Questionable research practices among Brazilian psychological researchers: Results from a replication study and an international comparison

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*R*esearch on scientific integrity is growing in psychology, and questionable research practices (QRPs) have received more attention due to its harmful effect on science. By replicating the procedures of previous research, the present study aimed at describing the use of QRPs among Brazilian psychological researchers and to make an international comparison with previous studies in other countries—the US and Italy. Two hundred and thirty-two Brazilian researchers in the field of psychology answered questions related to 10 different QRPs. Brazilian researchers indicated a lower tendency to engage in two QRPs (failing to report all of a study's dependent measures; deciding whether to collect more data after looking to see whether the results were significant) when compared to their Italian and North American counterparts, but indicated a higher tendency to engage in two other QRPs (selectively reporting studies that "worked"; not reporting all of a study's conditions). Most of the sample did not admit integrity conflicts in their own research but indicated that others have integrity problems, as observed in previous studies. Those discrepancies could be attributed to contextual and systemic factors regarding different publication demands among the different nations. Further studies should focus on identifying the antecedents of QRPs.

Keywords: Questionable research practices; Replicability; Meta-research; Scientific integrity; Bias.

Psychology has been increasingly rethinking its scientific practices and structures in recent years. This has been motivated by several factors, such as research fraud scandals (Callaway, 2011), lack of reproducibility of classical psychological studies (De Boeck & Jeon, 2018, Open Science Collaboration, 2015), adoption of research and publication models that incentivise novelty over truth (Nosek, Spies, & Motyl, 2012), widespread use of problematic WEIRD samples to support universal conclusions (Henrich, Heine, & Norenzayan, 2010), and lack of consideration toward contextual variables that embed the psychological processes (Pettigrew, 2018), among other issues.

QUESTIONABLE RESEARCH PRACTICES

One source of bias in scientific studies are the so-called questionable research practices (QRPs)

(John, Loewenstein, & Prelec, 2012). They are strategies used during the research process that, as pointed out by Agnoli, Wicherts, Veldkamp, Albiero, and Cubelli (2017), can maximise the chances of finding apparent evidence to support an expected result or to produce an attractive, counterintuitive research conclusion that is more likely to be published by scientific journals. In a way, we may interpret QRPs as strategies that researchers engage with to meet the demands for publishing innovative findings.

The concept of HARKing (Hypothesizing After the Results are Known), which is a well-known type of questionable research practice, has been subject to criticism for more than two decades (Kerr, 1998). Other examples of QRPs are: failing to report all of the study's dependent measures or conditions; interrupting or continuing data collection until one finds evidence in support of a

TABLE 1
Questionable Research Practices (QRPs) and self-admission rates in percentages for US, Italian, and Brazilian psychologists

QRP	US (John et al., 2012)		Italy (Agnoli et al., 2017)		Brazil	
	Self-admission rate (N)	95% CI	Self-admission rate (N)	95% CI	Self-admission rate (N)	95% CI
1. In a paper, failing to report all of a study's dependent measures	63.4 (486)	59.1–67.7	47.9 (219)	41.3–54.6	22.4 (232)	17.0–27.8
2. Deciding whether to collect more data after looking to see whether the results were significant	55.9 (490)	51.5–60.3	53.2 (222)	46.6–59.7	22.4 (232)	17.0–27.8
3. In a paper, failing to report all of a study's conditions	27.7 (484)	23.7–31.7	16.4 (219)	11.5–21.4	34.5 (232)	28.4–40.6
4. Stopping collecting data earlier than planned because one found the result that one had been looking for	15.6 (499)	12.4–18.8	10.4 (221)	6.4–14.4	10.3 (232)	0.06–14.3
5. In a paper, "rounding off" a p value (e.g., reporting that a p value of .054 is less than .05)	22.0 (499)	18.4–25.7	22.2 (221)	16.7–27.7	17.7 (232)	12.8–22.6
6. In a paper, selectively reporting studies that "worked"	45.8 (485)	41.3–50.2	40.1 (217)	33.6–46.6	54.7 (232)	48.3–61.1
7. Deciding whether to exclude data after looking at the impact of doing so on the results	38.2 (484)	33.9–42.6	39.7 (219)	33.3–46.2	19.8 (232)	14.7–25.0
8. In a paper, reporting an unexpected finding as having been predicted from the start	27.0 (489)	23.1–30.9	37.4 (219)	31.0–43.9	9.1 (232)	0.05–12.7
9. In a paper, claiming that results are unaffected by demographic variables (e.g., gender) when one is unsure (or knows that they do)	3.0 (499)	1.5–4.5	3.1 (223)	0.9–5.4	4.3 (232)	1.7–6.9
10. Falsifying data	0.6 (495)	0.0–1.3	2.3 (220)	0.3–4.2	0.86 (232)	−0.3–2.1
Mean self-admission rate	29.9%	-	27.3%	—	19.6%	—

Note: US and Italian statistics were taken from Agnoli et al. (2017).

hypothesis; "rounding off" numbers to favour statistical significance; selectively submitting studies that "worked" to journals, and falsifying data. The concern with such practices is not restricted to psychology. It has recently received attention from other fields such as biology (Barnett, Fraser, Parker, Nakagawa, & Fidler, 2018) and business (Butler, Delaney, & Spoelstra, 2017). The prevalence of QRPs has also been a focus of attention in medicine for over 10 years (Gardner, Lidz, & Hartwig, 2005; Geggie, 2001).

Studies carried out in the United States (US), Germany, and Italy have assessed QRPs prevalence among psychological researchers (Agnoli et al., 2017; Fiedler & Schwarz, 2016; John et al., 2012). John et al. (2012) conducted a survey in the US in which research psychologists responded to a questionnaire inquiring whether they had ever engaged in these practices. They developed a list of 10 different QRPs (see Table 1 for the items). Apart from asking whether they themselves, the research psychologists, had engaged in a QRP, John et al. (2012) also asked participants to estimate, according to their perception, the percentage of research psychologists at their university that employed QRPs at least once, and how likely they thought other psychologists would admit using QRPs.

Incentives were offered to respondents to make them more prone to being honest. These incentives were manipulated through two conditions: a Bayesian-truth-serum (BTS) condition, in which a scoring algorithm developed

by one of the authors (Prelec, 2004) was used to provide additional incentives for truth-telling, and a control condition, in which no intervention took place. In the BTS condition, each participant received the instruction that a charitable donation would be made on their behalf, and the size of it would be related to the truthfulness of their responses (which would be determined by the BTS scoring algorithm) (John et al., 2012).

Six QRPs were employed by more than a quarter of the respondents, and, out of these six, QRPs 1, 2 and 6 were admitted by more than half of the respondents (see Table 1 for the items). QRP 9 and 10 were used by less than 5% of the participants. The mean self-admission rate in the BTS condition was 36.6% (excluding the data falsification item [QRP 10]) and in the control condition, 33%. Additionally, odds ratio associated with differences between conditions along the practice was mostly negligible or moderate. As pointed out by Agnoli et al. (2017), the difference between the admission rates in the Bayesian Truth Serum and control conditions of John et al. (2012) was not substantial.

Additionally, rates of prevalence derived from the admission estimate added up to 100%, a method that was posteriorly criticised by Fiedler and Schwarz (2016). These authors conducted a replication of John et al. (2012) with members of the German Psychological Society regarding the use of the same QRPs items, although modifications were made in seven of them. Fiedler and

Schwarz (2016) also argued that the definition of prevalence in the original paper does not correspond to what is the prevalence of a practice in the research literature. As a result, the obtained prevalence estimates were lower by orders of magnitudes.

A more recent direct replication of the US study (John et al., 2012) was carried out with members of the Italian Association of Psychology (Agnoli et al., 2017). The findings pointed out that the percentages of Italian psychologists who admitted to having used the 10 QRPs were similar to the results obtained in the US, nevertheless, there were minor differences regarding self-admission rates for some QRPs. For instance, Italian psychologists reported engaging in QRP 1 (In a paper, failing to report all of a study's dependent measures) less often, as well as stated employing QRP 8 (In a paper, reporting an unexpected finding as having been predicted from the start) more frequently. Almost all researchers (88%) admitted using at least one of the practices, and they generally considered a practice possibly defensible if they had admitted using it. However, Italian researchers were much less inclined to consider a practice to be defensible than their US counterparts. Finally, participants estimated that the percentage of researchers who had used the practices was greater than the self-admission rates and estimated that psychological researchers would not be prone to admitting it.

RESEARCH INCENTIVES AND COMPETITIVENESS IN BRAZIL

Particularities in research contexts of different countries seem relevant to understanding antecedents and differences between QRPs used by researchers with different nationalities. In Brazil, there are more than 1500 full or part-time professors advising master's and doctoral students in the 80 graduate programs (master's degree and Ph.D.), and most of the Brazilian scientific research in psychology is performed in such graduate programs. About 320 of these professors receive the Productivity Research Grant from the National Council for Scientific and Technological Development (CNPq), the main federal funding agency. To receive this grant, the researcher needs the approval for a research project and to achieve goals related to three productivity indicators: (a) participating in the scientific community (ex: board of scientific associations, committees in funding agencies), (b) supervising graduate students and (c) publishing scientific articles. This last indicator corresponds to 70% of the evaluation and is based on the number of published articles during a period (five or 10 years, depending on the funding resource) and on the quality of the journals in which these articles were published. Only 49% of the proposals are recommended for receiving this grant, and only part of these recommendations receive the funding.

It is an indicator of the competitiveness and pressure for publishing articles in the Brazilian system.

Furthermore, the national system of evaluation of graduate programs defines publication goals as requirements to maintain their working authorization, and in the past 15 years it has also defined an increase in the internationalisation of the scientific production as the main goal to the whole system, which illustrates the high pressure for researchers to publish internationally (Bastos, Tomanari, Trindade, & Andery, 2015; Gomes & Fradkin, 2015; Guzzo, Linhares, Teodoro, & Koller, 2015). According to Scimago (www.scimagojr.com), which analyzes the international impact of psychological scientific publication based on Scopus database, Brazil holds the 15th position in the ranking when considering the number of documents published between 2007 and 2018. While the US and Italy hold first and eighth positions (respectively) in both number of published documents and citations, Brazil's ranking in citations falls to the 18th position. It should be noted that only 20 of the 60 Brazilian psychological scientific journals are included in the Scimago ranking and that most of these publish papers only in the Portuguese language. It is relevant to consider demands to publish internationally because, for most of the Brazilian researchers, it is harder than publishing inside the country, augmenting the chances of using QRPs to get published.

Despite the relevant criticisms of Fiedler and Schwarz (2016), it may be useful to compare different estimations to shed light on the prevalence of QRPs among different nations and institutional constraints on the researchers seeking to publish their work. Such comparisons may help to more clearly elucidate the influence of the immediate social context on scientific practices such as QRPs. The aim of the present research is to estimate the prevalence of QRPs among Brazilian psychological scientists through a replication of Agnoli et al. (2017) and to make an international comparison of prevalence among Brazilian, North American, and Italian samples. To the best of our knowledge, there are no studies are describing the prevalence of QRPs among Brazilian researchers in any field. Some authors have broadly discussed about research integrity in the country (Lins & Carvalho, 2014; Vasconcelos, Sorenson, Watanabe, Foguel, & Palácios, 2015), but there is no evidence about the frequency of QRPs in any scientific field. Therefore, the present study is the first to describe evidence about QRPs in a non-WEIRD country and may stimulate new investigations about this topic in different areas of research in Brazil.

METHOD

Participants

Like in the study of Agnoli et al. (2017), participants were recruited online via e-mail and invited to complete

the survey by accessing a website link. This method of data collection preserve participants' anonymity and may predispose them to be more self-disclosing than they would be if other methods of data collection were used. E-mails were sent with permission to lists of researchers from Brazilian psychological associations which congregate psychological researchers, specifically the *Sociedade Brasileira de Psicologia* (SBP—Brazilian Psychological Society) and the *Associação Nacional de Pesquisa e Pós-Graduação em Psicologia* (ANPEPP—National Association of Research and Graduate Studies in Psychology). E-mails were also sent to the Department Chairs of every Brazilian psychology graduate program asking them to forward the invitation to their e-mail lists, especially research faculty.

The sample size was determined by means of a power analysis through the pwr R package (Champely, 2012). A two-sided test for one proportion was performed by adopting the following parameters: $\alpha = .05$, $1 - \beta = .8$, $h = .2$, indicating a sample size of 196 participants. The effect size of .2 can be considered a low effect size and was assumed in the absence of data from a meta-analysis to justify a more precise value for this estimation. As effect sizes from singular studies are frequently biased, the decision to expect at least a small effect size could provide a less biased estimation. We initially obtained 649 participants and excluded all participants that had not answered at least the first question about the 10th QRP. By answering this question, participants would have completed roughly 60% of the survey. This exclusion criterion resulted in a sample of 239 participants with only seven participants not having completed the entire study. We opted to exclude those as well, to have a data frame with complete cases.

The final sample was comprised of 232 participants which were mostly white (75%), female (67%), Brazilians (99%) and had a mean age of 40.68 (*SD* = 12.03). Our participants were researchers in the psychology field from both public (66%) and private (34%) institutions (one participant did not answer this question). Most of them were professors (52%), when considering adjunct, substitute, assistant, associate and emeritus professors under the same category, graduate students (38%), post-doctoral researchers (3%) or other occupations (7%).

Measures and materials

Like in the study of Agnoli et al. (2017), the original instrument from John et al. (2012) was separately translated and adapted to Brazilian Portuguese by two native Portuguese language speakers. A combined version was created after reaching a consensus of questions by these two translators. This version was then back translated to English by one bilingual native English-speaking translator with experience in psychological research, and

this version was compared to the original instrument to ensure that both versions were semantically similar. Minor changes were performed to reach a final version.

In the final version, the 10 original QRPs (John et al., 2012) were presented to each participant in a fixed order. For each QRP, participants were asked to complete four mandatory items and two optional open-ended items before proceeding to the next QRP. The first four mandatory items were: (a) Prevalence estimate—estimated percentage of Brazilian psychological researchers involved in the practice described above (slider scale from 0 to 100); (2) Admission estimate—estimated percentage of Brazilian psychological researchers who would admit to have performed this practice (slider scale from 0 to 100); (3) Self-admission rate—admission of having engaged in the practice (Yes or No); (4) Defensibility—if the participant admitted having engaged in the practice, he or she was asked about the degree to which the practice was justifiable (Yes, Possibly or No).

Two optional open-ended questions allowed participants to explain their answers to the defensibility item if they answered "Yes" (open-ended question 1) or "Possibly" (open-ended question 2) on this item. If participants chose one of these two response options, it means that they thought the practice was defensible and these open-ended questions allowed them to argue about that. A derived prevalence estimate was obtained by dividing self-admission rate by admission estimate (John et al., 2012). Estimates were capped at 100% (only QRPs 3 and 6 exceeded 100% by a small margin). Prevalence and admission estimates depend on the accuracy of participants' knowledge of their own research community, so the derived prevalence estimate should not be treated as an estimate of actual behaviour (Fiedler & Schwarz, 2016). This estimate is plotted in the present study (Figure 1) to allow comparability with previous studies that also calculated this derived prevalence estimate (Agnoli et al., 2017; John et al., 2012). A last question delivered to participants regarded how suspicious they were about the integrity of the research carried out by their own work, graduate students, researchers at other institutions, and researchers at their own institution. The response options to such questions were never, once or twice, occasionally and often.

Procedure

Participants were recruited online via e-mail and invited to complete the survey by accessing a website link. Considering the arguments presented by Agnoli et al. (2017), as well as the findings of John et al. (2012) regarding the fact that there was no substantial difference between the Bayesian Truth Serum and control conditions, this study attempted to replicate the procedure adopted by Agnoli et al. (2017), therefore, running only the control condition of the original study of John et al. (2012).
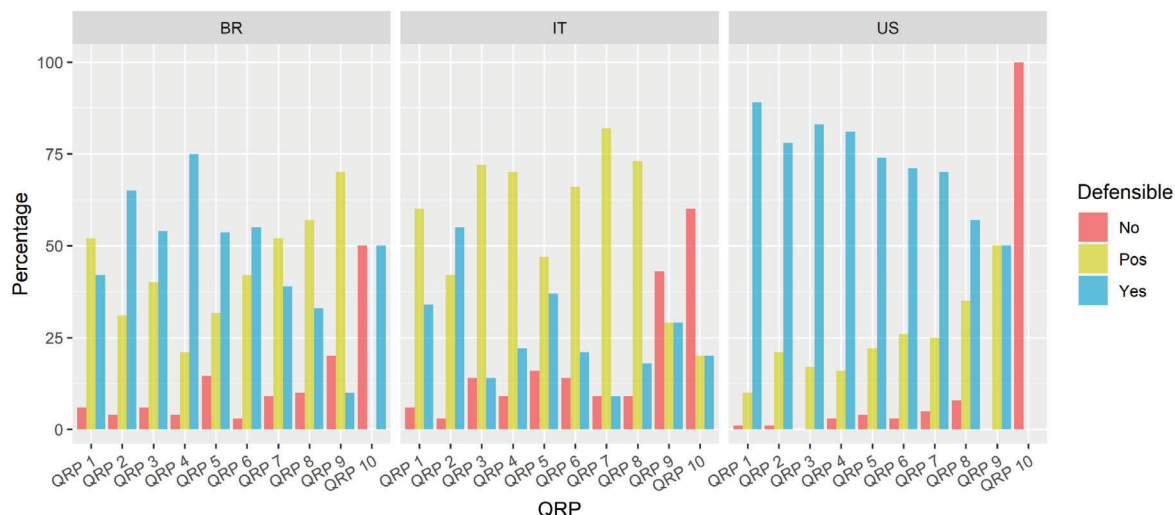
Figure 1. Defensibility response percentages in the US, Italian (IT), and Brazilian (BR) samples. [Colour figure can be viewed at wileyonlinelibrary.com].

The study reported in this manuscript strictly followed the Ethical Principles in the Conduct of Research with Human Participants proposed by the American Psychological Association. Participants were informed about the purpose of the study, limits of confidentiality, assurance of anonymity, potential risks and benefits of participation, and the rights to withdrawal from the study at any time without penalty. Agreement with the informed consent was obtained from all participants on the first page of the survey and was mandatory for participation. After that, participants answered to the full Portuguese version of the QRPs scale (John et al., 2012) and to the same questions that Agnoli et al. (2017) used about gender, age, ethnicity, area of research, and current professional status.

Compliance with Ethical Standards: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual adult participants included in the study.

RESULTS

The general outline of the introduction, method, and data analysis used in the present study was pre-registered before data collection at the Open Science Framework (OSF). The anonymous raw data and R code for conducting the present data analyses are available at the OSF (https://osf.io/f3svc). Data analysis associated with the answers to the open-ended questions will not be described in the paper due to size constraints of the journal.

Self-admission rates and corresponding confidence intervals for Italian (Agnoli et al., 2017), Brazilian and North American (John et al., 2012) psychologists in the control group of John et al. (2012) are presented in Table 1. As stated by Agnoli et al. (2017), self-admission rates across QRPs were similar among North American and Italian research psychologists, and were also highly correlated, $r = .94$, 95% CI [.76; .99].[1] Some significant differences should be highlighted regarding the Brazilian psychological researchers' sample. The average correlations between the Brazilian and the previous samples of North American and Italian researchers were lower than the one found between North American and Italian researchers, $r = .48$, 95% CI [−.21; .85], and $r = .43$, 95% CI [−.28; .83], respectively.

When inspecting the QRPs individually, self-admission rates for QRP 1 (In a paper, failing to report all of a study's dependent measures), QRP 2 (Deciding whether to collect more data after looking to see whether the results were significant), QRP 7 (Deciding whether to exclude data after looking at the impact of doing so on the results) and QRP 8 (In a paper, reporting an unexpected finding as having been predicted from the start) were about twice to three times lower for Brazilian respondents when compared to the North American and Italian ones (see Table 1). On the other hand, rates were higher for QRP 3 (In a paper, failing to report all of a study's conditions), QRP 6 (In a paper, selectively reporting studies that "worked"), and QRP 9 (In a paper, claiming that results are unaffected by demographic variables [e.g., gender] when one is actually unsure [or knows that they do]) in the Brazilian sample. While the

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[1]Based on the data available, our analysis of the correlation between US and IT samples resulted in a lower association, $r = .87$, 95% CI [.52; .97]. However, results still suggest a high association between self-admission rates.
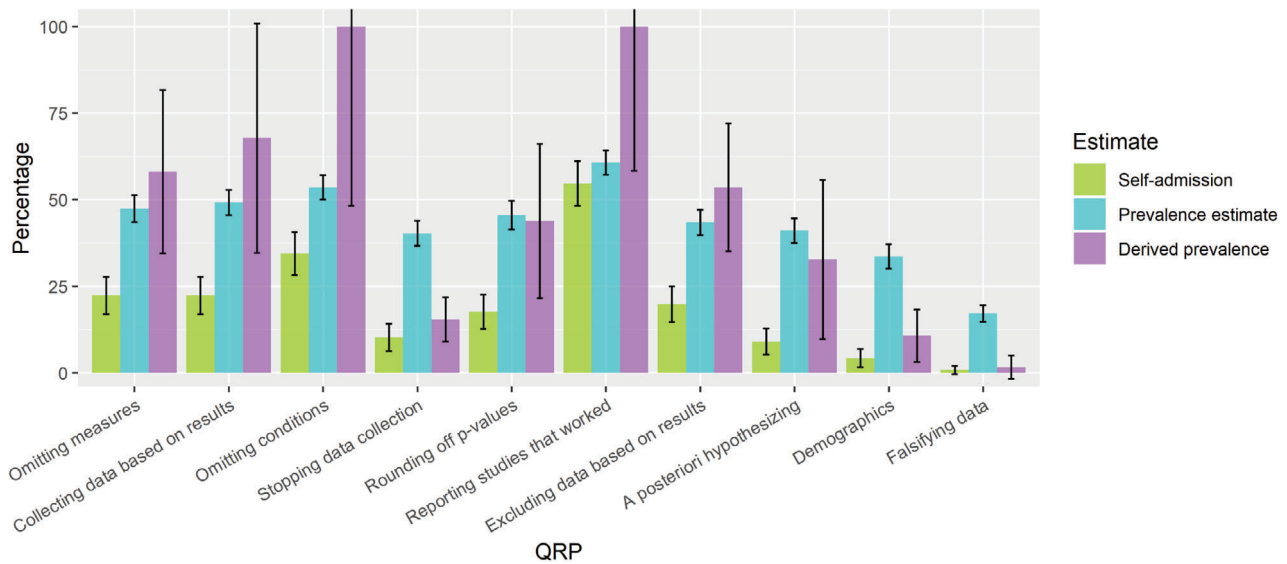
Figure 2. Self-admission rate, prevalence estimate, and derived prevalence estimate in the Brazilian sample. [Colour figure can be viewed at wileyonlinelibrary.com].

mean self-admission rate across all 10 QRPs was 27.3% for the Italian sample and 29.9% for the North American sample, this mean was 19.6% in the Brazilian sample (see Table 1). Almost all research psychologists in Italy (88%), the US (91%) and Brazil (85%) reported having employed at least one QRP. Very few US, Italian and Brazilian participants admitted ever falsely claiming that results were unaffected by demographic variables (QRP 9) or falsifying data (QRP 10).

Figure 1 presents the distributions of judgments about QRP's defensibility among the countries (see Table 3 for the number of participants in Figure 1 for each country and QRP along with chi-square tests of difference between samples at https://osf.io/f3svc/). North American and Brazilian research psychologists tended to see their own research practices as more defensible than Italian ones (see blue bars in Figure 1). For instance, most of the Brazilian (60.5%) and North American (77.4%) researchers considered QRPs 2–6 to be defensible, while most Italian (59.4%) regarded them only as possibly defensible. On the other hand, most Brazilian (53.7%) and Italian researchers (71.6%) considered QRPs 1, 7 and 8 to be possibly defensible, while North American researchers tended to think they were defensible (72%). As shown in Table 1, the mean self-admission rates in the Brazilian sample was lower than in the Italian one. The same pattern is observed in respondents' prevalence estimates (mean: Brazil = 43.2%; Italy = 47.5%) and derived prevalence estimates (mean: Brazil = 50.1%; Italy = 82.3%) in Figure 2. The highest derived prevalence estimates in the Brazilian sample were for QRPs 3 and 6. The Brazilian sample also presented derived prevalence estimates that were generally lower for all QRPs in comparison with those observed in the North American
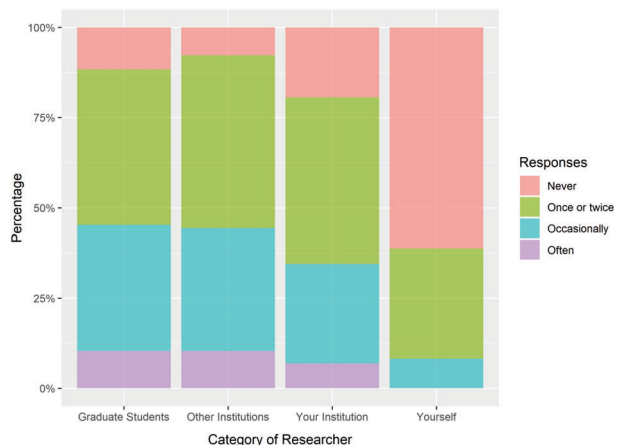
Figure 3. Distribution of responses regarding doubts about the integrity of other researchers and themselves in the Brazilian sample (N = 232). [Colour figure can be viewed at wileyonlinelibrary.com].

and Italian samples (see Figure 1 in Agnoli et al., 2017, and Figure 1 in John et al., 2012).

Researchers were asked about how suspicious they were about the integrity of the research carried out by their own work, graduate students, researchers at other institutions, and researchers at their own institution. Agnoli et al. (2017) and John et al., 2012 also asked about doubts regarding the integrity of the researcher's own collaborators, but this question was accidentally not included in our survey. As can be seen in Figure 3, Brazilian researchers occasionally doubted the integrity of other researchers, but they had infrequent doubts about the integrity of their own work. Similar frequencies of responses were found across countries: researchers reported having

TABLE 2
Frequencies of participants, mean self-admission rate and defensibility responses by demographic category in the Brazilian sample

Demographic category Psychology subfields[b]	N	Self-admission rate (%)	Defensibility (%)[a]		
			No	Possibly	Yes
Social	37	18.1	2.4	8.2	10.6
Organisational and work	30	18.7	1.6	10	10.8
Clinical	26	19.2	.9	10	12.3
Development	20	22.0	0	11.5	11
Behaviour analysis	19	18.9	0	12.7	11.3
Psychological assessment	17	19.4	2.5	10.6	8.1
School and education	17	16.5	2.8	8.6	9.3
Health	16	20.0	0	10.7	13.6
Mental health	12	12.5	0	0	17
Other	38	18.8	.8	6.7	16.9
Career position[c]					
Graduate student	89	17.2	1.5	8.8	10.5
Assistant professor	10	19.0	2.8	11.4	17.1
Post-doc	6	16.7	0	8	12
Adjunct professor	55	21.3	2.4	10.6	10.8
Associate professor	23	20.9	0	7.1	16.2
Full professor	23	25.6	1.3	11.7	13
Other	23	18.3	.52	8.4	13.7

[a]Percentages calculated considering all participants. [b]Participants could select more than one subfield. [c]Three participants were substitute professors. They were omitted from Table 2 due to their small number.

doubts about their own integrity (endorsing at least one item)—31% US, 35% Italian and 31% Brazilian—, and occasionally or often having doubts about the integrity of researchers of other institutions—49% US, 51% Italian and 44% Brazilian (Agnoli et al., 2017).

Concerning the self-admission rate in psychology subfields, the frequency was similar within subfields with a slightly higher percentage in developmental, health, clinical psychology and psychological assessment (see Table 2). The subfields with highest self-admission rates among previous studies were social, cognitive, and neuroscience in John et al. (2012) and social, experimental and organisational in Agnoli et al. (2017), so no clear patterns emerged from all three studies. When career position is considered, as presented in Table 2, the self-admission rates increase with the seniority level, following the same pattern described by Agnoli et al. (2017) (John et al. (2012) did not report data about career position).

DISCUSSION

The purpose of the present research was to describe the occurrence of QRPs among Brazilian psychological researchers and to make an international comparison with Italian and US samples. These purposes were reached through the direct replication of the procedure carried out by Agnoli et al. (2017). The results showed similarities between the use of QRPs among nations, but some differences were also observed. Considering the similarities, the entire sample of the present research recognised all the QRPs that were presented to them, indicating that

this QRP list might be recognisable by psychological researchers from other non-WEIRD countries.

Brazilian psychologists generally presented lower self-admission rates when compared to Italians and North Americans. They also reported lower engagement in QRPs 1 and 2, but a higher use of QRPs 3 and 6 in comparison to the other countries. One practical implication of these findings is that, in Brazil, graduate programs in psychology should emphasise the importance of avoiding QRPs among their graduate students and professors, especially the practices of selective omission of experimental conditions (QRP 3) and only reporting studies that "worked" (QRP 6). As both QRPs tend to increase publication bias in psychology (Francis, 2013), concrete actions with the goal of raising awareness among psychologists carrying out research could potentially benefit the transparency, quality and impact of studies conducted in Brazil. This could possibly be improved by requiring graduate students, postdoctoral researchers and professors associated with graduate programs to pre-register their studies before data collection in platforms such as the Open Science Framework (Asante et al., 2017) and by including classes about QRPs nature and consequences in introductory and mandatory courses. The actual impact of such interventions is currently unknown and future studies describing data about it could be useful to persuade psychological researchers to carry out changes in Brazilian graduate programs. Several factors could explain the differences observed in the Brazilian sample, such as a higher frequency of use of specific qualitative methods in the Brazilian context, to which

some of the QRPs are just not applicable. Unfortunately, data about the specificity of the editorial guidelines of scientific journals to which Brazilian researchers usually submit their manuscripts were not evaluated. Therefore, considering the type of research carried out among Brazilian psychologists (i.e. qualitative × quantitative), the editorial guidelines of Brazilian scientific journals could complement the present study with contextual information, and this could be further explored in future studies.

The most relevant differences between the Brazilian and the previous international samples were related to self-admission rate, prevalence estimate and derived prevalence. Brazilians tended to report lower levels in all three indices, which was also evidenced by the correlations between samples. Regarding the defensibility of QRP's, Brazilians and Italians presented similar evaluation patterns. North Americans, on the other hand, tended to consider all QRPs as more defensible than researchers from the other two countries.

These differences could be attributed to a more competitive academic environment for researchers in the US if compared to Brazil or Italy. Another potential explanatory factor is the increasing worldwide discussion about the importance of avoiding QRPs after the publication of John et al. (2012), which received more than 1140 citations according to Google Scholar (information obtained in 8/29/2019). Many other publications following this article warned against the harms associated with QRPs, which could have increased researchers' awareness of these issues in recent years (Agnoli et al., 2017; De Boeck & Jeon, 2018; Fiedler & Schwarz, 2016). This could potentially have influenced participants' responses found in the more recent samples of the Italian and Brazilian studies, but previous familiarity with these discussions was not measured in the present to evaluate this possibility.

In fact, it was surprising that high rates of engagement with different QRPs could still be observed in Brazil and Italy despite the worldwide debates and numerous publications that have been put forth since John et al. (2012). The present study indicates that the current strategy adopted by the open science movement within psychology may not be reaching effectively researchers from other countries like Brazil. For this reason, other international comparisons including data from non-WEIRD countries could offer a more complete portrait of how psychological science is changing (or not) its practices outside developed countries. Evidence like this may signal the need to develop other strategies to disseminate knowledge about research integrity and replication around the world more effectively.

As it is typical in research on sensitive issues, most of the sample did not admit integrity conflicts in their own research, but they stated that they believed others have integrity problems, similarly to what was previously observed by Italian and North American researchers. This result suggests that social desirability might be a strong potential bias in this topic of research. This is one of the limitations of the present study and further investigation about research integrity should deal with this challenge using different methods to minimise social desirability bias.

Some contextual and antecedent factors should also be noted regarding the use of QRPs. These can be identified in the immediate social context in which researchers do their work. As evidenced in this study, there are differences between the Brazilian and the other two samples collected previously. Such differences could be attributed to factors such as: (a) the frequent use of qualitative methods (in which QRPs might be present in different formats than those captured by previous authors); (b) the possibility that QRPs are not well addressed as a discussion subject in graduate programs, resulting in a lack of awareness among researchers; (c) the fewer academic professional opportunities (which pressures young researchers to seek out work in areas which do not demand publication for career development); (d) the evaluation processes for professors in most public universities, which do not require publishing scientific papers to achieve tenure (only being part of a graduate program where researchers have publication goals); (e) and the job opportunities in the private higher education sector that are commonly focused on teaching, not research.

The cultural context in which the studies about QRP were conducted may also play a role in what was found, as there are known cultural differences when it comes to moral judgments and actions. For example, North Americans and Brazilians differed in how they judged non-harm-based morality situations (Haidt, Koller, & Dias, 1993). While North Americans of high social economic status did not consider disgusting and disrespectful actions as moral transgressions as long as these actions were perceived to have no harmful interpersonal consequences, in low Socioeconomic status groups, especially in Brazil, scenarios that involved disgust and disrespect were considered moral transgressions even when they were perceived to be harmless.

Corruption is a frequent topic in the Brazilian media and population given the recent political scandals that Brazil has been living in recent years (BBC, 2018). Media's emphasis on potentially relevant subjects may cause individuals to focus on their considerations when forming opinions, for individuals have the inclination to use cognitive short-cuts in information processing (Price & Tewksbury, 1997). In this context, morally debatable actions such as some of the QRPs (i.e., falsifying data) may fall under the category of chronically accessible schemas, and, therefore, Brazilians may react to these things differently when compared to people in other nations.

Another issue is that, differently from Brazil, data from the US, Italy and Germany about QRPs was composed of samples from WEIRD societies. In fact, WEIRD samples are considered to be outliers and unrepresentative of the rest of the species when it comes to a wide range of domains, such as moral reasoning, reasoning styles and self-concepts (Henrich et al., 2010). Thus, additional replication studies ought to be conducted to further investigate if similar findings could be found between Brazilian researchers and researchers from other non-WEIRD countries. One limitation of the current investigation is that, although the method and data analysis planned for the present study were pre-registered before data collection, the pre-registration process lacked details about the statistical techniques that would be employed, elaboration of confirmatory hypotheses, and it was not formally frozen in time as it would be ideal due to lack of familiarity with this procedure in the OSF platform. In future studies, we intend to develop more detailed pre-registration documents with confirmatory hypothesis based on previous findings and theory, and to properly create a frozen-in-time version of it. Our international comparison only included data about three countries, which is another limitation of the study. Nevertheless, an important contribution of the study was to present the first evidence of engagement with QRPs from a non-WERID country, widening the current knowledge about the frequency and variation in the use of QRPs within psychology around the world.

The present research has shown that there are differences in prevalence among nations which deserve further investigation. The use of such practices is deleterious for the development of science since it increases, for instance, the probability of false positives. If not addressed, these practices can spread and become the normal practice for new generations of scientists, pushing science away from its true objective: to produce accurate and clear information about the world, the human mind, and behaviour. A promising path for future studies is comparative research of QRPs by exploring the contextual and systemic factors that could predict their use in other non-WEIRD countries.

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