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***SENSITIZING UNDERGRADUATE STUDENTS TO THE NATURE, CAUSES,
 AND CONSEQUENCES OF RESEARCH FRAUD: PRELIMINARY REPORT***

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At the 1990 APA annual convention in Boston (Public Interest Coalition meeting, August 16), considerable concern was expressed about the rise in uncovered research fraud incidents in the behavioral and social sciences. It was also noted that relevant teaching materials designed for undergraduate students were nonexistent.

Inattention to issues of scientific misconduct during early training may numb students to the more serious versions of misconduct. It is even possible that “little scientific misdemeanors” are unwittingly reinforced at the undergraduate level. For example, most teaching psychologists have probably observed that undergraduate students do not seem to label their projects as “real research,” possibly because professors nurture that notion by referring only to published (or publishable) work executed by people who have received post-graduate training. Therefore, students may be more likely to believe that the rules of science, including those related to integrity, are not applicable to the work they are doing.

The term “significant findings” may often be misunderstood by undergraduates as a qualitative rather than a quantitative concept. That is, “nonsignificant” findings are seen by students as equivalent to “poorly done” or “uninteresting” or “of little value. Therefore, students in a competitive situation may be willing to fudge or bend data in order to “reach significance.” Finally, beginners at anything are often given latitudes simply because they are in the process of learning. Unfortunately, excused behavior early on—such as a sloppy calculation or a plagiarized paragraph—may desensitize students to the seriousness with which such behavior is viewed once one becomes an acknowledged scientist.

The APA Division Two (Teaching of Psychology) Executive Committee supports the creation of a pamphlet for use by undergraduate teaching psychologists that contains hints for sensitizing undergraduate students to scientific values. Before we start this phase, we decided to collect some survey data from undergraduate students to confirm that “early warnings” did indeed exist rather than rely on anecdotal data or informal observation. Survey forms (see attached) were sent to 120 psychology majors who would be graduating within one month from California State University, Northridge. This enabled us to assure that the requirements for graduation (which included at least one upper-level statistics class, one experimental psychology class, and two research seminars) had been completed. We received 65 responses. Preliminary

discriminant analyses indicate differences among the students based on their overall GPA. However, at this time we offer some general findings of interest. (Item numbers correspond to those in the survey form.)

A worrisome percentage of students appear to excuse scientific misconduct if the perpetrator committed the offense—in this case, inventing data (see #1)—because he was having serious personal problems (death of father). The vast majority of students believed that the perpetrator, if caught, should simply be given another chance to do the job correctly rather than receive censure. Or, in a case of data trimming—in this case, deleting observations on two outlier rats (see #3)—the act was generally seen as unethical. But, if caught, most respondents believed that the students should only be asked to reanalyze the data without the prior deletions and no further discussion or penalty should be imposed on them.

Fudging data “just a little bit” in order to reach significance (see #2) was judged as very unethical by 59% of the respondents, but 41% assigned a less serious judgment to such behavior. Five percent indicated that this act is “the sort of thing that just has to be done sometimes in life.” Altering a hypothesis mid-stream in order to support emerging data trends was seen as acceptable by over a fifth of the respondents (most reasoning that the study will receive more interest if it reports significance), and very unethical by only a quarter of the subjects (see #6). Or, more disturbingly, over a third of the respondents thought that it was OK to fudge data a little to reach significance just so long as it was not the final report—in this case, a thesis progress report meeting (see #10)—and that the perpetrator vows that he will report honest data when the final paper is submitted.

Writing a term paper by only slightly altering material written by someone else (see #5) was seen as OK by almost 20% of the respondents and only a minor infraction by an additional 25% as long as the sources are cited in the bibliography. Only 5% of the respondents believed that it was OK to count an entire problem wrong because of a computational error because “accuracy in science is important” (see #9, part 2). Most in this sample also viewed willful scientific misconduct to be a markedly different matter from carelessness or too-hastily-executed work. Citing secondary sources and reporting them as if they were consulted directly was not seen as an ethical problem by most of the respondents even if the professor specifically required that only primary sources be reported (see #7).

Most students said that they would confront a professor who was planning to publish falsified data to tell him that he was “making a mistake,” and that they would take additional action if the professor ignored their warning (see #4). However, 15% indicated that there was nothing else that they could do about it if the professor decided to ignore their confrontation. When students observed a peer falsifying data (see #8), most said they would confront the offending student. However, 20% would not, indicating that this “was the student’s problem,” and only 55% judged student falsification of data as “very unethical.”

Substantial numbers of students did believe that class projects reporting statistically significant findings were more likely to earn better grades and that an assignment reporting non-significant findings would have to be superior in order to compensate (see #8 & 9, part 2).

Respondents do overwhelmingly believe that people who cheat when they are students are more likely to cheat later on and disagree that the amount of scientific fraud is low and that most cases of data fraud committed by already-established scientists are quickly discovered (see #5, 3 and 6, part 2).

These general trends should not be interpreted to mean that students are not correctly socialized. We are concerned, however, that enough of them—including some representative of those with near-perfect “GPA’s with plans to go on to graduate school for PhD degrees—have already incorporated the equivalent of “petty scientific thievery” as acceptable (or at least not particularly problematical) when warranted by a needed outcome, such as getting a good grade.

As a future project, we plan to create a handout to help make teaching psychologists and students more aware of these problems. Care will be taken to create a presentation that students will find engaging and interesting. Fortunately, for an unfortunate reason, this is easy to assure because the stories of abuse—such as the “patchwork mouse” (see Hixon, 1976), Sir Cyril Burt’s fictitious data reinforcing the British tier system of education (see Kamin, 1974), and the fabricated data by J. B. Rhine’s overly ambitious successor at the Institute for Parapsychology at Duke University—are inherently fascinating. Liberal use of case studies will help illustrate the individual motivating factors (reputation, recognition by one’s peers), ways the scientific enterprise unwittingly fosters dishonest behavior (e.g., pressure by funding agencies to achieve results in order to extend funding), and the devastating consequences (e.g., betrayal of the public trust, contamination of the knowledge stockpile).

Readings of Interest

Broad, W. J., & Wade, N. (1982). Betrayers of the truth. New York: Simon and Shuster. (Great source of material for discussion with students. Well-written and fascinating.)

Committee on Government Operations. (1990). Are scientific misconduct and conflicts of interest hazardous to our health? Washington, DC: U.S. Government Printing Office. (Accounts of major contemporary scandals in science. The risks and tragic outcome of blowing the whistle are illustrated throughout.)

Sigma Xi (1991). Honor in science. Research Triangle Park, NC: Author. (An outstanding booklet, aimed primarily at graduate students and early-career scientists.)

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Below are ten scenarios taking place in university settings that could lead to differences in opinion and controversy. Please enter your opinions.

1. Sam and each of his classmates were assigned the task of collecting survey data on 25 people in a crowded mall as part of a social psychology class project. Many of the classmates were upset because they were given only one week to accomplish this difficult task. Sam was particularly distressed because he had just gotten over the flu and was already way behind in all of his classes. Furthermore, Sam’s father had recently died and his mother was very distraught and needed Sam’s comforting. Sam decided to fill out his 25 survey forms himself because he just did not have time or emotional or physical energy to go to the mall and do it the way it was assigned.

Sam's behavior was (Check only one.)

- Extremely unethical
 Generally unethical
 Somewhat unethical
 Not unethical

If Sam's professor learned about how Sam created his data, what would be the appropriate and fair way for the professor to deal with it? (Check only one.)

- Let Sam off the hook due to his many troubles.
 Assign Sam a grade of F on the project and report him to a higher school authority.
 Assign Sam a grade of F on the project, but not report him to a higher school authority.
 Give Sam another chance to collect the data properly.

2. Terry changed some of the data she collected just a little bit because it was so close to supporting her hypothesis. The professor had told her that if she reached significant findings, she might be able to present her study at a professional meeting. Terry has worked very hard in school, but knows that having a research paper on her record will substantially boost her chances of getting into a graduate program. (Check only one reaction.)

- Terry's action was one of those things that has to be done sometimes in life.
 Terry's action was slightly unethical.
 Terry's action was generally unethical.
 Terry's action was very unethical.

3. Deb and Tony helped their professor run a study using rats. It was hoped that the study would be seen as important and published in a journal. During the runs, two of the 100 rats behaved very differently from the others. Deb and Tony figured that because these rats were so "out of step" with the others, they would delete their scores because they did not seem to be representative of rat behavior. Does this pose a problem? (Check only one.)

- That was a generally acceptable thing to do under the circumstances.
 It probably didn't matter much one way or the other.
 The data for the two "different" rats should have been left in.
 The data for the two "different" rats should have been left in and it was unethical and poor scientific practice to cut that data out.

If Deb and Tony's professor found out that they had deleted the data from two rats, what would be the appropriate way for the professor to deal with it? (Check one.)

- Thank the students for making an appropriate decision.
 Ignore it because it was not important.
 Ask the students to reanalyze the data including the two "off beat" rats, without further comment about what the students did.
 Scold the students.
 Terminate the students' involvement in the research.

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4. Jamie was Dr. Hobbs' research assistant. Dr. Hobbs was her favorite professor, and she was grateful for the opportunity to work with him. This would also look terrific on her own record, and she could count on a good letter of recommendation as well. Jamie knew that Dr. Hobbs was trying to get promoted, and so she did extra careful work. When it came time for Dr. Hobbs to analyze the data, Jamie was puzzled. The data being analyzed were not the data she had collected for Dr. Hobbs. She compared her records and verified that the two sets of numbers were different. What would you do if you were Jamie? (Check as many as would apply to your approach.)

- Approach Dr. Hobbs and tell him that he "made a mistake."
 Say nothing, assuming that Dr. Hobbs had some sensible explanation.
 Say nothing, because Dr. Hobbs might withdraw his support (for example, he might no longer be willing to write a letter.)
 Say nothing because it is not a student's place to question a professor.
 Tell other students, and ask what they would do.
 Tell the Department Chair that Dr. Hobbs may be falsifying data.
 Tell another professor one trusts and admires and ask for advice.

(Continued from above case). If Jamie chose to express concern to Dr. Hobbs directly, and Dr. Hobbs told her "not to worry about it" and then he went ahead and published his data and got promoted, what then? (Check only one.)

- There is nothing that Jamie can really do about it.
 Jamie should again confront Dr. Hobbs and request that he admit that the data are not correct.
 Jamie should contact one of Dr. Hobbs' superiors and tell them the story.

5. Jenny was writing a paper on children's play behavior. Although she did properly cite her sources in a bibliography, most of the paragraphs in her paper were only slightly altered versions of the books she used. How do you see Jenny's actions. (Check only one.)

- It is OK because she did not copy "word -for-word."
 It is OK because she did cite all of the references that she consulted in the bibliography.
 This was a minor ethical infraction.
 This was a moderate ethical infraction.
 This was a major ethical infraction.

6. Jack was conducting a study that he had planned for a long time. As he was collecting data, he began to notice that the hypothesis he had going into the study was not being confirmed. However, something else that would definitely confirm another hypothesis was unfolding. He decided to change his hypothesis. (Check one or more if they apply.)

- This is acceptable because he had not yet finished collecting data when he changed his hypothesis.
 This is acceptable because there will be more interest in his study due to the fact that he will have supported a hypothesis.
 This is a minor ethical infraction.
 This is a moderate ethical infraction.
 This is a major ethical infraction.

7. The professor assigned a term project, and it was clearly stated that students should consult ten primary sources (e.g., going to original presentation of the material, such as a journal article). Tom had a difficult time locating ten primary sources for his term paper. However, in the six primary sources he did find in the library, descriptions of the information found in four others was quite extensive. He wrote his paper, citing all ten sources. He did not, however, indicate that for four of them he had gotten the information from a secondary source. Strictly speaking, Tom should have indicated that (e.g., Smith, 1986, as cited in Jones, 1987). How do you see Tom's action? (Check as many as apply.)

- It's OK because he did get information about all ten works.
- It's OK, but not the best way to do a good term paper.
- Tom should have indicated that his presentation of four works was based on secondary sources.
- This was a minor ethical infraction.
- This was a moderate ethical infraction.
- This was a major ethical infraction.

8. Sam and Joe were assigned the use of the same lab space to run their experiments. Sam used the room early in the morning until about noon. He noticed that everything was exactly as he left it when he returned the following day, suggesting that Joe never used the room. He asked if anyone ever saw Joe come in, and nobody had. Joe's materials never "moved" and began to collect a thin coat of dust. However, Joe always handed in his weekly data sheets. What should Sam do? (Check only one reaction.)

- Nothing, this is Joe's problem.
- Nothing. Give Joe the benefit of the doubt.
- Nothing. Getting involved is too messy.
- Speak directly to Joe about his suspicions that Joe is not actually collecting data.
- Speak to the professor about his suspicions that Joe is "forging" (making up) data.

Assuming Joe was "forging" his data, how serious do you see Joe's infraction to be? (Check only one.)

- Not serious
- Mildly serious
- Serious
- Very serious

9. Dr. James, a statistics professor, counts the entire problem wrong on a test or homework assignment even if only a minor computational error (e.g., error in addition) was involved. (Check one.)

- It is unfair to take points off if only a minor computational error is involved and everything else was done correctly.
- This is appropriate because accuracy in science is important.
- Only partial credit should be deducted due to a computational error.

10. Jeff has developed a theory on how to help learning disabled children read. He believed in the theory, but had difficulty finding a technique that would support it. The deadline for his thesis progress meeting is fast-approaching. At the last minute he discovers a technique that appears to

support his hypothesis, but not at a statistically significant level. He decided to change his preliminary results a little to look more impressive to the committee so that they will encourage him to continue on that track. He plans to be completely honest with the actual study. (Check one or more reactions.)

- ____ No harm is being done here, and Jeff buys a little time to try to sharpen up his technique.
 ____ This is only a minor indiscretion because the data were pointing in the right direction and this was not the final report.
 ____ Jeff committed a minor ethical offense.
 ____ Jeff committed a moderate ethical offense.
 ____ Jeff committed a major ethical offense.

A few general questions follow. Please use the following key to answer them.

- +3= I strongly agree with this statement.
 +2= I generally agree with this statement.
 +1= I slightly agree with this statement.
 -1= I slightly disagree with this statement.
 -2= I generally disagree with this statement.
 -3= I strongly disagree with this statement.

____ 1. Professors should be lenient with students who are discovered to have falsified data in some way because students are still in the "learning stage."

____ 2. Because research done by undergraduate students is unlikely to ever be published or to affect science in any way, that student-collected data may be purposely or accidentally wrong should not be of much interest to anyone.

JUST A FEW MORE TO DO ON THE **BACKSIDE** OF THIS PAGE.

____ 3. The amount of scientific fraud perpetrated by already established scientists is probably very small.

____ 4. Professors should be more sympathetic when students cheat because students are under too much pressure to achieve.

____ 5. People who cheat when they are students are also more likely to cheat later on when they are scientists.

____ 6. Most cases of data fraud committed by already-established scientists are quickly discovered.

____ 7. It is true that all else being equal, student term papers reporting statistically significant findings (that is, are able to support their hypotheses) are probably going to be more impressive to a professor than are those reporting non-

significant findings.

____ 8. A student's research paper reporting statistically non-significant results will probably have to be better done in order to get a good grade to compensate for the fact that the hypothesis was not supported.

____ 9. There is a very big difference between purposely manipulating data to get a desired result and errors in data caused by haste or carelessness.

We would like to describe our sample in the final report. We would appreciate having the below demographic information.

Are you planning to go to graduate school?

____ Yes, PhD program in psychology

____ Yes, MA program in psychology

____ Yes, other (specify: _____)

____ Not sure now

____ No

How old are you? _____ Sex: ____ Male ____ Female

What is your overall GPA? _____

Major area of interest in psychology: ____clinical/counseling ____experimental

____social

____school/developmental ____physiological/comparative ____quantitative

____other (Please specify: _____)

THANK YOU FOR YOUR HELP!!! (Postage paid envelope enclosed)