A BAYESIAN INVESTIGATION OF ALLEGED SEXUAL MISCONDUCT

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I would like to thank Dr. Richard Carrier, PhD. Who taught me all I know about the historical method

ABSTRACT. June 15, 2016 Amy Frank made allegations of "sexually harassment" and "touching" against Dr. Richard Carrier, PhD at an event at Arizona State University. In this work we examine the truth of these allegations using the only sound method for investigating historical claims, Bayes theorem, and find the allegations are true with a probability in excess of 94.73684%. Our findings will have far-reaching consequences for legal thinking.

1. INTRODUCTION

On June 15, 2016 Amy Frank made allegations of *sexually harassment* and *touching* against Mr. Carrier, PhD[1]. The inappropriate touching and harassment allegedly took place at at Secular Student Alliance (SSA) event at Arizona State University in April 2015 and according to an official statement by the SSA an internal investigation determined:

> After an internal investigation, Mr. Carrier was removed from our speakers list last year, and no longer has an official or unofficial affiliation with the Secular Student Alliance.[2]

Mr. Carrier has later denied any such misconduct took place and describe the events as being fairly innocent[3]. According to ordinary reasoning it is difficult to establish what events has transpired in the past as in this case. As Dr. Richard Carrier himself puts it in his reply: *"there isnt any way to corroborate either of our accounts."*.

However, ordinary reasoning about historical events is often deficient and highly illogical. For instance, Mr. Carriers reply relies on the *criteria* of there having to be witnesses or other ways to corroborate the accounts to determine their truth, however he himself has shown such criteria-based reasoning, when applied to past events, is highly dubious [Carrier, 2012]. Further evidence of this can be seen in how ordinary reasoning has here lead two different people (Mr. Carrier and Ms. Frank) to greatly different conclusions regarding these alleged events. We thus find

in this case of alleged sexual misconduct the same deficiencies as Dr Carrier himself identifies as plaguing historical Jesus studies [Carrier, 2012].

Mr. Carrier himself recently proved (using formal logic) that all historical reasoning reduces to applications of Bayes theorem and proposed Bayes theorem as the only way to resolve historical claims [Carrier, 2012]. In a second volume he showed how these techniques could be applied to demonstrate Jesus most likely never existed, thereby advancing the field beyond criteria-based thinking and the current paradigm [Carrier, 2014]. In this work, we will similarly apply Mr. Carriers methods to these allegations of sexual misconduct by Ms. Frank to determine their truth.

2. Methods

Bayes theorem it is the mathematical formula

$$P(H|E) = \frac{P(E|H)P(H)}{P(E|H)P(H) + P(E|\neg H)P(\neg H)}$$

where E is the evidence, H is the hypothesis (Guilty or not) and $P(H)$ is known as the prior. A full introduction can be found in Carrier [2012]. In our case the hypothesis H is that: *Mr. Carrier is guilty in the allegations of sexual harassment and inappropriate touching* (which we will denote by "Guilty"). Our general background information contains information about Mr. Carrier, Ms. Frank and the SSA and the aforementioned investigation and the evidence E is the allegation by Ms. Frank and whatever evidence may come to light in the coming days.

3. Analysis

First, to establish the prior term in Bayes theorem, we must establish the reference class the allegations leveled to Mr. Carrier belongs to. While some[4] statisticians may regard the application of reference classes to one-off events as "unsound", "asking for troubles", "idiotic" and a "freshman error", we refer to the peer-reviewed work Carrier [2014] which describes why this is a good idea.

We could consider several different reference classes. A suitable reference class should take relevant information into consideration while not being overly narrow [Carrier, 2014]. The relevant information at hand is that a charge has been made involving some form of sexual harassment or misconduct and after an investigation by a third party Mr. Carrier was removed. Thus, we apply the reference class:

> *An investigation by a 3'rd party of inappropriate conduct resulted*
> *in the accused being removed.*

How plausible is it that a member in that reference class is guilty? Not only is there an accusation (and most accusations are true), but an investigation resulted in disciplinary actions. We could say that the probability of guilt is as high as 99%, however we will err on the conservative side and say that 9 out of 10 in the reference class are actually guilty. Thus, the prior probability of misconduct is 90% or stated mathematically: $P(\text{Guilty}) = 90\%$.

What then about the evidence? The evidence in this case is the testimony of Ms. Frank and the specifics of this case. We thus have an allegation made by a named

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[4]all

person but no other witnesses asides Dr. Carrier. How likely is this if Mr. Carrier is guilty? Mr. Carrier is a very smart person, and this combined with the specifics of the allegation (inappropriate touching) we can expect these events to have taken place in private and thus there being no witness or other specific evidence – thus the evidence is 100% expected given he is guilty, $P(\text{Evidence}|\text{Guilty}) = 100\%$.

On the other hand, suppose Carrier is *not* guilty. Then we can know such an allegation to not to have any witnesses (there could not be any for it did not take place), but do we really expect the accuser to come forth with her name in this case? Why not remain anonymous? Why is his name said to have been "passed around"[5]? These facts taken together are not very expected assuming Mr. Carrier is innocent. We might say they are only 10% expected, but lets err on the side of innocence and say the chance of these unexpected events is as high as 50% given he is innocent. Thus we have: $P(\text{Evidence}|\text{Innocent}) = 50\%$.

Having established these facts we can combine them mathematically using Bayes theorem:

$$P(\text{Guilty}|\text{Evidence}) = \frac{P(\text{Evidence}|\text{Guilty})P(\text{Guilty})}{P(\text{Evidence}|\text{Guilty})P(\text{Guilty}) + P(\text{Evidence}|\text{Innocent})P(\text{Innocent})}$$
$$= \frac{1 \times 0.9}{1 \times 0.9 + 0.5 \times 0.1}$$
$$= 0.9473684$$

Thus according to this computation there is at least a 94.73684% chance that Mr. Carrier is indeed guilty. And properly the chance is much higher than that since we have used the most conservative estimates throughout.

4. DISCUSSION

Can any reasonable objections be made to these conclusions? Firstly, since we relied on Bayes theorem rather than add-hoc evidence-based reasoning any such objection must be framed using Bayes theorem and specifically by showing which numbers are wrong [Carrier, 2014].

But consider how such a discussion might proceed: One could argue the evidence was examined wrongly. However, most sexual assaults only involve two witnesses and the evidence cannot be said to be at all unexpected on the assumption of guilt. Similarly, one could try to argue that the evidence is very expected on his innocence (but really? multiple attestations of troubling behaviour?), but even if this is accepted this cannot move the final result to less than 90% – and arguably we are already being far to conservative given the nature of the evidence!

On the other hand one can argue we should use another reference class. But it is an undisputed fact Mr. Carrier belongs to the class of people who has been removed after an investigation and this is a well-defined reference class. Furthermore, if any other reference class is used, the evidence used to establish the reference class still has to be taken into account and this would therefore not alter the result, as discussed at length in Carrier [2014].

5. CONCLUSION

In summary, we conclude that according to formal logic and mathematics the allegations against Mr. Carrier are true with a chance in excess of 94.73684% (and

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[5]https://www.facebook.com/heinousheina/posts/10104235648677951?pnref=story

properly much higher)[6]. The application of Bayes theorem to historical claims has once again been vindicated and shown how it can move the discussion forward beyond where ordinary reasoning and common sense might otherwise suggests we should venture. This is a paradigm-shift in legal and moral thinking which can be expected to have far-reaching consequences in all areas of human life. This work should therefore be cited in all subsequent work on history, mathematics and ethics.

References

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Post-Script

This piece is intended as satire. The author does not have any opinion on the allegations or any connection to any of the involved parties.

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[6]And while this number may be obtained from other numbers which are purely guesswork and speculation, it is obtained by a mathematical formula, so it is mathematically true. Period. [Carrier, 2012, 2014].