# Misplacing Trust in Bitcoin Information Sources

## Extended Abstract

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## ABSTRACT

The Internet pervades many aspects of modern life offering up seemingly boundless opportunities to connect, inform and be informed. As the range and number of sources for information online explode, how people go about selecting and interpreting information has become a pertinent area for study, not least in the recent light of the prevalence of *fake-news*—as people are well known to act upon information they *believe* to be trustworthy. Where the decision to act incurs risk, an inability to accurately select and assess the credibility of information presents a challenge.

This extended abstract summarizes findings from a study of 57 Bitcoin users. Our analysis shows that this self-identifying technical and expert community was not significantly influenced by confirmation bias (a facet of *fake-news*). However, the same users also failed to demonstrate a true reliance upon the facts contained in news articles, often deferring trust to the source of the news which could still render them susceptible to *fake-news*, and, in turn, place their speculation of the crypto-currency at risk.

## KEYWORDS

Trust; Bitcoin; crypto-currency; fake-news; credibility evaluation; informational trust, empirical study

## 1 INTRODUCTION

Significant attention has been paid to *fake-news* in recent months - where the boundaries between truth and fiction are blurred [5], and fact is traded for appealing to opinion or belief. In regulated financial markets this form of disinformation has long been understood to go hand in hand with illegal practice such as *pump and dump* and *short and distort* market manipulations. As people are more likely to trust and, in turn, act upon information they believe to credible [10], it is critical for the mitigation of risk that users not only need to be able to locate relevant information, but also interpret and ascertain its truthfulness or credibility.

Within the realm of the crypto-currency bitcoin, an environment has arisen in which a wider group of opportunistic speculators could likely succumb to some form of band-wagoning [8] - an effect where the preference for bitcoin would increase purely based upon other people discussing and buying bitcoin. This effect has been driven by a finite supply of bitcoins, coupled with a rapidly rising

price and, increasing discussion of Bitcoin in the news press and online forums. Such band-wagoning, argues Becker [1], could be strong enough to make the *"demand curve slope upward"* resulting in a feedback loop. Research by Garcia *et al* [3] has shown that when making investment decisions, Bitcoin speculators partake in such self-reinforcing feedback loops - discussing, searching for and utilizing information in the form of social media and news reporting. Of course, with such pricing volatility has also come more widespread news reporting of bitcoin further fuelling the feedback loop. Unfortunately, for speculators, the supply of *"credible* [bitcoin] *information is limited"* [2] and Glaser *et al* [4] express that those same speculators are *"limited in their level of professionalism and objectivity... highlighted by the bias towards positive news."*

With concerns that bitcoin speculators might be susceptible to *fake-news* used within their investment decisions, we present findings from our online study of confirmation bias and information trust.

## 2 METHOD

We conducted an online study with 57 bitcoin-using self-selecting participants from a number of calls for participation placed in prominent bitcoin forums and user-groups. The study sought to examine the extent to which speculators might exhibit confirmation bias in selecting and evaluating news articles, and, secondly, to build a model of informational trust for those participants. Briefly, 66.7%
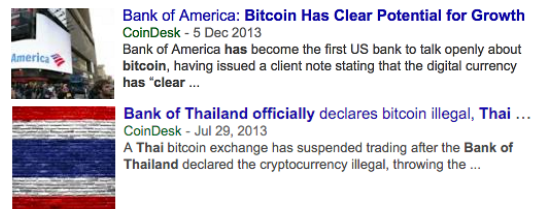


**Figure 1: Example of high quality positive (top) and low quality negative (bottom) banner stimulus used in experiment**

considered themselves as being in paid employment, and 86% were located in Europe or the Americas. 21% were students, and 63.1% had at least college level education. 73.7% self-rated their own expertise with bitcoin as high or very high. 52.6% stated they were not influenced by news when making investment decisions. 56.1% ($n = 32$) participants held bitcoin at the time of study with 23 taking a hold position, and the remaining 9 actively seeking to buy further bitcoin.

The stimulus experimentation, used in the study, asked participants to evaluate the credibility of 6 bitcoin related news articles from Reuters and Coindesk, pre-rated as equally credible by participants. Half of the articles were manipulated by a professional journalist to contain falsehoods (see Figure 1 for examples). Two

articles were positive in sentiment, 2 negative and 2 held a neutral position. For each participant we created key constructs, being: i) sentiment towards bitcoin ($S$), ii) self-reported levels of expertise ($E$), iii) propensity to trust ($T_P$), iv) trust in source (the website) of the article ($T_S$), and v) trust in the medium (online news) of the article ($T_M$).

To explore *confirmation bias*, the alignment of participant ($S$) to article sentiment was noted. After neutral observations were removed we were left with 147 sentiment-containing evaluations. Two hypotheses were posited - that participants with sentiment alignment to the stimulus would evaluate article credibility more highly (H1) [11], and would spend significantly more time on that evaluation (H2) [6]. We used Mann-Whitney U tests to test for differences between the medians of the sentiment aligned and counter-aligned groups. To build a *model of informational trust*, we utilized Lucassen and Schraagen's informational trust layer model [9]. We applied mediated regression analysis between the constructs ($S$, $T_P$, $T_M$ & $T_S$) and the score the participant gave to the news article they rated as *most* credible ($T_I$) to ascertain which credibility evaluation strategy was being used by each participant. The factual correctness of the chosen article was also noted.

## 3 KEY FINDINGS

### 3.1 Limited Evidence of Confirmation Bias

No significant support for either hypothesis was found, however notable findings were:

- Just over a third (34%) of evaluations were made on a preliminary banner representation of the news article instead of viewing the full version. Within this sub-group alone, limited but significant statistical support for the first confirmation bias hypotheses (H1) could be observed.
- Further evidence of confirmation bias lay within this sub-group, with participants evaluating high quality (accurate) articles more favorably than inaccurate articles. These two findings suggest participants were pre-judging the article, and were discriminating in evaluations towards the high quality banners. However, with very little content to accurately assess the quality of the banner (there is simply not enough detail in a banner), it is likely that they were deferring to other information based decision making processes such as those described by Lucassen and Schraagen [9], and whose results are summarized in section 3.2.
- Counter to H2, participants spent significantly *less* time evaluating sentiment-aligned articles. Again this was most apparent with those basing their evaluation upon the short form banner.

### 3.2 Reliance is Not Upon Expertise and Fact

On average, participants rated their chosen most credible stimulus 4.37 out of 5 - henceforth referred to as the participants' trust in the information ($T_I$). Where participants correctly identified factually correct articles as most credible they were assigned to a group labelled $HQ$ ($n = 37$), otherwise to the group $LQ$ ($n = 20$). Broadly, both groups had similar scores for the constructs $T_P$, $T_M$ & $T_S$, and how they rated the most credible article ($T_I$). Notable findings were:

- The $LQ$ group had a slightly greater tendency to self-rate expertise ($E$) more highly, but no significant influence of a participant's education or $E$ upon $T_I$ was found in either group using one-way ANOVA tests - meaning that evaluation was unlikely being made using a semantic or surface strategy [9].
- Using mediated regression, for the $HQ$ group a significant influence of $T_S$ was observed, but for the $LQ$ group the influence was from $T_M$.

These findings tell us that participants were not employing either their education or expertise to understand the factual correctness of the articles being evaluated, but instead relied upon their trust in the source (the website) of the article for the $HQ$ group, or a weaker trust in the medium (online news) for the $LQ$ group.

Evidence clearly links a user being willing to act upon information the more they believe it to be credible—37% ($n = 21$) of all participants expressed a willingness to make 'buy' or 'sell' decision based on their credibility evaluation. That nearly half (45%) of the group $LQ$ declared they would change their bitcoin position, based upon the article they viewed as most credible, demonstrates how readily those with self belief in their expertise can fall for *fake-news*, a phenomenon possibly explained by an overconfidence in one's own ability [7].

## 4 CONCLUSIONS

Our analysis leads to two key observations. Firstly, that expertise based credibility evaluation strategies are not significantly being used by these investors and that trust is not being placed in the fundamentals of the information itself. Secondly, that bitcoin investors are making credibility evaluations based upon un-mediated biases for either the source or medium of the information. For those making correct evaluations there is a trust in the source of the information, otherwise trust is deferred to a more general trust of information based on the Internet. Given the current importance of such speculation to the growth of bitcoin, where *trusted* sources of Bitcoin information are overly partisan or, indeed, in some way compromised, there is a very real danger that speculative losses will undermine user trust in the crypto-currency.

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