



A Critical Analysis of Falsification as Fraud



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Abstract: This paper critically evaluates the classification of research-related fraudulent activities, with an emphasis on the specific misconduct falsification. The analysis begins by interrogating the assumption that all acts of fraud in research are intentional, suggesting that some instances may inadvertently arise during the course of scholarly activities. Misconducts like fabrication and falsification are categorized as fraudulent primarily due to their generation during research activities and their direct contribution to the distortion of scientific knowledge. Plagiarism, while deceptive, does not necessarily originate from the research process nor lead directly to such distortion, and therefore is not classified as *de facto* fraud. The paper proposes that the definition of falsification – as established by the PHS – requires refinement to prevent wrongful allegations and convictions, enhance transparency, and offer clearer guidelines. This nuanced understanding is vital for safeguarding the credibility of the research process and protecting scientists from unfounded career-damaging accusations. Ultimately, this paper advocates for a clearer definition of falsification to protect the integrity of scientific research and prevent the miscarriage of justice.

Keywords: Ethics; falsification; fraud; research misconduct; philosophy of science; semantics.

I. Allegations and Fraud as They Pertain to Falsification

According to the Office of Research Integrity (ORI) data from case summaries of misconduct outcomes between 2006 and 2015, while the number of cases of misconduct being considered has increased, the number of cases in which there were findings of misconduct has remained relatively consistent (ORI, n.d.)¹. This trend has the disturbing corollary that not only has making false allegations (e.g., Hama 2018; Turvey et al. 2017; Hellman 1988) become more frequent, but because of the increased number of accusations despite the absence of a commensurate increase in findings of misconduct (Habermann et al. 2010), more individuals are being falsely accused. Moreover, such an

¹ This article is part of an unpublished dissertation entitled “The Violation Imperative” (the University at Buffalo, 2017), revised and updated by the author.

increase in false accusations implies that, unless only those actually guilty of misconduct are the ones whose cases result in findings of guilt, which is obviously untrue, there are necessarily increases in the number of false convictions as well as tarnishing personal and professional reputations – sometimes, irreparably.

Regardless of the social, ethical, or legal transgression of which one may be accused, one thing is certain: there will always be a proportion of such allegations that ultimately and inevitably will be determined false. Nevertheless, certainty of occurrence in no way implies frequency of such. Even given the most generous estimate of frequency, it would be difficult to imagine – let alone accept – that false allegations are being made nearly as often as instances in which there is a legitimate basis for whistleblowing. Unfortunately, between 2006 and 2015, for each year except just one outlier, there were more cases resulting in no findings of misconduct than there were those in which there were findings. In the absence of any significant increase in actual findings of research misconduct occurring, any attempts at understanding the data become rather complicated.

Efforts to reconcile the trends in the data and possible justifications for them were the impetus behind this paper. Could all of the accusers responsible for the false allegations during all but one year outnumber legitimate complainants? If so, what motivated the false allegations? Could they have hallucinated yet truly believed the object of their hallucination? Perhaps the accusers were fully aware of their actions intentionally making false allegations? Better still, although it is not high on a tentative list of explanations, in all fairness, maybe the problem really is not related to the whistleblowers at all. Unless year after year there is evidence to support the same accusers making allegations that cannot be substantiated based on there being no finding of misconduct in cases, which is very unlikely, there is only one other commonality that potentially connects the cases, and it does not relate to the motive, intent, or action of the accusers at all: that commonality is the gatekeepers in charge of *determining whether to hear the cases and rendering decisions concerning cases heard*.

Although due diligence requires that all realistic possibilities be given serious consideration, rather than jumping to the absolute worst conclusion of either the people making false allegations, or that those sworn to uphold the virtues of the profession and the entire scientific community at large have orchestrated some fantastically brilliant yet devious plan conspiring to limit findings in cases heard to bolster the image of adequate self-regulatory capacity, it would be more reasonable that the problem lies not with actions, or the failure to act. Giving people the benefit of the doubt that they are genuinely doing their best to maintain integrity, the issue that would be consistent with adopting this framework for viewing the phenomena of false allegations would be the presence of a flaw or defect with the manner in which the classifications comprising misconduct are defined, which contributes to misunderstanding what constitutes an instance of falsification (e.g., Popper 1959).

Depending on one's perspective, both the best and the worst aspect of allegations

in general is the same: *allegations do not require evidence*. This is consistent with the fact that, if there were to be evidence of what is alleged, then there could not be any allegations (i.e., an assertion or claim that someone has done something wrong or illegal); there would instead be findings of the transgression in question. *It is only after a ruling of no findings that allegations may be determined false. Unfortunately, by the time a ruling of no findings has been made, the damaging effects have already occurred to the individuals cleared of wrongdoing*. While it may be the case that transgressions – be they criminal, ethical, or otherwise – do not always leave evidence of their occurrence, does this not imply that evidence must be requisite to make allegations? Without evidence, on what ground would allegations rest? Before we can consider this and other questions, we must understand what it means to ‘allege’.

II. Allegations as a Losing Proposition for the Falsely Accused

By definition, to allege is “to assert without or before proof” (Merriam-Webster 2017). On the one hand, individuals wrongly accused of having committed misconduct may view the absence of an evidence requirement to make allegations as the worst possible thing. Because there is no evidence required to make a claim against others, it does not matter whether one will ultimately be exonerated because nothing will have changed concerning the status of evidence. Nevertheless, at best, people will always be remembered for having been rightfully cleared of allegations of misconduct of which they were accused. Alternatively, at worst, he or she may potentially be wrongly convicted for something that he or she did not do, which occurs often enough to merit the creation of scholarly works dedicated entirely to the phenomenon of *False Convictions* concerning various types of crime and misconduct (Turvey et al. 2017).

Regardless of which outcome occurs, neither exoneration nor false conviction is particularly beneficial or designed to protect those unjustly accused. Although there are procedures in place to appeal when falsely convicted, there are no such means in the case of those falsely *accused*. In particular, even when exonerated of alleged misconduct after being falsely accused, one is truly never wholly ‘cleared’ in the eyes of the many due to flawed reasoning that leads to the erroneous belief that only the guilty are alleged to have committed transgressions. This phenomenon of persistent guilt despite the lack of findings is eerily reminiscent of the manner in which allegation phenomena operate. Because of their similarities, this paper begins by considering what may be responsible for such irrational guilt persistence in spite of the absence of reason.

III. Serial-Positioning and Primacy Versus Recency as Frameworks for Appreciating Allegation Phenomena

With such a poor outlook for anyone falsely accused regardless of the outcome of

their hearing, the phenomenon of allegations and their aftermath merit consideration in my opinion. As a potential tool for analysis, I propose that observations be understood from the perspective of the effects of serial-positioning (i.e., presentation order of items) on recall (Neiman et al. 2013; Meyer et al. 2020). What do people remember the most? The allegation itself (intimating guilt) or the finding of innocence? Serial positioning in recall is a well-studied phenomenon in cognitive psychology, where the position of an item in a list influences its likelihood of being remembered (Walker & Hulme 1999). Research has shown a clear interaction between word frequency and serial position, indicating that recall accuracy varies across different positions in a list (Walker & Hulme 1999). This highlights the crucial role that the position of an item plays in its memorability. Moreover, studies have found that the preferred serial order in recall is influenced by the frequency of item pairings in adjacent positions during free recall tasks (Gardner et al. 1968). This structured organization of information in memory based on sequential relationships between items suggests that memory organization is not random. The serial position effect observed in recall tasks is attributed to the formation of associations between serial positions and the items to be recalled (Frensch 1994), contributing to differential recall performance across positions in a sequence.

Additionally, age-related differences have been observed in the utilization of temporal and semantic associations during recall, with older adults showing weakened use of temporal context compared to younger adults (Golomb et al. 2008). The asymmetry effect in cued recall tasks emphasizes the role of associative retrieval processes in recall performance across different serial positions (Kahana 1996), indicating that retrieval is influenced by the context in which information was encoded.

Studies examining free recall and immediate serial recall (ISR) have shown distinct patterns in recall performance, with free recall typically exhibiting a U-shaped serial position curve with extended primacy effects and minimal recency effects, while ISR shows a different recall pattern (Bhatarah et al. 2008). Error patterns in serial ordering tasks have provided insights into the principles of serial recall, highlighting processes such as anticipation, where items are recalled too early in the sequence (Ma et al. 2019). Research on memory for serial order has emphasized the role of positional cues and the spin-list technique in understanding recall performance dynamics (Kahana et al. 2009). The serial position curve, which plots the probability of recall as a function of position, visually represents how memory performance varies across positions in a sequence (Murdock 1962). Overall, the concept of serial positioning in recall underscores the complex interplay between memory processes, temporal-spatial associations, and age-related differences in memory utilization, shedding light on the intricacies of human memory and cognition.

The phenomenon of primacy versus recency in recall lists is a well-established area of study in cognitive psychology, shedding light on how the position of items in a list influences their likelihood of being remembered. The primacy effect refers to the tendency

for items presented at the beginning of a list to be recalled more accurately than those in the middle, while the recency effect pertains to the superior recall of items presented at the end of a list (Ward 2002). This distinction in recall patterns has been consistently observed in various experimental settings, highlighting the impact of serial position on memory performance. Studies have shown that in free-recall tasks, a U-shaped serial-position curve typically emerges, with items from both the beginning (primacy effect) and end (recency effect) of the list being remembered more effectively than items from the middle (Hofrichter et al. 2014). This pattern underscores the differential encoding and retrieval processes that occur based on the position of items in a sequence, with primacy and recency effects reflecting distinct memory mechanisms.

The primacy and recency effects have been attributed to the rehearsal and encoding strategies employed by individuals during the presentation of a list (Bayley et al. 2000). Items at the beginning of a list benefit from increased rehearsal and deeper encoding, leading to a stronger primacy effect, while items at the end benefit from being in the short-term memory buffer, contributing to the recency effect. These effects demonstrate the interplay between attention, encoding processes, and memory consolidation in determining recall performance. Moreover, research has explored how factors such as age-related cognitive decline and comorbid conditions like depression can influence the magnitude of primacy and recency effects in memory tasks (Meyer et al. 2020). Understanding how individual differences impact the primacy and recency effects provides valuable insights into the underlying cognitive processes involved in memory formation and retrieval across different populations.

The serial position effects observed in memory tasks have practical implications for assessing cognitive function and memory disorders such as Alzheimer's disease. By examining how individuals recall items from the beginning, middle, and end of a list, researchers can gain valuable information about memory functioning and potential impairments, highlighting the diagnostic utility of primacy and recency effects in clinical settings. Furthermore, the investigation of serial position effects in memory tasks has extended to diverse populations, including bilingual individuals and patients with mild cognitive impairment (Hofrichter et al. 2014). Comparing how different groups exhibit primacy and recency effects provides valuable insights into the universality of these memory phenomena and how they may be modulated by factors such as language proficiency and cognitive health. In conclusion, the study of primacy versus recency effects in recall lists offers a window into the intricate processes underlying human memory. By examining how the position of items in a sequence influences recall performance, researchers can unravel the complexities of memory encoding, storage, and retrieval, contributing to a deeper understanding of cognitive function and memory-related disorders.

Concerning *primacy versus recency*, as it relates to serial-positioning, it has been observed that the last or most recent item in a list of items is what people are most likely to freely recall while second-most-likely in a list of items studied for subsequent recall

are those that were among the first encountered. In fact, it is based on such research findings that textbooks on academic writing suggest structuring the series of points for one's argument with the second-most important point mentioned initially and the most important point stated last (Behrens & Rosen 2018). Applied as a lens through which to view the impact of allegation, primacy guiding cognitive bias in the best and worst scenarios would predict allegations themselves standing out regardless of any subsequent findings to be most likely recalled whereas exoneration either at trial initially or upon appeal subsequently occurring lastly being recalled would implicate recency effects as the dominating force behind cognitive bias.

Given the damaging effects of allegations to the personal and professional lives of individuals accused even when allegations are immediately discredited or discrediting is delayed, primacy is that which appears to take precedence. However, despite this obvious primacy effect, the basis for it is both unintuitive and unclear. Moreover, in the face of multiple allegations on separate occasions, the primary effect seems to be reinforced. What is interesting is that over time, the primacy effect is transient. Transience makes sense when considering that the longer a list of items may be, the longer the time since the first item was mentioned, which affects recall. Nonetheless, it is recency that not only determines what is most likely to be recalled but has also been shown to increase recall with successive trials (Huang et al. 1977). Thus, recency would be expected to guide recall in the case of exoneration of the innocents, which means the outcome of allegations and not the allegations themselves are what should be recalled. Yet, persistence of the presumption of guilt based on having been *alleged* despite the exoneration is very real. The question is 'why this is the case'?

One explanation is that there may be a crucial difference between a list of items for recall and actual events such as allegations: the inextricable link to, and attribution of, values. That is a variety of letters or unrelated words one is asked to study for later recall would be devoid of any meaningful, inherent attributes that rely upon judgment or assessment. Conversely, concerning a list comprising a string of events that one is instructed to study for later recall, in which there is a piece of information included stating a prominent scientist is alleged to have committed research misconduct, appended to the content of the item itself, would be some form of valuation resulting in the attribution of either good, bad, or possibly neutral. In this particular instance, the information content would likely be labelled with some variety of semantic tagging much the same way an internet framework called "Cog Tag" has suggested (Wu et al. 2013). When later prompted for free recall, undoubtedly certain tagged items (e.g., deemed good or bad) would come to mind before others.

Given the incessant war waged between our evolutionary pressures to the self and those to the group (Peditakis 2014), it would make sense that events that are labelled and interpreted as threats are more readily recalled. Furthermore, of the two evolutionary pressures, I contend that the pressures to the self are given priority over those to the

group since self-preservation is the best way to guarantee one's ability to satisfy both pressures. Attentional resources are quite supple and may be directed according to the needs of the particular task of the moment (Morrison et al. 2014), and the task above all else is self-preservation, the ability to direct one's attention as required with the tagged 'bad' items in memory could explain the observed behavior of persistence of guilt and the aftermath of false allegations in general. On a primal level, recalling or remembering allegations despite them being dismissed are perceived as red flags and threats to the self.

IV. Allegation as Allegory: Circular Reasoning

From the perspective of the person making the allegations, the absence of an evidence requirement is perceived as the best thing about the manner in which allegations may be made. The onus is effectively on the accused and the 'system'. After all, the mindset of accusers who claim to have the utmost faith in the process may be that if they should be wrong about the accused, then the latter ought not be found guilty and will be exonerated. Although I would strongly disagree with such a lackadaisical attitude for a number of reasons, which include wrongful convictions do occur on occasion, if the wrongly accused is fortunate enough to be exculpated, should he or she confront the person responsible for putting them through the ordeal afterward and state, *'I told you that there was no evidence for the allegations that you made,'* the accuser is still within reason to truthfully retort, *'I know. I believe you because there was no evidence when I made the allegations.'*

Despite the hypothetical scenario being rather distressing to acknowledge for some, as an allegory it serves to underscore a major issue that this paper attempts to tackle. By no means am I claiming that herein exists a panacea, nor that one exists elsewhere; however, given that there may always exist the potential for something so devastating to occur, success in small increments that this work aims to accomplish ultimately contributes to overall progress. Furthermore, that there exists a possibility of being falsely accused should be cause for concern regarding allegations in general as well as those related to research misconduct in particular because there is sizable cost associated with being involved regardless the outcome of the allegations.

For obvious reasons, it should be understood that all allegations of research misconduct may lead to severe consequences if the parties accused are ultimately convicted regardless. Furthermore, for one to go from an allegation to a ruling in a suspected case of research misconduct is a process that may be protracted as well as costly. Research regarding cost estimates attempted to determine the aggregate cost (AC) of a case of scientific fraud using a statistical method that incorporates both measurable and intangible costs (Michalek et al. 2010). The AC estimate produced from their analysis was calculated to be \$525,000 US.

Financial costs associated with cases are not the only setback resulting from allegations. Hey and Chalmers (Hey & Chalmers 2010) discuss how allegations of

suspected misconduct that were unfounded led to a case that was widely publicized in the UK. *Allegations may be responsible for damage to defendants that ensues even when no evidence is ever found.* In my opinion, it was the resultant damage that still occurred despite the absence of proof that justified the claim that the situation was handled inappropriately and inadequately. Moreover, the damage that occurred was protracted taking eleven years to determine that there was no real basis for the allegations made. The ultimate cost was more than an estimated £6 million in total (Hey & Chalmers 2010).

Given the repercussions of allegations, it may be concluded that the manner in which they function in general is extremely problematic. The most problematic aspect from any defendant's perspective is that the sole recourse that the accused may have if another alleges misconduct is to attempt to sue for libel (Hey & Chalmers 2010). However, to successfully sue for defamation as a strategic legal maneuver may prove exceedingly difficult. The difficulty would be in proving how allegations may be considered libelous, or defamatory given the possible outcomes. On the one hand, if the accused is convicted on the basis of findings produced during the trial, then no 'good character' can be said to have been tarnished because there exists evidence that nullifies the potential for libel claims. Conversely, if acquitted, the exoneration of the accused is supposed to ensure that their reputation remains intact. Unfortunately, as mentioned, this is not how it tends to be for the accused whether exculpated or not. It appears as though one may become easily ensnared by the web of allegations of research misconduct due to lack of evidence required. That notwithstanding, allegations are seemingly impossible to escape because although an absence of evidence may eventually result in the case being found not to have merit, due to the very same lack of proof required to allege, a conviction is not needed for damage to occur. While it may be exceedingly difficult to target allegations directly, the approach that I will use consists of addressing the issue of research misconduct, which involves allegations indirectly. Specifically, the issue addressed in this paper relates to one of the foundations of research misconduct as it is defined in a widely accepted established definition of the Public Health Service (PHS).

Because the entirety of research misconduct may not be adequately addressed in any single article, as part one of a multi-part philosophical critique, I will consider only a single pillar that comprises the definition of research misconduct. By concentrating on one main aspect, the total result of my work may provide understanding and allow for the reframing of suspected instances of research misconduct. In addition, any novel ideas that are derived from the findings may have the potential to contribute to the discourse concerning the ethical conduct of research and possibly prevent future allegations from being made frivolously or due to honest ignorance. In this article, I will be deconstructing the definition of falsification under the rubric of research misconduct as defined by the PHS.

V. Geometrical Method of Deconstructing Falsification as Misconduct

Fabrication (Fanelli 2009), falsification, and plagiarism (FFP) that comprise explicit definitions of research misconduct may each be considered to result in instances of fraud when these acts are perpetrated. As an explicit definition, the definition of falsification provides sufficient detail to allow for identified instances matching the *definiens* (i.e., the description) to be substituted with the *definiendum* (i.e., word) 'falsification' being defined (Cook 2009). As far as the term is routinely understood, fraud may be defined as "that which is done with the intent to deceive" (Fellbaum 1998). According to this definition of fraud, one may infer that there exist at least two aspects:

- 1) The aspect of intent and
- 2) The aspect of deception.

What is interesting to note is that, despite their existence, neither the aspect of intent nor that of deception may be directly observable or measured, which renders them both theoretical constructs (Martella 2013). As mental abstractions, theoretical constructs are often relied upon to convey ideas, concepts, or notions that defy immediate perception. Furthermore, any percept comprised of an instance of a construct shares underlying characteristics with all others. In fact, it is only through the realization of such percept that one is justified in claiming the existence of constructs.

A claim of understanding concerning fraud in this capacity would be that the core aspect of fraud is that of intent. *Core aspect* refers to that which is requisite, foundational to the occurrence of fraud, or considered that without which it would be impossible for fraud to occur. That is, while deception can occur without intent, as we will discuss in the remainder of this section, the absence of intention would violate the definition given, as well as most commonsense understandings of fraud. That notwithstanding, although the core aspect of intent may be necessary, it must still be qualified by the aspect of deception.

Qualification of intent by the aspect of deception influences what counts as fraud in the following two significant ways. Firstly, qualification affects the aspect of intent by establishing a relation that resembles equivalence superficially. Such a resemblance whereby intent is interpreted to be deception leads to an apparently explicit relationship in which one may be thought of as being interchangeable with the other. Nonetheless, the substitution of one for the other is, in fact, not possible. Unfortunately, 'intent' cannot be substituted by 'deception' in any place that it occurs because *each instance of deception does not necessarily have to correlate with that of intent*. The qualification of intent by deception may be best understood as descriptive. As such, qualifying intent with deception serves only to explain how things were, are, or will be (Browne & Keeley 2015).

The second way in which the qualification functions is in its subordination of the aspect of intent itself. By subordination, I refer to a reduction in the status of the aspect of intent to that of deception. A reduction occurs in which *the property of being perceptible becomes required for the aspect to be realized*. As counter-intuitive as it may seem, I view

the additional property of being perceptible as a reduction in status because it results in another requirement. For instance, both intent and deception can exist independently of one another. However, it is only through certain acts of deception (e.g., example of check forgery) that intention may be inferred. In this respect, it is impossible for intention to be perceived directly; thus, it may only be so indirectly. Conversely, deception may be perceived by both direct and indirect means. Going from direct to indirect perception is the reduction of intention to which subordination refers.

The reduction of the status of intent to that of deception is due to the absence of true bidirectionality, or biconditionality. Biconditionality, as a class of relation between two objects, refers to the symmetry of conditionalization such that if A then B, then if B then A (Cook 2009). From the truth of such symmetry, it may be understood why biconditionality is used to represent or describe one concept of equivalence (Cook 2009). Equivalence among the two aspects of intent and deception that results from a reduction in status of intent is established through the construct of subordination. The aspect of intent is conceptual and immaterial whereas that of deception manifests itself in observable forms. Given the nature of, and relation between, both intent and deception, deception is directly verifiable whereas intent may only be confirmed through a performative behavior, such as an act of deception. Despite rendering the aspect of intent less powerful, the reduction of intent to the level of deception through subordination serves the purpose of making it possible for intent to be verifiable.

VI. Relational Semantics of Intent and Deception

The aspects of intent and deception, as qualities or properties, are related to one another in a variety of ways. Individually, each of the relations that one aspect bears to the other, or to itself alone, has meaning. Nevertheless, were we to analyze as many of the relations as possible to assess the aspects of intent and deception for consistency and what they entail, then it would provide more insight into their essence and guide the process of interpretation, which leads to more profound understanding.

VII. Case of Fraud: Cashing a Forged Check

In order to analyze the relation between the aspects of intent and deception, it will suffice to examine a prototypical instance of fraud comprised of these two aspects. Thus, let us begin by supposing that there actually exists a forged check and that the forged check was successfully cashed. From the actual existence of this forged check, it will be our goal to determine, with respect to the two aspects, what the instance of fraud entailed. Forgery may be defined as the act of producing a copy of either a document, signature, or work of art (Oxford 2017). Given that something is copied, through this definition one may interpret forgery in the context of an absence of authenticity. By virtue of both the

behavior of the individual and the act itself associated with the committal of forgery, outside of coercion, entrapment, or otherwise being forced against one's will, it can be inferred that the person responsible for committing fraud could only have intended for deception to occur.

By copying the signature of another person onto the check, going to the bank, and handing the forged check over, it may be concluded that passing his or her signature off as that of another so as to cash the check was not only their intention, but upon successful completion was also to become their deception. That notwithstanding, intending for deception to occur does not imply that deception will result. Moreover, the concept of forgery has multiple frameworks from which to be interpreted as fraud. Some frameworks include: from either the perspective of the one committing the act (i.e., intention), or the one not committing it (i.e., deception); and from within the framework of the process itself, which is active (i.e., copying the signature of another) and from that of the product that results (i.e., consequences of copying the signature of another). Does the existence of multiple perspectives in any way influence what would be categorized as fraud? Should it? In other words, from a framework of intention alone regardless of a successful outcome, success in deception regardless of intent, the action itself regardless the intent or success, or consequences regardless the action, is there an example that qualifies all four frames? We must evaluate and redetermine core aspect designation.

VIII. Thought Experiment: Characterizing Fraud

I have thus far assumed that intent to deceive is requisite for fraud to occur. Nonetheless, I contend that intent is neither core, nor is it even pertinent to the process of committing fraud. I will discuss a hypothetical case concerning a forged check and demonstrate the inherent flaw in the definition of fraud as it currently stands. Let us suppose that there is an actual check that was signed for and cashed by a person for whom it was not meant. The person who forged the signature and check, therefore, intended to deceive. Additionally, upon successfully cashing a check, he or she has committed fraud. So, it is either the case that this forger had to have signed the name of another, or he or she had to just have not signed his or her own name. Which is the most adequate phrasing for the stipulation of forgery? In other words, with respect to fraud, is it more important to propose that the forger signed the name of another person, or that he or she did not put his or her own signed name down? In order to decide which wording should be used to frame the act of forgery, one needs to first determine whether it is possible for both versions of the criterion to be consistent with one another. By consistent, it is meant that both versions of the framing of criteria may be true simultaneously without contradiction. An example analogous to this may be found in the Principles of Ethics in which comparisons are made between beneficence and nonmaleficence.

When comparing doing good by beneficence with not doing harm through

nonmaleficence, one is afforded the opportunity to potentially see the same thing from multiple perspectives. Nonetheless, while it may be true that doing good would be considered not doing harm, not doing harm is not necessarily considered the same as doing good, which demonstrates the necessity in having the perspectives of the same thing from both as principles.

IX. Procedure for Comparison

The key to comparing multiple perspectives of the same phenomenon is the construction of both an affirmation and corresponding denial statement. For instance, concerning the notion of good, constructing it as a principle of ethics in the form of 'doing good' (i.e., beneficence) initiates the comparison process through the use of a verb. After the verb-phrase, the next stage requires the construction of the negated form. Nonetheless, with 'no(t)' plus verb phrase, we are left with 'not-doing good' and not doing good is not equivalently formulated. Since this negated construction cannot be compared because it is not the same, it can be corrected by extending the negation in a different context to the notion of good itself. In this fashion, once 'not good' is obtained, it may be substituted for its equivalent (i.e., bad or harm) to result in 'not doing harm'. Finally, not doing harm can be rewritten swapping the negation with the verb yielding 'doing no harm'.

The reason for the aforementioned procedure is to allow for the logical analysis of the structures. This procedure is analogous to what occurs with higher-order logics in which a statement as a particular realization is abstracted and regimented in order to obtain its logical structure and logical form, respectively. For instance, if '*John writes*' is the particular realization under consideration, then the statement may be rewritten in a logically structured format '*there is an x such that x is john and x writes*'. As it pertains to ethical principles of beneficence, the negated form 'not doing harm', is the negative construction that may be thought of as that which results from a metaphoric rarefaction in which there is a stepping back to allow for the more general form. In so doing, 'doing no harm' may now be properly compared with 'doing good'.

The actual comparison occurs by examination of the relation between both constructions, which in this case is binary. Is it true that doing good is equivalent to not doing harm? Yes. Conversely, is it true that not doing harm is equivalent to doing good? It is possible yes and possible no; but not necessarily so, which makes the statement contingent. A statement is considered to be contingent if it is both possible that the statement is true, and possible that it is false (Cook 2009). Therefore, this first relational comparison reveals an asymmetrical relation to exist between both beneficence and nonmaleficence such that necessarily if beneficence, then nonmaleficence, yet it is possible if nonmaleficence, then beneficence AND its possible if nonmaleficence, then not beneficence as well. That is, to say, the conditionalization of beneficence to nonmaleficence is one of necessity whereas that of nonmaleficence to beneficence is one of contingency – possibly yes or possibly no

but not necessarily either. If x 's doing good for y implies y to do good for z , then is it true that x is doing good for z ? That is, if $B_{xy} = x$ doing good for y , then if B_{xy} and B_{yz} , then B_{xz} true? Yes, so B (beneficence-doing good) and N (nonmaleficence-not doing harm) as they are in a relation to one another are so transitively.

There are other such relations concerning B and N as well, which model the manner in which a relation may be used to determine the nature of the status. In addition, the relation between intent and deception may be analyzed in much the same fashion as beneficence/nonmaleficence was, which should assist in uncovering the semantics of the connection that is shared. Let us suppose for our hypothetical scenario, there exist two distinct individuals. Each of them is named Frank Frauder. one has middle initial $D.$, and the other $E.$ Both males, similar appearance but not identical. They live in the same state, different towns and addresses, different phone numbers too. But they were born on the same day, and work at the same company, to make it interesting. Although unlikely, these facts are all theoretically possible and will be our base case for the determination. We will now begin by assuming from the following different perspectives: that from fraud being known to occur and that from the one committing it. The perspective of the one committing it will be divided into wittingly and unwittingly committing fraud. Also, from the perspective of knowing that fraud occurred not having been the one to commit it. Thus, the question of intent concerns how best to phrase the action that resulted in the fraud: as an affirmation or denial. Is it writing or signing the name of another, or not signing one's own name, that most adequately labels what transpires?

Consider the perspective as the intention before it was done, and as the intention once completed. However, once completed, the action(s) successfully carried out become the deception. The only difference between the two aspects relates to the ontological status. In other words, the ontological status pre-commission distinguishes intention from post-commission at which point the intention becomes manifest as the deception itself. While it is possible for the action to be carried out and be unsuccessful, it is prior to being carried out and success in being carried out that are the main concerns because from these two outcomes all four scenarios may be determined according to their framework. Prior to being carried out delineates or demarcates pure intention which may not be verifiable; if successfully carried out, then we know deception occurred and there were consequences as well. Carried out unsuccessfully implies that the act itself is what matters most whether intention preceded it or not.

X. Relevant Dichotomies

In consideration of what we know regarding the notion of fraud based on the definition previously given, the intent to deceive stipulation resulting in the two aspects of intention and deception as criteria for determination may be understood through the manner in which they are related to one another. As it currently stands, however, it seems

as though the definition of fraud stipulating intention to deceive may be incorrect. In an effort to determine whether fraud, as defined, will hold, the nature of the relationship between intention and deception must be thoroughly vetted. We must ascertain as much relevant information about these two aspects as possible. Given the information will be pertinent to either one or the other if the two aspects are not identical, it is recommended that the approach to this task be analyzing for what I have termed the *relevant dichotomies*. Relevant Dichotomies may be understood as opposing pairs of qualities, properties, or characteristics that either the presence or absence of which allows for their classification into groups according to similarities and differences. In the case of intention and deception, the relevant dichotomies concern the binary relation each aspect as object bears on the other.

For example, let us suppose that we have just thrown into the air and let fall as they may two or more coins. I claim that, through relevant dichotomies, it is possible to separate all of the coins with ease. One relevant dichotomy would be the color. That is, while no coin may be exactly a match, any of the coins may be split into groups of those that are either silver-grey or near yellow-brown. Please note that if a coin were to be gold, then it would fall under the yellow-brown category. Another relevant dichotomy could be whether the coins show a particular side of themselves (e.g., heads). In this fashion, one could continue to identify other relevant dichotomies that would eventually result in all remaining coins being categorized. What would not be a relevant dichotomy for coins? Shape or size. Why? Because in the USA, all coins are circular so there would be no way to distinguish between them because there is only one option, not a true dichotomy. Furthermore, if one were to try claiming size as a relevant (e.g., Large and Small) determining what is considered large and small would have to be arbitrary or subjective to some extent because there would have to be six choices of size, which is more than two. In other words, silver dollars and fifty-cent coins would be obviously large while dimes and pennies would be considered small. Nickels and quarters would be up for debate because they are neither the largest nor the smallest and would require additional criteria for separation. In fact, categorization of the coins according to size would differ based on whether a child chooses or an adult because coin size is relative to other coins, but coin size could be relative to the palm size of the hand picking up the coin. In this fashion, shape and size complicate things and fail as relevant dichotomies.

There will be clever readers who swiftly point out that a coin could have landed on its edge thickness in theory – something to which I can attest – which would result in a trichotomy: heads, tails, and edge. These individuals would wonder how this would be possible to reconcile since there are three outcomes possible and not two. Please note that the purpose of selection of categorization was embedded in the name. Most crucial is the ability to make the process simplistic. Thus, the requirement of both relevance and dichotomization at each step achieves simplicity.

In the rare case that among tossed coins a coin is found to be standing on its

edge, then neither head side nor tail side shows skyward. Therefore, the new relevant dichotomy would be showing sides either yes, or no. Then, the sides showing group undergoes dichotomization into heads or tails, which results in the three groups. While it may have been just as easy to trichotomize in this case, the point may have been missed by implementing dichotomization. Instead of three categories, in the event that there were ten or one-hundred different groups that could be formed, it would be readily understood how quickly dichotomizing immediately into however many categories encountered might overwhelm by becoming unnecessarily difficult. There is a distinction between taking additional time and being difficult: often, I would argue the way to discern the two would be that if a procedure takes less time to complete, but results in a higher chance of error, then that procedure would be labeled more difficult.

The approach for dichotomization is general to specific. It proceeds in a logically structured manner so as to minimize error despite taking as long or longer to complete. Nonetheless, because dichotomization requires only two categories, whether compared to trichotomizing, or more, I contend that it will always be simpler and faster to look upon a pile of items for rapid assessment – be the items coins dropped or otherwise – and notice a dichotomy (2) than a trichotomy (3) or higher split. In this particular case, this allows one to separate coins on their sides from those that landed on the edge-thickness almost instinctively and more rapidly without taking much more time to complete the dichotomization of the coins showing sides. Most importantly, the coins on their edges simply can be retossed because the number of times in a row a coin could land on its edge after being truly retossed is few if even that many. Moreover, if such a procedure were carried out iteratively with the prior round's results serving as the basis for subsequent ones in a recursive process, completing a relevant dichotomy assessment would result in more easily managed, less error-prone, and finely categorized groupings.

XI. Propositions and the Dimensional Properties of Fraud

The following propositions with regard to fraud are crucial for understanding the issue:

1) In the event of success in the core aspect of intention, there would also be success in deception (i.e., if the intention to forge a check exists and is carried out successfully, then deception will have occurred);

2) Additionally, were an individual to have failed in their attempt of the intention, the failure does not alter the fact that deception was the intent.

The potentially relevant dichotomies for intention and deception involve several properties and dimensions concerning the manner in which each relates to the other and to itself. Such dimensional properties include the *ontological*, the *temporal*, and *those related to achievement*. For instance, if x intends to deceive, then the following may be inferred: *The intention exists before the deception and the deception exists after the*

intention. This inference points to the temporal nature of the relation that the intention bears on deception concerning earlier than/later than. Furthermore, we also can infer that because the relation earlier than is the inverse of later than, the relation is considered asymmetrical (). For example, an asymmetrical relation would be the binary predicate *is the biological parent of* ($P_ _$). The reason that the relation is asymmetrical is because for all x and all y such that x is not equivalent to y , if x is the biological parent of y (Pxy), then it's not the case that y is the biological parent of x .

We may also consider another relevant dichotomy, which concerns achievement of the intent when present. Thus, whether the intention was successful is the focus and what being successful means in the case of deception. To note is that, on its own, as an intangible, intention itself has no way of realizing achievement directly; it may only be considered successful through the actions that result in the object of the original intention, which preceded them. Conversely, the perspective may be altered such that one could directly address whether the deception is successful and what that means for the intention. Such an alteration may provide valuable insight that would have otherwise been missed.

XII. Achievement Reveals Status of Intention

Evaluation of the success or failure of fraudulent acts as a relevant dichotomy relates to both intention and deception. Upon evaluation, can any intention be said successful if it does not exist? No, it cannot. Thus, intention must exist. Nonetheless, can deception be considered successful on evaluation if the intention to deceive does not exist? Yes. In other words, it is *possible* that someone may be deceived by another's actions without the existence of the intent to deceive. For instance, on several occasions, by pure happenstance, the color and clothing I have worn resembled that of staff in a store to those failing to pay close attention. As a result, questions were asked of me that I was unable to answer. Upon my notification, the person who asked me replied '*Oh, I'm sorry! I thought you worked here*'. The people were deceived into thinking I was someone I was not without my intention to deceive (i.e., commit fraud). This is a crucial piece of information that reveals something about the nature of deceit and the role that intentions, acts, and achievement play, if any, in their success.

If an intention is to be successful, then it must itself exist. Also, because the intention is deception, a successful intention implies deception was achieved. Nonetheless, even if the intention were not successful (i.e., failed), then it would still have to exist; although, the deception would also be unsuccessful. It appears as though if the intention exists, then either it is successful or unsuccessful. If successful, deception is successful; if unsuccessful, then deception is as well. If the intention exists, then either deception is successful or unsuccessful. *Therefore, since the intention must exist regardless of the success or failure of deception, the existence of intention cannot determine whether or not deception succeeds. It may be concluded that successful deception is independent of the existence of any intention*

to deceive. Additional questions then would include, if the deception is successful based on the fact that someone was deceived (e.g., wrong about me being employee), then is there a case of fraud? Why? Is it because both deception succeeded and intention succeeded, or just deception? Now that we have critiqued the conditionalized statement from left to right, we will consider the opposite direction for consistency. The converse line of reasoning begins with whether or not deception can be successful without the corresponding success of the intent. That is, if the intent to deceive requires intention and deception, if deception succeeds, can we determine anything about intention? If deception succeeds, then it occurs. But, if the deception occurred (e.g., someone was under the impression of something about which they were wrong), then is it necessarily the case that an intention to deceive existed? No. The intention may or may not have existed prior. Also, if the intention existed, then it may or may not have succeeded. Thus, since success in deception may or may not have been preceded by an intention to deceive that existed, it cannot be considered a determiner of the success of the deception. In addition, even if there exists an intention, which was successful, success in deception cannot depend on the success of the intention to deceive.

The issue that arises is deception, when successful, exists; when it is unsuccessful it does not exist. There is no way for deception to exist but be unsuccessful like intention. *It is in this respect that the status of intention may be said to be higher than deception*. Once intention is reduced to the level of deception by being executed, it has become equivalent with deception through its own demotion such that it may no longer exist independent of success or failure. There is something fascinating about the nature of intention and that of deceit, which merits mentioning. When comparing among derivations the verbs and noun word-forms, grammatically, verbs give rise to nouns in use. For instance, if I sing, then singing results; and if I think, then thinking results. So, whether physical or cognitive action, noun results. However, because the occurrence of deception (the noun) is not guaranteed by the one who deceives (the verb), there cannot exist a causal binary relation such that the verb bears this relation to the noun that is the effect.

XIII. Supervenience as a Framework for Comprehension of Aspects of Intent of Deception

Having established the aforementioned relationship regarding intent and deception, it may be beneficial to note that concerning falsification with respect to the classification status of fraud, as a tool for analysis the concept of *supervenience* could potentially provide a framework for understanding. *Supervenience* theory refers to the relation between two sets of properties, one of which seemingly emerges from another that is more basic (Mclaughlin & Barrett 2011). Although more basic can be understood to mean core, as it applies to the present topic, I argue the following: *It is not the case that the designation of fraud as a status for misconduct supervenes on the status of intent and*

deception being considered.

The basis for claiming fraud does not supervene on intent and deception is that a difference in fraud status (i.e., guilty/not, or occurred/did not) does not require a difference in the status of either intention or deception. That is, to say, according to supervenience theory, A-properties supervene on B-properties *if and only if* a difference in A-properties requires a difference in B-properties or, equivalently, if and only if exact similarity with respect to B-properties guarantees exact similarity with respect to A-properties (SEP, n.d.). In other words, with respect to fraud as it may be said to supervene on intention and deception, if the difference in the property going from not being a fraud to being on is determined, then there must be a corresponding difference going from not having the intent to deceive to having the intent to deceive. However, it has been demonstrated that doing something with the intent to deceive does not guarantee that what was done was successful; furthermore, the intent to deceive need not be successful either. But, if what was done or intended was not a result of one's action, then because it was not successful how could one be guilty of it? Take forgery of a check, for instance... the intent is to deceive, and the deception is passing off the check. Nonetheless, the intent is to pass signature as that of another; deception is passing signature off as that of another. Thus, intent is deception, but deception is intent realized.

XIV. Contextualism as a Framework for Understanding

Contextualism is the view that the meaning of an expression is a function of more than just the meaning of its constituent parts and the manner in which those constituents are combined to form the complex expression – in particular, the context within which that expression occurs contributes to its meaning (Cook 2009). Contextualism as a philosophical framework for understanding has a lexical counterpart in the word deictic. Contextualism is to an expression as deictic is to a word. Thus, the adjective deictic describes a word whose meaning is dependent upon the context within which it is being used (Oxford 2017). Both contextualism and deictic bear a relation to one another and to themselves, the appreciation of which I claim has the potential to assist in understanding falsification conceptually. Further, if the meaning of an expression is a function of more than just the meaning of its proper parts (semantics) and the manner in which those parts combine (syntactics), then as the context within which the expression occurs, which comprises the semantico-syntactic understanding, what additional non-semantico-syntactic dimensions comprise the context? Moreover, would a determination regarding the additional things comprising the context help us progress beyond the current state of understanding in which we are?

Some non-semantico-syntactic aspects of context may include the ontological and the locative. While these aspects are neither explicitly stated, nor directly related to the meaning of the words or expression per se, their ontological or locative status nonetheless

can influence the overall meaning of an expression. If the context within which the meaning of an expression is being determined hinges on the ontological status or locative status of an aspect not explicitly stated, then the overall meaning of an expression may be impacted. For instance, the statement: the person in front of you now standing on the platform has given birth twice. The meaning of the expression varies depending on the person. But, if there is no person (ontological status is nonexistent or false) or there is a person, but not in front of you (locative status is not where you said when you said it/false), then the meaning is impacted. Given the inconsistency that has been encountered based on the definition of fraud that required the intent to deceive, how do we reconcile what was deduced to adequately define fraud? That is, if the following statements are true:

- 1) that Fraud comprises the intent to deceive;
- 2) that the intent to deceive consists of two aspects: intention and deception;
- 3) that using relevant dichotomies to describe the properties of the relation of both to one another and each to themselves it was shown that the aspects are consistent and possible together but not necessarily so
- 4) that intention to deceive either may exist, or may not exist (i.e., is contingent) in instances of successful deception;
- 5) that if intention to deceive does exist, then either it may be successful, or unsuccessful;
- 6) that if intention to deceive is successful, then both the intention is successful, and the deception is successful.

Upon analysis success in deception appears to occur independently of the existence of any intent to deceive. Whether the intent was achieved (i.e., deception occurred), or not should not be what determines guilt in instances of fraud; that there was intent to deceive is paramount. Furthermore, although without the aspect of intention there can be no fraud, given successful cases of fraud result in the occurrence of deception, whether the intent was real or merely perceived from the perspective of someone who claims to have been deceived, the aspect of deception must have been the intent. There is an informal fallacy associated with fraud that concerns affirming the consequent (Cook 2009). When the consequent of a conditional statement, which is the latter half preceded by 'then', fallaciously is affirmed, the error is made in concluding that since the consequent is the only observation that was made of the conditional, the antecedent is responsible. In the case of the definition of fraud, the intention precedes the deception. This must be true since one cannot claim intention to deceive following the occurrence of the deception. It is not possible to simultaneously have intended that which occurs as it is occurring, so the conditional formulated from the definition may be stated as '*if intention, then deception*'. However, if someone is deceived, then they incorrectly affirm the deception based on the formulated conditional relationship by assuming that there had to be intention for it to occur. Of course, this logical fallacy is the result of faulty logic and the creation of false

causal relationship between intent and deception. Thus, deception can occur without intent the same way that intent can occur without deception.

XV. Hypothesis Concerning De Facto Fraud Classification in the Literature

Despite the technical definition of the term fraud according to which each constituent of FFP would qualify as an instance, it appears as though the classification of fraud has been applied to certain types of traditional misconduct to the exclusion of others, which results in the formation of a de facto group under the rubric of fraud. The forms of misconduct classified as members of this de facto group under fraud include both fabrication and falsification (Stroebe et al. 2012). An analysis of the de facto forms (i.e., fabrication and falsification) categorized as fraud in the literature was the starting point for obtaining insight into the basis for such classification of misconduct. When characteristics of de facto types are compared to that which is not included among them as fraud (i.e., plagiarism), the findings lead me to hypothesize that there are several perspectives that could have been used to make the distinction. Of the forms comprising the de facto fraud group, there is at least one characteristic or property they share that the other type of misconduct that is excluded from the group lacks. *That characteristic – I argue – is the de facto forms being, or directly resulting, from the actions or behavior of individuals that occurs during the course of performing research.*

While it could be maintained that such a characteristic may be significant for multiple reasons from any one perspective, it may also be for multiple reasons from a variety of perspectives. Regardless of the perspective, however, the ability to utilize this quality to distinguish particular types of misconduct from one another is paramount. In addition, *an awareness of the characteristic of the occurrence of an act of misconduct may also be used as a basis according to which one may determine the level of perceived gravity.* That is, de facto fraud can be deemed more serious than forms that do not include the de facto group. Alternatively, those forms of misconduct classified as fraud not only characteristically occur during the conduct of research, *they also directly lead to the distortion of knowledge.* In fact, according to the distortion of knowledge criterion as a characteristic for the purposes of classifying the de facto group members, the distinction could be seen as even more pronounced than with misconduct occurring solely while research is being done. Either from the perspective of ‘when’ the misconduct occurred, or ‘what’ occurred as a result of it may be equally useful in determining a classification system for misconduct as fraud. Although plagiarism as a type of misconduct may be considered as deceitful, *since misappropriating the work of another and presenting it as one’s own neither results from actions that occurred during the conduct of research, nor directly leads to distortion of knowledge (i.e., concerning the content of the work itself), plagiarism would not be included as a form of de facto fraud according to such a method of determination.*

Based on the analysis of the characteristics of the types of misconduct and the categories into which certain types have been grouped, my hypothesis is consistent with the grouping of both fabrication and falsification under fraud (Stroebe, Postmes, & Spears 2012) as de facto members. Moreover, I contend that the grouping may suggest that either ‘when’ or ‘what’ might have been used to distinguish the types of misconduct from one another, or that they perhaps ought to be. The decision to address falsification as fraud in this article was based on its being considered one of the most serious types of misconduct (George 2016). In particular, within the domain of fraud, the topic was restricted to the PHS definition of falsification that is currently established. Despite the existence of the current PHS definition, in consideration of the serious nature of the consequences that may potentially result from involvement in suspected cases of falsification as misconduct, I claim that further elaboration and refinement of the definition of falsification as misconduct under the rubric of fraud would likely reduce the number of new allegations and convictions. Through the provision of such transparency as refinement in definition would bring, the resultant clarification would not only contribute to the deterrence of misinformed allegations, but also reduce the potential for career-ending false convictions for individuals unjustly accused. It is for these reasons that a conscious decision has been made to focus on the definition of falsification as a type of research misconduct.

XVI. Definition as a Form of Argument

This section aims to use a logically philosophical framework to analyze and interpret the PHS’ definition of falsification because there should be no confusion as to what does and what does not qualify as a case of falsification. In lay terms, falsification refers to willfully changing facts or information to deceive, which can include manipulating or omitting things leading to misrepresentation. Thus, my task is to ultimately lay the groundwork for reconstructing the definition of falsification.

It is imperative that both the word being defined, and its explanation are deconstructed sufficiently. These are referred to as the *definiendum* and *definiens*, respectively (Cook 2009). Attempting to deconstruct any definition, which includes the PHS definition, without sufficiently atomizing both the *definiendum* and *definiens* to their core components, could result in overlooking important aspects that should be given the full respect and consideration that they deserve. Moreover, the fragmentation of the existing definition into irreducible elements allows for the identification of the building blocks present as well as any additional ones required to construct a complete argument for a replacement definition of falsification. The complete argument herein, constructed in support of a replacement definition of falsification, will comprise the actual replacement definition being proposed. To that end, in this paper, the construction of the definition of falsification is approached as one would the construction of a philosophical argument. After presenting a logical philosophical approach to creating definitions, and describing

what falsification is and why it is problematic (both allegations and fraud), the discussion turns to a reworked definition of falsification.

An argument comprises a set of statements or declarations that includes premises followed by conclusions (Cunningham 2012). Furthermore, premises may be understood as statements or declarations that provide evidence or as support on which an argument relies to justify its conclusions (Cook 2009); a statement is itself considered to be a formal or explicit assertion (Oxford 2017). *What is interesting to note is that, according to the definition just presented, a definition itself qualifies as a statement because it formally or explicitly makes an assertion.* Because a definition makes one or more formal or explicit assertions, a definition may be understood as a set of one or more statements or declarations. Comprised of one or more statements, a definition must also consist of a consistent set of premises and a conclusion. Given that a set of statements is what comprises an argument, a definition may, therefore, also be considered an argument.

XVII. The Foundation for a Formal Definition

If the desire is to construct an adequate definition that does not involve circular reasoning, there must exist explicit guidelines to follow in constructing a formal sentence definition. There are always both similarities and differences between two or more things that exist. Similarities and differences are extremely useful for a variety of purposes, which include the present one concerning the word falsification. If there are at least two words that exist regardless of how one might qualify that existence metaphysically, then there must also be similarities and differences found between whatever two words one grants. And, without question, at least two words do exist for falsification, which I will take as an axiom.

When the words comprise a sentence, both the similarities and differences may be used to distinguish words from one another. Whether the words represent abstract concepts like falsification, or they have material referents in the external world, it is the existence of distinguishing similarities and differences that ultimately define them. Per Swales and Feak (Swales & Feak 2012), a formal definition of a word for my purposes will comprise an assignment to a class or group to which it belongs based on the similarities shared, which is then distinguished from other terms in the same class through explicit mentioning of any differences. *The flaw in the construction of the PHS version of falsification is caused by using the idea in the definition of a word that is being defined,* which is analogous to the case of circular reasoning in argumentation, which assumes what it is attempting to prove. To avoid such circular logic, which will allow for the definition of a word to be sufficiently formulated as an argument, the core idea of the word being defined must not be contained as a core idea derived from a word anywhere in the definition itself (Swales & Feak 2012).

Let me suppose that, based on the surprisingly unanticipated success of the current

research paper, the use in print of one word that I coined has apparently been recognized for the first time. I coined the word 'propriosophy' to describe an idea that resulted from fusing two previously separate constructs that had garnered the attention of the editors at the world-famous alliteratively named dictionary publishing company, Lucky Lexicon. I am both honored and humbled when they ask him to provide a definition of propriosophy for the upcoming edition of their dictionary. So, I offer the following as the official submission: *Propriosophy: The wisdom of oneself that may be derived from one's own reality; the wisdom of self that is obtained through the application of the guiding principle of consistency in the interpretation of one's experiences readily abandoning any beliefs or positions, which are determined to be inconsistent with one's experiences.*

The reader should note that no words contained in the definition may be reduced to the same ideas in the term being defined. Both root words comprising the term proposed mean 'wisdom' and 'own/self' and are incorporated into the definition. Nevertheless, their usage in the definition does not result from being derived from the meaning of another word that was used. The new term reduced to its core word components 'wisdom' and 'own/self' has been defined through the usage of the core word components to which the term may be reduced. Therefore, *because the definition does not rely on words that may be reduced to the same ones that comprise the new term, it is not considered circular.* As a result of not relying on circular reasoning, unlike falsification, there should be no confusion as to what does or does not qualify as a case of propriosophy. But what about cases of falsification?

The purpose of presenting the word I coined for example was to establish what a non-circular example of a definition might resemble. Having a comparison of what a definition should look like can help to identify what components are necessary in a final definition of falsification. Furthermore, unlike the definition that was just encountered, according to which no confusion should be possible, because the PHS definition of falsification is circular (which makes confusion both possible and likely), I argue that one should be able to prove anything by relying on it and shall do so. Demonstrating that anything may be proven through the use of circular reasoning allows for one to appreciate and thoroughly understand why that circular reasoning is both dangerous and insufficient for any argument or definition.

XVIII. The Use of Recursion in the Development of Definition

We have seen how definitions may be interpreted as an argument. Similar to the structure of an argument, the set of one or more consistent statements comprising a definition includes two components: the *definiendum* (i.e., description) and the *definiens* (i.e., the word itself). To provide the best possible definition of falsification, the explicit definition must include unique *definiens* and *definiendum*, and should result from employing a recursive process to construct them. Recursive definitions are inductive

because after the initial terms have been identified, all subsequent terms are defined in terms of the prior ones (Cunningham 2012). Through the addition of layers, the recursive process incorporates all previous definitions to be used as a premise for some subsequent conclusion. Through the development of a definition resulting from recursion, the definition itself may be considered fact because each step is constructed from the prior one about which there was already an agreement, which renders the definition to be a fact (Boylan & Johnson 2010).

XIX. Demonstrating the Recursive Method

To see how this works, we must begin with something about which there is agreement. If at any stage of the recursion there is no agreement, then the process discontinues. Let us suppose the following: words are used in reference to something and *something* could either be the word itself or something other than itself. There should be no disagreement thus far. That to which a word refers may be either physical or metaphysical, such as tangible objects or immaterial ideas. Moreover, when multiple words are used together, abstract ideas or physical objects can be described. If descriptions consist of words, then descriptions must also be in reference to something as well, which is what they describe. When a group of words is used together with an individual word to label that which is described, the description and a word comprise a definition. A definition constructed makes a formal or explicit assertion about something (i.e., that to which the description and words are used to describe). As such, the definition may be considered a statement or declaration. When statements are made as a set, these statements together comprise an argument. Therefore, *an argument is in reference to something*. Given what we have thus far established, the following demonstrates how the recursive definition of argument may be developed:

- 1) Understanding may be derived through meaning or interpretation and is dependent on perspective;
- 2) Meaning, along with any other physical or immaterial thing, is something referred to and conveyed by words;
- 3) Meaning and words are used to describe that to which they refer;
- 4) Meaning and words used to describe that to which they refer comprise a definition;
- 5) Meaning and words used to describe that to which they refer comprise a definition thereby making a formal or explicit assertion about the referent;
- 6) Meaning and words used to describe that to which they refer comprising its definition and making a formal or explicit assertion about it consist of a set of statements or declarations;
- 7) Meaning and words used to describe that to which they refer comprising its definition and makes a formal or explicit assertion about the referent consisting of a set

of statements, which defines an argument;

8) Therefore, *from understanding, it has been demonstrated how a definition is a form of argument, which is about something.*

I claim that *if* the word falsification and the PHS description of the word, are together the statement or declaration that comprise the PHS definition of falsification, which is assumed as fact, then the definition may be seen as the basis for any argument to be made regarding falsification. In other words, the description, and the word itself that comprise the PHS definition of falsification, are the criteria against which something that may potentially be categorized as an instance of falsification is to be compared. The definition consisting of the description and word assert the existence of what amounts to being a logical equivalence between two or more things. In a logically or semantically equivalent relationship represented by a materially bi-conditional relation, one thing is always true when another is true in the same interpretation (Cunningham 2012). Concerning the present case of the definition of falsification, this implies that anytime the word may be interpreted as true (with regard to something), the materially bi-conditional relationship establishes that the description may be interchanged with the word. It is due to the semantically equivalent relationship between the word and description that comprises a definition that a conclusion may be made with regard to something being determined to be an instance of the object of the definition.

Let us suppose that for all definitions, there exists a word and a description that comprise them. The relationship between them is: *word if and only if the description is the case*. Therefore, if it can be shown that there exists a y such that either y fits the description, or that y is an instance of the word, then the opposite can be concluded to be the case. Furthermore, if there exists a definition consisting of a word and its description assumed to be the case, and something is found that matches the description of the definition, then it may be concluded that the something can be described by the word. In fact, given any two aspects as premise, the third may be deduced as the conclusion. In plain terms, based on the assumption of a definition consisting of a word (i.e., *definiendum*) and description (i.e., *definiens*): 1) Either something matches the description of a definition, and we conclude that something may be referred to by the word; 2) Something described and referred to by a word, which results in something being defined or 3) Something is defined by a word matching its description.

Completing the process of deconstruction results in the discovery of elements of which the word, description, and definition as concept was made. Also, the outcome of deconstruction may yield novel aspects of which we were unaware. Both the novel aspects found and the repurposing of old ones that have been discovered may then be used to construct a definition of falsification that I claim should be conceptually adequate, sensitive, and specific. These ideas that I have appropriated and modified contribute to the development of a solid foundation that will serve as a framework for definition in general.

XX. Conceptual Adequacy

By conceptually adequate, I mean that the definition of falsification at its core comprises the qualitative aspects of both provability and validity. The former is in reference to being able to demonstrate proof for what is claimed. The latter defined with respect to an argument is a quality in which the conditional ‘if ... then...’ will never go from true *antecedent* preceded by ‘if’ to false *consequent* preceded by ‘then’. Both provability and validity are fundamental to conceptual adequacy and their relation to one another determines the pseudo-qualitative abilities that I refer to as soundness and completeness (Garson 2014). As it pertains to definition as an argument, a conceptually adequate argument is sound if and only if it is complete because there is proof if and only if the argument is valid.

XXI. The Pseudo-Qualitative Abilities of Soundness and Completeness

Soundness and completeness are concepts that are related to adequacy and frequently encountered in mathematical and philosophical logic (Garson 2014). Specifically, soundness refers to a conditional argument in which the following is true: ‘*if there is proof of an argument then that argument is valid*’. Conversely, completeness may be understood as a conditional argument in which ‘*if an argument is valid, then there is proof of that argument*’. Thus, if the notions of soundness and completeness that comprise conceptual adequacy with respect to a given argument have been established, since they are conditional and are true in both directions, the relationship between them may be interpreted as being bi-conditional.

In a state of conceptual adequacy, an argument that is bi-conditional, which in our case is a definition, is sound if and only if that argument is complete as well (Garson 2014). Moreover, as it pertains to the soundness and completeness of an argument, an argument is provable if and only if that argument is valid. Because if and only if indicates that one thing is always true when another thing is or false when another is false, the bi-conditional is used to represent the idea of logical equivalence (Cunningham 2012). According to this perspective of adequacy regarding the bi-conditional relation created by soundness and completeness, provability ought to be understood to be logically equal to validity when something is conceptually adequate.

Unlike other qualitative characteristics that are readily perceived through the faculties requiring nothing more than perception itself, if the properties of soundness and completeness are to be attributed to anything, then they must both be demonstrated for verification. By demonstrated, I mean there is no way to perceive either soundness or completeness as a property, quality, or characteristic of a thing passively; there must be some way to show that their existence has been established that requires active perception by the observer. Active perception is in reference to the usage of any of the

faculties of sense perception each occurrence of which results in an event that operates along a locative-temporal (i.e., space-time) continuum such that the truth value of a property predicated of an object derives from the truth-function of the coordinates for events A through A_n .

With respect to each dimension, there exists a discrete coordinate such that no product of them may occur more than once. By product, it is meant that it is not possible for there to exist more than one set of unique coordinates and event derivative. Although there can be identically derived aspects from different coordinate event sets, no two sets of coordinates and event derivative may exist and be identical. For instance, if one perceives something in particular with a unique locative-temporal coordinate (e.g., proof of A) and then perceives that same particular thing in a different locative temporal coordinate (e.g., A is valid), then as a result of the order perceived (i.e., proof to valid) and what was perceived where (i.e., locatively in the realm of truth in proof and the realm of truth in validity), one may conclude or attribute soundness to that thing. However, merely perceiving in a snapshot fashion either proof as event or validity as an event as passive does not provide sufficient justification for concluding soundness; there must be two or more (i.e., greater than any single instance of perception, which requires activity on the part of the one perceiving in the form of reasoning to make sense and derive understanding. Thus, the main distinction between traditional quality and pseudo-qualitative abilities is that qualities may be concluded with a single perception and are done passively whereas pseudo-qualities require more than one perception and active participation of the perceiver.

To establish evidence of both soundness and completeness, assuming there exists proof of an argument the argument must be derived to be valid (i.e., soundness); and if we begin by assuming an argument is valid, we must be able to prove that it is (i.e., completeness). The general definition of valid is being well-grounded in logic (Oxford 2017). However, in consideration of the validity of an argument with respect to logic, the definition is somewhat different due to the potential for flaws to exist that would compromise the conclusion of the argument. There may exist valid arguments for which there is no proof to allow us to conclude as much. Conversely, for a given system, it may be the case that, although there exists proof seemingly justifying the conclusion of an argument, the proof may be of that which is in fact not valid. Regardless, either situation results in logical missteps that are of no use for the purposes of substantiating the conclusion of an argument. Ultimately, although validity and provability are extremely important for the cogency of any argument, they are neither the same, nor does the existence of either guarantee the presence of the other. One well-known development concerned with provability, mathematics, and logic is Gödel's second incompleteness theorem, which claims that a given system that is consistent cannot prove its own consistency (Garson 2014). A consistent system may be understood from the perspective of an absence of a flaw in which there exists proof of a contradiction. However, if there

is no proof of contradiction then there is no proof that there is no proof of contradiction. Due to the uncertainty concerning accepting proof related to the potential for a system that was relied upon to obtain a particular proof, there may be no way for a system's claim of proof to be believed on its own basis. Thus, without such a basis for the belief in a system's claim of proof, there can be no confidence in that proof or what it entails either.

The absence of confidence in something being the case based on the existence of proof for that something in a given system makes it difficult to establish the concept of soundness. Soundness may be easily understood in terms of what asserting it would mean. Such an assertion would be that '*if there is proof of sentence B, then sentence B is true*'. Nevertheless, the assertion of soundness cannot be guaranteed, nor can one claim that to be the case given the potential flaws of a system. Flaws that are discovered in a particular system could either allow for invalid arguments to be proven or allow for both a proposition and its negation to be demonstrated. Because of the potential to undermine any proof through the discovery of flaws, this would render any proof of claims regarding sentence B to alone be both questionable and insufficient. Since provability of a sentence B alone is insufficient to establish its truth, the soundness as an aspect of argument to which I refer as being pseudo-qualitative needs to demonstrate why one should accept that proof of a sentence implies that the sentence is the case. Because provability of sentence B, which is at the core of soundness itself, for instance, is not taken at face value, I argue that soundness should not be considered a quality in the usual sense. The situation is analogous to some quality for which there is proof, such as a shape, requiring proof that proof of the quality implies that the quality is the case: the proof being once-removed from the quality also renders the supposed quality once-removed as well, which I refer to as pseudo-qualitative. It is in this respect that soundness I consider to be pseudo-qualitative.

XXII. System of Free Logic Inspired Rules Universal Out

I refer to soundness and completeness as being 'pseudo-qualitative' because they are conditional or contingent as opposed to actual. Conditionality restricts affirming them by requiring that certain conditions be met (hence, conditional) prior to such affirmation. The condition that must be satisfied beforehand may simply be thought of as the existence of the condition regardless of what that may be. In this respect, the structure of an argument for soundness and completeness resembles one in the form of a rule as found in a *system of free logic* (Garson 2014). The most attractive feature of a free logic system is that it allows for the blockage of undesirable inferences (Garson 2014). Because a presumption about existence is not made, a system of free logic prevents inferences that would allow for the proof of undesirable conclusions (Garson 2014). In such a system, *when there is proof of the existence of something it means that there is already evidence of the existence of that thing*. This fact is similar to the statement of Gödel-Loeb Axiom with regard to proof.

XXIII. Pseudo-Qualitative Claims and Abilities

Let us suppose that we want to claim that x is a square. Now, to make such a claim, because claiming x is a square implies x being an instance of an actualist's claim that '*there is an x such that x is a square*', there must be a way of substantiating what it is that allows being a square to be predicated of x . That is, we need to verify that conditions satisfying what a square is do exist before concluding that x is one. Thus, unlike the outright declaration that something has the quality of being square, what I have termed a 'pseudo-qualitative' version might claim something similar to the following: '*if a 2-dimensional geometrical shape with four sides where opposing pairs of sides are parallel to one another creating four equivalent 90 degree angles with adjacent sides has internal angles which total 360 degrees, then the shape is a square*'.

The main difference between traditional qualitative characteristics and pseudo-qualitative ones is that, to establish the quality, the Pseudo-quality requires proof of the condition's antecedent in order to conclude the consequent of a conditional claim. Soundness may be understood as an ability to show that proof of an argument being the case implies that the argument is in fact valid given the possibility of yet to be discovered flaws. Furthermore, in order for any proof of the argument to be meaningful, due to provability necessarily being contingent on the ability of soundness to be demonstrated (i.e., need for proof that proof implies the truth of a given argument), the theorem expressing this should be phrased as a conditional statement.

If it can be demonstrated that proof of argument A implies that argument A is the case, then there is already proof of argument A. The concept of provability has been shown to relate to that of soundness and completeness. Provability shows up in both notions and is expressed in the Gödel-Loeb Axiom as well (Garson 2014). This axiom claims that if there is proof for the soundness of a given argument (i.e., that proof of the argument implies that it is valid), then that argument is provable. In addition, if the reader recalls, the notion of validity with respect to an argument means that the argument will never proceed from true premises to a false conclusion.

According to the notion of validity, then, because soundness must show proof of an argument A as true premises leads to a true conclusion, the idea of soundness may be viewed as entailing validity. In other words, for soundness to be substantiated, there must not exist a case in which the acceptance of truth of provability of argument A could lead to argument A being false; therefore, the condition for soundness describes that for validity. If there is proof of a given argument, then that argument is true. On the other hand, the converse of soundness in which it is asserted that if valid, then there exists proof of a given argument, is what may be referred to as completeness (Garson 2014). Altogether, the concepts of provability, validity, soundness, completeness, and the role of pseudo-qualitative abilities based on the notion of restricting undesirable inferences as found in free logic interrelate coherently to comprise a framework I refer to as *conceptual*

adequacy.

What I have termed conceptual sensitivity and conceptual specificity are based on ideas that I have appropriated from the field of epidemiology and medicine, as it pertains to the identification of diseases using tests. The notions of sensitivity and specificity capture the essence of what any definition as argument should be able to accomplish. In the traditional interpretation related to epidemiology and medicine, the understanding of *sensitivity* relates to the ability of a test to result in positively identifying a disease when a disease is present (Boslaugh 2012). On the other hand, *specificity* is defined with respect to a test that does not identify disease in cases in which the disease is absent (Boslaugh 2012). Occasionally, there are tests that have false positive results just as there are those that fail to identify the disease when the disease is actually present. By determining how many false positives and false negatives occur for a given test, the sensitivity and specificity may be ascertained.

Analogous to an experimental test for disease, *I view the role of a definition as one in which the definition comprises the word being defined and its explanation is a test that may be used to correctly identify instances of the word being defined, which I refer to as conceptual sensitivity.* In addition, *the ability of a definition to correctly fail to identify something when it is not there I define as conceptual specificity.* In this capacity, the notions of conceptual sensitivity and specificity, like their traditional counterparts in epidemiology, serve as a measure of the usefulness and effectiveness of a given definition, in this case falsification.

XXIV. Sensitivity and Specificity as Components of a Definition

A definition equals a word plus a description. Envisioning the relationship between conceptual sensitivity and specificity as a biconditional statement may assist in understanding how it relates to a definition more readily. A biconditional relationship is one in which an 'If... then...' conditional statement is true in both directions (Garson 2014). A conditional statement consisting of an antecedent preceded by if and a consequent preceded by then is true just in case either the premises are false, or the conclusion is true. However, the special assignment in which the antecedent (or premises) is true, and the consequent (or conclusion) is as well describes the notion of validity with respect to arguments (Cunningham 2012).

Assuming the biconditional, the presence or absence of either proof of a proposition or validity of it, leads to conclusions that should be familiar to the reader. For instance, under the assumption given, if there is proof of a sentence being the case, then it may be deduced that the proposition is the case. Furthermore, when it is impossible to go from the truth of premises to a false conclusion, then the argument is considered valid (Cunningham 2012). In addition, when it can be demonstrated if there is proof of a sentence being the case, then the sentence is valid, soundness will have been established. Given that a positive test result in the presence of disease is analogous to a definition given the word

being able to positively identify instances of it by description, a biconditional statement that expresses sensitivity and specificity should be considered a form valid argument. Moreover, when it can be demonstrated (i.e., proven) that if there is proof of something, then that something is valid, we can also conclude that the sensitivity of an argument implies that it is sound as well. For that matter, showing that there is an absence of proof when something is not the case, which is specificity, because as an argument form, the truth of the antecedent entailing the truth of the consequent means that this is valid. Conversely, when read in the opposite direction, there is evidence for it if the argument is valid. In addition, the relationship of the biconditional statement is such that if there is no proof of a given disease, then it follows that there is no disease. Upon closer inspection, this conditional statement expresses and argues for specificity.

XXV. Conclusion

In conclusion, the analysis presented in this article sheds light on the classification of fraud and its constituent elements. The discussion on the de facto forms categorized as fraud, specifically fabrication and falsification, has led to the hypothesis that the classification of misconduct under the umbrella of fraud may have been based on certain distinguishing characteristics such as when the misconduct occurred and its impact on the distortion of knowledge. The focus on falsification as a serious type of misconduct within the domain of fraud suggests the need for a refined definition. Providing transparency and precision in the definition of falsification could prevent false or misinformed allegations and unjust career-ending convictions, and improve the fair treatment of individuals involved in misconduct allegations, and the integrity of research as well (Macrina 2014).

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