DECEIVING SCIENCE: THE ROLE OF DESCRIPTIVE NORM- AND SELF-DISCREPANCIES IN THE TRANSGRESSION OF BEHAVIORAL SCIENCE NORMS

Debbie Rouwenhorst

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Supervised by Elze Ufkes & Sven Zebel

Master Thesis for University of Twente,
Faculty of Behavioral, Management and Social Sciences,
Master Psychology of Conflict, Risk & Safety.

ABSTRACT

This study assesses a possible explanation as to why some scientist are more responsive to social pressures that can increase their tendency to engage in deviant scientific behavior by exploring what influence incompatibilities between different parts of a scientist's self-image have on the likelihood to engage deviant scientific behavior. Additionally it was assessed if more norm-deviant behavior of others increases the intention of individuals to engage in deviant scientific behavior. The data was collected under Dutch speaking students of Dutch Universities using a quantitative survey with two conditions: a High Descriptive Norm Discrepancy vs. a Low Descriptive Norm Discrepancy condition. The findings showed that experiencing a greater the gap between your actual self and your descriptive self will provoke higher levels of Contempt towards the scientific community. Having higher feelings of Contempt again resulted in a greater intention to engage in deviant scientific behavior. The discrepancy between Actual and Ideal identity did influence the intention to engage in deviant scientific behavior, yet not through the suggested, indirect route. The greater the perceived gap between Actual and Ideal identity was, the higher the intention to engage in Bias-related QRPs. No support was found for the influence of the gap between the norm and the behavior of significant others. Future research was suggested to assess the validity of self-discrepancies in different contexts, just as the direction of emotions that could influence the effects discrepancies have. Limitations of the study were the selected sample and the selected method of gathering data.

Introduction

In recent history an increasing number of cases about scientific misconduct have come to public awareness. Take for example the well-known case of the Dutch social scientist Diederik Stapel who has been accused and found guilty of scientific fraud (Levelt, Noort & Drent, 2012). This well renowned and respected scientist infringed on scientific integrity by falsifying, feigning and completing data, leading to the retraction of 55 articles (Levelt et al., 2012). This case was one of the Dutch greatest instances of scientific misconduct but it should be clear that scientific misconduct is not only a national problem or a problem solely to the social sciences. Take for example one of the world's most alleged medical frauds Dr. Andrew Wakefield has committed in 1998 (Flaherty, 2011). He falsely described a positive relationship between a form of autism and the vaccination for measles, a vaccine given to most people (Flaherty, 2011). Before the misconduct was detected a lot of people had refused vaccinations as a consequence of the side-effect Wakefield described and some scientist state that due to Wakefield's fraud some people may have even died.

This last example outlines the potential consequences scientific misconduct can have on society, notwithstanding the impact it has on the scientific discipline itself. Many universities and other research institution therefore take actions to promote the responsible conduct of research; conducting research in ways that fulfill the professional responsibilities of researchers, as defined by their professional organizations, the institutions for which they work and, when relevant, the government and public (Steneck, 2006). Due to the increasing number of cases of misconduct that reach public awareness, scientists, journalists and politicians are more interested and willing to discuss scientific misconduct and its consequences than somewhat 20 years ago (Drenth, 2010) and they deliberate about whether the known cases are caused by 'rotten-apples' in the discipline or whether they are just the tip of the iceberg (Drenth, 2010). Many studies (Fanelli, 2009; 2010; 2011; 2015; Fanelli, Costas & Larivière, 2015; Rajah-Kanagasabai & Roberts, 2015) are therefore already dedicated towards shedding light on the motives of scientist to engage in scientific misconduct. Yet providing a comprehensive framework of influential factors still proves to be a challenge just as addressing why some scientist appear to be more responsive to social pressures than others (Rajah-Kanagasabai & Roberts, 2015).

This study assesses a possible explanation as to why some scientist seem more responsive to pressures found to influence the likelihood to engage deviant scientific behavior by exploring what influence incompatibilities between different parts of a respondent's self-image have on the likelihood to engage deviant scientific behavior. In the section below some theoretical elements will be elucidated where after we will describe the research questions and hypothesis.

THEORETICAL FRAMEWORK

THE CONCEPT OF IDENTITY

As surviving as a lone individual in the Stone Age was unlikely, human beings are prone to belonging to and fitting in a group (Alexander, 1974). To make sure they fit in the group, individuals adapt their behavior towards those seen and accepted in the relevant social groups. A quote resembling that, just as resembling the foundation of a certain strand of the Identity-theory, is '*Society shapes self, shapes social behavior'* (Stryker & Burke, 2000, p. 285). This quote highlights the idea that the person you are and the person you will become are dependent on the social environment you will find yourself in because your social environment shapes who you think you are and this again shapes your behavior. This quote incorporates two important constructs, namely the *self* and *behavior*, of which the first is important to address in further detail.

The *self* is, in this case, a trait that an individual adopts as a relevant part of his or her self-concept (total of selves). This means people have the possibility to possess as many selves as groups, persons or traits with who they relate. As these groups, people or traits might change over time, the self is also evolving and unstable (Terry & Hogg, 2000; Stryker & Burke, 2000).

The way a person's self relates to their behavior was first researched by Tajfel & Turner (1979) who were first to describe the desire of individuals to maintain a coherent, aligned and positive self-image in their social identity theory (Stryker, 2007; Stryker & Burke, 2000). This desire implied that individuals verify the alignment between their behavior and their self in the relevant social groups and when noticing a gap between these two trying to align these by changing either their behavior or their self.

This for example means that a man can consider himself to be an ambitious businessman and therefore will try to behave the way he thinks an ambitious businessman will, by for example working extra hours. At the same time he can think of himself as a family-man who loves to spend as much time as possible with his family. The scarcity of time can however force this man to make a choice in where to spend his spare time and therefore he might not behave the way he wants according to a certain *self*. When either his family-man behavior or his businessman behavior does no longer come up to scratch, the man will try to align behavior and self again (Tajfel & Turner, 1979). This means that he either starts seeing himself as less of a businessman or as less of a family-man.

That process of experiencing not being able to align selves and behaviors by having to choose which of your selves to let be most salient, is said to evoke negative emotions (Higgins, 1987; Higgins et al, 1985; 1986). As Higgins (1987) and Higgins et al (1985; 1986) state that there are different kinds of dissonances between different types of selves, they also put forward that these distinct dissonance evoke distinct types of emotions that will again have a unique influences on behavior. This will be elucidated in the following section.

SELF-DISCREPANCY THEORY

The Self-Discrepancy Theory ('*SDT*') of Higgins (1987) and Higgins et al. (1985; 1986) builds on the idea of Tajfel & Turner (1979) that people are motivated to ensure that their actual behavior is congruent to their self-image. The SDT thereby focuses on the influence different incompatibilities between behavior and *self* have on emotions and how the specific emotions influence people's behavior. To discriminate between different types of discrepancies, the SDT distinguishes domains of the self from perspectives of the self. The domains of the self that Higgins (1987) describes are: (a) the actual self, which is a person's representation of who thinks he actually is; (b) the ideal self, which is a person's representation of who he would like to be, in an ideal world; and (c) the ought self, which is a person's representation of who he thinks he could or should be. Higgins (1987) and Higgins et al. (1985; 1986) also call for the need to distinguish between perspectives of self – if someone describes the domains in either his own perspectives of someone else's – as that might influence the specific emotions someone experiences.

People can perceive discrepancies between the domains of the self – actual, ideal or ought – that evoke specific negative emotional states. A discrepancy between the actual self and the ideal self (Actual-Ideal Discrepancy) is for example found to evoke feelings resembling the absence of positive outcomes .The person will then experience dejection-related emotions such as dissatisfaction, disappointment, and sadness (Higgins, 1987). A discrepancy between the actual self and the ought self (Actual-Ought Discrepancy) is found to evoke feelings resembling the presence of negative outcomes. A person will then be feeling Agitation-related emotions such as fear, apprehension, and agitation (Higgins, 1987). Many authors have studied the specific affective states that accompany self-discrepancies because it is supposed that the subtle differences in emotions might influence behavior differently (Higgins, 1987; Higgins et al., 1985; 1986; Strauman & Higgins, 1988; Strauman, 1992; Key et al, 2000).

The SDT could offer a possible explanation as to why some scientist might be more vulnerable to engage in deviant scientific behavior than others: the specific affective state a scientist might experience as a consequence of not being able to align behavior and self might differ through differences between accessibility and relative magnitude of the discrepancies between actual, ideal or ought identity (Higgins, 1987). Before diving deeper into assessing deviant scientific behavior, it is explained in the section below what that specifically obtains.

SCIENTIFIC MISCONDUCT

A major difficulty in the research on scientific misconduct is that there has been no consensus on how misconduct should be defined. Many say that it is due to gray area between fabrication and creative insight that misconduct is so difficult to define (Grinnell, 1997). What behaviors are considered to be misconduct is in essence a reflection of the norms and values of an institution, department or country as

the rules and norms about responsible conduct are formed by situational, cultural, institutional and governmental pressures. The U.S. government for example defines misconduct as "*the intentional attempt by an investigator or scientist to manipulate data or fashion results*" (Sovacool, 2008, p. 273) whereas the Office of Research Integrity gives a much broader definition (Steneck, 2006, p. 56) "*Fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results. (a) Fabrication is making up data or results and recording or reporting them; (b) Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record; (c) Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit; (d) Research misconduct does not include honest error or differences of opinion*".

As illustrated by Figure 1, some agreement has been reached on this topic, namely that there are considered to be three levels of scientific behavior; Responsible Conduct of Research ('RCR'), Questionable Research Practices ('QRP') and Fabrication, Falsification & Plagiarism ('FFP') (Fanelli, 2009; Steneck, 2006; Sovacool, 2008). These behaviors lie on a scale from ideal towards worst behavior but where exactly one category flows in the other again depends on situational, cultural, institutional and/or personal characteristics.

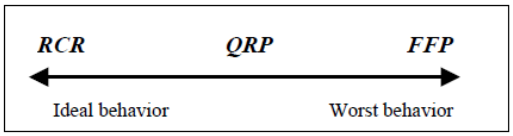

Figure 1: Three-category scale of scientific misconduct from Steneck (2006)

But what are then the broad differences between QRPs and FFPs? The Committee on Science Engineering and Public Policy (1992) define QRPs as "*…actions that violate traditional values of the research enterprise and that may be detrimental to the research process"* (p. 28). They state that it differs from FFPs as they do not directly damage the integrity of the research process and are therefore presumably less serious. FFPs are seen as more serious forms of scientific misconduct due to its conscious, deliberate and extensive nature and it incorporates fabrication (invention of data or cases), falsification (willful distortion of data or results) and plagiarism (copying of ideas, data, or words without attribution) (Fanelli, 2009; Drenth, 2010; Gordon, 2014). QRPs are thus considered smaller, less far-reaching and integrity-damaging behaviors and in many cases are not considered wrong per se. A major reason to incorporate QRPs in the definition of scientific misconduct is however provided by Steneck (2006) and Drenth (2010) who state that the impact of QRPs is expected to be proportionally bigger than the impact of FFPs simply based on the higher level of occurrence of these behaviors.

According to Steneck (2006) QRPs entail three categories of behaviors; 1. Misrepresentation (reporting something that is not in accordance to the facts) 2. Inaccuracy (being careless or sloppy in reporting)

and 3. Bias (not being objective in reporting). But many other and more extensive examples of QRPs are given by other authors like Rajah-Kanagasabai & Roberts (2015) and John, Loewenstein & Prelec (2012).

To be clear about what we consider to be scientific misconduct in this study, we give our definition of deviant scientific behavior: The attempt by an investigator or scientist to manipulate data or fashion results by misrepresentation, being inaccurate or biased in reporting (Steneck, 2006) or fabricating falsifying or plagiarizing data. The focus of this study will however lie on QRPs as these are more common examples of deviant scientific behavior.

Scientific Misconduct and the Behavior of Significant Others

Because the science-discipline increasingly becomes subject to forces of the free-market system and competition for scarce resources like funding and publication in the best journals increases (Drenth, 2010; Fanelli, 2009; Kravitz & Baker, 2011), it can be expected that acting in accordance with the norms of the discipline might become more challenging for scientists. Andersson et al. (2007) have described six universal scientific behavioral norms that apply to the scientific community just as well as their 'counter-norms' (see Table 1). These counter-norms reflect the effect pressures like scarcity of time, money and publication opportunities might have on what behaviors are actually considered the norm. Andersson et al. (2007) therefore make clear in their research that science norms, just as identities, can change over time. What means that what behavior is seen as typical for an ethical scientist, and is thus picked up by a person who reflects or adopts that trait as part of his self-image, can change by environmental pressures.

The changes in the norm, the behavior and in people's selves will not always attune to one another what can work in hand discrepancies. As described before, the SDT focusses on how discrepancies between actual-, ideal- and ought selves influence emotions and behaviors. What however seems underexposed in this theory is the specific influence the actual behavior of others has on the self of an individual. The behavior of others might for example not always be a reflection of the norm but more of the counter-norm as described by Andersson et al. (2007). That might have prominent influence on what behavior or trait someone will adopt or refer to in a self – as that is seen as appropriate behavior in the social group. Therefore in this research an extra domain of self will be assessed namely the descriptive-self, which is based on the descriptive norm that reflects the perception of the actual behavior significant others perform (Rivis & Sheeran, 2003). A descriptive-self is therefore a person's representation of the actual behavior significant other perform.

This seems to have some similarities with the difference between the Actual-self in either an own or other perspective. The descriptive self is however your interpretation of the *actual behavior of others* whereas the actual-self is a reflection of *your actual behavior* by a significant other. So the objective of the actual behavior is different between the types of selves.

Science Norms		Science Counter-Norms	
Communality	Scientist openly share findings with colleagues	Secrecy	Scientist protect their newest findings to ensure priority in publishing, patenting, or applications
Universalism	Scientist evaluate research only on its merit, i.e.; according to accepted standards on the field	Particularism	Scientist assess new knowledge and its applications based on the reputation and past productivity of the individual or research group
Disinterestedness	**Scientist are motivated by the desire for knowledge and discovery, and not by the possibility of personal gain**	**Self-Interestedness**	**Scientist compete with others in the field for funding and recognition of their achievements**
Organized Skepticism	**Scientist consider all new evidence, hypotheses, theories, and innovations, even those that challenge or contradict their own work**	**Organized Dogmatism**	**Scientist invest their careers in promoting their own most important findings, theories, or innovations**
Governance	Scientist are responsible for the direction and control of science through governance, self-regulation and peer review	Administration	Scientists rely on administrators to direct the scientific enterprise through management decisions
Quality	**Scientist judge each other's contributions to science primarily on the basis of quality**	**Quantity**	**Scientists assess each other's' work primarily on the basis of numbers of publications and grants**

Table 1: The standards of science and their counter-standards as expressed by Andersson et al (2007)

Research Design and Hypothesis

In this research it will be assessed if discrepancies between an individual's selves (Actual vs. Ideal, Ought and Descriptive) influences intention to engage in deviant scientific behavior through the distinct emotions the discrepancies evoke. In addition it is assessed if more norm-deviant behavior of others ('Descriptive Norm Discrepancy') increases the intention of individuals to engage in deviant scientific behavior.

The research question therefore is:

To what degree does an Actual-Ideal-, Actual-Ought- or Actual-Descriptive Discrepancy influence the tendency to engage in deviant scientific behavior and how does a Descriptive Norm Discrepancy influence this relationship?

In order to answer the research questions some hypotheses are drafted. These hypotheses are elucidated in the section below just as in Figure 2 (the main-hypotheses) and Figure 3 (the interactional hypotheses).

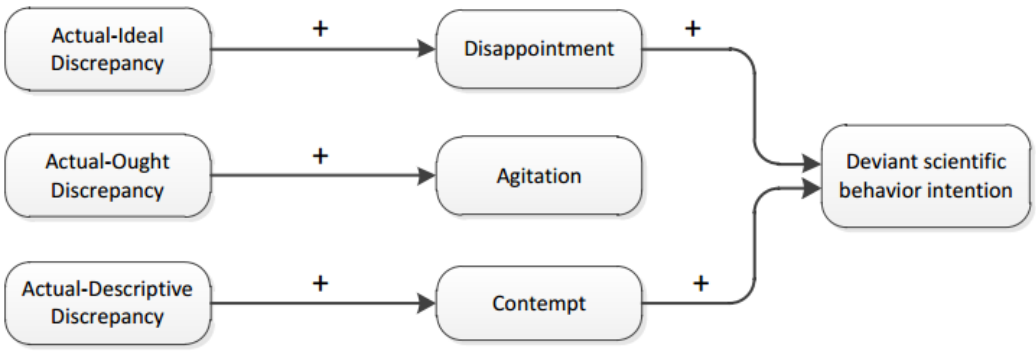

Figure 2: Process Model of the main-effects (H1 and H2)

Starting at the first independent variable, the three types of Idiosyncratic Self Discrepancies (discrepancies between different selves, '*ISDs*') are expected to have their distinct influence on emotions, as each discrepancy is predicted to evoke a specific affective state (Higgins, 1987; Higgins et al, 1986). A single hypothesis is described for the main-effect of discrepancies on emotions as found in literature (Higgins, 1987; Higgins et al., 1985; 1986; Higgins, 1999; Key et al., 2000; Watson et al., 2010; Hardin & Lakin, 2009; Bizman et al., 2001; Shaver et al., 1987).

> *H1: There is a positive relationship between Actual-Ideal Discrepancy & Disappointment, between Actual-Ought Discrepancy & Agitation and between Actual-Descriptive Discrepancy & Contempt*

Next, a positive relationship is expected between feelings of Contempt and the tendency to behave deviant. According to Fischer & Roseman (2007) contempt is an emotion you feel when you experience negative consequences of a person's or group's behavior and feel unable to understand or change that person's/group's behavior. They describe feelings of Contempt to therefore drive the social exclusion of that person or group from one's social network in order to try to reduce the negative impact of their behavior (Fischer & Roseman, 2007; Lerner & Kelter, 2001). As feelings of contempt in a scientific context might lead to the drive to socially exclude the scientific community from one's network, the motivation to want to behave in accordance to the norms of that community will no longer be a priority.

Disappointment is also expected to be positively related to the intention to behave deviant nevertheless in a much lower extent than contempt. According to Zeelenberg & Pieters (2004), disappointment about a person's or group's behavior is likely to evoke responses like complaining and talking about the problem with significant others instead of socially excluding the person or group from one's social network (Fischer & Roseman, 2007). However, someone might feel insecure about the 'rightness' of their behavior in the social group as verification of alignment between behavior and self in the group (Tajfel & Turner, 1979) will no longer give valuable insight (the behavior of the group does no longer reflect the specific trait and behavior one has adopted as *self)*. This might make someone more

vulnerable to engage in deviant behavior because it is no longer clear what behavior is appropriate (Zeelenberg & Pieters, 2004).

Agitation and other fearful emotions are described by Lerner & Keltner (2001) to evoke risk-aversive behaviors as they showed in their study that fear decreased feelings of certainty, feelings of being in control and the optimistic perception of risk. Therefore we do not expect Agitation to lead to more deviant behavior because scientist will likely be more punctual about the correctness of their behavior. These insight on the effect of emotions on the intention to behave deviant leads to our second main-effect hypothesis:

> *H2: There is a positive relationship between both Contempt and Disappointment and the tendency to engage in deviant scientific behavior*

It is one of our goals in this study to assess whether norm-deviant behavior of others increases the intention of individuals to engage in deviant scientific behavior. We suspect that this happens through the '*Society shapes self shapes social behavior'*-route: the behavior of others influences the self-discrepancies of individuals and therefore subsequently an individual's emotions and intentions to engage in deviant scientific behavior. To further elucidate these expectations some interaction-hypotheses are drafted. These hypotheses are also made visual in Figure 3.

The interaction between Actual-Ideal Discrepancy and Descriptive Norm Discrepancy (the degree to which the behavior of significant others is deviating from the accepted norm, '*DND*') is expected to result in higher feelings of Disappointment. In this interaction, a person will experience that both their own behavior (Actual-Ideal Discrepancy) just as the behavior of others (DND) is deviating from what behavior is wanted (the norm and the ideal). We expect this to lead to feelings of solidarity and acceptance in the transgression of the norm: if both myself and significant others are not able or motivated to reach behavior that is expected by the norm or the ideal than this norm or ideal might not be a proper reflection of what behavior is actually achievable. The abstract image of the ideal behavior will not change however and thus will remain in pursuit wherefore we suspect individuals to report moderate feelings of Disappointment that the ideal behavior has not been reached.

> *H3: A high Actual-Ideal Discrepancy with a high Descriptive Norm Discrepancy will have a positive effect on Disappointment*

In the next interaction one perceives that a large part of the community one is feeling linked to is not behaving in a way that is described by the norm (Descriptive Norm Discrepancy). Additionally, the person himself acts differently than that large part of the community (Actual-Descriptive Discrepancy). It is therefore expected that someone will experience doubts about their fit with that community. As checking the alignment between one's behavior and self as a 'good scientist' within the scientific community will no longer provide any confirmation, a person might start to change his behavior or his

identity to ensure a positive and coherent self-image (Tajfel & Turner, 1979). We expect that this is accompanied with feelings of Disappointment regarding the behavior of the scientific community, just as well as Agitation.

H4: A high Actual-Descriptive Discrepancy with a high Descriptive Norm Discrepancy will have a positive effect on Disappointment and Agitation

For the interaction of Actual-Ought Discrepancy and DND, we again expect people to experience some feelings of solidarity in the transgression of the norm, just as in the interaction between Actual-Ideal Discrepancy and DND. In this case people perceive that their actual behavior is deviating from the behavior they are ought to show and that the behavior of others also deviates from the norm. The Ought-behavior is however seen as a more realistic hankering of 'good' behavior due to its subjectivity to counter-pressures, wherefore it is expected that people feel that they can change their ought-self more easily that their ideal self. Therefore we expect lower levels of negative emotions than in the interaction between Actual-Ideal Discrepancy and DND.

H5: A high Actual-Ought Discrepancy with a high Descriptive Norm Discrepancy will have a negative effect on Disappointment, Agitation and Contempt.

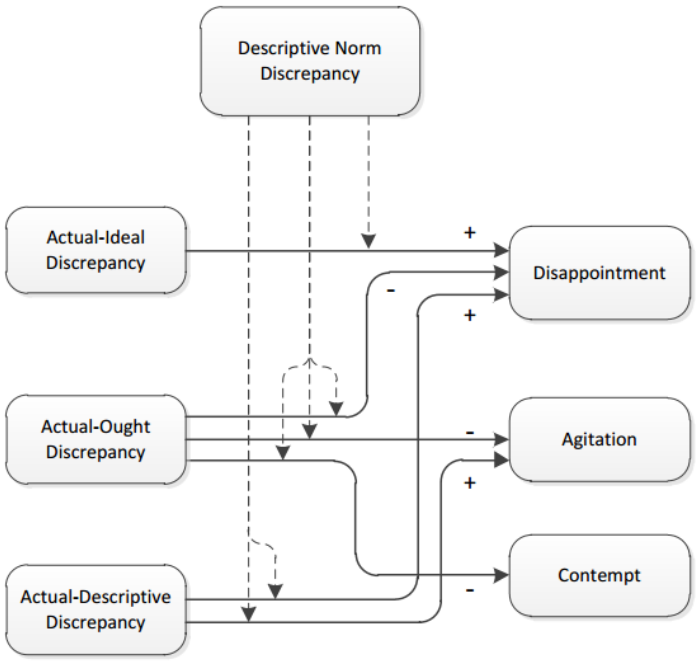

Figure 3: Process Model of Interaction Effects (H3, H4 and H5). The dotted-line indicates the proposed moderation of Descriptive Norm Discrepancy on the relationship of ISDs on emotions. The solid-line indicates the proposed effects of ISDs on emotions when moderation of DND is presumed.

Method

Design & Procedure

The data was collected using a quantitative survey with two conditions: a High Descriptive Norm Discrepancy vs. a Low Descriptive Norm Discrepancy condition. The quantitative survey was presented to the respondents through an online questionnaire that comprised of several components that measured specific elements. The different components of the questionnaire will be elucidated in the section below. The indicated duration for filling in the questionnaire was approximately 15 minutes.

Sample

172 Dutch speaking students of Dutch Universities that were either in the last year of their bachelor, in their master or that have graduated within the last year, started in the research. Only respondents that have completed questionnaire to the Behavior Intention Measure were included. No respondents were excluded for other reasons. This led to 72 respondents that were included in the sample (drop-out rate of 58%). The average age of the total sample was 24.5 years with an *SD* of 4.74. The sample included 36 males (M_{age} = 25.1 years, SD_{age} = 5.17) and 46 females (M_{age} = 24.0 years, SD_{age} = 4.37). Of the 72 respondents 17 were final year bachelor-students (4 male and 13 female), 51 master-students (27 male and 24 female) and 14 just-graduated respondents (5 male and 9 female).

Measurement Components

Informed Consent & Demographics:

The questionnaire started with an informed consent in which the respondents had to accept the terms of the study where after a demographic measure was presented in which the respondents had to fill in their age in years, their gender and their study-phase. The gender and study-phase-items were multiple choice items, age was an open question. For the study-phase respondents had to choose between last-year bachelor, master or just-graduated.

Idiosyncratic Self-Discrepancy Measure

Subsequently, an Idiosyncratic Self-Discrepancy ('ISD') measure was presented to assess to what degree an individual perceives to have a discrepancy between two selves. For this assessment an adjusted version of Watson (2004) & Watson et al.'s (2010) Abstract Measure of Discrepancy was used. This instrument uses two circles to resemble the two identities and these circles are used to visualize the amount of overlap between selves. The grey circle represented a respondent's actual self ('the way you think you actually are as a scientist') and the white circle represented either the ideal self ('the way you want to be as a scientist, in an ideal world'), the ought self ('the way you want to be as a scientist, knowing and coping with the challenges everyday life brings you') or the descriptive self ('the image you have about the actual scientific behavior of others'). Whereas Watson (2004) and Watson et al. (2010) do not specify the Abstract Measures-instrument towards a specific situation, in this research,

since it is about the scientific behavior of respondents, it is mentioned that the questions should be seen in the light of the respondent's self as a scientist.

The respondent scored the perceived overlap between selves on a 7 point Likert-Scale (not at all – completely overlapping). The overlap between Actual-Ideal ('*Actual-Ideal Discrepancy'*), Actual-Ought ('*Actual-Ought Discrepancy')* and Actual-Descriptive (*'Actual-Descriptive Discrepancy)* selves were assessed. In order to make interpreting the results more easily, we recoded the scores to indicate discrepancy instead of overlap; so a score of 1 – not at all overlapping - was recoded into 7 - complete discrepancy. Compared to a lower score, a higher score thus means that a respondent perceives larger gaps, indicating more discrepancy, between their actual and respectively ideal, ought, or descriptive self. On average respondents reported an Actual-Ideal Discrepancy of 4.09 (*SD* = 1.03), an Actual-Ought Discrepancy of 4.09 (*SD* = 1.22) and an Actual-Descriptive Discrepancy of 4.33 (*SD* = 1.35).

Behavior Intention Measure

After the Idiosyncratic Self Discrepancy-measure, the respondents were presented nine statements about scientific behaviors and had to indicate on a 0-100% slidebar how large the likelihood would be for him/her to engage in the described behavior. This measure was used to assess the intention to perform deviant scientific behavior. The statements described a certain QRP that relates to three of the science norms described by Andersson et al. (2007) namely Quality, Organized Skepticism and Disinterestedness (see Table 1). For each of the three science norms a bias-type, a misrepresentation-type and an inaccuracy-type of QRP was described.

To assess what constructs the Behavior Intention-items measured, a factor analysis was conducted. As the communality of one item - the amount of variance that was explained by the latent factors - did not exceed the standard of .40 this items was not taken along in the factor analysis. The KMO measure of Sample Adequacy was .519 and Bartlett's measure of Sphericity was $p<0.001$ indicating that the sample of items only just had sufficient overlap to do a factor analysis. The factor analysis with Direct Oblimin rotation indicated the presence of three components with an eigenvalue above 1 that together explained 64.7% of the total variance. Component 1 (from now on addressed as '*bias behavioral intention'*) (α = .811) measured bias-related QRPs and explained 37.1% of the total variance. Items that loaded high on this component were the likelihood to report biased findings and not being objective towards one's own findings. Component 2 (from now on addressed as '*misrepresentation behavioral intention'*) measured misrepresentation-related QRPs and explained 14.3% of the variance. The α of component 2 was .601, which is not that high but because of the explorative character of the study, we accepted this Alpha. Two examples of items that loaded on this component were the tendency for improper acknowledgement of resources and reporting findings as expected from the start. The reliability of component 3 was too low (α = .185) wherefore this component was not taken into account as a measure of behavioral intention.

Descriptive Norm Discrepancy Manipulation

In the behavior intention measure that is described above, the respondents were evenly and randomly distributed between two conditions: a low norm-discrepant condition and a high-norm-discrepant condition. In the description of the QRPs in the statements presented in the Behavior Intention Measure, a descriptive norm component was incorporated. This component gave the respondents an idea of what the actual behavior of others was and this was based on a percentage of prevalence as found in literature. For example on the item how likely respondents were to be insufficient critical towards the findings of their own research, Martinson et al (2005) reported in their study that 6% of the scientist admitted to sometimes fail to present data that contradict one's own previous research. In the low norm-discrepant condition the percentage that was presented to the respondents deviated a little from the percentage found in the literature – so in this case 16%. Whereas in the high norm-discrepant condition the percentage deviated strongly (±20%) from the percentage found in the literature – in this case 26%.

Affective Measure

After responding to the statements in the Behavior Intention measure the respondent had to indicate what their affective state towards the scientific community was at that time. Based on the emotions that, according to the literature, accompanied discrepancies, questions were prepared to measure three (categories of) emotions; disappointment, agitation and contempt (Higgins, 1987; Higgins et al., 1985; 1986; Higgins, 1999; Key et al., 2000; Watson et al., 2010; Hardin & Lakin, 2009; Bizman et al., 2001; Shaver et al., 1987). Again a factor analysis was conducted to assess what constructs the items measured. KMO measure of Sample Adequacy was .820 and Bartlett's measure of Sphericity was $p<0.001$ indicating that the sample of items had sufficient overlap to do a factor analysis. For all the items the communality exceeded .40 wherefore all items were taken into account in the factor analysis. The factor analysis with Direct Oblimin rotation indicated the presence of four components with an eigenvalue above 1 that together explained 69.1% of the total variance. This was surprising as we aimed for the presence of three constructs (disappointment, agitation and contempt).

Component 1 loaded on the items that assessed emotions as disappointment, dissatisfaction, worry and anxiousness and from now on will be addressed as the measure for '*Disappointment*'. It explained 40.4% of the total variance and had an α of .818. Component 2 loaded on emotions as nervousness, agitation and uneasiness and will be considered the measure for '*Agitation*'. This component explained 11.8% of the variance and had an α of .781. Component 3 loaded on the items that measured disgust, incomprehension, recalcitrance and frustration and will from now on be addressed as the measure for '*Contempt'*. It explained 8.5% of the variance and had an α of .856. The last unexpected component measured '*Embarrassment'* by loading on the items that assessed emotions like guilt, shame, dismay and indifference. Embarrassment explained 8.4% of the variance and had an α of .800 after deletion of

the indifference-item (including this item would reduce reliability to .613).

In Table 2 on the next page the correlations of the variables of interest in this research are presented.

	Mean	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Age	24.5	1																			
2. Gender	n.a.	-,112	1																		
3. Studyphase	n.a.	**,289****	-,093	1																	
4. Actual-Ideal Discrepancy	4.09	-,208	,217*	-,169	1																
5. Actual-Ought Discrepancy	4.09	-,089	,184	-,111	**,494****	1															
6. Actual-Descriptive Discrepancy	4.33	,169	,034	,044	**,227***	**,222***	1														
7. Bias Behavioral Intention	40.6	-,008	,159	-,131	**,309****	,148	**,234***	1													
8. Misrepresentation Behavioral Intention	38.6	-,038	,205	-,154	**,296****	**,252***	**,239***	**,605****	1												
9. Disappointment	2.2	,071	,104	,203	**-,233***	-,089	,100	,164	,178	1											
10. Agitation	1.8	,081	**,350****	-,132	,140	,165	,127	**,248***	**,349****	**,425****	1										
11. Contempt	2.1	,105	,152	,122	-,007	,045	**,252***	**,383****	**,417****	**,552****	**,491****	1									
12. Embarrassment	1.9	**,225***	,218	,041	,124	-,031	,085	**,242***	,193	**,505****	**,467****	**,508****	1								
13. Own influence on identity	72.0	-,092	**-,258***	-,009	**-,283***	-,168	-,057	-,069	-,038	,168	-,062	,026	-,110	1							
14. Others influence on identity	53.3	-,016	,029	-,029	,080	**-,314****	-,030	,106	,080	,073	,051	,145	,092	,032	1						
15. Connection Scientific Community Pretest	55.3	-,189	-,027	-,048	-,192	-,144	-,014	-,079	-,066	,104	-,023	-,060	,024	,067	,202	1					
16. Connection Scientific Community Posttest	45.8	-,080	-,045	,008	**-,345****	**-,223***	-,058	-,219	-,133	,201	-,073	-,131	,016	,096	,128	**,719****	1				
17. Average norm-confusion pretest	40.5	-,008	**,245***	-,108	,182	,144	,063	,200	,109	,003	**,300****	,210	,087	-,162	-,081	**-,449****	**-,347****	1			
18. Average norm-confusion posttest	44.6	,005	,179	-,152	**,356****	**,314****	,149	**,286***	**,301****	,059	**,354****	**,261***	,145	-,167	-,026	**-,307****	**-,370****	**,596****	1		
19. Change in norm-confusion (pretest-posttest)	-3.9	-,024	,077	,046	-,198	-,191	-,099	-,099	-,218	-,063	-,078	-,070	-,070	,013	-,072	-,134	,045	**,406****	**-,492****	1	
20. Change in connection to scientific community (pretest-posttest)	9.1	-,121	-,002	-,057	,206	,098	,043	,168	,072	-,140	,061	,091	,016	-,053	,135	**,335****	**-,414****	-,118	,103	**-,246***	1

Table 2: Correlations table of the different independent, dependent or possibly moderating variables of the research (* correlation is significant at .05 level (2-tailed)) (correlation is significant at .01 level (2-tailed))[3]**

RESULTS

HYPOTHESES

To test Hypothesis 1: *There is a positive relationship between Actual-Ideal Discrepancy & Disappointment, between Actual-Ought Discrepancy & Agitation and between Actual-Descriptive Discrepancy & Contempt,* first the correlations table was consulted as presented in Table 2 and subsequently multiple regression analyses were done to assess the relationships when the effect of the other ISD variables were controlled for.

For Disappointment Table 2 indicated the presence of a significant negative correlation with the Actual-Ideal Discrepancy of r = -.233 (p = 0.01), which was in contrary to our hypothesis. It means that when people reported a greater gap between their Actual and Ideal self (the way you think you are as a scientist vs. the way you want to be as a scientist, in an ideal world), they experienced lower levels of Disappointment regarding the behavior of the scientific community. The multiple linear regression to control for the effect of the other ISD's also showed a significant relationship between Disappointment and Actual-Ideal Discrepancy as independent variable (β of = -.277, t (78) = -2.167, p = .033). Meaning that, even when the influence of the other ISD's was controlled, a higher discrepancy between Actual and Ideal self led to lower levels of Disappointment. The effects of the Actual-Ought Discrepancy and the Actual-Descriptive Discrepancy on Disappointment were not significant; respectively β = .005, t (78) = .039, p = .969 and β = .167, t (78) = 1.445, p = .969.

For Agitation none of the ISD's were correlated or showed a significant relationship in the regression analysis. The controlled effect of the Actual-Ideal Discrepancy was β = .065, t (78) = .498, p = .620, of the Actual-Ought Discrepancy it was β = .114, t (78) = .878, p = .383 and of the Actual-Descriptive Discrepancy it was β = .085, t (78) = .718, p = .475). Meaning that none of the ISD's appeared to be have a significant relationship with feelings of Agitation regarding the behavior of the scientific community.

For the third emotion, Contempt, a significant, positive correlation was present with the Actual-Descriptive Discrepancy (r= .252, p = 0.01), which was in accordance with our hypothesis. This can be interpreted as that when respondents perceived a greater gap between their Actual and Descriptive Self (the way you think you are as a scientist vs. the image you have about the actual scientific behavior of others) they reported higher feelings of Contempt towards the scientific community. The multiple linear regression analysis indicated that even when we controlled for the effect of the other ISD's, Actual-Descriptive Discrepancy remained a significant predictor of Contempt with a β of .267 (t (78) = 2.301, p = .024). The Actual-Ideal Discrepancy and Actual-Ought Discrepancy had no significant influence on Contempt (respectively β = -.085, t (78) = -.658, p = .512 and β = .024, t (78) = .186, p = .853).

Based on these findings we can partially accept Hypothesis 1 as some of the proposed effects were found; Disappointment was predicted by the Actual-Ideal Discrepancy however not in the proposed direction, Agitation was not predicted by the Actual-Ought Discrepancy and Contempt was predicted by the Actual-Descriptive Discrepancy in the proposed direction[1].

To test hypothesis 2; *there is a positive relationship between both Contempt and Disappointment and the tendency to engage in deviant scientific behavior*, again correlations were inspected where after regression analyses were conducted. As the factor analysis for the scientific behavior intention indicated the presence of two components – Bias Behavioral Intention and Misrepresentation Behavioral Intention - the testing of this hypothesis will be done for both components as dependent variable.

The correlations showed a significant relationship between Bias Behavioral Intention and the amount of Agitation (r = .248, p = 0.01) and the amount of Contempt (r = .383, p = 0.05) a respondent feels. This can be interpreted as respondents that reported higher feelings of Agitation or Contempt regarding the (behavior of) the scientific community had higher intentions to perform bias-related QRPs. The multiple regression analysis indicated however that Contempt remained the only emotion that significantly predicted Bias Behavioral Intention when the influence of the other emotions was controlled (β of .367, t (78) = 2.628, p =.010). This means that when respondents had higher feelings of Contempt towards the scientific community, their intention to perform bias-related scientific misconduct was also higher. The effects for Disappointment (β = -.111, t (78) = -.815, p = .418) and Agitation (β = .080, t (78) = .619, p = .538) were not significant. The effect of Agitation thus did not hold when the other ISDs were controlled for meaning that the effect was (partially) caused by other ISDs.

The intention to engage in Misrepresentation-related QRPs was also positively correlated with the amount of Agitation (r = .349, p=0.05) and the amount of Contempt (r = .417, p=0.05). The multiple regression analysis indicated that again Contempt was the only emotion that was a significant predictor of misrepresentation-related QRPs when the influence of the other emotions was controlled for. This means that when respondents felt higher levels of Contempt towards the scientific community, their intention to perform misrepresentation-related QRPs was higher (β = .394, t (78) = 2.915, p = .005). The effects for Disappointment and Agitation were respectively β = -.107, t (78) = -.812, p = .419 and β = .228, t (78) = 1.830, p = .071. The effect of Agitation was thus again caused by the influence of another ISD on Misrepresentation Behavioral Intention.

[1] The analyses were also done for the fourth emotion 'Embarrassment' however none of the effects appeared significant wherefore no further attention will be given towards this emotion (Actual-Ideal Discrepancy β = .167, t (78) = 1.277, p = .205, Actual-Ought Discrepancy β = -.128, t (78) = -.981, p = .330 and Actual-Descriptive Discrepancy β = .073, t (78) = .617, p = .539)

Based on these findings we can partially adopt Hypothesis 2 as Contempt positively predicted both tendencies to engage in deviant scientific behavior: the intention to engage in both bias and misrepresentation related QRPs was higher when higher levels of Contempt were reported. Disappointment however did not show significant relationship with either Bias or Misrepresentation Behavioral Intention wherefore we cannot conclude that this emotion had any effect on the tendency to engage in deviant scientific behavior[2].

As we suspected that the effect of the ISDs on emotions could be moderated by the degree to which the behavior of significant others is deviating from the norm ('Descriptive Norm Discrepancy' or 'DND'), we conducted moderation analyses using the PROCESS-macro of Hayes (2013). In this analysis the specific emotion was the dependent variable, the ISD the independent variable and the DND-condition the possible moderator.

For feelings of Disappointment no significant moderation of DND-condition was present on the effect Actual-Ideal Discrepancy had on this emotion (β = -.027, t (75) = -.117, p = .907). Meaning that the degree to which the behavior of significant others deviated from the accepted norm did not influenced the effect the Actual-Ideal Discrepancy had on Disappointment. Neither for the effect of Actual-Ought Discrepancy or of Actual-Descriptive Discrepancy on Disappointment a moderation-effect of DND-condition was found (respectively β = -.070, t (75) = .248, p = .805 and β = -.219, t (75) = -.713, p = .478). So also the effects of Actual-Ought Discrepancy and Actual-Descriptive Discrepancy on feelings of Disappointment regarding the behavior of the scientific community did not change when the size of the gap between the norm and the actual behavior of others differed.

The same analyses were done for Agitation and the results did not show any influence of DND-condition on the effects of the ISDs on Agitation (Actual-Ideal Discrepancy β = .267, t (75) = 1.090, p = .279; Actual-Ought Discrepancy β = .110, t (75) = .426, p = .671; Actual-Descriptive Discrepancy β = .081, t (75) = .256, p = .799). Meaning that the degree to which the behavior of significant others deviated from the accepted norm did not influence the effect the Actual-Ideal Discrepancy, the Actual-Ought Discrepancy nor the Actual-Descriptive Discrepancy had on feelings of Agitation towards the scientific community.

For Contempt, the same conclusion can be drawn as for Agitation: the moderation analyses did not show any significant moderating effect. Meaning that the size of the gap between the norm and the actual behavior of others did not affect the influence ISDs had on feelings of Contempt towards the scientific community (Actual-Ideal Discrepancy β = .010, t (75) = .371, p = .971; Actual-Ought

[2] For the fourth emotion 'Embarrassment' a significant correlation was present with Bias Behavioral Intention however multiple linear regression showed no effect of Embarrassment on either Bias- or Misrepresentation Behavioral Intention wherefore no further attention towards this emotion will be given (respectively: β = .074, t (78) = .554, p = .581) and β = -.061, t (78) = -.466, p = .642).

Discrepancy β = -.052, *t* (75) = -.208, *p* = .836; Actual-Descriptive Discrepancy β = -.240, *t* (75) = -.954, *p* = .343).

Based on these moderation effects, we have to reject all three interaction-variables. For Hypothesis 3: *A high Actual-Ideal Idiosyncratic Self-Discrepancy with a high Descriptive Norm Discrepancy will have a positive effect on Disappointment*, the analysis indicated that no significant moderation effect of DND-condition on the effect of Actual-Ideal Discrepancy on Disappointment was present. This means that feelings of Disappointment did not increased or decreased when the behavior of others was more deviating from the norm. For Hypothesis 4 and Hypothesis 5, the same conclusion can be made, no moderation effects were present of DND-condition on the effect that either Actual-Descriptive Discrepancy had on Disappointment or Agitation or that Actual-Ought Discrepancy had on Disappointment, Agitation or Contempt.

H4: A high Actual-Descriptive Idiosyncratic self-discrepancy with a high Descriptive Norm Discrepancy will have a positive effect on Disappointment and Agitation

H5: A high Actual-Ought Idiosyncratic Self-Discrepancy with a high Descriptive Norm Discrepancy will have a negative effect on Disappointment, Agitation and Contempt.

Mediation of Contempt

As there was a significant effect present between Actual-Descriptive Discrepancy and Contempt and between Contempt and both Bias- and Misrepresentation Behavioral Intention, we assessed whether Contempt was a mediator of the effect between Actual-Descriptive Discrepancy and Behavioral Intention. To assess this possible mediation, we again used the PROCESS-macro of Hayes (2013). The mediation-analysis with Actual-Descriptive Discrepancy as independent variable, respectively Bias- or Misrepresentation Behavioral Intention as dependent variable and Contempt as mediator, provided the effects as shown in Figure 4. The effects show that the influence of Actual-Descriptive Discrepancy on Bias- & Misrepresentation Behavioral Intention is fully mediated by Contempt as the total effect decreased and became insignificant when contempt was taken along (Bias: total effect = *b:* .238, *p* = .030, direct effect = *b:* .153, *p* = .157; Misrepresentation: total effect = *b:* .245, *p* = .028, direct effect = *b:* .150, *p* = .159) and the indirect effect was also significant (Bias: ISD on contempt = *b:* .247, *p* = .025,

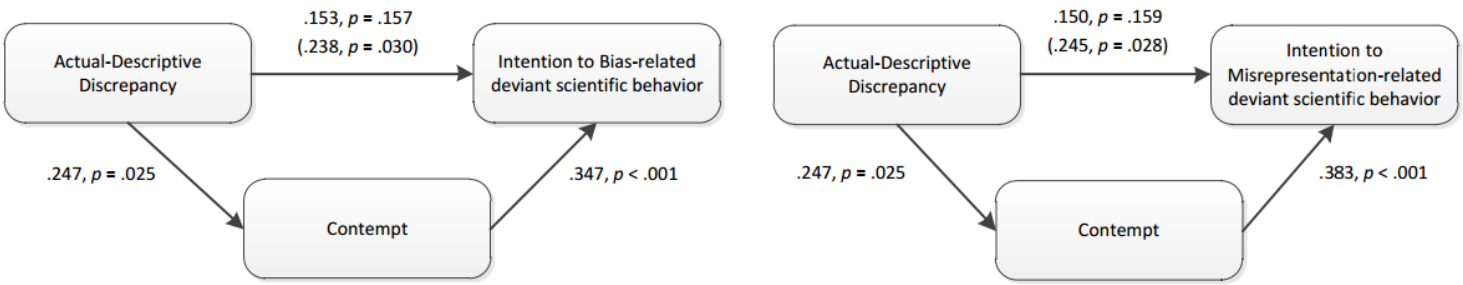

Figure 4: The effect-values of a mediation analysis of Contempt on Actual-Descriptive Discrepancy and respectively Bias- or Misrepresentation Behavioral Intention (total effect is indicated between brackets)

contempt on intention *b:* .347, p = <.001; Misrepresentation: ISD on contempt = *b:* .247, p = .025 contempt on intention *b:* .383, p = <.001).

Direct influence ISD on Behavioral Intention

The performed analyses to assess the influence of self-discrepancies on the intention to engage in deviant scientific behavior were done only for an indirect route, namely via the proposed emotions. But according to Table 2, significant correlations are present that suggest the possibility of a more direct route. Bias Behavioral Intention for example significantly correlated with Actual-Ideal Discrepancy (r = .309, p = .01) and Actual-Descriptive Discrepancy (r = .234, p = .05). Multiple linear regression with Bias Behavioral Intention as dependent variable showed a controlled, significant effect of Actual-Ideal Discrepancy on Bias Behavioral Intention with a β of .285 (t (81) = 2.319, p = .023). This means that when respondents reported higher levels of Discrepancy between their Actual and Ideal identity, they also reported higher intentions to engage in Bias-related QRPs. The effects for Actual-Ought Discrepancy and Actual-Descriptive Discrepancy were not significant, respectively β = -.032, t(81) = -.261, p = .795 and β = .176, t(81) = 1.603, p = .113.

Table 2 also showed significant correlations for Misrepresentation Behavioral Intention with Actual-Ideal Discrepancy (r = .296, p = .01), Actual-Ought Discrepancy (r = .252, p = .05) and Actual-Descriptive Discrepancy (r = .239, p = .05). The multiple linear regression analysis with Misrepresentation Behavioral Intention however indicated that none of the individual ISD's proved to be a significant predictor when their influence was controlled for the influence of the other ISD's (Actual-Ideal Discrepancy; β = .200, t(81) = 1.631, p = .107, Actual-Ought Discrepancy; β = .116, t(81) = .947, p = .346 and Actual-Descriptive Discrepancy; β = .168, t(81) = 1.533, p = .129).

In Figure 5 all the results that were found in the analyses are indicated. [3]

[3] In Table 2 the correlations of some other variables that were measured in this study are also indicated. These were measured as was suspected they could be of value in explaining certain proposed effects. Only for 'Average norm-confusion posttest' interesting correlations showed wherefore moderation analyses with this construct were conducted on the effect of contempt on respectively Bias Behavioral Intention, Misrepresentation Behavioral Intention. The results showed no moderation β = .04, t (75) = .323, p = .748 and β = .10, t (75) = .844, p = .402 wherefore no further attention is given to these variables.

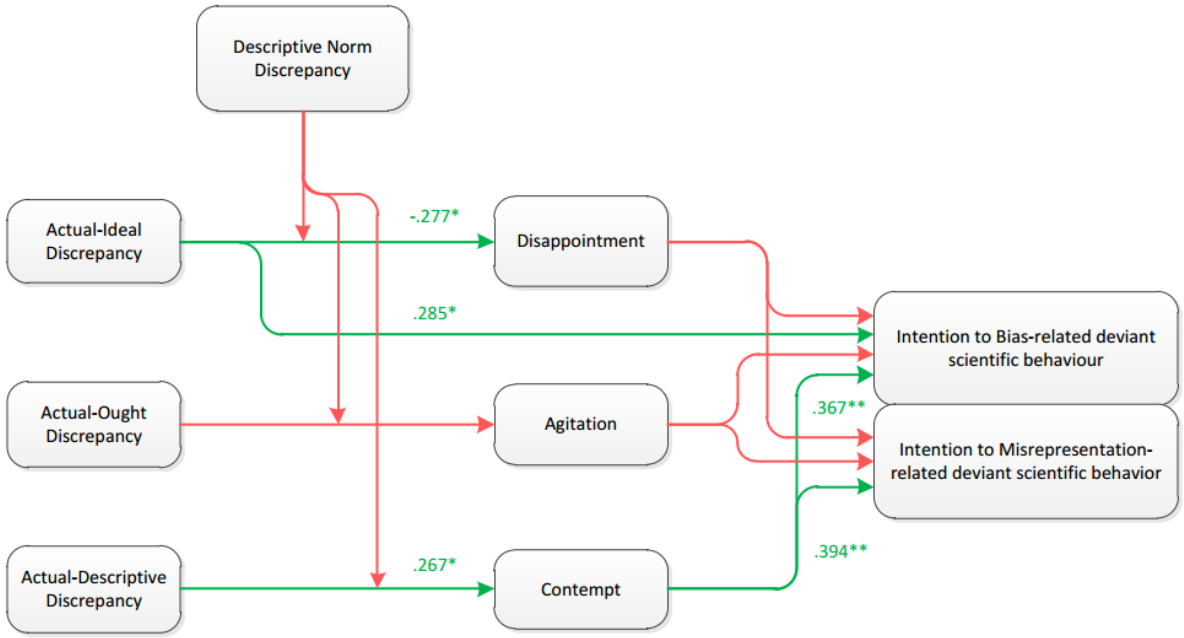

Figure 5: Process Model with effect sizes for the significant effects found (green lines). The effects that were not significant are indicated in red (* correlation is significant at .05 level (2-tailed)) (correlation is significant at .01 level (2-tailed))**

Conclusion & Discussion

The current research focused on assessing what the influence of self-discrepancies were on the intention to engage in deviant scientific behavior. It was suggested that this influence took place through the specific negative affective state a discrepancy will evoke which will subsequently guide behavior. As addition it was assessed what the specific influence was of the behavior of significant others in the tendencies to engage in QRPs. The research question was as follows:

To what degree does an Actual-Ideal, Actual-Ought or Actual-Descriptive Discrepancy influence the tendency to engage in deviant scientific behavior and how does a Descriptive Norm Discrepancy influence this relationship?

The findings showed that experiencing a greater the gap between your actual self (the way you think you are as a scientist) and your representation of the actual scientific behavior of others provoked higher levels of Contempt towards the scientific community. Having higher feelings of Contempt again resulted in a greater intention to engage in deviant scientific behavior. Based on that, we conclude that Actual-Descriptive Discrepancy is predicting deviant scientific behavior in the way that was proposed in the process model. This however was the only discrepancy for which that could be concluded. The discrepancy between Actual and Ideal identity (the way you think you are as a scientist vs. the way you want to be as a scientist, in an ideal world) did influence the intention to engage in deviant scientific

behavior, yet not through the suggested route. Actual-Ideal Discrepancy namely directly influenced the intention for Bias-related QRPs; the greater the perceived gap between Actual and Ideal identity was, the higher the intention to engage in Bias-related QRPs. We did not find any support for the influence of the gap between the norm and the behavior of significant others.

The findings that the Actual-Descriptive Discrepancy predicted the tendency to engage in deviant scientific behavior through feelings of Contempt could be interpreted in different ways. As a person feels that his behavior deviates from the behavior of others in the scientific community and that the behavior of others deviates from the norm, it leaves open two possibilities; either the person feels to behave *more* in accordance with the norm than the scientific community or *less* in accordance with the norm than the scientific community. From this study we can not infer which of these possibilities causes the effect on Contempt. Acting more in accordance with the norm than the scientific community could result in higher feelings of contempt because that person finds the behavior to be shortcoming on the expectation of the scientific community. Acting less in accordance with the norm could also evoke feelings of Contempt as one may find the behavior of the scientific community to be too neatly. What however steers towards one of the possibilities, is the effect Contempt subsequently has on the tendency to engage in deviant scientific behavior. Directly after reporting the self-discrepancies the behavioral intentions were measured where people indicated to have a higher intention towards deviant scientific behavior when they felt more Contempt towards the scientific community. We predicted feelings of Contempt to lead to the drive to socially exclude the scientific community from one's network and therefore to a reduction of the motivation to act in accordance with their norms. Yet that would be a lengthy process that would not be likely to happen in a flash and should be reflected in the feelings of connectedness towards the scientific community. What therefore seems a more likely possibility is that people acted *less* in accordance to the norm than the scientific community, wherefore they felt contempt as they find the scientific community too neatly, and also indicate a higher intention to engage in deviant scientific behavior, as that was what they did before already.

The fact that the Actual-Ideal Discrepancy directly influenced the intention to engage in bias related QRPs also suggest such a type of effect: as respondents did not experience a negative emotion that steered behavior in a specific manner, the fact that their behavior deviated from the ideal must have. This suggest that the higher intention to deviant scientific behavior is mostly reflecting that a respondent's behavior already deviated from the ideal instead of that respondents increase the intention to misbehave because they do not reach the ideal-behavior.

Because these interpretations of the results are merely based on induction, further studies are needed to assess whether the effects are present due to choices made in this study or that scientist actually believe the scientific community to be too neatly. Addressing the specific direction of the discrepancy in more detail could be helpful in that. Many authors (Gonnerman et al., 2000; Ozgul et

al., 2003; Phillips & Silvia, 2005 and Tangney et al., 1998) did already advocate for more in-depth research towards the discrepancies as they did not find distinct Ideal and Ought discrepancy in their research.

Also in this study our analyses indicated the magnitude of the three discrepancies to be relatively equal and average just as having a significant correlation to each other, suggesting that respondents might not see the actual, ideal and ought self so differently from one another. Watson (2004) and Watson et al. (2010) developed a special measure to assess these discrepancies and showed it to be effective in a general context, yet in the applied context of this study its validity was not that clear.

Higgins (1999) already brought a possible explanation as to why discrepancies are not always distinguishable. He described four variables that moderate the likelihood of finding unique discrepancy-emotion relations: the magnitude of a self-discrepancy, the accessibility of a self-discrepancy, the applicability and relevance of a self-discrepancy in a current context, and the importance of a self-discrepancy to the person (Higgins, 1999). In this study, the magnitude of the three discrepancies were relatively equal, so therefore we suspect the accessibility, the applicability and/or the relevance of the discrepancies to be different for the three factors which may has effected the influence it has on the emotions respondents experienced. For example, in our student-sample the applicability of different 'scientific-self' may be lower than the applicability for actual scientist.

Therefore one of the limitations of this study is the usage of students as respondents. Where on average, using students is a relatively good way to do an explorative research, in the specific subject of scientific misconduct it was doubtful whether students were sufficiently aware of and concerned with science ethics to give any insight in the behavior of scientist. This is also reflected in the connection the respondents felt with the scientific community, what on average was 50%, which is not that high. Therefore, when this research would have been conducted again, the sample would preferable consist of actual scientist ('people conducting scientific research as their predominant work').

Another limitations of this study originates from the alignment between focus of discrepancy and focus of emotion. Where the discrepancy was measured at a personal-base, the emotions were measured at a group-base meaning that we assessed emotions towards the group instead of towards one self. Bizman, Yinon, & Krotman (2001) have shown that effects of group-based discrepancy and group-based emotions go in the same direction as personal-discrepancies and personal-emotion, yet having a combination of the two might negatively affect the validity of the measures and eventually the outcomes. The contradicting evidence for the effect of the Actual-Ideal Discrepancy on Disappointment could for example be explained in the light of this misalignment. When your behavior deviates more strongly from the Ideal, it can be expected that you are disappointed in your own behavior, yet being disappointed in the scientific community does not make sense in this specific discrepancy.

The perceived level of difficulty of the questionnaire is the final limitation of this study. Many respondents provided feedback after filling in the questionnaire and mentioned that they thought the questionnaire was quite challenging. What was mentioned to be especially challenging was the abstract level at which the respondents had to think about themselves and their behavior. This could have negatively affected the responses given, as people hurried to finish the questionnaire and therefore became less motivated to provide accurate answers. Another danger is that respondents did not fully understood the questions and therefore have provided inaccurate answers. For further research it should therefore be considered if a questionnaire is the most suitable way to assess such an abstract subject or in what way the questionnaire could have been altered to become more suitable. Ensuring a greater sample could have already made the responses more reliable.

This study has tried to provide some insights as to way some scientist could be more responsive to pressures found to influence the likelihood to engage deviant scientific behavior based on the discrepancies between different parts of the scientific-self of individuals. Interesting results were found as the addition of a Descriptive Self in the SDT showed to have predictive effects on the intention to engage in deviant scientific behavior through feelings of Contempt. Further research should however assess if such an addition proves valuable in more areas, just as whether the found effects of this explorative research can also be found under more bounded conditions.

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