration (Bouter et al. 2016). Research misconduct can produce misinformation that increases risky behavior (e.g., declining vaccination), damage careers of unaware collaborators, delay scientific progress, and damage integrity of the scientific field when it is associated with news of misconduct (Stroebe, Postmes, and Spears 2012). QRPs, even though they are more ambivalent, may produce detrimental effects too, especially when they occur in combinations and in a longer time period. One prominent example is how a combination of publication bias (i.e., the tendency of journals to only publish statistically significant findings (Ioannidis et al. 2014; Simonsohn, Simmons, and Nelson 2015); and small sample sizes (Button et al. 2013) perpetuate a replication crisis: Studies with small sample sizes were more likely to the increase of type I error and an inflation of effect sizes (Button et al. 2013; Ioannidis 2008; Simonsohn, Simmons, and Nelson 2015). Since the published studies create an impression of large effect sizes, subsequent studies in the future may adopt even smaller sample sizes under the impression of a large effect, which in turn perpetuates the error!

Even though prevalence estimates for QRPs were larger than scientific misconducts (Artino, Driessen, and Maggio 2019; Bouter et al. 2016; Fiedler and Schwarz 2016; Gopalakrishna et al. 2022; John, Loewenstein, and Prelec 2012; Xie, Wang, and Kong 2021), they are arguably more difficult to detect due to their subtlety and researchers' proneness to underestimate their rates (Artino, Driessen, and Maggio 2019). Indeed, observed QRP rates were higher than their self-admission rates (Haven et al. 2019; John, Loewenstein, and Prelec 2012; Xie, Wang, and Kong 2021). A recent meta-analysis (Xie, Wang, and Kong 2021) estimates self-admitted prevalence rates of 1.9–3.3% for research misconduct and an average prevalence rate of 6.1% for QRPs.

Studies have attributed QRP rates to individual (e.g., personal interests, poor role model) and situational (e.g., "publish or perish" demand, lack of guidelines) factors (Kolstoe and Pugh 2023; Roje et al. 2022). Researchers with higher scores in the so-called dark personality triad (i.e., machiavellllianism, narcissism, and psychopathy (Jones and Paulhus 2014)) tend to commit more QRPs (Antes et al. 2007; Tijdink et al. 2016). With regard to situational

factors, organizational culture that puts emphasis on ends as opposed to the means to achieve them (Davis 2003), for instance on university rankings and competitiveness, tend to overlook QRPs and misconducts. Additionally, RCR training and experience have also been shown to be a protective factor (see also Hyytinen and Löfström 2017) to combat QRPs. However, researchers, especially early-career ones, may still find implementing RCR to be challenging due to their lack of experience in making decisions in ambiguous situations, which requires strong ethical reasoning skills.

Ethical reasoning

Ethical reasoning needs to be exercised to maintain integrity when one is faced with a dilemma. In the context of research conduct, specifically, one needs to weigh to what extent their actions reflect beneficence, justice, autonomy, and nonmaleficence (Beauchamp and Childress 1979). This is not an easy feat, however, since, in exercising reasoning, one may be tempted to select an action that provides the largest individual gain as opposed to one that promotes the cardinal values (Thoma 2014). Studies have found that reflective-level reasoning (e.g., questioning one's judgment, analyzing personal motivations) negatively contributed to unethical research behavior and vice versa (Antes et al. 2010; McCormack and Garvan 2014). At the same time, it was also found that individuals with "dark personality traits" such as narcissism adopted poor metacognitive strategies (Antes et al. 2007; Davis, Wester, and King 2008), indicating that ill-intentioned researchers might use metacognitive strategies to justify their engagement in IRBs. To complicate matters further, well-intentioned researchers who did not get sufficient RCR training or did not know how to communicate misconduct to their peers may incidentally commit QRPs (Hyytinen and Löfström 2017).

The current study

The aims of this study are twofold. First, to investigate whether OSP provide a protective factor against IRB, which includes QRP and research misconduct. Second, to evaluate whether different types of ethical reasoning can moderate the relationship between OSP and IRB. We focus on researchers in the field of behavioral science, where the signal-to-noise ratio is high and methodological consensus is low (Fanelli, Costas, and Ioannidis 2017).

A high level of OSP knowledge might not be sufficient to prevent IRB due to personality factors (Antes et al. 2007) and/or situational constraints (Van Bavel et al. 2016). When they face ethical research problems, highly knowledgeable individuals might fail to adopt helpful metacognitive strategies (e.g., recognizing circumstances, seeking help), which in turn contribute to their IRB engagement. Additionally, some personality factors, such as openness to

experience, may facilitate the adoption of helpful metacognitive strategies while others, such as narcissism, may become a boundary condition (Antes et al. 2007; Davis, Wester, and King 2008). In a large-scale study, we will investigate whether the interaction between OSP knowledge and metacognitive strategies contribute to IRB engagement, while controlling for personality factors. Specifically, we ask:

RQ1. What is the contribution of OSP knowledge as a protective factor to Irresponsible Research Behavior, upon controlling for individual differences-related factors?

RQ2. What is the contribution of Ethical reasoning as the moderator of the relationship between OSP knowledge and IRB, upon controlling for individual differences-related factors?

Methods

Participants

Data collection was initially planned to be arranged exclusively in the Netherlands and Indonesia. However, due to the poor participation rate after 1 month of data collection, we decided to recruit participants globally through the Prolific Academic panel service (https://www.prolific.com/). We set these criteria for our panel: Have a postgraduate degree in behavioral sciences, medicine, or engineering; Have worked/are currently working in the European Union countries, Southeast Asian countries, or North American countries. In total, 952 participants from behavioral science and its neighboring disciplines where it is common to collect behavioral data from human participants (e.g., from psychology, education, communication, health professions education, cognitive modeling) who have at least earned a Master's degree agreed to participate in our study in exchange for financial compensation of €9.5. Out of this number, 140 participants were excluded because they did not adhere to our inclusion criteria, because they responded too quickly (a total response time of less than 5 minutes). Out of this number, 786 participants provided complete responses and were included for data analysis. Note that this number may decrease in our inferential analysis due to the presence of "not applicable" options in some of our questionnaires.

Participants' gender was quite balanced (58.22% females and 41.47% males). Almost half of these participants (49.87%) were between 31 and 45 years old. Most participants are UK (37.91%) and US (16.21%) nationals; the rest come from all over the world, although predominantly from

Western European countries (10.22% Portugal, 4.61% Italy, 3,74% Spain). About two-thirds (64.88%) were currently working at a higher educational institution. Almost one fourth of participants (23.02%) have a PhD while the remaining have a master's degree or equivalent. More than half (52.29%) of the participants have at least submitted a paper for publication. The study was approved by the Ethical Committee of Bina Nusantara University.

Design and materials

This study had a cross-sectional correlational design with irresponsible research behavior (IRB) as the outcome measure, open science practice (OSP) knowledge as a predictor, ethical reasoning as the moderator, and personality (measure using two materials: Big 5 Inventory and Short Dark Triad) as a covariate. The study materials were developed in English and translated to Indonesian through a back-translation procedure (Sousa and Rojjanasrirat 2011). Specifically, the first and second authors developed the OSP knowledge and ethical reasoning questionnaires (more details below) in English and translated these questionnaires, along with the other questionnaires below to Indonesian. Two independent researchers (Faculty Members of an English Literature Department) then back-translated these Indonesian translations to English. Finally, all authors compared the two independent back-translated versions of the questionnaires and adjusted the items accordingly, and checked wording consistency. All materials and preregistration of this study are available on osf (osf.io/8fv4w/).

The outcome measure: Irresponsible research behavior (IRB)

Irresponsible research behavior, as mentioned above, refers to both questionable research practices and research misconduct. The frequency of IRB was estimated using the first section of a self-report survey that was developed by Artino, Driessen, and Maggio (2019). The survey consists of 43 items that aim to assess the level of questionable research practices and misconduct in four domains: data collection and storage (e.g., "Inappropriately e-mailed sensitive research data (e.g., data that contains personally identifiable information)"), data analysis (e.g., "Ignored a colleague's use of flawed data"), study reporting (e.g., "To confirm a hypothesis, selectively deleted or changed data after performing data analysis"), and collaboration and authorship (e.g., "Used someone else's ideas without their permission or proper citation"). Thus, these responses were coded on a Likert scale that ranged from 0 ("never") to 5 ("almost always"). "Not applicable" responses were coded as NA. This instrument has a Cronbach's alpha of $\alpha = .94$. The total score for each domain, as well as an overall IRB score, is calculated by summing the

responses, with higher scores indicating a greater frequency of irresponsible research behavior.

The predictor: Open science practices (OSP) knowledge

Open science practice knowledge is defined as participants' awareness of transparent and accountable practices in research conceptualization (e.g., creating preregistrations and registered reports), data collection (e.g., obtaining IRB approval, creating accessible project workflow), data analysis (e.g., ensuring code reproducibility and data sharing), and report and publications (Banks et al. 2019). To estimate OSP knowledge, we developed 12 vignettes that illustrate steps and decisions researchers typically have to make in four domains of research we mentioned above (Banks et al. 2019; Kathawalla, Silverstein, and Syed 2021). One of the vignettes presented to participants:

> Once researchers have determined their sample size, they may have the option to keep collecting data even after their desired number of samples has been reached. Among these options for helping researchers to get the best out of their sample, which one do you think is the most ideal practice to follow?

For each vignette, five possible responses were provided, including one "Not applicable in my field" response, which was coded as NA. These response options reflect participants' awareness of OSP as opposed to their self-admission rates of open science. We chose to adopt the former approach since it has been shown that self-admittance rates might be an overestimation (John, Loewenstein, and Prelec 2012).

Although in principle there were no correct or incorrect decisions, excluding the NAs, the responses were ranked from 1 = the furthest away from OSP to 4 = the most endorsed one by OSP. The first and second authors developed the responses and their ranking with wording feedback from from the last author. The possible answers provided to the example vignette above were:

(1) Continuing to collect more data if statistical significance has not been reached yet.
(2) Continuing to collect more data if one still has extra funding.
(3) Stopping data collection once the planned number of samples has been reached, but not disclosing this information on the paper.
(4) Stating and following a stopping rule in their article.

The option that participants choose the most frequently indicates their level of knowledge about OSP. For instance, if participants predominantly choose responses ranked as 4, it suggests a high level of knowledge about OSP, demonstrating a strong understanding of transparency, reproducibility, and ethical conduct in research.

An independent panel of $N = 5$ researchers with a background in educational science provide further written feedback on the vignettes and their responses; this feedback was redactional and no changes in response ranking were made. Vignettes order and their responses were randomized during data collection.

To ensure adequate and psychometrically sound factor structure, we examined the factor structure of the OSP questionnaire through exploratory factor analysis (EFA) using maximum likelihood factor extraction and oblique rotation, which allowed for correlated factors (Carpenter 2018; Goretzko, Pham, and Bühner 2021; Howard 2016). Parallel analysis results suggested a three-factor model. Upon eliminating four items with factor loadings < .2 and cross-loadings, we ended up with an 8-item questionnaire (see Appendix A) that has a Tucker Lewis Index of factoring reliability = 1.02 and a RMSEA < .001. This instrument has a Cronbach's alpha of $\alpha = .46$. Dropping any of the items did not improve the reliability index substantially.

The moderator: Ethical reasoning

Ethical reasoning is defined as the stage of moral reasoning according to the Neo-Kohlbergian perspectives (see below). To assess the type of reasoning our participants typically adopt during research, we initially developed eight vignettes that illustrate dilemmas researchers typically face in collecting and storing data, analyzing data, reporting results, and collaborating and assigning authorships. The formulation of our vignettes was inspired by the ethical dilemma game that was developed by the Erasmus University Rotterdam (https://www.eur.nl/en/about-eur/policy-and-regulations/integrity/research-integrity/dilemma-game). Critically, to estimate the type of ethical reasoning, for each vignette, we provided four possible responses; one "Not relatable" response that was coded as NA and three responses that correspond to stages of moral reasoning according to the Neo-Kohlbergian perspectives (McAlpine, Kristjanson, and Poroch 1997; Thoma 2014). In short, these stages are:

(1) Personal interest schema/egocentric level: This level focuses on the gains and losses of each individual regardless of the larger social systems and higher-order considerations. Actors are considered egocentric; they only seek pleasures and avoid pain. Moral dilemmas are considered in a very dichotomic, right/wrong view.
(2) Maintaining norm schema/conventional level: This level focuses on the societal rules, roles, and relationships with authorities. Actors conform to contextual/societal views. They may experience cognitive dissonance, but eventually appeal to authorities and hierarchical structures when dealing with ethical dilemmas.
(3) Post-conventional schema/reflective level: This level focuses on "the greater good" that transcends self and societal rules. Actors are critical and

reflective. When experiencing cognitive dissonance, they might consider additional viewpoints and circumstances. They care about accountability and responsibility, and may challenge authorities in spite of the risks.

For each participant, we first tallied the number of times they selected the egocentric, conventional, or reflective option for each vignette out of 8. Thus, each participant would have three sums of scores that reflect their egocentric, conventional, and reflective reasoning levels. From this set of tallies, we determined their level of reasoning based on these rules: (1) If the level of reasoning with the largest tally is not a tie, then the participant's level of reasoning is equal to that level. (2) If there are two or more levels of reasoning that tie, the participant's level of reasoning is equal to the *lowest* level of reasoning in which the tie is present. For instance, a participant with tallies 3, 3, and 2 for their egocentric, conventional, and reflective levels, was accordingly categorized into "Mainly egocentric." A participant with tallies 3, 2, and 3 was also categorized into "Mainly egocentric." Based on this categorization, we identified 78 (9.92%) participants as mainly egocentric, 169 (21.5%) as mainly conventional, and 539 (68.57%) as mainly reflective. Vignette and response order was randomized during data collection.

Internal consistency for this questionnaire was calculated for each level. First, responses that endorse a certain level were dummy-coded to one and the opposite to zero. For instance, a participant who endorsed the conventional option of one vignette would have the scores zero, one, and zero for the egocentric, conventional, and reflective levels, respectively. Second, we calculated Cronbach's alpha for each level, which yields an alpha of $\alpha = .27$, $\alpha = .22$, and $\alpha = .30$ for the egocentric, conventional, and reflective levels, respectively. Dropping any of the items did not improve the reliability index substantially. We did not perform a factor analysis on this questionnaire due to the low number of total items and the multidimension nature of the instrument (Carpenter 2018; Howard 2016).

The covariate: Personality

Personality was assessed using two standardized questionnaires: The short version of the Big Five Inventory (Rammstedt and John 2007) and the Short Dark Triad (Jones and Paulhus 2014). The Big Five Inventory consists of 10 short statements that measure individual propensities on five stable personality traits: introversion, neuroticism, openness to experience, agreeableness, and conscientiousness. Responses were provided on a 5-point Likert scale that ranges from 1 = Disagree strongly to 5 = Agree strongly. Each trait is scored separately, with higher scores indicating a stronger presence of that particular trait. This instrument has a Cronbach's alpha of $\alpha = .26$. Dropping any of the items did not improve the reliability index substantially and, due to the small number of items in this short version of the questionnaire, dimension-level

reliability testing was not performed since the number of items (two) per dimension would be too small to get an accurate estimate (Sijtsma 2009). The Short Dark Triad consists of 27 statements that indicate one's propensity on three socially aversive traits: machiavellianism, narcissism, and psychopathy. Responses were provided in a 5-point Likert scale that ranges from 1 = Disagree strongly to 5 = Agree strongly. Similar to Big 5, each trait is scored separately, with higher scores indicating a stronger presence of that particular trait. This instrument has a Cronbach's alpha of $\alpha = .87$.

Procedures

Participants were recruited online through the Prolific system (https://www.prolific.co/). All participants were provided information about our study, inclusion criteria, study length, anonymized participation, and their rights to stop and withdraw participation. At the end of the information page, they may indicate informed consent electronically by clicking the "Agree to participate!" button.

Participants first provided their responses for the open science vignette, questionable research practices survey, and ethical reasoning vignette, of which order was presented randomly. They then continued with providing their responses for the personality questionnaires that were presented in a random order, too. On average, participants completed their responses for this study in ~20 minutes. Upon completion, the first two authors screened for incomplete responses, participation lengths that were too short (< 5 minutes), or incomplete participation, excluded these participants, and rewarded the rest with their financial compensation.

Data analysis

Data analysis was conducted in R 4.2.0 (R Core team 2015). To evaluate whether open science awareness predicted questionable research practices and whether ethical reasoning moderated this relationship, we constructed linear models with questionable research practices as the outcome measure, the interaction between open science awareness and ethical reasoning as the predictor, and personality factors as covariates. Statistical significance was set at an alpha level of $< .05$. Summary tables were constructed using the "sjPlot" package (Lüdecke 2022). Factor analysis and reliability analysis were conducted using the "psych" package (Revelle 2024).

Results

Descriptive analysis for each variable

Open science practices knowledge

The responses for the open science knowledge vignettes can be seen in Appendix A. The most open responses of our vignettes were selected 19.59–60.69% of the time. The least open responses of our vignettes were selected 8.02–40.20% of the time. The proportions of most open actions selected were the highest in vignettes that related to sample size calculation (60.69%), ethical approval (38.17%), stopping rule (34.22%), transparent reporting (45.29%), and publication in an open-access journal (40.08%). Interestingly, in some vignettes the proportions of responses to the least and most open actions were quite identical, for instance in vignettes related to sampling (30.79% continue to collect data until statistical significance is reached vs 34.22% implement a stopping rule).

Ethical reasoning

Appendix B shows the responses for the ethical reasoning vignettes. Based on the mode of their most selected option, most participants adopted mainly reflective reasoning (71.87%), followed by mainly conventional (20.99%) and mainly egocentric (6.99%). Most participants chose the reflective option from a large number of our vignettes. Noticeable exceptions were observed in vignettes related to authorship, where most respondents (57.63%) chose the egocentric option.

Irresponsible research behavior

Appendix C shows responses from the ethical shades of gray questionnaire. Between 1.78–12.21% of researchers have committed IRBs at least once. Between .13–6.36% of researchers have committed IRBs frequently. The rates of misconduct were relatively low (e.g., 0–4.71% for data fabrication) compared to QRPs. Of the QRPs, those that were related to writing (e.g., 1.40–23.79% improper citations; 1.65–29.39% citing without reading properly), authorships (e.g., 0.89–12.21% addition of unqualified authors), data collection (0.25–11.32% stopping data collection when a statistical significance is reached; 2.04–11.58% collecting more data until a statistical significance is reached), and data handling (0.51–10.56% improper sensitive data storage) were relatively higher than the others.

Inferential analysis: Moderation analysis

To assess whether different types of ethical reasoning moderate the relationship between open science practice (OSP) knowledge and irresponsible research behavior (IRB), a moderation analysis was performed. In this analysis, IRB served as

the outcome variable, OSP knowledge as the predictor, ethical reasoning as the moderator, and personality as a covariate. Correlation analyses were conducted to examine the relationships between the variables, followed by hierarchical regression to test the moderation effect. Specifically, this approach aimed to determine if ethical reasoning influences the predictive power of OSP knowledge on IRB. Additionally, demographic variables were analyzed to identify any systematic effects on the measured variables.

Correlations

Table 1 shows the correlation coefficients between our key variables. Conscientiousness and Openness to experience were correlated negatively with irresponsible research behavior, $r = -.172$, $p < .001$, and $r = -.126$, $p < .001$, respectively. The dark personality triad were positively associated with irresponsible research behavior, $r = .273$, $p < .001$, $r = .192$, $p < .001$, and $r = .323$, $p < .001$ for machiavellianism, narcissism, and psychopathy, respectively. Machiavellianism and narcissism were negatively associated with open science knowledge, $r = -.071$, $p = .043$, and $r = -.085$, $p = .016$, respectively. Finally, open science knowledge was negatively correlated with irresponsible research behavior, $r = -.075$, $p = .035$.

Hierarchical regression

Table 2 shows a comparison of three models: Our null model with individual differences as a covariate, our main effect model with open science knowledge as a predictor (RQ1), and our full model with open science knowledge × ethical reasoning interaction as predictors (RQ2). Note that an additional N = 5 participants did not provide an adequate number of responses for their ethical reasoning vignettes to get their ethical reasoning classified into groups.

Against our expectations, after controlling for personality factors, OSP knowledge no longer predicted IRB, $t = -1.69$, $p = .092$. The addition of

Table 1. Correlations between variables of interest.

	OSP mean	IRB mean
OSP mean		−.075*
IRB mean	−.075*	
Extraversion	−.065	.051
Agreeableness	−.006	−.065
Conscientiousness	−.038	−.172***
Neuroticism	.067	.029
Openness	.019	−.126***
Machiavellianism	−.071*	.273***
Narcissism	−.085*	.192***
Psychopathy	−.064	.323***

*$p < .05$; **$p < .01$; ***$p < .001$.
OSP = Open Science Practices;
IRB = Irresponsible Research Behavior.

Table 2. Three models comparison: null model, main effect model, and full model.

	Null model		Main effect model		Full model	
Predictors	Estimates	Statistic	Estimates	Statistic	Estimates	Statistic
(Intercept)	.93***	4.93	1.09***	5.17	1.53***	4.10
Extraversion	.02	.95	.02	.87	.02	.87
Agreeableness	.03	1.38	.03	1.40	.03	1.43
Neuroticism	.02	1.36	.02	1.43	.03	1.59
Conscientiousness	−.05**	−2.68	−.06**	−2.74	−.06**	−2.79
Openness	−.06**	−3.10	−.06**	−3.04	−.05**	−3.07
Machiavellianism	.08*	2.37	.08*	2.33	.09**	2.39
Narcissism	.04	1.17	.04	1.14	.04	1.19
Psychopathy	.18***	4.56	.18***	4.58	.17***	4.32
Open science knowledge			−.05	−1.69	−.14	−1.09
Ethical reasoning - Mainly conventional					−.40	−1.07
Ethical reasoning - Mainly reflective					−.55	−1.59
Open science × Mainly conventional					.05	.38
Open science × Mainly reflective					.12	.90
Observations	781		781		781	
F-statistic	15.61***		14.23***		11.99***	
R^2 /R^2 adjusted	.139/.130		.142/.132		.169/.155	

*p < .05; **p < .01; ***p < .001.

our moderators did not improve our model further. Ethical reasoning and its interaction with OSP also did not predict IRB, all $|t|$'s < .37, all p's > .707.

Exploratory analysis

Given that our sample was rather heterogeneous in terms of educational backgrounds, experience in publishing papers, and current affiliations, we conducted additional analyses to evaluate whether our variables of interest systematically varied in relation to these demographic variables. Table 3 shows the means and standard deviations of these comparisons.

One-way ANOVAs with OSP or IRB as the outcome measure and demographics (educational background, experience in publishing papers, and affiliations) as the fixed factor were constructed to evaluate the effects of demographics difference. We found that Open Science Practice (OSP) mean did vary across educational backgrounds, $F(3,773) = 10.92$, $p < .001$, affiliations, $F(1,780) = 6.84$, $p < .009$, and experience in publishing papers, $F(1,781) = 43.9$, $p < .001$. Participants with Ph.D. degrees, who were affiliated with a higher education or research institution, and who have published papers, respectively, had higher OSP means.

IRB mean, on the other hand, did not vary across educational backgrounds, experience in publishing papers, and current affiliations, all F's < .99, all p's > .425. Ethical reasoning categories also did not vary across these demographic variables, all χ^2's < 13.69, all p's > .090.

Table 3. Demographic variables effect.

Demographics	*N*	Mainly Egocentric (%)	Mainly Conventional (%)	Mainly Reflective (%)	OSP Mean (SD)	QRP Mean (SD)
Master's degree (1 year)	175	8.57	22.29	68.00	2.69 (.47)	1.39 (.42)
Master's degree (2 year)	364	6.31	22.25	70.88	2.72 (.47)	1.43 (.42)
Ph.D. degree	200	8.50	16.00	75.50	2.93 (.55)	1.36 (.54)
Professional degree	70	0.00	22.50	77.50	2.63 (.49)	1.39 (.45)
Have not attempted to publish papers	374	6.95	20.85	71.12	2.63 (.44)	1.40 (.49)
Have attempted to publish papers	411	7.05	20.92	72.01	2.87 (.53)	1.41 (.46)
Non-research affiliation	204	7.35	22.55	69.60	2.68 (.45)	1.42 (.57)
Higher education/research affiliation	580	6.89	20.52	72.07	2.79 (.51)	1.39 (.42)

Discussion

Researchers are trained to adopt an open mind-set from developing their research questions to reporting their study results. However, unfavorable circumstances may force their hands to commit irresponsible research behavior. We aimed to evaluate to what extent, controlling for individual differences factors, OSP knowledge guards researchers from Irresponsible Research Behavior (IRB; RQ1), and whether this relationship is modulated by their ethical reasoning process (RQ2). To these ends, we asked ~ 800 researchers in behavioral and medical sciences to respond to our novel OSP and ethical reasoning vignettes, an IRB survey, and personality questionnaires.

We found relatively high levels of OSP knowledge; The most open responses of our vignettes were selected 19.59–60.69% of the time. Similar to what has been reported in the literature, the rates of IRBs were relatively low; Between 1.78–12.21% of researchers have committed IRBs at least once. OSP correlated negatively with machiavellianism and narcissism, and positively with neuroticism. The negative correlations with the dark triad were to be expected, as individuals whose scored relatively high in these traits have been shown to act in opposition to integrity and accountability (Antes et al. 2007). The positive correlation with neuroticism was more surprising; one interpretation could be that a moderate level of neuroticism might be beneficial to prevent from committing malevolent practices (Uppal 2017). OSP correlated negatively with IRB, but the magnitude of this correlation was small and against our hypothesis, this relationship was not moderated by ethical reasoning. Individual difference factors had higher contributions than OSP in predicting IRB.

OSP knowledge levels were quite high. This finding echoes what has been found by Makel et al. (2021), who showed that between 43–78% of respondents have engaged in at least one open science practice. Ferguson et al. (2023) reported a more optimistic estimation, with almost 90% of the scholars from top 20 universities in North America reporting to have engaged in at least one OSP. In detail, the rate of support for preregistration (27.68%) and analysis script sharing (24.94%) were lower than reported in Ferguson et al. (2023) (58% and 88%, respectively). Surprisingly, many of our respondents supported power analysis (60.69%) for determining the required sample size. This rate was substantially higher than what has been previously reported (47%; M. Bakker et al. 2016). At the same time, almost a third of our participants also endorsed *p*-hacking (30.79%), which we found quite surprising. While these numbers may reflect our participants' lack of awareness of the negative implications of these practices, they might also indicate that some fields of study still find these practices to be acceptable.

With regard to IRB rates, we found the levels of serious misconduct (0–4.71%) to be lower than that of QRPs (1.78–12.21%; at least once). This general pattern is consistent with what has been previously reported (Artino, Driessen, and Maggio 2019; Gopalakrishna et al. 2022; John, Loewenstein, and Prelec 2012). Our rates are comparable with similar self-admission rates reported in Artino, Driessen, and Maggio (2019), which were 1.7–2.7% of serious misconduct and .7–16.2% QRP at least once. Studies that estimate observed as opposed to self-admission rates, however, reported much higher rates. John, Loewenstein, and Prelec (2012) found observed QRP rates between 3–63.4%, while Gopalakrishna et al. (2022) found 53% of researchers have observed QRPs at least once and observed misconduct rates of between 4.2–4.3%.

Answering RQ1, OSP knowledge correlated negatively with IRB, which suggests that OSP somewhat protects against IRB. Another way to interpret this finding is that the OSP and IRB may exist simultaneously in a paradoxical manner, namely that even though researchers have knowledge of OSP, they still somewhat commit irresponsible research behavior (B. N. Bakker et al. 2021; Makel et al. 2021). This paradoxical state might exist because many researchers still consider some questionable practices, which make up for a large variance in our survey compared to misconducts, to be acceptable or defensible. At the same time, these researchers might be reevaluating their position (Makel et al. 2021) and start to accept open practices even though they may remain skeptical to some of these practices (B. N. Bakker et al. 2021). Importantly, however, the magnitude of this correlation was very small (r = .075), indicating a very weak effect and, upon controlling for individual differences factors, we found that OSP no longer predicted IRB. Given the correlational nature of our design, however, it is premature to interpret this finding as the effectiveness of disseminating

open science knowledge is diminished for researchers with particular personality traits.

Answering RQ2, we also found the IRB-OSP relationship to not be moderated by ethical reasoning. Indeed, our hypothesis that individuals with high OSP knowledge and high adoption of egocentric reasoning might be particularly susceptible to IRB was not supported. One interpretation of this finding would be that ethical reasoning plays little to no role in OSP and IRB adoptions since researchers might consider this type of reasoning to be too complex or cumbersome; and, instead, their behavior is informed by more tangible cues such as how other, more senior researchers conduct their research and the publication pressure in their field (Mumford et al. 2009). Another, more technical interpretation is that we may fail to detect the moderation effect due to a lack of power. Indeed, the shared variance between IRB and OSP was very small, hence a large number of observations is needed to detect any effect that is related to this relationship. Our number of observations to detect this effect was hurt by the unbalanced ethical reasoning categorization (i.e., only ~ 10% of our participants were categorized as mainly egocentric), thus, further examination of this issue is warranted in future studies.

Our main analysis findings suggest that individual difference factors might play a more substantial role in IRB. Indeed, consistent with other studies, researchers who scored high in the dark personality triad (machiavellianism, narcissism, and psychopathy) were more likely to commit IRB (Antes et al. 2007; Tijdink et al. 2016). Tijdink et al. (2016) found a link between machiavellianism and IRB, although narcissism and psychopathy did not correlate with IRB. Antes et al. (2007) found that those who are high in narcissism also tend to adopt poor metacognitive strategies; they tend not to question their own judgments, anticipate the consequences of their behavior, and consider others. At the same time, we also found that traits that are in line with principles of ethical research, namely conscientiousness and openness to experience to be negatively correlated with IRB. Antes et al. (2007) also found that those who scored high in conscientiousness to be more likely to adopt helpful metacognitive reasoning strategies; they tend to recognize their circumstances, anticipate the consequences of their behavior, and consider others.

Open science knowledge, it appears from the above set of findings, might not be a sufficient measure against irresponsible research behavior. Even though researchers could gain OSP knowledge through RCR training, our empirical data suggests that personality traits that focus on self-interests and achievement of ends regardless of the means might become a substantial barrier in researchers' decisions to not commit irresponsible conduct. Given the relative importance of individual traits, perhaps one suggestion would be to incorporate ethical virtues (Resnik 2012), in addition to practical principles of ethical

scientific conduct, in RCR training (Kalichman 2014). Ethical virtues, such as beneficence and harm avoidance, are less tangible than their ethical principles (e.g., data sharing and ethical approval request, respectively) and more difficult to teach. Yet, once they are formed and become a habit, they are more long-lasting and less susceptible to circumstantial and environmental changes effects (Kolstoe and Pugh 2023; Resnik 2012). This high initial investment, better long-term gain dyad is in line with the principle of "desirable difficulties" (de Bruin et al. 2023), which has been shown to be effective in promoting long-term retention in educational settings. Thus, in line with Resnik's (2012) suggestion to integrate virtue- and principle-based approaches in RCR education, the development of traits that are aligned with ethical virtues, such as beneficence and integrity, might require long-term investment. Yet, they are likely to be an important complement to OSP knowledge in reducing IRB, which can be trained in shorter terms.

Finally, we note several shortcomings of this study. First, our responses were collected from a heterogeneous sample that was recruited through a research panel platform. Thus, our sample came from different educational, vocational, and experiential backgrounds compared to other studies in the field (Ferguson et al. 2023; Haven et al. 2019). Consequently, factors such as differences in English language proficiency, rigorousness of IRB evaluations, and levels of RCR training of the participants may obscure some of the patterns we tried to identify in this study. To our defense, however, this more heterogeneous sample might represent the population rate better (Casler, Bickel, and Hackett 2013; Douglas, Ewell, and Brauer 2023), and our exploratory analysis suggests very few differences across groups regarding our variables of interest. Second, our ethical reasoning and OSP vignettes can be considered as improvements from self-reports (McAlpine, Kristjanson, and Poroch 1997; Paulhus and Vazire 2007), but their level of validity and reliability should be evaluated using an independent sample. We noted that some of our instruments had reliability indices that fell below and above the typical .7–.9 range that is considered to be acceptable in social science (Sijtsma 2009). This is true both for questionnaires that we have developed ourselves and those that have been used in prior studies. This might be due to the low number of items in some of our questionnaires. Therefore, further attempts to revise and develop the instruments we developed in this study, which could include restructuring, item revision, and further validity and reliability testing, is warranted in future studies. Lastly, our model only explained about 2% of the variance in irresponsible research behavior. Thus, further explorations on factors that might influence IRB are encouraged.

Conclusions

Researchers are trained to adopt an open mind-set and behavior, yet they may still commit irresponsible research behavior (IRB) due to situational challenges. We found that individual differences factors, namely dark personality triad, and conscientiousness and openness, contributed more to IRB than open science practices (OSP) knowledge. Our findings suggest that OSP knowledge needs to be complemented by the development of ethical virtues to encounter IRBs more effectively.

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CRediT author statement

WW: Conceptualization, methodology, software, formal analysis, investigation, writing – original draft. FMJ: Conceptualization, methodology, software, formal analysis, investigation, writing – review & editing. ADB: Conceptualization, methodology, resources, writing – review & editing.

References

Agnoli, F., J. M. Wicherts, C. L. S. Veldkamp, P. Albiero, and R. Cubelli. 2017. "Questionable Research Practices Among Italian Research Psychologists." *PLoS One* 12 (3): 1–17. https://doi.org/10.1371/journal.pone.0172792 .

Antes, A. L., R. P. Brown, S. T. Murphy, E. P. Waples, M. D. Mumford, S. Connelly, and L. D. Devenport. 2007. "Personality and Ethical Decision-Making in Research: The Role of Perceptions of Self and Others." *Journal of Empirical Research on Human Research Ethics* 2 (4): 15–34. https://doi.org/10.1525/jer.2007.2.4.15 .

Antes, A. L., X. Wang, M. D. Mumford, R. P. Brown, S. Connelly, and L. D. Devenport. 2010. "Evaluating the Effects That Existing Instruction on Responsible Conduct of Research Has on Ethical Decision Making." *Academic Medicine* 85 (3): 519–526. https://doi.org/10.1097/ACM.0b013e3181cd1cc5 .

Artino, A. R., E. W. Driessen, and L. A. Maggio. 2019. "Ethical Shades of Gray: International Frequency of Scientific Misconduct and Questionable Research Practices in Health

Professions Education." *Academic Medicine* 94 (1): 76–84. https://doi.org/10.1097/ACM.0000000000002412 .

Bakker, B. N., J. Kokil, T. Dörr, N. Fasching, and Y. Lelkes. 2021. "Questionable and Open Research Practices: Attitudes and Perceptions Among Quantitative Communication Researchers." *Journal of Communication* 71 (5): 715–738. https://doi.org/10.1093/joc/jqab031 .

Bakker, M., C. H. J. Hartgerink, J. M. Wicherts, and H. L. J. van der Maas. 2016. "Researchers' Intuitions About Power in Psychological Research." *Psychological Science* 27 (8): 1069–1077. https://doi.org/10.1177/0956797616647519 .

Bakker, M., A. van Dijk, and J. M. Wicherts. 2012. "The Rules of the Game Called Psychological Science." *Perspectives on Psychological Science* 7 (6): 543–554. https://doi.org/10.1177/1745691612459060 .

Banks, G. C., J. G. Field, F. L. Oswald, E. H. O'Boyle, R. S. Landis, D. E. Rupp, and S. G. Rogelberg. 2019. "Answers to 18 Questions About Open Science Practices." *Journal of Business & Psychology* 34 (3): 257–270. https://doi.org/10.1007/s10869-018-9547-8 .

Banks, G. C., S. G. Rogelberg, H. M. Woznyj, R. S. Landis, and D. E. Rupp. 2016. "Editorial: Evidence on Questionable Research Practices: The Good, the Bad, and the Ugly." *Journal of Business & Psychology* 31 (3): 323–338. https://doi.org/10.1007/s10869-016-9456-7 .

Beauchamp, T. L., and J. F. Childress. 1979. *Principles of Biomedical Ethics*. Oxford: Oxford University Press.

Bouter, L. M., J. Tijdink, N. Axelsen, B. C. Martinson, and G. Ter Riet. 2016. "Ranking Major and Minor Research Misbehaviors: Results from a Survey Among Participants of Four World Conferences on Research Integrity." *Research Integrity and Peer Review* 1 (1): 1–8. https://doi.org/10.1186/s41073-016-0024-5 .

Brandt, M. J., H. IJzerman, A. Dijksterhuis, F. J. Farach, J. Geller, R. Giner-Sorolla, J. A. Grange, M. Perugini, J. R. Spies, and A. van't Veer. 2014. "The Replication Recipe: What Makes for a Convincing Replication?" *Journal of Experimental Social Psychology* 50 (1): 217–224. https://doi.org/10.1016/j.jesp.2013.10.005 .

Button, K. S., J. P. A. Ioannidis, C. Mokrysz, B. A. Nosek, J. Flint, E. S. J. Robinson, and M. R. Munafò. 2013. "Power Failure: Why Small Sample Size Undermines the Reliability of Neuroscience." *Nature Reviews Neuroscience* 14 (5): 365–376. https://doi.org/10.1038/nrn3475 .

Carpenter, S. 2018. "Ten Steps in Scale Development and Reporting: A Guide for Researchers." *Communication Methods and Measures* 12 (1): 25–44. https://doi.org/10.1080/19312458.2017.1396583 .

Casler, K., L. Bickel, and E. Hackett. 2013. "Separate but Equal? A Comparison of Participants and Data Gathered via Amazon's MTurk, Social Media, and Face-To-Face Behavioral Testing." *Computers in Human Behavior* 29 (6): 2156–2160. https://doi.org/10.1016/j.chb.2013.05.009 .

Davis, M. S. 2003. "The Role of Culture in Research Misconduct." *Accountability in Research* 10 (3): 189–201. https://doi.org/10.1080/08989620390250207 .

Davis, M. S., K. L. Wester, and B. King. 2008. "Narcissism, Entitlement, and Questionable Research Practices in Counseling: A Pilot Study." *Journal of Counseling & Development* 86 (2): 200–210. https://doi.org/10.1002/j.1556-6678.2008.tb00498.x .

de Bruin, A. B. H., F. Biwer, L. Hui, E. Onan, L. David, and W. Wiradhany. 2023. "Worth the Effort: The Start and Stick to Desirable Difficulties (S2D2) Framework." *Educational Psychology Review* 35 (2): 35–41. https://doi.org/10.1007/s10648-023-09766-w .

Douglas, B. D., P. J. Ewell, and M. Brauer. 2023. "Data Quality in Online Human-Subjects Research: Comparisons Between MTurk, Prolific, CloudResearch, Qualtrics, and SONA." *PLoS One* 18 (3 March): 1–17. https://doi.org/10.1371/journal.pone.0279720 .

Fanelli, D., R. Costas, and J. P. A. Ioannidis. 2017. "Meta-Assessment of Bias in Science." *Proceedings of the National Academy of Sciences* 114 (14): 3714–3719. https://doi.org/10.1073/pnas.1618569114 .

Ferguson, J., R. Littman, G. Christensen, E. L. Paluck, N. Swanson, Z. Wang, E. Miguel, D. Birke, and J. H. Pezzuto. 2023. "Survey of Open Science Practices and Attitudes in the Social Sciences." *Nature Communications* 14 (1): 5401. https://doi.org/10.1038/s41467-023-41111-1 .

Fiedler, K., and N. Schwarz. 2016. "Questionable Research Practices Revisited." *Social Psychological & Personality Science* 7 (1): 45–52. https://doi.org/10.1177/1948550615612150 .

Gopalakrishna, G., G. Ter Riet, G. Vink, I. Stoop, J. M. Wicherts, and L. M. Bouter. 2022. "Prevalence of Questionable Research Practices, Research Misconduct and Their Potential Explanatory Factors: A Survey Among Academic Researchers in the Netherlands." *PLoS One* 17 (2 February): 1–16. https://doi.org/10.1371/journal.pone.0263023 .

Goretzko, D., T. T. H. Pham, and M. Bühner. 2021. "Exploratory Factor Analysis: Current Use, Methodological Developments and Recommendations for Good Practice." *Current Psychology* 40 (7): 3510–3521. https://doi.org/10.1007/s12144-019-00300-2 .

Hardwicke, T. E., M. B. Mathur, K. MacDonald, G. Nilsonne, G. C. Banks, M. C. Kidwell, A. H. Mohr, E. Clayton, E. J. Yoon, M. H. Tessler, et al. 2018. "Data Availability, Reusability, and Analytic Reproducibility: Evaluating the Impact of a Mandatory Open Data Policy at the Journal Cognition." *Royal Society Open Science* 5 (8): 180448. https://doi.org/10.1098/rsos.180448 .

Haven, T. L., J. K. Tijdink, H. R. Pasman, G. Widdershoven, G. Ter Riet, and L. M. Bouter. 2019. "Researchers' Perceptions of Research Misbehaviours: A Mixed Methods Study Among Academic Researchers in Amsterdam." *Research Integrity and Peer Review* 4 (1): 1–12. https://doi.org/10.1186/s41073-019-0081-7 .

Howard, M. C. 2016. "A Review of Exploratory Factor Analysis Decisions and Overview of Current Practices: What We are Doing and How Can We Improve?" *International Journal of Human-Computer Interaction* 32 (1): 51–62. https://doi.org/10.1080/10447318.2015.1087664 .

Hyytinen, H., and E. Löfström. 2017. "Reactively, Proactively, Implicitly, Explicitly? Academics' Pedagogical Conceptions of How to Promote Research Ethics and Integrity." *Journal of Academic Ethics* 15 (1): 23–41. https://doi.org/10.1007/s10805-016-9271-9 .

Ioannidis, J. P. A. 2005. "Why Most Published Research Findings are False." *PLOS Medicine* 2 (8): e124. https://doi.org/10.1371/journal.pmed.0020124 .

Ioannidis, J. P. A. 2008. "Why Most Discovered True Associations are Inflated." *Epidemiology* 19 (5): 640–648. https://doi.org/10.1097/EDE.0b013e31818131e7 .

Ioannidis, J. P. A. 2012. "Why Science is Not Necessarily Self-Correcting." *Perspectives on Psychological Science* 7 (6): 645–654. https://doi.org/10.1177/1745691612464056 .

Ioannidis, J. P. A., M. R. Munafò, P. Fusar-Poli, B. A. Nosek, and S. P. David. 2014. "Publication and Other Reporting Biases in Cognitive Sciences: Detection, Prevalence, and Prevention." *Trends in Cognitive Sciences* 18 (5): 235–241. https://doi.org/10.1016/j.tics.2014.02.010 .

John, L. K., G. Loewenstein, and D. Prelec. 2012. "Measuring the Prevalence of Questionable Research Practices with Incentives for Truth Telling." *Psychological Science* 23 (5): 524–532. https://doi.org/10.1177/0956797611430953 .

Jones, D. N., and D. L. Paulhus. 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 .

Kaiser, M., L. Drivdal, J. Hjellbrekke, H. Ingierd, and O. B. Rekdal. 2022. "Questionable Research Practices and Misconduct Among Norwegian Researchers." *Science and Engineering Ethics* 28 (1). https://doi.org/10.1007/s11948-021-00351-4 .

Kalichman, M. 2014. "Rescuing RCR Education." *Accountability in Research* 21 (1): 68–83. https://doi.org/10.1080/08989621.2013.822271.Rescuing .

Kathawalla, U.-K., P. Silverstein, and M. Syed. 2021. "Easing into Open Science: A Guide for Graduate Students and Their Advisors." *Collabra: Psychology* 7 (1): 1–14. https://doi.org/10.1525/collabra.18684 .

Kerr, N. L. 1998. "HARKing: Hypothesizing After the Results are Known." *Personality and Social Psychology Review* 2 (3): 196–217. https://doi.org/10.1207/s15327957pspr0203_4 .

Khezr, P., and V. Mohan. 2022. "The Vexing but Persistent Problem of Authorship Misconduct in Research." *Research Policy* 51 (3): 104466. https://doi.org/10.1016/j.respol.2021.104466 .

Klein, R. A., K. A. Ratliff, M. Vianello, R. B. Adams, Š. Bahník, M. J. Bernstein, K. Bocian, M. J. Brandt, B. Brooks, C. C. Brumbaugh, et al. 2014. "Investigating Variation in Replicability: A "Many Labs" Replication Project." *Social Psychology* 45 (3): 142–152. https://doi.org/10.1027/1864-9335/a000178 .

Klein, R. A., M. Vianello, F. Hasselman, B. G. Adams, R. B. Adams, S. Alper, M. Aveyard, J. R. Axt, M. T. Babalola, Š. Bahník, et al. 2018. "Many Labs 2: Investigating Variation in Replicability Across Samples and Settings." *Advances in Methods and Practices in Psychological Science* 1 (4): 443–490. https://doi.org/10.1177/2515245918810225 .

Kolstoe, S. E., and J. Pugh. 2023. "The Trinity of Good Research: Distinguishing Between Research Integrity, Ethics, and Governance." *Accountability in Research* 0 (00): 1–20. https://doi.org/10.1080/08989621.2023.2239712 .

Krishna, A., and S. M. Peter. 2018. "Questionable Research Practices in Student Final Theses – Prevalence, Attitudes, and the Role of the supervisor's Perceived Attitudes." *PLoS One* 13 (8): 1–24. https://doi.org/10.1371/journal.pone.0203470 .

Laine, H. 2018. "Open Science and Codes of Conduct on Research Integrity." *Informaatiotutkimus* 37 (4). https://doi.org/10.23978/inf.77414 .

Lüdecke, D. 2022. "sjPlot: Data Visualization for Statistics in Social Science." *Computer Software*. https://cran.r-project.org/package=sjPlot .

Makel, M. C., J. Hodges, B. G. Cook, and J. A. Plucker. 2021. "Both Questionable and Open Research Practices are Prevalent in Education Research." *Educational Researcher* 50 (8): 493–504. https://doi.org/10.3102/0013189X211001356 .

McAlpine, H., L. Kristjanson, and D. Poroch. 1997. "Development and Testing of the Ethical Reasoning Tool (ERT): An Instrument to Measure the Ethical Reasoning of Nurses." *Journal of Advanced Nursing* 25 (6): 1151–1161. https://doi.org/10.1046/j.1365-2648.1997.19970251151.x .

McCormack, W. T., and C. W. Garvan. 2014. "Team-Based Learning Instruction for Responsible Conduct of Research Positively Impacts Ethical Decision-Making." *Accountability in Research* 21 (1): 34–49. https://doi.org/10.1080/08989621.2013.822267 .

Mumford, M. D., S. Connelly, S. T. Murphy, D. Lynn, A. L. Antes, R. P. Brown, J. H. Hill, and E. P. Waples. 2009. "Field and Experience Influences on Ethical Decision Making in the Sciences Field and Experience Influences on Ethical Decision Making in the Sciences." *Ethics & Behavior* 19 (4): 263–289. https://doi.org/10.1080/10508420903035257 .

Munafò, M. R., B. A. Nosek, D. V. M. Bishop, K. S. Button, C. D. Chambers, N. Percie Du Sert, U. Simonsohn, E. J. Wagenmakers, J. J. Ware, and J. P. A. Ioannidis. 2017. "A Manifesto for Reproducible Science." *Nature Human Behaviour* 1 (1): 1–9. https://doi.org/10.1038/s41562-016-0021 .

Nelson, L. D., J. Simmons, and U. Simonsohn. 2018. "Psychology's Renaissance." *Annual Review of Psycholgy* 69 (September 2017):.17.1–.17.24. https://doi.org/10.1146/annurev-psych-122216-011836 .

Nosek, B. A., C. R. Ebersole, A. C. DeHaven, and D. T. Mellor. 2018. "The Preregistration Revolution." *Proceedings of the National Academy of Sciences of the United States of America* 115 (11): 2600–2606. https://doi.org/10.1073/pnas.1708274114 .

Open Science Collaboration. 2015. "Estimating the Reproducibility of Psychological Science." *Science* 349 (6251): aac4716–aac4716. https://doi.org/10.1126/science.aac4716 .

Paulhus, D. L., and S. Vazire. 2007. "The Self-Report Method." In *Handbook of Research Methods in Personality Psychology*, edited by R. W. Robins, R. C. Fraley, and R. F. Krueger, 224–239. New York: The Guilford Press.

Rammstedt, B., and O. P. John. 2007. "Measuring Personality in One Minute or Less: A 10-Item Short Version of the Big Five Inventory in English and German." *Journal of Research in Personality* 41 (1): 203–212. https://doi.org/10.1016/j.jrp.2006.02.001 .

R Core team. 2015. *R: A language and environment for statistical computing. R Foundation for Statistical Computing*, Vienna, Austria. https://www.R-project.org/ .

Resnik, D. B. 2012. "Ethical Virtues in Scientific Research." *Accountability in Research* 19 (6): 329–343. https://doi.org/10.1080/08989621.2012.728908 .

Revelle, W. 2024. *Psych: Procedures for Psychological, Psychometric, and Personality Research (No. R Package Version 2.4.6)*. Northwestern University. http://personality-project.org/r/psych/HowTo/psych_manual.pdf .

Rochmyaningsih, D. 2017. "The Developing World Needs More Than Numbers." *Nature* 542 (7639): 7. https://doi.org/10.1038/542007a .

Roje, R., A. Reyes Elizondo, W. Kaltenbrunner, I. Buljan, and A. Marušić. 2022. "Factors Influencing the Promotion and Implementation of Research Integrity in Research Performing and Research Funding Organizations: A Scoping Review." *Accountability in Research* 30 (8): 633–671. https://doi.org/10.1080/08989621.2022.2073819 .

Sandy, W., and H. Shen. 2019. "Publish to Earn Incentives: How Do Indonesian Professors Respond to the New Policy?" *Higher Education* 77 (2): 247–263. https://doi.org/10.1007/s10734-018-0271-0 .

Schmidt, B., A. Bertino, D. Beucke, H. Brinken, N. Jahn, L. Matthias, J. Mimkes, K. Müller, A. Orth, and M. Bargheer. 2018. "Open Science Support as a Portfolio of Services and Projects: From Awareness to Engagement." *Publications* 6 (2): 27. https://doi.org/10.3390/publications6020027 .

Sijtsma, K. 2009. "On the Use, the Misuse, and the Very Limited Usefulness of cronbach's Alpha." *Psychometrika* 74 (1): 107–120. https://doi.org/10.1007/s11336-008-9101-0 .

Simmons, J. P., L. D. Nelson, and U. Simonsohn. 2011. "False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant." *Psychological Science* 22 (11): 1359–1366. https://doi.org/10.1177/0956797611417632 .

Simonsohn, U., L. D. Nelson, and J. P. Simmons. 2014. "P-Curve: A Key to the File-Drawer." *Journal of Experimental Psychology General* 143 (2): 534–547. https://doi.org/10.1037/a0033242 .

Simonsohn, U., J. P. Simmons, and L. D. Nelson. 2015. "Better P-Curves: Making P-Curve Analysis More Robust to Errors, Fraud, and Ambitious P-Hacking, a Reply to Ulrich and Miller (2015)." *Journal of Experimental Psychology General* 144 (6): 1146–1152. https://doi.org/10.1037/xge0000104 .

Sousa, V. D., and W. Rojjanasrirat. 2011. "Translation, Adaptation and Validation of Instruments or Scales for Use in Cross-Cultural Health Care Research: A Clear and

User-Friendly Guideline." *Journal of Evaluation in Clinical Practice* 17 (2): 268–274. https://doi.org/10.1111/j.1365-2753.2010.01434.x .

Sternberg, R. J. 2012. "A Model for Ethical Reasoning." *Review of General Psychology* 16 (4): 319–326. https://doi.org/10.1037/a0027854 .

Stroebe, W., T. Postmes, and R. Spears. 2012. "Scientific Misconduct and the Myth of Self-Correction in Science." *Perspectives on Psychological Science* 7 (6): 670–688. https://doi.org/10.1177/1745691612460687 .

Thoma, S. J. 2014. "Measuring Moral Thinking from a Neo-Kohlbergian Perspective." *Theory & Research in Education* 12 (3): 347–365. https://doi.org/10.1177/1477878514545208 .

Tijdink, J. K., L. M. Bouter, C. L. S. Veldkamp, P. M. Van De Ven, J. M. Wicherts, and Y. M. Smulders. 2016. "Personality Traits are Associated with Research Misbehavior in Dutch Scientists: A Cross-Sectional Study." *PLoS One* 11 (9): 1–12. https://doi.org/10.1371/journal.pone.0163251 .

Uppal, N. 2017. "Moderation Effects of Perceived Organisational Support on Curvilinear Relationship Between Neuroticism and Job Performance." *Personality & Individual Differences* 105:47–53. https://doi.org/10.1016/j.paid.2016.09.030 .

Van Bavel, J. J., P. Mende-Siedlecki, W. J. Brady, and D. A. Reinero. 2016. "Contextual Sensitivity in Scientific Reproducibility." *Proceedings of the National Academy of Sciences of the United States of America* 113 (23): 6454–6459. https://doi.org/10.1073/pnas.1521897113 .

Vicente-Saez, R., and C. Martinez-Fuentes. 2018. "Open Science Now: A Systematic Literature Review for an Integrated Definition." *Journal of Business Research* 88 (June 2017): 428–436. https://doi.org/10.1016/j.jbusres.2017.12.043 .

Xie, Y., K. Wang, and Y. Kong. 2021. "Prevalence of Research Misconduct and Questionable Research Practices: A Systematic Review and Meta-Analysis." *Science and Engineering Ethics* 27 (4): 41. https://doi.org/10.1007/s11948-021-00314-9.