Deception, Lies, and Manipulation in Cyberspace:
Critical Thinking as a Cognitive Hacking Countermeasure

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Abstract:

Fallacious or misleading information disseminated using technology to deceive, exploit, and manipulate psychological weaknesses, perceptions, and decision-making is identified as disinformation. The exponential growth of the internet and the immense wilderness of information impacts human judgment, perception, and cognitive ability to discern the credible from incredible. The purpose of this literature review is to explore critical thinking as a counter to cognitive hacking and provide a conceptual analysis of fallacy and fallacious appeals as underpinnings to disinformation. The results of this literature review suggest that with bias suspension and awareness of fallacy and fallacious appeals, critical thinking is a viable solution to recognize disinformation. Also, future research may involve qualitative and quantitative studies on disinformation and the impacts on societal reality, decision-making, and the existence of truth.

Keywords: *Cognitive hacking, critical thinking, decision-making, disinformation, fallacious appeals, fallacy, truth*

THE COGNITIVE EFFECTS OF DISINFORMATION are existential societal threats. Since antiquity, deceptive and coercive tactics have influenced individual opinions and ideas. However, aided by the borderless and mass-connectedness of cyberspace, disinformation is propagandized to manipulate the cognitive processes of society on a large-scale. The exponential growth of the internet and immense wilderness of information has created a challenge likened to cognitive hacking where judgment, perception, and reasoning are exploited through psychological vulnerabilities. Because humans are poor judges of dishonesty and trickery[2], the cognitive ability to discern accuracy in information propagation is a global social concern.

Disinformation, in the context of this article, is fallacious information circulated using the internet to intentionally deceive, exploit, and manipulate psychological weaknesses, perceptions, and decisions. Rapid propagandizing distorts truth and blurs the lines between fact and fiction, where society is increasingly misinformed. The consequences of repeated exposure to disinformation result in altered perceptions and distorted beliefs - leaving accurate discernment an individual responsibility. However, while fiction is subjective, fact must remain objective and free of emotional connotations; thus, supporting critical thinking as a disinformation counter and viable solution to cognitive hacking. Therefore, the purpose of this paper is twofold: First, to discuss critical thinking as a counter to disinformation and cognitive hacking. Secondly, to provide a conceptual analysis of fallacy and fallacious appeals as underpinnings to disinformation.

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[2] Charles F. Bond Jr and Bella M. Depaulo, "Accuracy of Deception Judgments," *Personality and Social Psychology Review* 10, no. 3 (2006).

Critical Thinking and Disinformation

Disinformation distorts the perception of truth, and critical thinking is a conceivable and practical counter. The human mind creates a personal view of the world conjured through emotions, thoughts, and feelings that exert influence over reasoning, decision-making, and behavior. Repetitive exposure to disinformation impacts cognitive processes and hampers clarity in perception and judgment. More so, critical thinking acts as a firewall that filters disinformation and allows clarified perception, judgment, and decision-making.

When in search of truth, awareness of emotional impacts on perception is requisite to critical thinking. Interestingly, a societal baseline for truth goes unestablished but aligns with Kuhn's argument that truth is based on the constraints of culture and individual perceptions[3]. The validity of information draws on preconceived existences of genuineness used as a compass toward truth. However, when perception is loosely footed on biases, critical thinking is flawed; thus, weakening suppositions and increasing influences of disinformation. The presence of cognitive weaknesses, i.e., biases, supports rationalizations of inconsistent fusions of formal and informal fallacies. As a result, fallacy is justified while behaviors and decisions change to ease cognitive dissonance, which is antagonist to critical thinking.

Defining Critical Thinking

Over 2,400 years ago, the Socratic Method was developed based on Socrates' questioning philosophy. Through scrutiny, reasoning, and analysis, the Socratic dialogue prompted problem-solving elucidation through the decomposition of cognitive thought to encourage one to think.[4] Socrates recognized the necessity of clarified and lucid critical thought. However, extant and seminal literature lacks a universal definition of critical thinking which prompted scholars in various fields to attempt an overarching description, as follows:

- "reasonable, reflective thinking that is focused on deciding what to believe."[5]
- "incarnation of beliefs about the human process of coming to know and judge something."[6]
- "examines assumptions, discerns hidden values, evaluates evidence, and assesses conclusions" and stresses the awareness of fallacies in thinking.[7]
- "the systematic evaluation or formulation of beliefs, or statements, by rational standards. Critical thinking is systematic because it involves distinct procedures and methods...and it operates according to rational standards in that beliefs are judged by how well they are supported by reasons." [8]

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[3] Barry Barnes, Scientific Knowledge and Sociological Theory, (Routledge, 2013), https://doi.org/10.4324/9780203706541.

[4] James C. Overholser, "Elements of the Socratic Method: I. Systematic Questioning," *Psychotherapy: Theory, Research, Practice, Training* 30, no. 1 (1993).

[5] R. Ennis, "A Taxonomy of Critical Thinking Abilities and Dispositions," *Teaching Thinking Skills: Theory and Practice* (1987), 10.

[6] Rosemarie Rizzo Parse, "Critical Thinking: What Is It?," *Nursing Science Quarterly* 9, no. 4 (1996), 10.1177/089431849600900401, 139.

[7] David G. Myers and C. Nathan Dewall, Exploring Psychology (New York: Worth, 2007), xv.

[8] L. Vaughn, *The Power of Critical Thinking: Effective Reasoning About Ordinary and Extraordinary Claims*, (Oxford: Oxford University Press, 2005), 4.

Similarities thread through each meaning and root the concepts of discernment, belief, and thinking. Therefore, in the context of this article, the definition of critical thinking offered by Scriven and Paul is accepted:

> *The intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness.*[9]

The denotation touches multiple aspects of clarified thinking through objectivity and highlights the complexity of analyzing and questioning the validity of information by thinking conscientiously, viewing data holistically, questioning loosely-connected facts, and looking beyond constraints to reach accuracy and credibility. Viewing information from various perspectives, in parallel, and from the edge aligns with an inquisitive, open-minded, and well-informed critical thinker. Additionally, objective reasoning, suspension of biases, and abating insinuations of personal innuendoes are essential critical thinking qualities. Critical thinkers encompass an intellectual aptitude and the ability to take "one's thinking apart systematically…analyze each part, assess it for quality,"[10] and minimize flawed inferences that are inherently biased. The disposition of unbiased reasoning is a foundational criterion when seeking truth. For example, to circumvent creep of undisciplined or irrational suppositions, Norris and Ennis stress an ability to "reason from [disagreed] starting points…without letting the disagreement interfere with…reasoning."[11] Critical thinking should, at some point, result in a sound conclusion or judgment; however, where judging should occur in the overall cognitive process is heavily debated.

Judgment in Critical Thinking

Judgment is deductive reasoning of significant facts from various premises; nevertheless, deliberation ensues if judgment should occur during or after critical thinking analysis. Many researchers argue against the inclusion of judgment during the critical thought process.[12;13;14;15] Dewey proposes critical thinking eliminate all aspects of judgment to gain clarity free of personal bias which provisions holistic acceptance of newly discovered knowledge before a final determination. Similarly, Feldman supports the suspension of judging in successful critical

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[9] M. Scriven and R. Paul, "Defining Critical Thinking," accessed 01 December 2019 https://www.criticalthinking.org/pages/defining-critical-thinking/766, para. 2.

[10] Linda Elder and Richard Paul, "Critical Thinking: Distinguishing between Inferences and Assumptions," *Journal of Developmental Education* 25, no. 3 (2002), http://www.ncde.appstate.edu, para, 1.

[11] Stephen P. Norris and Robert H. Ennis, *Evaluating Critical Thinking. The Practitioners' Guide to Teaching Thinking Series* (Tulsa, OK: Midwest Publications, 1989, 12).

[12] John Dewey, *How We Think*, (New York: D.C. Heath & Co., 1909), https://www.gutenberg.org/files/37423/37423-h/37423-h.htm.

[13] Richard Feldman, "Deep Disagreement, Rational Resolutions, and Critical Thinking," *Informal Logic* 25, no. 1 (2005), http://amr.uwindsor.ca/ojs/leddy/index.php/informal_logic/article/viewArticle/1041.

[14] Gary R. Kirby and Jeffery R. Goodpaster, *Thinking*, 4th ed. (New Jersey: Pearson Prentice Hall, 2007).

[15] M. Miller, *The Book and the Right: The Roots of America's Greatness* (Maitland, FL: Xulon Press, 2010).

thinking, and Miller argues the abeyance of personal virtues to avoid incriminating judgment because even the most highly intelligent are subject to immorality. Lastly, Kirby and Goodpaster caution the inclusion of judging due to potential bias creep; specifically, when there is a personal vested stake.

Contrastingly, Facione identifies critical thinking as a "purposeful, self-regulatory judgment that results in interpretation, analysis, evaluation, and inference, as well as an explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based."[16] Additionally, several researchers support the inclusion of judging with an expertise caveat.[17;18;19;20] Bailin and Willingham posit when a critical thinker is well versed in the subject matter, judgment is acceptable – a concept supported by Lipman. However, mindfulness of appealing to credibility, along with the argument of Feldman, raises concerns of experienced individuals succumbing to corruption when discerning fallacy and fallacious appeals.[21]

Fallacy

In *De Sophistici Elenchi*, Aristotle denotes fallacy as a refutation - "…a deduction whose conclusion contradicts the statement that was previously made by the interlocutor"[22] Fogelin and Duggan characterize fallacy as "our most general term for criticizing any general procedure used for the fixation of beliefs that has an unacceptably high tendency to generate false or unfounded beliefs, relative to that method of fixing beliefs."[23] Fallacies are defects in reasonings, whether intentional or unintentional, and fictitious underpinnings used to persuade opinions, undermine truth and desecrate rules that govern argument. The façades transcend boundaries of economic stature, historical backgrounds, and religious preferences, as society is naïvely subject to fallacious arguments, particularly when defending taboo topics such as religion, abortion, politics, and sexuality. Therefore, constraint, discipline, and impartiality are requisites for critical thought to prevail.

The delusional beauty of fallacy permits dishonesty to appear more factual than truth. In Mein Kampf, Adolf Hitler declares, "In this, they proceeded on the sound principle that the magnitude of a lie always contains a certain factor of credibility, since the great masses of the people…in view of the primitive simplicity of their minds, they more easily fall a victim to a big lie than to a little one."[24]

To the same degree, George Orwell asserted:

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[16] Peter A. Facione, "*Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction. Research Findings and Recommendations*," (1990), http://files.eric.ed.gov/fulltext/ED315423.pdf, 3.

[17] Sharon Bailin, "Critical and Creative Thinking," *Informal Logic* 9, no. 1 (1987).

[18] ———, "Critical Thinking and Science Education," *Science & Education* 11, no. 4 (2002).

[19] Matthew Lipman, "Critical Thinking-What Can It Be?," *Educational Leadership* 46, no. 1 (1988), http://www.journal.viterbo.edu.

[20] Daniel T. Willingham, "Critical Thinking: Why Is It So Hard to Teach?," *Arts Education Policy Review* 109, no. 4 (2008), http://insight.bostonbeyond.org/wp-content/uploads/2017/05/Willingham-2007-1.pdf.

[21] Feldman, "Deep Disagreement, Rational Resolutions, and Critical Thinking".

[22] Annamaria Schiaparelli, "Aristotle on the Fallacies of Combination and Division in Sophistici Elenchi 4," Article, *History & Philosophy of Logic* 24, no. 2 (2003), http://dx.doi.org/10.1080/0144534031000096145, 111.

[23] Robert J. Fogelin and Timothy J. Duggan, "Fallacies," *Argumentation* 1, no. 3 (1987).

[24] Adolf Hitler, "Causes of the Collapse," in *Mein Kampf* (New York: Mariner, 1998).

> *And if all others accepted the lie which the Party imposed — if all records told the same tale — then the lie passed into history and became truth. "Who controls the past…controls the future: who controls the present controls the past." And yet the past, though of its nature alterable, never had been altered. Whatever was true now was true from everlasting to everlasting. It was quite simple. All that was needed was an unending series of victories over your own memory. "Reality control."[25]*

Humans are prone to profound psychological denials when lies are deeply engrained in personal convictions. When beliefs are challenged, desires to avoid cognitive dissonance are driven by self-deception, justification, and rationalization to substantiate perceptions, opinions, and biases. As a result, decisions and perceptions filtered through justified beliefs increase the appeal of fallacies. Consequently, when bias supports an erroneous end state, the directive to seek justice is difficult to attain. Fallacious appeals are deceptive influences inaccurately supported by authority, logic, and emotion. Exercising epoche in crucial thinking is obligatory to bracket and suspend biases. Furthermore, detecting fallacy in disinformation is difficult, and doing so requires an understanding of formal and informal arguments.

Formal fallacies are defective in argument form; whereas, informal fallacies are defective in argument content which may result in defective argument form. The list of fallacy types is numerous; therefore, this article will briefly address only informal fallacies, specifically, appeal to authority, circular reasoning, and red herring, which relates to the Aristotelian Triad of ethos, logos, and pathos, respectively. Additionally, informal fallacies are arguments that seem irrefutable and superficially sound, used to persuade ideas and opinions, and validity realizes conflict between premise and conclusion. Furthermore, unlike formal fallacies, informal arguments are flawed in reasoning rather than in logic.

Ad Verecundium (Appeal to Authority)

Pseudo authority, false authority, or *Argumentum Ad Verecundium*, is an argument of ethos that appeals to credibility and provincial authority. Appeal to authority results in flawed reasonings which provisions acceptance of a claim based on information presented by an inexpert. Appeal to authority blurs the lines between facts and opinions under the guise of reputation characterized as experience. *Ad Verecundium* is a conclusion supported upon the expertise premise, see Table 1.

Table 1

Appeal to Authority Example

| Argument	Statement
P1	A claims that P true
P2	A claims to be an expert on P
C	Therefore, P is true

Note. A is seemingly an expert on the subject of P and claims P is true; therefore, P is true. A = expert; P = premises; C = conclusion.

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[25] George Orwell, 1984 (World Public Library Association, 2017), http://117.211.153.211:8001/jspui/bitstream/123456789/467/1/1984.pdf, 14.

Accepting inexpert claims as truth influences the belief of erred reasoning, which limits adept authority to accept a claim as legitimate. The *Tongue and Quill* notes, "false authority is a fallacy tied to accepting facts based on the opinion of an unqualified authority. [Society] is chock-full of people who, because of their position or authority in one field, are quoted on subjects in other fields for which they have limited or no expertise."[26] To err is human and even experts are subject to culpabilities; therefore, cautious acceptance of expert opinions is crucial in deductive reasoning. Discernment lies in careful analysis of reasonableness versus emotions when weighing the evidence to conclude the premises with certainty.

Petitio Principii (Circular Reasoning)

Circular reasoning, begging-the-question, Catch-22, or *Petitio Principii*, is an argument of logos that renders the premises as the conclusion. *Petitio Principii* doubles back and is technically valid but fails to include an additional premise or reasoning for the conclusion, see Figure 1.
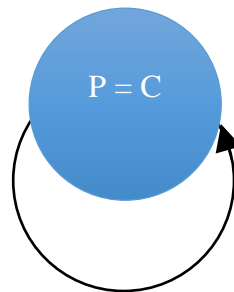
Figure 1. A depiction of circular reasoning. The premise is also the conclusion. (1) P is claimed as true. (2) Therefore, P is true.

The argumentum supports disinformation on actual or closely related proposals as a foundation of reasoning. A commonly used example advocated by Hahn, Oaksford, and Corner is "God exists because the Bible says so and the Bible is the word of God"[27]; therefore, God must exist. The argument of circular reasoning formulates a logical premise of evidence that the Bible is the word of God because the conclusion supports that God exists because the Bible says so. The argumentation of *Petitio Principii* is unjustifiable independent of the conclusion and represents a single premise that equates to an identical deduction. Discernment of circular reasoning involves identifying a separate reason for a conclusion that is outside of the premises.

Ignoratio Elenchi (Red Herring)

Irrelevant conclusion, Red Herring, or *Ignoratio Elenchi*, an argument of pathos[28] that influences by distracting attention from the issue at hand by appealing to emotions or introducing

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[26] Air Force Handbook (AFH) 33-337, Communications and Information Tongue and Quill, 27 July 2016, https://static.e-publishing.af.mil/production/1/saf_cio_a6/publication/afh33-337/afh33-337.pdf, 49

[27] Ulrike Hahn, Mike Oaksford, and Adam Corner, "Circular Arguments, Begging the Question, and the Formalization of Argument Strength," *Proceedings of AMKLC'05, International Symposium on Adaptive Models of Knowledge, Language and Cognition* (Espoo, Finland2005), http://www.cis.hut.fi/AKRR05/papers/amklc05hahn.pdf, para. 6.

[28] Elliot D. Cohen, *Critical Thinking Unleashed* (Landham, MD: Rowman & Littlefield, 2009).

irrelevant information. Arguing valid but immaterial viewpoints to evoke feelings or divert attention toward an unrelated subject is the foundational premise of red herring, see Figure 2.
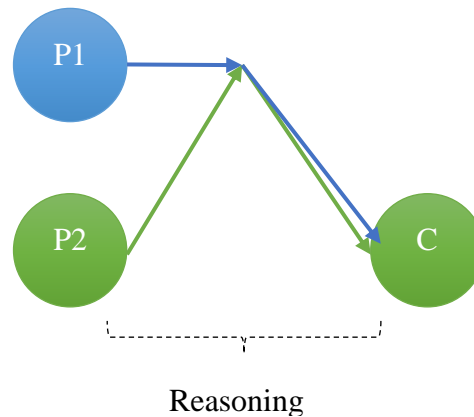
Reasoning

Figure 2. A depiction of red herring. A secondary argument (P2) is introduced and diverts reasoning away from the primary argument (P1), which results in an unrelated conclusion. (1) Topic P1 is under discussion. (2) Topic P2 is introduced as related to topic P1. (3) Topic P1 is abandoned. (4) Topic P2 is under discussion. (5) A flawed conclusion is regarded as true.

The red herring fallacy is a diversion tactic to manipulate and distract attention from the topic of discussion. Furthermore, all fallacies are persuasive strategies to manipulate an argument regardless of the truth.[29] Leeriness of ethos, logos, and pathos within the exhaustive list of fallacious reasonings is crucial to disinformation identification and critical thinking processes.

Conclusion

Truth rests at the conjunction of information technology and human cognition. Distinguishing fact from fiction may become more difficult as disinformation is continuously circulated across the internet. As a counter, where information exists, so should critical thinking; however, the societal seed has yet to root. The quality of critical thinking is flawed and subject to biases and presuppositions. Regardless, the failure or inability of society to decipher disinformation has morphed fallacy into an indistinguishable pseudo-truth. A significant issue supervenes in that the cognitive process of critical thought must be exercised beyond a few – the majority must recognize the presence of disinformation.

Does truth really exist if hidden inside the minds of a small percentage of critical thinkers? According to Kierkegarrd, "truth always rests with the minority…because truth is generally formed by those who really have an opinion, while the strength of a majority is illusory, formed by the gangs who have no opinion."[30] However, this researcher concluded that because the internet has distracted society and obscured truth in such a significant manner, conviction is deemed to rest in the number of social media likes and followers. Unfortunately, new truth, i.e. fake truth, pseudo

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[29] Antoine C. Braet, "Ethos, Pathos and Logos in Aristotle's Rhetoric: A Re-Examination," *Argumentation* 6, no. 3 (1992).

[30] Søren Kierkegaard. *The Diary of Søren Kierkegaard.* Ed. Peter Rhode. (New York: Citadel Press, 1960). No. 128 (1850).

truth, resides in the mainstream and definition is formed through repeated information exposure and manipulation of cognitive thought, which impacts discernment of fact from fiction. Therefore, a single individual who questions information is powerless when standing alone against the amalgamation of material that manipulates truth and clouds the judgment of society.

Nonetheless, although truth will remain truth, societal populism must interrogate the validity of propagandized information for authentic truth to prevail. Moving critical thought a step further, just as technology is taught in grade schools, so should critical thinking curricula to root seeds of creative thought and bias suspension for truth to remain victorious amid the perplexing wilderness of data. Future research may include (1) critical thinking as a learned societal skill; (2) the willingness of society to employ critical thinking versus easing cognitive dissonance, and (3) the impacts of disinformation on tradition – passing fallacy through the generations.

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